

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanical door hardware.
2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.
4. Cylinders for toll booth cash drawer locks.

B. Related Requirements:

1. Section 080500 "Common Work Results for Openings."
2. Section 081113 "Hollow Metal Doors and Frames."
3. Section 081400 "Wood Doors."
4. Section 084113 "Aluminum-Framed Entrances and Storefronts."
5. Section 133423 "Prefabricated Toll Booths."

1.2 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. 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. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing Openings: Where 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 proper door operation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at the Project site.

1. Conference participants shall include Installer's Architectural Hardware Consultant and the Owner's security personnel.

B. Keying Conference: Conduct conference at a time and location acceptable to the Owner's Representative.

1.4 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 electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Samples for Verification: For each type of exposed product, in each finish specified.
 - 1. Sample Size: Full-size units or minimum 2-by-4-inch (51-by-102-mm) Samples for sheet and 4-inch (102-mm) long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
 - 2. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- D. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - 2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
 - 3. Content: Include the following information:
 - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
 - b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - e. Fastenings and other installation information.
 - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.

- g. Mounting locations for door hardware.
- h. List of related door devices specified in other Sections for each door and frame.

- E. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of electrified door hardware.
 - 1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- B. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- C. Field quality-control reports.
- D. Sample Warranty: For warranties specified.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.
- C. Manufacturer warranties as specified.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 3. 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 Qualifications: A person 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 and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

1.8 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 coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.9 WARRANTY

- A. Special Warranty: 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 doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
 - 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.
- B. Locks and Latches:
 - 1. [Sargent Manufacturing Co., An ASSA ABLOY Group Company.](#)
 - 2. [Schlage, an Allegion Brand](#)
 - 3. [Yale Commercial Locks & Hardware, An ASSA ABLOY Group Company](#)
 - 4. [Stanley Commercial Hardware](#)

- C. Panic Exit Devices:
 - 1. [Precision Hardware, Stanley Security Solutions, Inc](#)
 - 2. [Sargent Manufacturing Co., An ASSA ABLOY Group Company](#)
 - 3. [Yale Commercial Locks & Hardware, An ASSA ABLOY Group Company](#)
- D. Push/Pulls:
 - 1. [Trimco/BBW](#)
 - 2. [Ives, an Allegion Brand](#)
 - 3. [Rockwood Manufacturing Co., An ASSA ABLOY Group Company](#)
 - 4. [Hager Companies](#)
- E. Electric Strikes:
 - 1. [Folger Adam EDC, An ASSA ABLOY Group Company](#)
 - 2. [HES, An ASSA ABLOY Group Company](#)
 - 3. [Von Duprin, an Allegion Brand](#)
- F. Door Closers.
 - 1. [Yale Commercial Locks & Hardware, An ASSA ABLOY Group Company](#)
 - 2. [LCN Closers, an Allegion Brand](#)
 - 3. [Sargent Manufacturing Co., An ASSA ABLOY Group Company](#)
- G. Stops
 - 1. [Ives, an Allegion Brand](#)
 - 2. [Rockwood Manufacturing Co., An ASSA ABLOY Group Company](#)
 - 3. [Hager Companies](#)
- H. Weatherstripping, Gasketing, and Seals:
 - 1. [Pemko Manufacturing Company, an ASSA ABLOY Group Company](#)
 - 2. [National Guard Products, Inc. \(NGP\)](#)
- I. Protective Plates and Trim:
 - 1. [Trimco/BBW,](#)
 - 2. [Ives, an Allegion Brand](#)
 - 3. [Rockwood Manufacturing Co., An ASSA ABLOY Group Company](#)
 - 4. [Hager Companies](#)

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is 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.

- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- C. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the ABA standards of the Federal agency having jurisdiction.
 - 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 (22.2 N).
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in the door hardware schedule.
 - 1. Door hardware is scheduled at the end of this Section.

2.4 HINGES

- A. Hinges: BHMA A156.1.
 - 1. Provide template-produced antifriction-bearing hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 2. Mounting: Full mortise (butts).
 - 3. Bearing Material: Ball bearing.
 - 4. Grade:
 - a. Grade 1 (heavy weight) for doors exceeding 3 feet in width.

- b. Grade 2 (standard weight) for all other doors.
- 5. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pin.
 - b. Interior Hinges: Steel with steel pin.
- 6. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Maximum security.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
- 7. Tips: Flat button

2.5 CONTINUOUS HINGES

- A. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
 - 1. Hinges for Fire-Rated Assemblies: With steel fire pins to hold fire-rated doors in place if required by tested listing.
 - 2. Mounting: Full surface, with removable continuous caps over fasteners.
 - 3. Electric Feature: Electric through wires and monitor.

2.6 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. 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 (13-mm) latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm) unless otherwise indicated.
- D. Lock Trim:
 - 1. Levers: Wrought.
 - a. Construction: Solid.
 - 2. Escutcheons (Roses): Wrought.
 - 3. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 - 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
- F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

- G. Mortise Locks: BHMA A156.13; Security Grade 1; stamped steel case with steel or brass parts; Series 1000.

