SECTION 081113

HOLLOW METAL DOORS AND FRAMES

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 hollow-metal work.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, [fire-resistance ratings,] [temperature-rise ratings,] and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.
   9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
   1. Amweld International, LLC.
   2. Ceco Door; ASSA ABLOY.
   3. Curries Company; ASSA ABLOY.
   4. Fleming Door Products ltd.; Assa Abloy Group Company.
   5. Pioneer Industries, Inc.
   6. Steelcraft; an Ingersoll-Rand company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings[**and temperature-rise limits**] indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and 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 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Standard-Duty Doors and Frames: SDI A250.8, Level 1. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
   1. Physical Performance: Level C according to SDI A250.4.
   2. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches.
      c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.032 inch.
      d. Edge Construction: Model 2, Seamless.

e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:
   a. Materials: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
   b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Full profile welded.
4. Exposed Finish: Prime.

C. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level B according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches.
   c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
3. Frames:
   a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
   b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Full profile welded.
4. Exposed Finish: Prime.

D. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches.
   c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
3. Frames:
   a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
   b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Full profile welded.
4. Exposed Finish: Prime.

E. Maximum-Duty Doors and Frames: SDI A250.8, Level 4. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.067 inch.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:
   a. Materials: Uncoated steel sheet, minimum thickness of 0.067 inch.
   b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
   c. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level B according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40 coating.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
3. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
   b. Construction: Full profile welded.
4. Exposed Finish: Prime.

C. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
   d. Edge Construction: Model 2, Seamless.
   e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
3. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
   b. Construction: Full profile welded.
4. Exposed Finish: Prime.

D. Maximum-Duty Doors and Frames: SDI A250.8, Level 4. [At locations indicated in the Door and Frame Schedule] <Insert locations>.
1. Physical Performance: Level A according to SDI A250.4.
2. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches
   c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.

d. Edge Construction: Model 2, Seamless.
e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
   b. Construction: Full profile welded.
4. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Hollow-metal frames of uncoated steel sheet, minimum thickness of [0.053 inch] [0.042 inch].

B. Construction: Full profile welded.

2.6 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.7 FRAME ANCHORS

A. Jamb Anchors:
   1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
   2. 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, minimum thickness of 0.042 inch, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.8 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.9 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:
   1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
   2. Fire Door Cores: As required to provide fire-protection[and temperature-rise] ratings indicated.
   3. Vertical Edges for Single-Acting Doors: [Bevel edges 1/8 inch in 2 inches] [Provide beveled or square edges at manufacturer's discretion].
   4. Top Edge Closures: Close top edges of doors with [inverted closures] [flush closures] [inverted closures, except provide flush closures at exterior doors] of same material as face sheets.
   5. Bottom Edge Closures: Close bottom edges of doors[where required for attachment of weather stripping] with end closures or channels of same material as face sheets.
   6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
   7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
   4. Jamb Anchors: Provide number and spacing of anchors as follows:
      a. 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) Three anchors per jamb up to 60 inches high.
         2) Four anchors per jamb from 60 to 90 inches high.
         3) Five anchors per jamb from 90 to 96 inches high.
         4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      b. 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.
   5. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
   6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
      a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
      b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

7. Terminated Stops: Terminate stops [6 inches] <Insert dimension> above finish floor with a [45] [90]-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers 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. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.10 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.11 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
   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-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 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 plumb, square, 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 will be 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 power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
   3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
   4. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
   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. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
   7. 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.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Steel Doors:
      a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
      c. At Bottom of Door: [3/4 inch] [5/8 inch] plus or minus 1/32 inch.
      d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
   3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "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.

3.4 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. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. 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.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

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SECTION 081416

FLUSH WOOD DOORS

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:
1. Solid-core doors[and transom panels] with wood-veneer MDO faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction[, louvers,] and trim for openings.[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; and the following:
1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. 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 face materials, approximately 8 by 10 inches (200 by 250 mm), 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 finished Work.]
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
   a. Provide Samples for each species of veneer and solid lumber required.
   b. Provide Samples for each color, texture, and pattern of plastic laminate required.
   c. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
3. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.

1.4 INFORMATIONAL SUBMITTALS

A. Quality Standard Compliance Certificates: [AWI Quality Certification] [WI Certified Compliance] Program certificates.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that [is a certified participant in AWI's Quality Certification Program] [is a licensee of WI's Certified Compliance Program].

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in [plastic bags or cardboard cartons] [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.

1.7 FIELD CONDITIONS

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

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between [25 and 55] [43 and 70] [17 and 50] <Insert numbers> percent during remainder of construction period.

1.8 WARRANTY

A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Exterior Doors: [Two] [Five] <Insert number> years from date of Substantial Completion.
   4. Warranty Period for Solid-Core Interior Doors: Life of installation.
   5. Warranty Period for Hollow-Core Interior Doors: [One] [Two] <Insert number> year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
   1. Graham Wood Doors; an Assa Abloy Group company.
   2. Marshfield Door Systems, Inc.
   3. Vancouver Door Company.

B. Source Limitations: Obtain flush wood doors[indicated to be blueprint matched with paneling] [and wood paneling] from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
   1. Provide [AWI Quality Certification] [WI Certified Compliance] Labels indicating that doors comply with requirements of grades specified.
   2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

B. WDMA I.S.1-A Performance Grade: [Extra Heavy Duty] [Heavy Duty] [Standard Duty] [As indicated].

C. WDMA I.S.1-A Performance Grade:
   1. Heavy Duty unless otherwise indicated.
   2. Extra Heavy Duty: [Classrooms] [public toilets] [janitor's closets] [assembly spaces] [exits] [and] [patient rooms] <Insert locations>[and where indicated].
   3. Standard Duty: [Closets (not including janitor's closets)] [and] [private toilets] <Insert locations>[and where indicated].

D. 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 testing at positive pressure according to [NFPA 252] [or] [UL 10C].
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: [Where indicated] [At vertical exit enclosures and exit passageways], provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
   3. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   4. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
   5. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
   6. Pairs: Provide formed-steel edges and astragals with intumescent seals.
      a. Finish steel edges and astragals with baked enamel[same color as doors].
      b. Finish steel edges and astragals to match door hardware (locksets or exit devices).

E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

F. Structural-Composite-Lumber-Core Doors:
   1. Structural Composite Lumber: WDMA I.S.10.
      a. Screw Withdrawal, Face: 700 lbf.
      b. Screw Withdrawal, Edge: 400 lbf.

G. Mineral-Core Doors:
   1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
   2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as[needed to eliminate through-bolting hardware.][follows:]
      a. 5-inch top-rail blocking.

b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
c. 5-inch midrail blocking, in doors indicated to have armor plates.
d. [4-1/2-by-10-inch lock blocks] [5-inchmidrail blocking], in doors indicated to have exit devices.

3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
   a. Screw-Holding Capability: [550 lbf] [475 lbf] [400 lbf] per WDMA T.M.-10.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors <Insert drawing designation>:
1. Grade: Premium, with Grade A faces.
2. Species: .
3. Cut: .
4. Match between Veneer Leaves: [Book] [Slip] [Pleasing] match.
5. Assembly of Veneer Leaves on Door Faces: [Center-balance] [Balance] [Running] match.
6. Pair and Set Match: Provide for doors hung in same opening[or separated only by mullions].
7. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by [10 feet] [20 feet] <Insert dimension> or more.
8. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
9. Transom Match: [Continuous match] [End match] [As indicated].
10. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Section 064216 "Flush Wood Paneling."
11. Exposed Vertical[and Top] Edges: [Same species as faces or a compatible species - edge Type A] [Same species as faces - edge Type A] [Applied wood-veneer edges of same species as faces and covering edges of faces - edge Type B] [Applied wood edges of same species as faces and covering edges of crossbands - edge Type D].
12. Core: Glued wood stave Structural composite lumber.
13. Construction: [Five] [Five or seven] plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.[Faces are bonded to core using a hot press.]
14. Construction: Seven plies, either bonded or nonbonded construction.
15. WDMA I.S.1-A Performance Grade: [Extra Heavy Duty] [Heavy Duty] [Standard Duty] [As indicated].

2.4 DOORS FOR OPAQUE FINISH

A. Interior Solid-Core Doors <Insert drawing designation>:
1. Grade: Premium.
2. Faces: MDO.
   a. Apply MDO to [standard-thickness, closed-grain, hardwood face veneers] [or] [directly to high-density hardboard crossbands].
3. Exposed Vertical[and Top] Edges: Any closed-grain hardwood.
4. Core: Glued wood stave Structural composite lumber.
5. Construction: [Three] [Five] [Five or seven] plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.[Faces are bonded to core using a hot press.]
6. Construction: [Three] [Seven] plies, either bonded or nonbonded.
7. WDMA I.S.1-A Performance Grade: [Extra Heavy Duty] [Heavy Duty] [Standard Duty] [As indicated].

2.5 LIGHT FRAMES AND LOUVERS

A. Wood Louvers: Door manufacturer's standard solid-wood louvers unless otherwise indicated.
   1. Wood Species: Same species as door faces.

B. Metal Louvers:
   1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Air Louvers, Inc.
      b. Anemostat; a Mestek company.
      c. L & L Louvers, Inc.
      d. Louvers & Dampers, Inc.; a division of Mestek, Inc.
      e. McGill Architectural Products.
   2. Blade Type: Vision-proof, inverted V.
   3. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

C. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.
   1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Air Louvers Inc.
      b. Anemostat; a Mestek company.
      c. L & L Louvers, Inc.
      d. Louvers & Dampers, Inc.; a Mestek company.
      e. McGill Architectural Products.
   2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

2.6 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 NFPA 80 requirements 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, BHMA-156.115-W, and hardware templates.
   1. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
   1. Fabricate door and transom panels with full-width, solid-lumber[, rabbeted,] meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
   3. Louvers: Factory install louvers in prepared openings.

2.7 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. Factory finish doors.

C. Factory finish doors that are indicated to receive transparent finish.

D. Factory finish doors where indicated in schedules or on Drawings as factory finished.

E. Transparent Finish:
   1. Grade: [Premium] [Custom].
   2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" [System 5, conversion varnish] [System 9, UV curable, acrylated epoxy, polyester, or urethane] [System 10, UV curable, water based] [or] [System 11, catalyzed polyurethane] <Insert finish designation>.
   3. Finish: [WDMA TR-4 conversion varnish] [or] [WDMA TR-6 catalyzed polyurethane] <Insert finish designation>.
   4. Staining: [Match Architect's sample] [As selected by Architect from manufacturer's full range] [None required].
   5. Effect: [Open-grain finish] [Filled finish] [Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores].
   6. Sheen: [Satin] [Semigloss].

F. Opaque Finish:
   1. Grade: [Premium] [Custom].
   2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" [System 5, conversion varnish] [System 9, UV curable, acrylated epoxy, polyester, or urethane] [System 10, UV curable, water based] [or] [System 11, catalyzed polyurethane] <Insert finish designation>.
   3. Finish: [WDMA OP-4 conversion varnish] [or] [WDMA OP-6 catalyzed polyurethane] <Insert finish designation>.
   4. Color: [Match Architect's sample] [As selected by Architect from manufacturer's full range].
   5. Sheen: [Satin] [Semigloss] [Gloss].