2.7 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: BHMA A156.36: Grade 1 with strike that suits frame.

2.8 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.
 - 1. Material: Steel.
 - 2. Mounting: Mortised.
 - 3. Fire-Rated Door Assemblies: Use fail-secure electric strikes with fire-rated devices.
 - 4. Features: Lip extension kit.

2.9 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.
 - 1. Strike: Dustproof.
 - 2. Fire Rated: Listed and labeled for use in fire-rated assemblies.

2.10 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
- B. 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.
- C. 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.
- D. Rim Exit Devices: Grade 1.
 - 1. Type: 28, incorporating a deadbolt.
 - 2. Actuating Bar: Push pad.
 - 3. Material: Aluminum.
- E. Mortise Exit Devices: Grade 1.
 - 1. Type: 3.
 - 2. Actuating Bar: Push pad.
 - 3. Material: Aluminum.
- F. Surface Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: 2.
 - 2. Actuating Bar: Push pad.

3. Material: Aluminum.
 4. Configuration: Top and bottom rods.
- G. Extruded-Aluminum Removable Mullions: With malleable-iron top and bottom retainers, and prepared for strikes as follows:
1. Strikes: Two standard recessed strikes.
- H. Exit Device Outside Trim: Lever with cylinder; material and finish to match locksets unless otherwise indicated.
1. Match design for lock trim unless otherwise indicated.
- I. Through-Bolt Fasteners: For exit devices and trim on metal doors.

2.11 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.
1. Core Type: Interchangeable.
 2. Number of Pins: Six.
 3. Lock Types: Mortise and bored-lock types.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.12 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
- B. Keys: Nickel silver.
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."

2.13 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.
- B. Flat Push Plates: With square corners and beveled edges; secured with exposed screws.

1. Thickness: 0.050 inch (1.3 mm).
 2. Size: 4 inches wide by 16 inches high (102 mm wide by 406 mm high).
- C. Push-Pull Plates: With square corners, beveled edges, and raised integral lip; secured with exposed screws.
1. Thickness: 1/8 inch (3.2 mm).
 2. Size: 3-1/2 inches wide by 15-3/4 inches high (89 mm wide by 400 mm high).
- D. Straight Door Pulls:
1. Type: 3/4-inch (19-mm) constant-diameter pull.
 2. Mounting: Through bolted with oval-head machine screws and countersunk washers.
 3. Minimum Clearance: 1-1/2 inches (38 mm) from face of door.
 4. Overall Length: 9 inches (229 mm).
- E. Offset Door Pulls: 1-inch (25-mm) constant-diameter pull.
1. Mounting: Surface applied with concealed fasteners.
 2. Offset: 2 inches (51 mm).
 3. Minimum Clearance: 2-1/4 inches (57 mm) from face of door.
 4. Overall Length: 9 inches (229 mm).
- F. Straight Pull-Plate Door Pulls: Pull fixed to 0.050-inch- (1.3-mm-) thick plate, 4 inches wide by 16 inches high (102 mm wide by 406 mm high) with square corners and beveled edges.
1. Type: 3/4-inch (19-mm) constant-diameter pull.
 2. Mounting: Surface applied with concealed fasteners.
 3. Minimum Pull Clearance: 1-1/2 inches (38 mm) from face of door.
 4. Overall Pull Length: 9 inches (229 mm).
- G. Single Push Bar: Horizontal-bar type.
1. Mounting: Through bolted with oval-head machine screws and countersunk washers.
 2. Shape and Size: 1-inch (25-mm) constant-diameter round bar.
 3. Minimum Clearance: 1-1/2 inches (38 mm) from face of door.

2.14 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

2.15 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions 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.

- B. Surface Closer with Cover: Grade 1; Modern type with mechanism enclosed in cover.
 - 1. Mounting: Opposite hinge side unless otherwise indicated.
 - 2. Type: Regular arm unless otherwise indicated.
 - 3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
 - 4. Mounting: Opposite hinge side unless otherwise indicated.
 - 5. Type: Regular arm unless otherwise required or scheduled.
 - 6. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
 - 7. Cover Material: Aluminum.
 - 8. Closing Power Adjustment: At least 35 percent more than minimum tested value.

2.16 STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; aluminum base metal.
- B. Dome-Type Floor Stop: Grade 1; with minimum 1-inch- (25-mm-) high bumper for doors without threshold and 1-3/8-inch- (35-mm-) high bumper for doors with threshold.
 - 1. Provide with extruded-aluminum riser for carpet installations.
- C. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch (64-mm) diameter, minimum 3/4-inch (19-mm) projection from wall; with backplate for concealed fastener installation.
 - 1. Bumper Configuration: Convex.

2.17 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
- B. Overhead Concealed Slide Holders: Type 1; Grade 1; hold open and release by push and pull of door unless control is set in inactive position; with stop, shock absorber, and adjustable holding pressure; for doors opening 110 degrees.
 - 1. Door Swing Type: Single acting.