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see [Section 087100 "Door Hardware."] [Section 087111 "Door Hardware (Descriptive Specification)."]

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 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

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SECTION 083113

ACCESS DOORS AND FRAMES

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 access doors and frames for walls and ceilings.

1.3 ALLOWANCES

A. Access doors and frames are part of an access door and frame allowance.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details[, fire ratings,] material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

C. Product Schedule: For access doors and frames.[Use same designations indicated on Drawings.]

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection[and temperature-rise limit] ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges <Insert drawing designation>:
   1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
   2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
   3. Description: Face of door flush with frame, with exposed flange and concealed hinge.
   4. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
   5. Uncoated Steel Sheet for Door: [Nominal 0.060 inch , 16 gage] <Insert thickness>, factory [primed] [finished].
   6. Frame Material: [Same material, thickness, and finish as door] <Insert material, thickness, and finish>.

7. Latch and Lock: [Cam latch, screwdriver operated] [Cam latch, key operated] [Cam latch, hex-head wrench operated] [Cam latch, pinned-hex-head wrench operated] [Cam latch, spanner-head wrench operated] [Latch bolt, knurled-knob operated] [Latch bolt, key operated] [Prepared for mortise cylinder] [As indicated on Drawings] [As indicated in schedule] <Insert operator>[with interior release].

B. Flush Access Doors with Concealed Flanges <Insert drawing designation>:
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Description: Face of door flush with frame; with concealed flange for [gypsum board] [plaster] installation and concealed hinge.
3. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
4. Uncoated Steel Sheet for Door: [Nominal 0.060 inch , 16 gage] <Insert thickness>, factory [primed] [finished].
5. Frame Material: [Same material and thickness as door] <Insert material, thickness, and finish>.
6. Latch and Lock: [Cam latch, screwdriver operated] [Cam latch, key operated] [Cam latch, hex-head wrench operated] [Cam latch, pinned-hex-head wrench operated] [Cam latch, spanner-head wrench operated] [Latch bolt, knurled-knob operated] [Latch bolt, key operated] [Prepared for mortise cylinder] [As indicated on Drawings] [As indicated in schedule] <Insert operator>[with interior release].

C. Recessed Access Doors with Concealed Flanges<Insert drawing designation>:
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
3. Description: Door face recessed [1/2 inch] [5/8 inch] [1 inch] for [gypsum board] [plaster] [acoustical tile] <Insert material> infill; with concealed flange for [gypsum board] [plaster] [no bead for acoustical tile] installation and concealed hinge.
4. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
5. Uncoated Steel Sheet for Door: [Nominal 0.060 inch , 16 gage] <Insert thickness>, factory [primed] [finished].
6. Latch and Lock: [Cam latch, screwdriver operated] [Cam latch, key operated] [Cam latch, hex-head wrench operated] [Cam latch, pinned-hex-head wrench operated] [Cam latch, spanner-head wrench operated] [Latch bolt, knurled-knob operated] [Latch bolt, key operated] [Prepared for mortise cylinder] [As indicated on Drawings] [As indicated in schedule] <Insert operator>[with interior release].

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges <Insert drawing designation>:
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Description: Door face flush with frame, [with a core of mineral-fiber insulation enclosed in sheet metal] [uninsulated]; with exposed flange, self-closing door, and concealed hinge.
3. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
4. Fire-Resistance Rating: Not less than [that indicated] [that of adjacent construction] [45 minutes] [1 hour] [1-1/2 hours] [2 hours] [3 hours] <Insert requirement>.

5. Uncoated Steel Sheet for Door: [Nominal 0.036 inch , 20 gage] <Insert thickness>, factory [primed] [finished].
6. Frame Material: [Same material, thickness, and finish as door] <Insert material, thickness, and finish>.
7. Latch and Lock: Self-latching door hardware, [operated by knurled-knob] [operated by key] [prepared for mortise cylinder] [as indicated on Drawings] [as indicated in schedule] <Insert operator>[with interior release].

B. Fire-Rated, Flush Access Doors with Concealed Flanges <Insert drawing designation>:
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Description: Door face flush with frame, [with a core of mineral-fiber insulation enclosed in sheet metal] [uninsulated]; with concealed flange for [gypsum board] [plaster] installation, self-closing door, and concealed hinge.
3. Locations: [Wall] [Ceiling] [Wall and ceiling] <Insert location or substrate>.
4. Fire-Resistance Rating: Not less than [that indicated] [that of adjacent construction] [45 minutes] [1 hour] [1-1/2 hours] [2 hours] [3 hours] <Insert requirement>.
5. Uncoated Steel Sheet for Door: [Nominal 0.036 inch , 20 gage] <Insert thickness>, factory [primed] [finished].
6. Frame Material: [Same material, thickness, and finish as door] <Insert material, thickness, and finish>.
7. Latch and Lock: Self-closing, self-latching door hardware, [operated by knurled-knob] [operated by key] [prepared for mortise cylinder] [as indicated on Drawings] [as indicated in schedule] <Insert operator>[, with interior release].

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Frame Anchors: Same material as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 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 in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
   1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.

E. Latch and Lock Hardware:
   1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
   2. Keys: Furnish two keys per lock and key all locks alike.
   3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in [Section 087100 "Door Hardware."] [Section 087111 "Door Hardware (Descriptive Specification)."]

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 083323

OVERHEAD COILING DOORS

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:
   1. Insulated service doors.
   2. Fire-rated service doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
   3. Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
   5. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   6. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
   1. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Oversize Construction Certification: For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
   1. Maintenance Proximity: Not more than [two] <Insert number> hours' normal travel time from Installer's place of business to Project site.

B. 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 according to [NFPA 252] [or] [UL 10B].
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: [Where indicated] [At exit enclosures and exit passageways], provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
   3. Smoke Control: [Where indicated] [In corridors and smoke barriers], provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing according to UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of door opening at 0.10-inch wg for both ambient and elevated temperature tests.

C. Sound-Control Doors: Assemblies tested in a laboratory for sound-transmission-loss performance according to ASTM E 90, calculated according to ASTM E 413, and rated for not less than the STC value indicated.

D. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines] [and] [ICC A117.1] <Insert requirement>.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
   1. Design Wind Load: [As indicated on Drawings] [Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward] <Insert loads>.
   2. Testing: According to ASTM E 330[or DASMA 108 for garage doors and meeting the acceptance criteria of DASMA 108] <Insert requirement>.
   3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
   4. Operability under Wind Load: Design overhead coiling doors to remain operable under [design] [uniform pressure (velocity pressure) of 20 lbf/sq. ft.] <Insert load> wind load, acting inward and outward.

B. Windborne-Debris Impact Resistance: Provide [glazed] [and] [impact-protective] overhead coiling doors that pass missile-impact and cyclic-pressure tests according to [ASTM E 1996 for Wind Zone 1] [ASTM E 1996 for Wind Zone 2] [ASTM E 1996 for Wind Zone 3] [ASTM E 1996 for Wind Zone 4] [or DASMA 115] <Insert requirement>.
   1. Large-Missile Test: For overhead coiling doors located within 30 feet of grade.

2. Small-Missile Test: For overhead coiling doors located more than 30 feet above grade.

C. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to [ASCE/SEI 7] <Insert requirement>.
1. Component Importance Factor: [1.5] [1.0].

2.3 DOOR ASSEMBLY <Insert drawing designation>

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
a. Cookson Company.
b. Cornell Iron Works, Inc.
c. McKeon Rolling Steel Door Company, Inc.
d. Overhead Door Corporation.
e. Raynor.
f. Southwestern Rolling Steel Door Co.
g. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than [10,000] [20,000] [50,000] [100,000] [200,000] <Insert number>. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
1. Include tamperproof cycle counter.

C. Air Infiltration: Maximum rate of [0.08 cfm/sq. ft.] <Insert rate> at 15 and 25 mph when tested according to [ASTM E 283] [or] [DASMA 105].

D. STC Rating: [26] <Insert value>.

E. Curtain R-Value: [4.5 deg F x h x sq. ft./Btu] [5.0 deg F x h x sq. ft./Btu] [6.0 deg F x h x sq. ft./Btu] <Insert value>.

F. Door Curtain Material: Galvanized steel Aluminum.

G. Door Curtain Slats: [Curved] [Flat] profile slats of [1-7/8-inch] [2-5/8-inch] [3-1/4-inch] <Insert dimension> center-to-center height.
1. Insulated-Slat Interior Facing: Metal.
2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

H. Bottom Bar: Two angles, each not less than [1-1/2 by 1-1/2 by 1/8 inch thick] <Insert dimensions>; fabricated from [hot-dip galvanized steel] [stainless steel] [or] [aluminum extrusions] and finished [to match door] <Insert requirement>.

I. Curtain Jamb Guides: Galvanized steel Aluminum with exposed finish matching curtain slats.

J. Hood: Match curtain material and finish.
1. Shape: [Round] [Square] [As shown on Drawings] <Insert shape>.
2. Mounting: [Face of wall] [Between jambs] [As shown on Drawings].

K. Locking Devices: Equip door with slide bolt for padlock.

L. Manual Door Operator: Manufacturer's standard crank operator Awning-crank operator Wall-crank operator.
   1. Provide operator with through-wall shaft operation.
   2. Provide operator with manufacturer's standard removable operating arm.

M. Curtain Accessories: Equip door with weatherseals astragal push/pull handles pull-down strap poll hook.

N. Door Finish:
   1. Aluminum Finish: .
   2. Baked-Enamel or Powder-Coated Finish: [Color as indicated by manufacturer's designations] [Color matching Architect's sample] [Color as selected by Architect from manufacturer's full range] <Insert color>.
   3. Stainless-Steel Finish: .
   4. Interior Curtain-Slat Facing: [Match finish of exterior curtain-slat face] [Finish as indicated by manufacturer's designations] [Finish matching Architect's sample] [Finish as selected by Architect from manufacturer's full range] <Insert finish>.

2.4 FIRE-RATED DOOR ASSEMBLY

A. Fire-Rated Service Door: Overhead fire-rated coiling door formed with curtain of interlocking metal slats.
   1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
   2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
      a. Cookson Company.
      b. Cornell Iron Works, Inc.
      c. McKeon Rolling Steel Door Company, Inc.
      d. Overhead Door Corporation.
      e. Raynor.
      f. Southwestern Rolling Steel Door Co.
      g. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than [10,000] [20,000] [50,000] [100,000] [200,000] <Insert number>. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. Fire Rating: [3/4 hour] [1 hour] [1-1/2 hours] [3 hours] [4 hours] [with temperature-rise limit] [and] [with smoke control].

D. Air Infiltration: Maximum rate of [0.08 cfm/sq. ft.] <Insert rate> at 15 and 25 mph when tested according to [ASTM E 283] [or] [DASMA 105].

E. Door Curtain Material: Galvanized steel.

F. Door Curtain Slats: [Curved] [Flat] profile slats of [1-7/8-inch] [2-5/8-inch] [3-1/4-inch] <Insert dimension> center-to-center height.

G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

H. Hood: Match curtain material and finish.
   1. Shape: [Round] [Square] [As shown on Drawings] <Insert shape>.

2. Mounting: [Face of wall] [Between jambs] [As shown on Drawings].

I. Locking Devices: Equip door with slide bolt for padlock.

J. Manual Door Operator: Manufacturer's standard crank operator Awning-crank operator Wall-crank operator.
1. Provide operator with through-wall shaft operation.
2. Provide operator with manufacturer's standard removable operating arm.

K. Curtain Accessories: Equip door with smoke seals, automatic closing device, astragal push/pull handles pull-down strap poll hook.

L. Door Finish:
1. Baked-Enamel or Powder-Coated Finish: [Color as indicated by manufacturer's designations] [Color matching Architect's sample] [Color as selected by Architect from manufacturer's full range] <Insert color>.
2. Stainless-Steel Finish: .

2.5 MATERIALS, GENERAL

A. 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.

2.6 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
2. Aluminum Door Curtain Slats: ASTM B 209 sheet or ASTM B 221 extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch; and as required.
3. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
4. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with [minimum steel thickness of 0.010 inch] [and] [minimum aluminum thickness of 0.032 inch].

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain[, and a continuous bar for holding windlocks].

2.7 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
1. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.8 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

2.9 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field- installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, [flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene] [nylon brushes] <Insert material>.

C. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

D. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

E. Pull-Down Strap: Provide pull-down straps for doors more than 84 incheshigh.

F. Poll Hooks: Provide pole hooks and poles for doors more than 84 incheshigh.

G. Automatic-Closing Device for Fire-Rated Doors: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism.[Testing for manually operated doors shall allow resetting by opening the door without retensioning the counterbalancing mechanism][Release mechanism for motor- operated doors shall allow testing without mechanical release of the door.] Automatic-closing device shall be designed for activation by the following:
1. Replaceable fusible links with temperature rise and melting point of [165 deg F] <Insert temperature> interconnected and mounted on both sides of door opening.
2. Manufacturer's standard UL-labeled smoke detector and door-holder-release devices.
3. Manufacturer's standard UL-labeled heat detector and door-holder-release devices.
4. Building fire-detection, smoke-detection, and -alarm systems.

2.10 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, [seamless] [or] [welded] carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
   1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.11 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of type indicated. Size gears to require not more than [25-lbf] [30-lbf] <**Insert value**> force to turn crank. Fabricate gearbox to be oil tight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.

2.12 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.13 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, application, and baking.

2.14 STEEL AND GALVANIZED-STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Fire-Rated Doors: Install according to NFPA 80.

E. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
1. Perform installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
1. Adjust exterior doors and components to be weather-resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include [three] [six] [nine] [12] months' full maintenance by skilled employees of coiling-door Installer. Include [monthly] [quarterly] preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 084113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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:
1. Exterior and interior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors[and door-frame units].

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. 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 aluminum-framed entrances and storefronts, showing the following:
a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.
3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer[and laboratory mockup testing agency][and field testing agency].

B. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.
   1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by [manufacturer and witnessed by a qualified testing agency] [a qualified testing agency].

D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Laboratory Mockup Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated [and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025]..

C. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated [and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025].

1.7 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 WARRANTY

A. Special Warranty: [Manufacturer] [Installer] agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
      e. Failure of operating components.
   2. Warranty Period: [Two] [Five] [10] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure 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.

C. Structural Loads:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: [As indicated on Drawings] <Insert loads>.

D. Deflection of Framing Members: At design wind pressure, as follows:
   1. Deflection Normal to Wall Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite] [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] <Insert deflection limit> 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 [1/360 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].
      a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
   3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
      a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

E. Structural: Test according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
   2. When tested at [150] <Insert number> percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding [0.2] <Insert number> percent of span.
   3. Test Durations: As required by design wind velocity, but not less than [10] <Insert number> seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
   1. Fixed Framing and Glass Area:
      a. Maximum air leakage of [0.06 cfm/sq. ft.] <Insert value> at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] <Insert value>.
   2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of [1.0 cfm/sq. ft.] <Insert value> at a static-air-pressure differential of 1.57 lbf/sq. ft..
b. Single Doors: Maximum air leakage of [0.5 cfm/sq. ft.] <Insert value> at a static-air-pressure differential of 1.57 lbf/sq. ft..

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] <Insert value>.

H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] <Insert value>.
2. Maximum Water Leakage: [According to AAMA 501.1] [No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation]. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

I. Interstory Drift: Accommodate design displacement of adjacent stories indicated.
1. Design Displacement: [As indicated on Drawings] <Insert design displacement>.
2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement[and 1.5 times the design displacement].

J. Energy Performance: Certify and label energy performance according to NFRC as follows:
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] [0.57 Btu/sq. ft. x h x deg F] [0.69 Btu/sq. ft. x h x deg F] <Insert value> 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] [0.40] [0.45] <Insert value> as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than [15] [25] [35] [45] <Insert value> as determined according to NFRC 500.

K. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.
1. Outdoor-Indoor Transmission Class: Minimum [26] [30] [34] <Insert number>.

L. Blast Resistance:
1. Hazard Rating: [No Break] [No Hazard] [Minimal Hazard] [Very Low Hazard] [Low Hazard] [High Hazard] per ASTM F 1642.
2. Performance Condition: [1] [2] [3a] [3b] [4] [5] per GSA-TS01.

M. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for [Wind Zone 1] [Wind Zone 2] [Wind Zone 3] [Wind Zone 4].
1. Large-Missile Test: For glazed openings located within 30 feet of grade.

N. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of [180 deg F] <Insert temperature>.
b. Low Exterior Ambient-Air Temperature: [0 deg F] <Insert temperature>.
c. Interior Ambient-Air Temperature: [75 deg F] <Insert temperature>.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
1. EFCO Corporation.
2. Kawneer North America.
3. YKK AP America Inc.

C. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's 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:.
4. Finish: High-performance organic finish.
5. Fabrication Method: Field-fabricated stick system.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
a. Sheet and Plate: ASTM B 209.
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.
2. 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.
a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 INSULATED SPANDREL PANELS

A. Insulated Spandrel Panels: Laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.

1. Thermal Insulation Core: Manufacturer's standard [rigid, closed-cell, polyisocyanurate board] [extruded-polystyrene board] [expanded-perlite, mineral-insulation board] <Insert insulation>.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: [25] <Insert value> or less.
2. Smoke-Developed Index: [50] [450] <Insert value> or less.

2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-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: As indicated.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
a. Provide nonremovable glazing stops on outside of door.

2.6 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

B. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.7 GLAZING

A. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

B. Glazing Sealants: As recommended by manufacturer.

2.8 ACCESSORIES

A. 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.

B. Anchors: Three-way adjustable anchors with minimum adjustment of [1 inch] <**Insert dimension**> 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.

C. Concealed Flashing: [Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials] [Dead-soft, 0.018-inch- thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer].

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-milthickness 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. 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 interior for vision glass and exterior for spandrel glazing or metal panels.
6. 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. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Storefront Framing: Fabricate components for assembly using head-and-sill-receptor system with shear blocks at intermediate horizontal members.

G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

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. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than [50] [70] percent [PVDF] [or] [FEVE] resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
   1. Exterior Doors: Install to produce weathertight 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.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 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; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on [representative areas of aluminum-framed entrances and storefronts] [mockups] <Insert requirements>.
   1. 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. Perform a minimum of [two] [three] <Insert number> tests in areas as directed by Architect.
      b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to [10, 35, and 70 percent completion] <Insert requirements>.

C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
   1. Test a minimum of [two] [four] [six] <Insert number> areas on each building facade.
   2. Repair installation areas damaged by testing.

D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 MAINTENANCE SERVICE

A. Entrance Door Hardware:
   1. Maintenance Tools 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] <Insert number> 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. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

END OF SECTION 084113

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SECTION 084413

GLAZED ALUMINUM CURTAIN WALLS

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 glazed aluminum curtain walls.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

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.
   3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

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.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:
   1. Testing Program: Developed specifically for Project.
   2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
   3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For Installer[and laboratory mockup testing agency][and field testing agency].

C. 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.

D. Product Test Reports: For glazed aluminum curtain walls, for tests performed by [manufacturer and witnessed by a qualified testing agency] [a qualified testing agency].

E. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated[and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025].

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.
   1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings.
   2. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

A. Special Assembly Warranty: [Manufacturer] [Installer] agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals[, metal finishes,] and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
   2. Warranty Period: [Two] [Five] [10] <Insert number> 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. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: [Five] [10] [20] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazed aluminum curtain walls.

B. General Performance: Comply with performance requirements specified, as determined by testing of 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 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.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: [As indicated on Drawings] <Insert loads>.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite] [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] <Insert deflection limit> 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 [1/360 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].
3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
   a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4-inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at [150] <Insert number> percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding [0.2] <Insert number> percent of span.
3. Test Durations: As required by design wind velocity, but not less than [10] <Insert number> seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:
   a. Maximum air leakage of [0.06 cfm/sq. ft.] <Insert value> at a static-air-pressure differential of [1.57 lbf/sq. ft.] [6.24 lbf/sq. ft.] <Insert value>.

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
   1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] <Insert value>.

H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
   1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than [6.24 lbf/sq. ft.] [10 lbf/sq. ft.] [15 lbf/sq. ft.] <Insert value>.
   2. Maximum Water Leakage: [According to AAMA 501.1] [No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation]. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

I. Interstory Drift: Accommodate design displacement of adjacent stories indicated.
   1. Design Displacement: [As indicated on Drawings] <Insert design displacement>.
   2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement[and 1.5 times the design displacement].

J. Energy Performance: Certify and label energy performance according to NFRC as follows:
   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] [0.57 Btu/sq. ft. x h x deg F] [0.69 Btu/sq. ft. x h x deg F] <Insert value> 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] [0.40] [0.45] <Insert value> as determined according to NFRC 200.
   3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than [15] [25] [35] [45] <Insert value> as determined according to NFRC 500.

K. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows:
   1. Outdoor-Indoor Transmission Class: Minimum [26] [30] [34] <Insert number>.

L. Blast Resistance:
   1. Hazard Rating: [No Break] [No Hazard] [Minimal Hazard] [Very Low Hazard] [Low Hazard] [High Hazard] per ASTM F 1642.
   2. Performance Condition: [1] [2] [3a] [3b] [4] [5] per GSA-TS01.

M. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for [Wind Zone 1] [Wind Zone 2] [Wind Zone 3] [Wind Zone 4].
   1. Large-Missile Test: For glazed openings located within 30 feet of grade.
   2. Small-Missile Test: For glazed openings located more than 30 feet above grade.

N. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
   2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
      a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of [180 deg F] <Insert temperature>.
      b. Low Exterior Ambient-Air Temperature: [0 deg F] <Insert temperature>.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
   1. EFCO Corporation.
   2. Kawneer North America; an Alcoa company.
   3. Oldcastle, Inc.
   4. YKK AP America Inc.

C. Source Limitations: Obtain all components of curtain wall system, including framing [spandrel panels] [venting windows] [entrances] [sun control] and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Construction: [Thermally broken] [Thermally improved] [Nonthermal] <Insert description>.
   2. Glazing System: [Retained mechanically with gaskets on four sides] [Retained mechanically with gaskets on two sides and structural sealant on two sides].
   3. Glazing Plane: [Front] <Insert location>.
   4. Finish: [Clear anodic finish] [Color anodic finish] [Baked-enamel or powder-coat finish] [High-performance organic finish].
   5. Fabrication Method: [Either factory- or field-fabricated system] [Field-fabricated stick system] [Factory-fabricated unitized system] [Factory-fabricated unit and mullion system].

B. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
   1. Include snap-on aluminum trim that conceals fasteners.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:
   1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
      a. Sheet and Plate: ASTM B 209.
      b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
      c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
      d. Structural Profiles: ASTM B 308/B 308M.
   2. 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.
      a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
      b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
      c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCES

A. Entrances: Comply with Section 084113 "Aluminum-Framed Entrances and Storefronts."

2.5 SUN CONTROL

A. Sunshades: Assemblies consisting of manufacturer's standard outrigger brackets, louvers, and fascia, designed for attachment to curtain wall with mechanical fasteners.
   1. Orientation: [Horizontal] [Vertical].
   2. Projection from Wall: [As indicated on Drawings] [20 inches] [25 inches] [30 inches] [35 inches] <Insert projection>.
   3. Outriggers: [Straight with square edges] [Straight with rounded edge] [Curved] [Wedge] <Insert shape>.
   4. Louvers:
      a. Number: [Three] [Four] [Five] <Insert number> louvers per unit.
      b. Shape: [Planar] [Arched] [Circular] [Airfoil] [Square].
      c. Width: [6 inches] [8 inches] [10 inches] <Insert dimension>.
      d. Mounting Angle: [25] [30] [35] <Insert number>degrees.
   5. Fasciae: [Rectangular] [Bullnose] [Angular] [Circular].
   6. Finish: [Match adjacent glazed aluminum curtain wall] <Insert finish>.

B. Materials:
   1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
      a. Sheet and Plate: ASTM B 209.
      b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
      c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
      d. Structural Profiles: ASTM B 308/B 308M.

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

2.7 ACCESSORIES

A. 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][, fabricated from 300 series stainless steel].

B. Anchors: Three-way adjustable anchors with minimum adjustment of [1 inch] <Insert dimension> 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.

C. Concealed Flashing: [Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials] [Dead-soft, 0.018-inch- thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer].

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

2.8 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] [interior] [interior for vision glass and exterior for spandrel glazing or metal panels].
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
7. Components curved to indicated radii.

D. Fabricate components to resist water penetration as follows:
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. Curtain-Wall Framing: Fabricate components for assembly using [manufacturer's standard assembly method] [shear-block system] [screw-spline system] [head-and-sill-receptor system with shear blocks at intermediate horizontal members] <Insert description>.

F. Factory-Assembled Frame Units:
1. Rigidly secure nonmovement joints.
2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless otherwise indicated.
5. Install glazing to comply with requirements in Section 088000 "Glazing."

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

2.9 ALUMINUM FINISHES

A. High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than [50] [70] percent [PVDF] [or] [FEVE] resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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. Where welding is required, 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 is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum is in 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 Section 088000 "Glazing."

3.3 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; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 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; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Test Area: Perform tests on [one bay at least 30 feet, by one story] [representative areas of glazed aluminum curtain walls] [mockups] <Insert requirements>.

C. Field Quality-Control Testing: Perform the following test on [representative areas of glazed aluminum curtain walls] [mockups] <Insert requirements>.
1. 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. Perform a minimum of [two] [three] <Insert number> tests in areas as directed by Architect.
   b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to [10, 35, and 70 percent completion] <Insert requirements>.

2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
   a. Perform a minimum of [two] [three] <Insert number> tests in areas as directed by Architect.
   b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to [10, 35, and 70 percent completion] <Insert requirements>.
3. Water Penetration: 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.

D. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION 084413

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SECTION 085123.13

HOT-ROLLED STEEL WINDOWS

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 steel windows from hot-rolled members.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.
   1. Review requirements for hot-rolled steel windows, including, but not limited to, the following:
      a. Coordinating finishing of hot-rolled steel windows with other work where color and finish matching is indicated.
      b. Coordinating hot-rolled steel windows with other exterior wall components, including anchorage, glazing, flashing, weeping, air barriers, sealants, and protection of finishes.
      c. Sequencing work to construct a watertight and weathertight exterior building enclosure.
      d. <Insert agenda items>.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.

B. Shop Drawings:
   1. Include plans, elevations, sections, and details.
   2. Detail attachments to other work, and between units, if any.
   3. Include hardware and required clearances.
   4. Mullion details, including reinforcement and stiffeners.
   5. Flashing details.
   6. Glazing details.
   7. Accessories.

C. Samples: For each exposed product and for each color specified, 12 inches long.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [Installer] [manufacturer] [and] [testing agency].

B. Product Test Reports: For hot-rolled steel windows, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For hot-rolled steel windows to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating hot-rolled steel windows that meet performance requirements indicated and of documenting performance by labels, test reports, and calculations.

B. Installer Qualifications: An installer acceptable to window manufacturer for installation of units required for this Project.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of hot-rolled steel 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.
      c. Excessive water leakage or air infiltration.
      d. Faulty operation of operable sash and hardware.
      e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      f. <Insert failure modes>.
   2. Warranty Period:
      a. Window: [Two] [Three] <Insert number> years from date of Substantial Completion.
      b. Finish: [Five] [10] [20] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
   1. Arcadia Incorporated.
   2. Bliss Nor-Am Doors & Windows Ltd.
   3. Hope's Windows, Inc.
   4. Torrance Steel Window Co., Inc.

2.2 PERFORMANCE REQUIREMENTS

A. SWI Standards: Comply with applicable requirements in SWI's "The Architect's Guide to Steel Windows and Doors" and "Specifications: Hot-Rolled," except where more stringent requirements are indicated.

B. Structural Wind Loads: As indicated on Drawings.

C. Deflection Limits: 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 pressures.

D. Structural: Test according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, hot-rolled steel windows do not evidence deflection exceeding specified limits.
   2. When tested at [150] <Insert number> percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding [0.2] <Insert number> percent of span.
   3. Test Durations: As required by design wind velocity, but not less than [10] <Insert number> seconds.

E. Air Infiltration for Weather-Stripped Sash: Not more than [0.37 cfm/ft.] <Insert value> of sash crack length at an inward test pressure of [6.24 lbf/sq. ft.] <Insert value> when tested according to ASTM E 283.

F. Air Infiltration for Non-Weather-Stripped Sash: Not more than 1.0 cfm/ft. of sash crack length at an inward test pressure of 1.56 lbf/sq. ft. when tested according to ASTM E 283.

G. Water Penetration: No leakage for 15 minutes when window is subjected to a rate of flow of 5 gal./h/sq. ft. with a differential pressure across the window of [2.86 lbf/sq. ft.] [6.24 lbf/sq. ft.] when tested according to ASTM E 331.

H. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of [0.80 Btu/sq. ft. x h x deg F] [0.32 Btu/sq. ft. x h x deg F] [0.35 Btu/sq. ft. x h x deg F] [0.60 Btu/sq. ft. x h x deg F] <Insert value>.

I. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of [0.40] [0.30] [0.27] [0.80] <Insert value>.

J. Condensation Resistance: Provide hot-rolled steel windows with a [CRF when tested according to AAMA 1503] [CR determined according to NFRC 500] of [36] [40] <Insert number> minimum.

K. Thermal Movements: Provide hot-rolled steel 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: [120 deg F, ambient; 180 deg F material surfaces] <Insert temperature change>.

L. Forced-Entry Resistance: Comply with Performance [Grade 10] <Insert grade> requirements when tested according to ASTM F 588.

M. Crack Tolerances: Test each type and size of required window unit, with sash closed and locked, for compliance with tolerances indicated in SWI's "The Architect's Guide to Steel Windows and Doors" and "Specifications: Hot-Rolled."

2.3 HOT-ROLLED STEEL WINDOWS

A. Operating Types: Provide the following operating types in locations indicated on Drawings:
   1. Fixed.

B. Hot-Rolled Steel Windows: Provide frame and sash members formed from hot-rolled, new billet steel sections. Provide combined weight of frame and sash members and depth of frame or sash members according to the SWI specifications category for [Light Intermediate] [Standard Intermediate] [Heavy Intermediate] [Heavy Custom] hot-rolled steel windows.
   1. Thermally Improved Design: Provide frame and sash members designed to isolate interior and exterior surfaces for improved thermal performance.

C. Window Finish: High performance, organic.
   1. Color and Gloss: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and gloss>.

D. Mullions: Formed of hot-rolled steel matching window units; with anchors for support to structure and for installation of window units and having sufficient strength to withstand design pressure indicated. Provide mullions of profile indicated and with cover plates. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections.

E. Glazing Stops: Provide manufacturer's standard screw-applied or snap-on glazing stops fabricated from [extruded or formed sheet aluminum] [formed steel or stainless steel]; coordinate with Section 088000 "Glazing" for glazing system indicated. Finish glazing stops with same finish as window units if fabricated of steel; otherwise, provide manufacturer's standard finish. Match color to window units.

F. Weather Stripping: Manufacturer's standard compressible weather stripping, complying with AAMA 701/702, ASTM C 509, or ASTM C 864 and designed for permanently resilient sealing under compression and for complete concealment when sash is closed.

2.4 GLAZING

A. Glass and Glazing System: See Section 088000 "Glazing" for glass units and glazing requirements for hot-rolled steel windows.

2.5 ACCESSORIES

A. Fasteners: Provide fasteners of bronze, brass, stainless steel, or other metal that are warranted by manufacturer to be noncorrosive and compatible with trim, hardware, anchors, and other components of hot-rolled steel windows.
   1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

B. Anchors, Clips, and Window Accessories: Provide units of stainless steel, hot-dip zinc-coated steel, bronze, brass, or iron complying with ASTM A 123/A 123M. Provide units with sufficient strength to withstand design pressure indicated.
   1. Windborne-Debris-Impact Resistance: Provide anchors and clips of same design used to pass windborne-debris-impact-resistance testing.

C. Sealant: For sealants required within fabricated windows, provide manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.6 FABRICATION

A. General: Fabricate hot-rolled steel windows of type and in sizes indicated to comply with SWI standards. Include a complete system for assembly of components and anchorage of window units.

B. Provide units that are reglazable without dismantling framing.

C. Prepare windows for site glazing.

D. Subframes and Operable Sash: Formed of hot-rolled steel of profile indicated. Miter or cope corners, and weld and dress joints smooth.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.

G. Provide water-shed members above sash.

2.7 STEEL FINISHES

A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with [SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning"] [or] [SSPC-SP 8, "Pickling"] <Insert surface preparation method>.

B. High-Performance Organic Finish: Two-coat fluoropolymer finish containing not less than [50] [70] percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify rough-opening dimensions, levelness of sill plate, and clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. SWI Publication: Comply with applicable requirements in SWI's "General Guidelines on the Installation of Steel Windows," except where more stringent requirements are indicated.

B. Comply with manufacturer's written instructions for installing windows, hardware, operators, accessories, and other components.

C. Install windows level, plumb, square, true to line, without distortion or impediment to thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

D. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.

E. Install windows and components to drain condensation, water-penetrating joints, and moisture migrating within windows to the exterior.

F. Separate corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Field Quality-Control Testing:
   1. Testing Methodology: Test windows for air-penetration resistance and water resistance according to AAMA 502, Test Method [A] [B], by applying same test pressures required for performance.
   2. Testing Extent: [Three] [Three mockup] <Insert number or description> windows as selected by Architect and a qualified independent testing and inspecting agency. Test windows immediately after installation.

C. Prepare test reports according to AAMA 502.

D. Window will be considered defective if it does not pass tests and inspections.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

B. Clean factory-finished steel surfaces immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

C. Protect window surfaces from contact with contaminating substances resulting from construction operations. Remove contaminants immediately according to manufacturer's written recommendations.

D. Refinish or replace windows with damaged finish.

END OF SECTION 085123.13

SECTION 087100

DOOR HARDWARE

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. This Section includes the following:

1. Commercial Mechanical door hardware, accessories and/or cylinders for the following:

a. Swinging doors.
b. Sliding/Folding doors.
c. Overhead/Roll-up doors.

B. Related Sections include the following:

1. Division 08 Section "Hollow Metal Doors and Frames"
2. Division 08 Section "Flush Wood Doors"
3. Division 08 Section "Aluminum-Framed Entrances and Storefronts"

C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering and scheduling remain requirements of this Section.

1. Permanent cores to be installed by Owner.

1.3 REFERENCE STANDARDS

A. This Section references the following Codes/Standards:

1. American National Standards Institute (ANSI) (Current Editions)

a. ANSI A117.1 – Accessible and Usable Buildings and Facilities
b. ANSI A156 (All related Sections)

2. Builders Hardware Manufacturers Association (BHMA) (Current Editions)

a. ANSI/BHMA A156.XX (All related Sections)

3. Door and Hardware Institute (DHI)

a. DHI/ANSI A115.IG – Installation Guide for Doors and Hardware.
b. DHI Sequence and Format for the Hardware Schedule.

c. DHI Recommended Locations for Builder's and Architectural Hardware.

4. National Fire Protection Association (NFPA) (Current Editions)

a. NFPA 80 – Fire Doors and Windows
b. NFPA 101 – Life Safety Code

5. International Building Code (IBC) (Current Editions)

1.4 SUBMITTALS

A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Power, signal, and control wiring. Include the following:

a. System schematic.
b. Point-to-point wiring diagram.
c. Riser diagram.
d. Elevation of each door.

2. Detail interface between electrified door hardware, fire alarm, access control, security and building control systems or other systems as may apply.
3. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Samples for Verification: For exposed door hardware of each type, in specified finish, full size. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets.

1. Samples will be returned to Contractor. Units that are acceptable through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.

D. Product Certificates: For electrified door hardware, signed by product manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

E. Qualification Data: For Installer and Architectural Hardware Consultant.

F. Product Test Reports: If requested by the Architect provide reports based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks, latches, delayed-egress locks and closers.

G. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

H. Warranty: Special warranty specified in this Section.

I. 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. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

    a. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
    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. Include description and function of each lockset and exit device.
        3) Complete designations of every item required for each door or opening including name and manufacturer.
        4) Fastenings and other pertinent information.
        5) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
        6) Explanation of abbreviations, symbols, and codes contained in schedule.
        7) Mounting locations for door hardware.
        8) Door and frame sizes and materials.
        9) Description of each electrified door hardware function, if applicable, including location, sequence of operation, and interface with other building control systems.

            a) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

        10) List of related door devices specified in other Sections for each door and frame.
        11) Product Cut Sheets for all material scheduled.

    c. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant (AHC), detailing Owner's final keying instructions for locks as determined at Key Conference. Include schematic keying diagram and index each key set to unique door designations.

1.5 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 (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
2. Installer shall have warehousing facilities in Project's vicinity.
3. Scheduling Responsibility: Preparation of door hardware and keying schedules.

4. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant (AHC) Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant (AHC) 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.

1. Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant (AHC) who is experienced in providing consulting services for electrified door hardware installations.

C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. 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 NFPA 252.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Keying Conference: If required by the Architect, conduct conference at a location 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 including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for key control system.
4. Address for delivery of keys.

G. Pre-installation Conference: If required by the Architect, conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
2. Review sequence of operation for each type of electrified door hardware.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required testing, inspecting, and certifying procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys and permanent cores, if applicable, to Owner by hand delivery, registered mail or overnight package service.

1.7 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.

B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system and building control system as applicable for this project.

C. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.8 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. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of operators and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: 3 years from date of Substantial Completion, except as follows:

a. Bored Locksets: 7 years from date of Substantial Completion.
b. Mortise Locksets: 10 years from date of Substantial Completion.
c. Exit Devices: 5 years from date of Substantial Completion.
d. Manual Closers: 10 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Maintenance Tools 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 door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide 6 months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

1.10 EXTRA MATERIALS

A. Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Refer to Hardware Sets indicating “Extra Material” in Part 3 "Door Hardware Sets" Article.

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 named manufacturers' products.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

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 provide as specified.

2. Manufacturers' names are abbreviated in Part 3 "Door Hardware Sets" Article.

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

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 HINGES, GENERAL

A. Quantity: Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches.
2. Three Hinges: For doors with heights 61 to 90 inches.
3. Four Hinges: For doors with heights 91 to 120 inches.
4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

C. Hinge Weight: Unless otherwise indicated, provide the following:

1. Entrance Doors: Heavy weight antifriction-bearing hinges.
2. Doors with Closers: Standard weight antifriction-bearing hinges.
3. Interior Doors: Standard weight hinges. Provide antifriction-bearing as specified in Part 3 "Door Hardware Sets" Article.

D. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Stainless steel, with stainless-steel pin or brass, with stainless-steel pin body and brass protruding heads as specified in Part 3 "Door Hardware Sets" Article.
2. Interior Hinges: Brass, with stainless-steel pin body and brass protruding heads, Steel, with steel pin or Stainless steel, with stainless-steel pin as specified in Part 3 "Door Hardware Sets" Article.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin, Stainless steel, with stainless-steel pin as specified in Part 3 "Door Hardware Sets" Article.

E. Hinge Options: Where indicated in door hardware sets or on Drawings:

1. Hospital Tips: Slope ends of hinge barrel.
2. Decorator Tips: Oval, Ball, Steeple, Urn, Acorn as specified in Part 3 "Door Hardware Sets" Article.
3. Safety Stud: Designed for stud in one leaf to engage hole in opposing leaf.
4. Maximum Security Pin: Fix pin in hinge barrel after it is inserted.
5. Non-removable Pins (NRP): 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 and outswinging corridor doors with locks.
6. Corners: Square.

F. Electrified Functions for Hinges: Comply with the following:

1. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
2. Monitoring: Concealed electrical monitoring switch.
3. Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.

G. 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 and wood screws for wood doors and frames (Pilot holes required for wood doors and/or frames). For NRP hinges finish screw heads to match surface of hinges.

2.3 HINGES

A. Butts and Hinges: BHMA A156.1. Listed under Category A in BHMA's "Certified Product Directory."

B. Template Hinge Dimensions: BHMA A156.7.

C. Approved Manufacturers:

1. Hager Companies.
2. McKinney Products Company.
3. Stanley Hardware.

2.4 SPRING HINGES

A. Self-Closing Hinges: BHMA A156.17. Listed under Category A in BHMA's "Certified Product Directory."

B. Approved Manufacturers:

1. Hager Companies.
2. McKinney Products Company.
3. Stanley Hardware.

2.5 PIVOTS AND PIVOT HINGES

A. Pivots: BHMA A156.4. Listed under Category C in BHMA's "Certified Product Directory."

B. Self-Closing Pivot Hinges: BHMA A156.17. Listed under Category A in BHMA's "Certified Product Directory."

C. Approved Manufacturers:

1. McKinney Products Company.
2. Rixson Specialty Door Controls.

2.6 CONTINUOUS HINGES

A. Standard: BHMA A156.26. Listed under Category N in BHMA's "Certified Product Directory."

B. General: Minimum 0.120-inch thick, hinge leaves with minimum overall width of 4 inches fabricated to full height of door and frame as recommended by the Manufacturer.

1. Fire Pins: Steel pins to hold labeled fire doors in place if required by tested listing.

C. Continuous, Pin & Barrel Hinges: Hinge with knuckles formed around a pin that extends entire length of hinge.

1. Base Metal for Exterior Hinges: Stainless steel.
2. Base Metal for Interior Hinges: Stainless steel or steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Stainless steel or steel.
4. Approved Manufacturers:

a. Hager Companies.
b. Markar Architectural Products, Inc.
c. McKinney Products Company.
d. Select Products.
e. Stanley Hardware.

f. Zero International.

D. Continuous, Geared Hinges: Extruded-aluminum, geared hinge leaves joined by a continuous extruded-aluminum channel cap with concealed, self-lubricating thrust bearings.

1. Approved Manufacturers:

a. Hager Companies.
b. Markar Architectural Products, Inc.
c. McKinney Products Company.
d. Select Products.
e. Stanley Hardware.
f. Zero International.

2.7 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." and ANSI A117.1.

1. 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.

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Electrified Locking Devices: BHMA A156.25.

1. Provide as specified in Part 3 "Door Hardware Sets" Article.

D. Lock Trim:

1. Levers: Provide as specified in Part 3 "Door Hardware Sets" Article.
2. Escutcheons (Roses): Provide as specified in Part 3 "Door Hardware Sets" Article.
3. Dummy Trim: Match lock trim and escutcheons.
4. Lockset Designs: Provide as specified in Part 3 "Door Hardware Sets" Article.

E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors and as follows:

1. Bored Locks: Minimum 1/2-inch latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
3. Deadbolts: Minimum 1-inch bolt throw.

F. Backset: 2-3/4 inches, unless otherwise indicated.

G. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:

1. Strikes for Bored Locks and Latches: BHMA A156.2.
2. Strikes for Mortise Locks and Latches: BHMA A156.13.
3. Strikes for Interconnected Locks and Latches: BHMA A156.12.

4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
5. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
6. Extended Lip Strikes: For locks used on frames requiring the additional length to protect frame and trim.
7. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

2.8 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.
3. Interconnected Locks: BHMA A156.12.

B. Bored Locks: BHMA A156.2, Listed under Category F in BHMA's "Certified Product Directory."

1. Approved Manufacturers:

a. Best Access Systems.
b. Sargent Manufacturing Company.
c. Schlage Commercial Lock.

C. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13. Listed under Category F in BHMA's "Certified Product Directory."

1. Approved Manufacturers:

a. Best Access Systems.
b. Sargent Manufacturing Company.
c. Schlage Commercial Lock.

2.9 DOOR BOLTS

A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Dutch-Door Bolts: Minimum 3/4-inch throw.
2. Mortise Flush Bolts: Minimum 3/4-inch throw.

B. Dustproof Strikes: BHMA A156.16, Grade 1.

C. Surface Bolts: BHMA A156.16, Grade 1 unless Grade 2 is indicated.

1. Flush Bolt Heads: Minimum of 1/2-inch diameter rods of brass, bronze, or stainless steel with minimum 12-inch long rod for doors up to 84 inches in height. Provide longer rods as necessary for doors exceeding 84 inches.
2. Approved Manufacturers:

a. Burns Manufacturing Incorporated.

b. Don-Jo Mfg., Inc.
c. Hager Companies.
d. IVES Hardware.
e. Trimco.

D. Manual Flush Bolts: BHMA A156.16, Grade 1 unless Grade 2 is indicated designed for mortising into door edge.

1. Approved Manufacturers:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Hager Companies.
d. IVES Hardware.
e. Trimco.

E. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1 unless Grade 2 is indicated designed for mortising into door edge.

1. Approved Manufacturers:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Hager Companies.
d. IVES Hardware.
e. Trimco.

2.10 SELF-CONTAINED ELECTRONIC LOCKS

A. Electronic Security System Description

1. General:

a. Install a network ready electronic lock system, complete and including without limitation, the following components:

b. Lock Technology: RFID (radio-frequency identification), proximity activated, network ready w/BLE (Bluetooth Low Energy).

2. Approved Manufacturers:

a. "QUANTUM III X Lever"; Saflok, a Kaba Group Company (800-523-9605)

1) Provide Auto Deadbolt Option (ADB) & Bluetooth Low Energy (BLE) at all Guestroom Entry Doors and other areas as noted in Sets.

3. Guest Room Locking System, Front Desk System

a. Basis-of-Design Product: Subject to compliance with requirements, provide "System 6000" by Saflok, a Kaba Group Company,

b. Microprocessor based Front Desk Controller System shall be a PC based network RFID encoding, handheld unit with lock integration (LPI) feature. Include the following:

1) Main PC Base computer, RS232 Cable and support hardware.

2) 2 Each Network RFID keycard encoder station and power supply.

3) 1 Each Basic System Items: Manuals, etc.

4) 1 Each System Printer with Serial Cable

5) Keycards: Generic reusable plastic RFID keycards. Quantity: 500.

c. System shall be designed for the following features:

1) Password access to front desk system

2) Transaction log of last 4,000 transactions

3) Simple three-step check in progress

4) Encoder must encode and validate cards

5) Encoder must be able to "read a card"

6) Fail-safe key cards in case of catastrophic power failure

7) Handheld Unit: Password protected and be able to program up to 50 locks. In addition HHU associated with the Front Desk System. This unit will be used for lock interrogation, diagnostics and programming. Program shall include:

(a) Set time clock
(b) Perform diagnostic check
(c) Interrogate up to last 100 entries: time, date and card identification

d. Guest Room: Locks shall be opened by a correctly coded card, upon placement of card on the RFID reader. Use of a newly issued card shall automatically re-key the lock to void the previous card, and guest cards shall additionally self-cancel by date and time automatically. Perimeter door reader to allow authorized guest cards. Canceled cards must not access perimeter reader. Provide BLE features.

1) Audit trail in lock of last 100 entries - time, date, and card identification.

2) Office/passage function by card for offices, entry doors or hospitality suites.

3) Reusable ABA or ISO 14443 standard Mifare RFID cards

4) Three (3) or Four (4) standard AA batteries or a Four (4) AA battery pack.

5) Non-volatile memory lock will not lose program even if the batteries are removed.

6) Four (4) levels of master/staff cards; 20 masters per level.

7) Staff cards shall be individualized to identify individual card holder via lock audit.

8) All cards are time limited.

9) For Finish and Lever design see hardware sets.

10) Deadbolt override cards for emergency level.

11) Simultaneous retraction of deadbolt and latchbolt (1" steel dead bolt with security pins and 3/4" anti-friction latch bolt).

12) Intelligent power shutdown feature. Batteries remain deactivated until keycard is inserted. Master level card key will activate a flashing LED “Low Battery” light warning system 30 days in advance of battery failure.

13) Mortise lockset to conform to BHMP Grade One, and meet UL Fire Rating A (3-Hour) through C (3/4-Hour).

14) Exterior door applications shall have special weather protection stand.

15) ANSI grade entry/egress/door ajar tracking mortise.

B. General: Internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism, and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case. Provide low-battery detection and warning, LED status indicators, and ability to program at the lock; type and function indicated.

1. Type: Mortised as specified in Part 3 "Door Hardware Sets" Article.
2. Actuating Device: Provide as specified in Part 3 "Door Hardware Sets" Article.

a. Card: Manufacturer's standard.

3. Faceplate Material: Provide as specified in Part 3 "Door Hardware Sets" Article.
4. Trim: Provide as specified in Part 3 "Door Hardware Sets" Article.

C. Accessory: Card encoder and software.

D. Training of Owner’s personnel:

1. Manufacturer shall provide instruction of Owner’s personnel to ensure that the security system is operating properly. All training shall be accomplished before Owner’s personnel are allow to operate the system. Manufacturer to provide on-site technical personnel to assist with final training.
2. Manufacturer shall provide software package, Customer key configuration design and system manuals.

E. Installation Pre-qualification:

1. Doors/Frames shall be prepared to Factory Template.
2. Installation personnel shall be trained and approved by the Manufacturer. Installation of system components shall comply with Manufacturer’s instructions and recommendations.
3. Installers shall adjust, check and verify each lock to ensure proper operation and function of every unit, replace that which cannot be adjusted to operate freely and smoothly as intended for the application made.

F. Defective Work:

1. The following shall be considered defective materials:

a. Unauthorized substitutes.
b. Items delivered with missing, broken, damaged or defaced parts.
c. Items of incorrect function or finish.

2. The following shall be considered defective installation:

a. Items broken, damaged or defaced after delivery
b. Items incomplete, misaligned or incorrectly located.

G. Contract Closeout:

1. Twenty-Four hours following issuance of Certificate of Substantial Competition, the General Contractor shall replace all batteries in all electronic card key locksets with new alkaline batteries.

H. Provide 2% additional Card Lockset stock for Owner inventory.

I. Approved Manufacturers:

1. SAFLOK (Saflok, a Kaba Group Company) (800-523-9605)

2.11 EXIT DEVICES:

A. Exit Devices: BHMA A156.3, Grade 1 unless Grade 2 is indicated. Listed under Category G in BHMA's "Certified Product Directory."

B. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." and ANSI A117.1.

1. 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.

C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf 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. Removable Mullions: BHMA A156.3.

G. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit 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. Mullions shall be used only with exit devices for which they have been tested.

H. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

1. Operation: Rigid or movable as specified in Part 3 "Door Hardware Sets" Article.

I. Outside Trim: Material and finish to match locksets, unless otherwise indicated.

1. Match design for locksets and latchsets, unless otherwise indicated.

J. Through Bolts: For exit devices and trim on metal doors, non-fire-rated wood doors and fire-rated wood doors as specified in Part 3 "Door Hardware Sets" Article.

K. Electronic Exit Bars: Non-latching electronic releasing device, activated by an adjustable capacitance sensor, with no moving parts; listed and labeled as panic exit hardware. Fabricate bar from extruded aluminum, and provide door and frame transfer device and 16 feet of cord to route wiring off the door frame.

L. Electrified Exit Devices (ELR): Electric Latch Retraction/Electric Dogging shall be by motorized retraction only (PHI MRL). Solenoid retraction will not be accepted.

M. Approved Manufacturers:

1. Precision Hardware, Inc.
2. Sargent Manufacturing Company.

2.12 LOCK CYLINDERS

A. High-Security Lock Cylinders: BHMA A156.30**,** Grade 1.

1. Key Control Level: Category A.
2. Destructive Test Level: Category A.
3. Surreptitious Entry Resistance Level: Category A.

B. 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 or Seven pin as required for this project.
2. Mortise Type: Threaded cylinders with rings and cam as required for proper lock operation.
3. Rim Type: Cylinders with back plate, flat type vertical or horizontal tailpiece and raised trim ring.
4. Bored-Lock Type: Cylinders with tailpieces as required for proper lock operation.

a. High-Security Grade: BHMA A156.5, Grade 1A, listed and labeled as complying with pick and drill resistant testing requirements in UL 437 (Suffix A).

C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.

D. Construction Keying: Comply with the following:

1. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

a. Replace construction cores with permanent cores as directed by Owner or Architect.

E. Manufacturer: Same manufacturer as for locks and latches.

F. Approved Manufacturers:

1. Best Access Systems.
2. Sargent Manufacturing Company.
3. Schlage Commercial Lock.

2.13 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. No Master Key System: Cylinders are operated by change keys only.
2. Master Key System: Cylinders are operated by a change key and a master key.

3. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
4. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
5. Existing System: Master key or grand master key locks to Owner's existing system.
6. Existing System: Re-key Owner's existing master key system into new keying system.
7. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation.

a. Notation: As specified and determined at keying conference.

2. Quantity: In addition to one extra key blank for each lock, provide the following:

a. Cylinder Change Keys: Three.
b. Master Keys: Five.
c. Grand Master Keys: Five.
d. Great-Grand Master Keys: Five.

2.14 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5, Grade 1; 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.

1. Multiple-Drawer Cabinet: Cabinet with drawers equipped with key-holding panels and key envelope storage, and progressive-type ball-bearing suspension slides. Include single cylinder lock to lock all drawers.
2. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
3. Portable Cabinet: Tray for mounting in file cabinet, equipped with key-holding panels, envelopes, and cross-index system.

B. Cross-Index System: Multiple index system for recording key information as specified in Part 3 "Door Hardware Sets" Article. Include three receipt forms for each key-holding hook. Set up by Hardware Distributor.

1. Approved Manufacturers:

a. Lund Equipment Co., Inc.
b. MMF Industries.
c. Telkee.

C. Key Control System Software: BHMA A156.5, Grade 1; multiple-index system for recording and reporting key-holder listings, tracking keys and lock and key history, and printing receipts for transactions. Include instruction manual.

1. Approved Manufacturers:

a. Best Access Systems.

b. Sargent Manufacturing Company.
c. Schlage Commercial Lock.

D. Key Lock Boxes: Designed for storage of two keys, with tamper switches to connect to intrusion detection system if required.

1. Approved Manufacturers:

a. Knox Company.

2.15 ELECTRIC STRIKES

A. Standard: BHMA A156.31, Grade 1.

B. General: Use fail-secure electric strikes with fire-rated devices.

C. Approved Manufacturers:

1. Folger Adam Security Inc.
2. HES, Inc.

2.16 OPERATING TRIM

A. Standard: BHMA A156.6 and as illustrated on Drawings.

B. Materials: Fabricate from aluminum, brass, bronze or stainless steel, unless otherwise indicated in Part 3 "Door Hardware Sets" Article.

C. Approved Manufacturers:

1. Burns Manufacturing Incorporated.
2. Don-Jo Mfg., Inc.
3. Trimco.

2.17 CLOSERS

A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." and ANSI A117.1.

1. Comply with the following maximum opening-force requirements:

a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.

C. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.

D. Flush Floor Plates: Provide finish cover plates for floor closers unless thresholds are indicated. Match door hardware finish, unless otherwise indicated.

E. Recessed Floor Plates: Provide recessed floor plates with insert of floor finish material for floor closers unless thresholds are indicated. Provide extended closer spindle to accommodate thickness of floor finish.

F. Power-Assist Closers: As specified in Division 08 Section "Automatic Door Operators" for access doors for people with disabilities or where listed in the door hardware sets.

G. 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.

H. Surface Closers: BHMA A156.4**,** Grade 1 unless Grade 2 is indicated. Listed under Category C in BHMA's "Certified Product Directory." Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.

1. Approved Manufacturers:

a. LCN Closers.
b. Sargent Manufacturing Company.
c. Stanley Door Closer.

I. Coordinators: BHMA A156.3.

1. Approved Manufacturers:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Trimco.

2.18 PROTECTIVE TRIM UNITS

A. Size: 2 inches less than door width on push side and 1 inch less than door width on pull side, by height specified in door hardware sets.

B. Fasteners: Manufacturer's standard machine or self-tapping screws.

C. Metal Protective Trim Units: BHMA A156.6; beveled top and 3 sides; fabricated from material as specified in Part 3 "Door Hardware Sets" Article.

1. Material: 0.050-inch thick.
2. Approved Manufacturers:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Trimco.

2.19 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 A156.16, Grade 1.

C. Combination Floor and Wall Stops and Holders: BHMA A156.8, Grade 1.

D. Combination Overhead Stops and Holders: BHMA A156.8, Grade 1.

E. Electromagnetic Door Holders: BHMA A156.15. Listed under Category C in BHMA's "Certified Product Directory."

1. Coordinate with fire detectors and interface with fire alarm system for labeled fire door assemblies.

F. Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch fabricated for drilled-in application to frame.

G. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch fabricated for drilled-in application to frame.

H. Approved Manufacturers:

1. Burns Manufacturing Incorporated.
2. Architectural Builders Hardware (ABH)
3. Trimco.

2.20 DOOR GASKETING

A. Standard: BHMA A156.22. Listed under Category J in BHMA's "Certified Product Directory."

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. Air Leakage: Not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

D. 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 fire and/or smoke-labeled doors.

E. Fire-Labeled Gasketing: 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 NFPA 252.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill].

F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

H. Gasketing Materials: ASTM D 2000 and AAMA 701/702.

I. Approved Manufacturers:

1. National Guard Products.
2. Pemko Manufacturing Co.
3. Zero International.

2.21 THRESHOLDS

A. Standard: BHMA A156.21. Listed under Category J in BHMA's "Certified Product Directory."

B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." and ANSI A117.1.

1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

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

D. Approved Manufacturers:

1. National Guard Products.
2. Pemko Manufacturing Co.
3. Zero International.

2.22 SLIDING DOOR HARDWARE

A. General: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories as specified in Part 3 "Door Hardware Sets" Article.

B. Approved Manufacturers:

1. Hafele
2. Leatherneck Hardware
3. Barn Door Hardware

2.23 FOLDING DOOR HARDWARE

A. General: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories as specified in Part 3 "Door Hardware Sets" Article.

B. Approved Manufacturers:

1. Hafele
2. Hager Companies.
3. Stanley Hardware.

2.24 MISCELLANEOUS DOOR HARDWARE

A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosures; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

B. Auxiliary Hardware: BHMA A156.16**,** Grade 1.

1. Approved Manufacturers:

a. Burns Manufacturing Incorporated.
b. Don-Jo Mfg., Inc.
c. Trimco.

2.25 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. 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.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. 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. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Steel Machine or Wood Screws: For the following fire-rated applications:

a. Mortise hinges to doors.

b. Strike plates to frames.
c. Closers to doors and frames.

3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:

a. Surface hinges to doors.
b. Closers to doors and frames.
c. Surface-mounted exit devices.

4. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.26 FINISHES

A. Standard: BHMA A156.18, as indicated in door hardware sets.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

B. Wood Doors: Comply with DHI A115-W Series. Drill pilot holes of appropriate size for ALL wood door installations.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings and/or 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."

B. 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.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
3. Drill pilot holes of appropriate size for ALL wood door installations.

C. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated verify location with Architect.

1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

3.4 ADJUSTING

A. Initial 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. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. 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 from the latch, measured to the leading edge of the door.

B. Occupancy Adjustment: Approximately 6 months after date of Substantial Completion, Installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SETS

PARKING GARAGE

HARDWARE SET # P01 - EXTERIOR STAIR - (3070/HMXHM/UL)

DOOR(S): P100, P201
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB199 4.5 X 4.5	630	STN
1	EA	RIM EXIT DEVICE	3R0 FL 2114 X 4914B (PASSAGE)	630	PHI
1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 8" X 2" LDW X B4E/CSK	630	TRM
1	EA	SEAL	5075C X LAR (HEAD/JAMBS)	CHAR	NGP
1	EA	SWEEP	601A X LAR	AL	NGP
1	EA	THRESHOLD	896 X LAR X FASTENERS FOR SECURE MOUNTING TO SUBSTRATE	AL	NGP
1	EA	DRIP CAP	16A X OFW	AL	NGP

HARDWARE SET # P02 - STAIR (3070/HMXHM/UL)

DOOR(S): P203, P301, P303, P401, P403
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB168 4.5 X 4.5	652	STN
1	EA	RIM EXIT DEVICE	3R0 FL 2114 X 4914B (PASSAGE)	630	PHI
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 8" X 2" LDW X B4E/CSK	630	TRM
1	EA	SEAL	5075C X LAR (HEAD/JAMBS)	CHAR	NGP

GENERAL BUILDING AREA

HARDWARE SET # B01 - MAIN ENTRY (2-36100/WDXHM)

DOOR(S): 001A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	FLOOR CLOSER/PIVOT	L27 X SC X L180 TOP PIVOT X DR THICKNESS	626	RIX
6	EA	INT PIVOT	ML19 X DR THICKNESS	626	RIX
2	EA	PULL	TBD (ALLOWANCE = $400.00 EACH)	TBD	TBD
2	EA	PUSH PLATE	TBD (ALLOWANCE = $200.00 EACH)	TBD	TBD
1	EA	THRESHOLD	TYPE 3 X 427FC X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	AL	NGP
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B02 - MAIN ENTRY VESTIBULE (2-36100/WDXHM)

DOOR(S): 001B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	FLOOR CLOSER/PIVOT	L27 X SC X L180 TOP PIVOT X DR THICKNESS	626	RIX
6	EA	INT PIVOT	ML19 X DR THICKNESS	626	RIX
2	EA	PULL	TBD (ALLOWANCE = $400.00 EACH)	TBD	TBD
2	EA	PUSH PLATE	TBD (ALLOWANCE = $200.00 EACH)	TBD	TBD
1	EA	THRESHOLD	TYPE 3 X 427FC X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	AL	NGP
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B03 - EXTERIOR STAIR, EXIT CORRIDOR (3070/HMXHM)

DOOR(S): 007, 008.1A, 116B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN

1	EA	RIM EXIT DEVICE	3R0 2103 X 4903B (STOREROOM)	630	PHI
1	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B04 - LUGGAGE VESTIBULE (3070/HMXHM)

DOOR(S): 009
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	RIM EXIT DEVICE	3R0 2114 X 4914B (PASSAGE)	630	PHI
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B05 - LUGGAGE STORAGE (3070/HMXHM)

DOOR(S): 010
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B06 - MDF, DEPOSIT BOX VIEWING, ELECTRICAL (3070/HMXHM/UL)

DOOR(S): 011, 110.18, 112,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B07 - BUSINESS CENTER (3070/HMXHM)

DOOR(S): 012A, 012B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER X BLE	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE) (DOOR 012A ONLY)	689	SDC
1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE) (DOOR 012B ONLY)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU (DOOR 012A ONLY)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B08 - SPA (2-30810/??X??) NEED DR/FRM MAT'L, LOCKABLE (RCU/MAGNET)?

DOOR(S): 013
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	FLOOR CLOSER/PIVOT	L27 X SC X L180 TOP PIVOT X DR THICKNESS	626	RIX
4	EA	INT PIVOT	ML19 X DR THICKNESS	626	RIX
2	EA	PULL	TBD (ALLOWANCE = $400.00 EACH)	TBD	TBD

2	EA	PUSH PLATE	TBD (ALLOWANCE = $200.00 EACH)	TBD	TBD
1	EA	THRESHOLD	TYPE 3 X 427FC X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	AL	NGP
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B09- FAMILY RESTROOM (3070/HMXHM)

DOOR(S): 015, 045
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	LATCHSET	45H0L16H VIN (PRIVACY W/INDICATOR)	626	BST
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	PROTECTION PLT	KO050 6" X 1" LDW X B4E/CSK (MOP)	630	TRM
1	EA	FLOOR STOP	1215CKU (DOOR 012A ONLY)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B10 - JANITOR, IDF/AV (3070/HMXHM)

DOOR(S): 016, 027, 047, 048,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B11 - M/W PUBLIC RESTROOM (3070/HMXHM)

DOOR(S): 018A, 020A, 049, 050
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG

3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	PUSH PLATE	1001-3 4 X 16	630	TRM
1	EA	PULL W/PLATE	1018-3 4 X 16	630	TRM
1	EA	DEADBOLT	8T37S CORMAX (CLASSROOM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	PROTECTION PLT	KO050 6" X 1" LDW X B4E/CSK (MOP)	630	TRM
1	EA	WALL STOP	1270CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B12 - TOILET STALL - INSWING (2670/WDXWD)

DOOR(S): 018B, 018C, 018D, 018E, 018F, 020B, 020C, 020D, 020E, 020F, 020G, 020M, 020N, 020P, 020Q, 020L, 020S

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	SPG HINGE	2060R 4.5 X 4.5 (MOUNT AT TOP AND MIDDLE POSITIONS)	626	STN
1	EA	LATCHSET	7KC30L16D (PRIVACY)	626	BST
1	EA	DEADBOLT	D271 (INDICATOR)	626	FAL
1	EA	WALL STOP	1278CV (CONCAVE)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B13 - TOILET STALL - OUTSWING (2670/WDXWD)

DOOR(S): 018G, 018H, 018J, 020H, 020J, 020K, 020R

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	SPG HINGE	2060R 4.5 X 4.5 (MOUNT AT TOP AND MIDDLE POSITIONS)	626	STN
1	EA	LATCHSET	7KC30L16D (PRIVACY)	626	BST
1	EA	DEADBOLT	D271 (INDICATOR)	626	FAL
1	EA	OVERHEAD STOP	4420 SERIES (TEMPLATE FOR 90°)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B14 - TOILET STORAGE (3070/HMXHM)

DOOR(S):
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	652	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST
1	EA	OVERHEAD STOP	4420 SERIES (TEMPLATE FOR 90°)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B15 - MEETING RM CORRIDOR (2-3093/??X??) NEED DR/FRM MAT'L, LOCKABLE? (RCU/ACCESS CONTROL?)

DOOR(S): 021A, 021B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	CVR EXIT DEVICE	3R0 2608 X 2908B (CLASSROOM)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 CS SN X ALL REQ'D MOUNTING PLATES/BRACKETS (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	SWEEP	601A X LAR	AL	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	AL	NGP

NOTE(S):

BALANCE OF ALL WEATHER SEAL PROVIDED BY MANUFACTURER/SUPPLIER

HARDWARE SET # B16 - MEETING ROOM, SALON (2-30100/WDXHM/UL/AC)

DOOR(S): 025A, 026A, 027A, 032A, 036A, 036B, 038A, 039A, 039B, 040A, 040B, 041A, 043A, 043B, 043C, 043D
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG

2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
1	EA	SVR EXIT DEVICE	3R0 FL22 LBR (CARD READER O/S TRIM) X DR HEIGHT (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER X BLE (ACTIVE LEAF)	626	SAF
1	EA	SVR EXIT DEVICE	3R0 FL2201 LBR (EXIT ONLY - NO O/S PLATE) X DR HEIGHT (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	VIEWER	976U (INACTIVE LEAF)	PL	TRM

HARDWARE SET # B17 - MEETING ROOM BOH ACCESS (30100/WDXHM/UL)

DOOR(S): 025B, 026B, 027B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
1	EA	RIM EXIT DEVICE	3R0 FL2108 X 4908 B (CLASSROOM)	630	PHI
1	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	VIEWER	976U	PL	TRM

HARDWARE SET # B18 - BOH CORRIDOR (2-3070/HMXHM)

DOOR(S): 025
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 2214 LBR X 4914B (PASSAGE)	630	STN
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM

2	EA	WALL STOP	1270CX (CONVEX)	626	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B19 - BOARDROOM (2-30100/WDXHM/UL)

DOOR(S): 026
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
1	EA	SVR EXIT DEVICE	3R0 FL22 LBR (CARD READER O/S TRIM) X DR HEIGHT (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER X BLE (ACTIVE LEAF)	626	SAF
1	EA	SVR EXIT DEVICE	3R0 FL2201 LBR (EXIT ONLY - NO O/S PLATE) X DR HEIGHT (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B20 - BOARDROOM VESTIBULE (2-30100/WDXHM)

DOOR(S): 028
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	SVR EXIT DEVICE	3R0 2214 LBR X 4914B X DR HEIGHT (PASSAGE)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM
1	EA	VIEWER	976U	PL	TRM

HARDWARE SET # B21 - MEETING ROOM, SALON ROOM (30100/WDXHM/UL/AC)

DOOR(S): 030A, 030B, 032B, 037A, 037B,

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
1	EA	RIM EXIT DEVICE	3R0 FL21 (CARD READER O/S TRIM)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER X BLE (ACTIVE LEAF)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	VIEWER	976U	PL	TRM

HARDWARE SET # B22 - COAT CHECK (3070/HMXHM)

DOOR(S): 031.2
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	LOCKSET	45H7R16H CORMAX (CLASSROOM)	626	BST
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B23 - PREFUNCTION ENTRY (2-30710/??X??) NEED DR/FRM MAT'L, LOCKABLE? (RCU/ACCESS CONTROL?)

DOOR(S): 033A, 033B, 033C, 035A, 035B, 035C,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	CVR EXIT DEVICE	3R0 2608 X 2908B (CLASSROOM)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 CS SN X ALL REQ'D MOUNTING PLATES/BRACKETS (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	SWEEP	601A X LAR	AL	NGP

1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	AL	NGP

NOTE(S):

BALANCE OF ALL WEATHER SEAL PROVIDED BY MANUFACTURER/SUPPLIER

HARDWARE SET # B24 ENTRY VESTIBULE (2-30610/??X??) NEED DR/FRM MAT'L

DOOR(S): 021C, 021D, 033D, 033E, 033F, 034A, 034B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	DUMMY BAR EXIT	N673DR-3 (RIDIG DUMMY BAR)	630	PHI
2	EA	DUMMY TRIM	2902B (DUMMY TRIM)	630	PHI
2	EA	CLOSER	D4550 CS SN X ALL REQ'D MOUNTING PLATES/BRACKETS (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC

NOTE(S):

BALANCE OF ALL WEATHER SEAL PROVIDED BY MANUFACTURER/SUPPLIER

HARDWARE SET # B25 - EXHIBIT CORRIDOR (3070/HMXHM)

DOOR(S): 038B, 039C, 039D, 041B, 043E, 043F, 043G, 043H,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	RIM EXIT DEVICE	3R0 2108 X 4908 B (CLASSROOM)	630	PHI
1	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

1	EA	VIEWER	976U	PL	TRM

HARDWARE SET # B26 - EXHIBIT CORRIDOR, RESTROOM CORRIDOR (2-30100/WDXHM/UL)

DOOR(S): 042A, 042B, 044A

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	SVR EXIT DEVICE	3R0 2214 LBR X 4914B X DR HEIGHT (PASSAGE)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B27 - RESTROOM CORRIDOR EXIT, RESTAURANT STAIR EXIT (2-3070/HMXHM)

DOOR(S): 044B, 182
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN
2	EA	SVR EXIT DEVICE	3R0 2201 (EXIT ONLY)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	HD FLR STOP	1209 (MOUNT TO COORDINATE W/MAX CLOSER SWING)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B28 - CAN WASH (3070/HMXHM)

DOOR(S): 046
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN
1	EA	LOCKSET	45H7R16H CORMAX (CLASSROOM)	630	BST
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B29 - SERVICE VESTIBULE (2-3070/??X??/UL) NEED DR/FRM MAT'L

DOOR(S): 051
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 2208 LBR X 4908 B (CLASSROOM)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B30 - OPERABLE PARTITION STORAGE (3070/HMXHM)

DOOR(S): 052, 053
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	630	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	630	BST
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B31 - KITCHEN (2-3070/HMXHM)

DOOR(S): 101.1A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG

6	EA	HINGE	FBB168 4.5 X 4.5 NRP	652	STN
2	EA	SVR EXIT DEVICE	3R0 2208 LBR X 4908 B (CLASSROOM)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 EDA SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 32" X 1" LDW X B4E/CSK (ARMOR)	630	TRM
2	EA	FLOOR STOP	1215CKU	626	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B32 - KITCHEN EXTERIOR (2-3070/HMXHM)

DOOR(S): 101.1B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB199 4.5 X 4.5 NRP	652	STN
1	EA	SVR EXIT DEVICE	3R0 2208 X 4908 B (CLASSROOM)	630	PHI
1	EA	SVR EXIT DEVICE	3R0 2201 (CLASSROOM)	630	PHI
1	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 EDA SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 6" LDW X B4E/CSK (DO NOT MOUNT UNDER BOTTOM LATCH CASE)	630	TRM
2	EA	HD FLR STOP	1209 (MOUNT TO COORDINATE W/MAX CLOSER SWING)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B33 - BEVERAGE SERVICE (3070/HMXHM)

DOOR(S): 101.2A, 101.2B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB168 4.5 X 4.5	652	STN
1	EA	PUSH PLATE	1001-3 4 X 16	630	TRM

1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE) (DR 101.2A)	689	SDC
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE) (DR 101.2B)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B34 - OFFICE SPACE, CONFERENCE (3070/HMXHM)

DOOR(S): 101.5, 101.13, 110.2, 110.5, 110.6, 110.7, 110.8, 110.15,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	630	STN
1	EA	LOCKSET	45H7A16H CORMAX (OFFICE)	630	BST
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B35 - JANITOR (KITCHEN), HOLDING (HOUSKEEPING), EMER ELEC, TESTING, INTERVIEW, (3070/HMXHM)

DOOR(S): 101.3, 108, 109, 122.1, 129.3, 129.4
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	630	STN
1	EA	LATCHSET	45H0N16H (PASSAGE)	630	BST
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B36 - SELF-CONTAINED COOLERS, RESTAURANT SHELL EXTERIOR (PER MANUFACTURER)

DOOR(S): 101.4, 101.6, 101.8, 101.9, 101.10, 101.12, 127, 179B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
			ALL HARDWARE PROVIDED BY MANUFACTURER		

HARDWARE SET # B37 - BEVERAGE STORAGE, DRY STORAGE, HOUSKEEPING (3070/HMXHM)

DOOR(S): 101.7, 101.11, 107A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	630	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 32" X 1" LDW X B4E/CSK (ARMOR)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B38 - M/W LOCKER, BREAKROOM (3070/HMXHM)

DOOR(S): 102, 103, 105A, 105B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	PUSH PLATE	1001-3 4 X 16	630	TRM
1	EA	PULL W/PLATE	1018-3 4 X 16	630	TRM
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	PROTECTION PLT	KO050 6" X 1" LDW X B4E/CSK (MOP)	630	TRM
1	EA	WALL STOP	1270CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B39 - BOH CORRIDOR, CENTRAL PLANT EXTERIOR, CARPENTRY SHOP EXTERIOR (IS 104 EMPLOYEE ENTRANCE?) (2-3070/??X??/AC) ACCESS CONTROL??? NEED DR/FRM MAT'L

DOOR(S): 104, 120B, 124. 134, 125.6B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG

6	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN
1	EA	SVR EXIT DEVICE	3R0 22 (CARD READER O/S TRIM) (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER (ACTIVE LEAF)	626	SAF
1	EA	SVR EXIT DEVICE	3R0 2201 (EXIT ONLY) (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 6" LDW X B4E/CSK (DO NOT MOUNT UNDER BOTTOM LATCH CASE)	630	TRM
2	EA	HD FLR STOP	1209 (MOUNT TO COORDINATE W/MAX CLOSER SWING)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B40 - HOUSKEEPING EXTERIOR, FIRE PUMP (3070/HMXHM)

DOOR(S): 107B, 117
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB199 4.5 X 4.5	630	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST
1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B41 - ADMINISTRATIVE SUPPORT (3070/HMXHM)

DOOR(S): 110.1, 110.12
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	630	STN
1	EA	LOCKSET	45H7R16H CORMAX (CLASSROOM)	630	BST

1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B42 - ADMIN STORAGE AREAS, DEPOSIT BOXES (3070/HMXHM)

DOOR(S): 110.3, 110.16, 110.17, 110.20,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	630	STN
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	630	BST
1	EA	OVERHEAD STOP	4420 SERIES	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B43 - COUNTING ROOM, CASHIER (3070/HMXHM)

DOOR(S): 110.9, 110.10
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	630	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 32" X 1" LDW X B4E/CSK (ARMOR)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM
1	EA	VIEWER	976U	PL	TRM

HARDWARE SET # B44 - COAT CLOSET, WORKSHOP (3070/HMXHM)

DOOR(S): 110.12, 125.4A,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	630	STN

1	EA	LATCHSET	45H0N16H CORMAX (PASSAGE)	630	BST
1	EA	OVERHEAD STOP	4420 SERIES	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B45 - FRONT DESK WORK AREA, HW ROOM, MAINT RECEPTION (3070/HMXHM/UL)

DOOR(S): 110.14, 121, 125.1, 129.1
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B46 - SERVICE LOBBY (2-3070/HMXHM/UL)

DOOR(S): 111,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB168 4.5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 2214 LBR X 4914B (PASSAGE)	630	PHI
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B47 - STAIR, EXITWAY (3070/??X??/UL) NEED DR/FRM MAT'L

DOOR(S): 008.1B, 115, 116A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB168 4.5 X 4.5	652	STN