2.18 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:
 - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
 - 3. Gasketing on Double Doors: 0.50 cfm per foot (0.000774 cu. m/s per m) of door opening.
- C. Adhesive-Backed Perimeter Gasketing: Vinyl bulb gasket material applied to frame rabbet with self-adhesive.

- D. Adjustable Astragals for Meeting Stiles: Screw-adjustable, manufacturer's standard gasket material held in place by housing; mounted with screws.
 - 1. Housing Material: Aluminum.
 - 2. Mounting: Surface mounted on face of each door.
- E. Door Sweeps: Manufacturer's standard gasket material held in place by flat housing or flange; surface mounted to face of door with screws.
 - 1. Housing or Flange Material: Aluminum.
- F. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Saddle Thresholds:
 - a. Fluted top, barrier free.
 - 2. Base Metal: Aluminum.

2.19 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Armor Plates: 36 inches (914 mm) high by door width with allowance for frame stops.
 - 2. Kick Plates: 8 inches (203 mm) high by door width with allowance for frame stops.
 - 3. Mop Plates: 6 inches (152 mm) high by 1 inch (25 mm) less than door width.
 - 4. Stretcher Plates: 8 inches (203 mm) high by door width with allowance for frame stops.

2.20 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
- B. Coat Hooks: Grade 1; two curved hooks with rounded ends; 3-inch (75-mm) projection from wall; for surface-screw application.
 - 1. Material: Burnished cast aluminum.
- C. Silencers for Metal Door Frames: Grade 1; neoprene or rubber; minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

2.21 AUXILIARY ELECTRIFIED DOOR HARDWARE

- A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; listed and labeled for use with fire-alarm systems.
- B. Monitor Strikes: Cast strike with toggle.
- C. Door Position Switches: Magnetically operated reed switch designed for concealed mounting.

- D. Door and Frame Transfer Devices: Steel housing for mortise in hinge stile of door, with flexible tube for wiring bundle; accommodating doors that swing open to 120 degrees.

2.22 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-rating 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 indicated, 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.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with 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. Fire-Rated Applications:
 - a. Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.23 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

- 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-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- 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: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
- 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. 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.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches

(750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
 - 2. Furnish permanent cores to Owner for installation.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
 - 1. Configuration: Provide one power supply for each door opening with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 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. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

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

3.6 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.

3.7 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Engage Installer to train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

Hardware Set A

Doors: 1-1 Women, 1-2 Men, 1-3 Lockers, 1-9 Break

Each to Have:

- | | |
|---|---|
| 3 | Standard weight ball-bearing butts, 4.5" x 4.5" |
| 1 | Closer |
| 1 | Push plate |
| 1 | Pull plate |
| 1 | Wall stop |
| 1 | Mop plate |
| 3 | Silencers |

Hardware Set B

Doors: *1-3A Closet, 1-3B Closet*, 1-4 Safe, 1-5 Work Room, 1-6 Communication Room, *1-7B Office*, 1-8 Electrical, *1-9A Water Service*, 1-12 Janitor, 1-18 Storage, 1-20 Storage, 1-21 Storage; ~~2-5 Janitor~~; 2-1 Storage, ~~2-9~~ *2-8* Communications

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5"
- 1 Mortise storeroom lock
- 1 Cylinder
- 1 Wallstop
- 3 Silencers

Hardware Set C

Doors: ~~1-7 Office~~ *1-7A Office*, 1-10 Office

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5"
- 1 Mortise office lock
- 1 Cylinder
- 1 Wallstop
- 3 Silencers

Hardware Set D

Doors: 1-11A Generator, 2-7 ~~Elevator Equipment~~ *Storage*

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5"
- 1 Closer
- 1 Mortise storeroom lock
- 1 Mortise cylinder
- 1 Wallstop
- 1 Kickplate
- 1 Gasketing

Hardware Set E

Doors: 1-11B Generator

Each to Have:

- 3 Standard-weight ball-bearing butts, 4.5" x 4.5," non-ferrous with non-removable pins.
- 1 Closer
- 1 Panic exit device, exit only
- 1 Overhead holder
- 1 Lock guard
- 1 Kick plate
- 1 Bottom sweep
- 1 Threshold
- 1 Weatherstripping
- 1 Rain drip

Hardware Set F

Doors: 1-13A Stair, ~~1-22 Generator~~

Each to Have:

- 3 Standard-weight ball-bearing butts, 4.5" x 4.5 non-ferrous with non-removable pins.
- 1 Closer
- 1 Mortise storeroom lock
- 1 Overhead holder
- 1 Lock guard
- 1 Kick plate
- 1 Bottom sweep
- 1 Threshold
- 1 Rain drip
- 1 Weatherstripping

Hardware Set G

Doors: 1-13B Stair, 1-13C Stair, 2-3B Stair

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5"
- 1 Closer
- 1 Mortise passage set
- 1 Wallstop
- 1 Kickplate
- 3 Silencers

Hardware Set H

Doors: 1-14A ~~Entry Corridor~~, 1-14B ~~Entry Corridor~~, 1-14C ~~Entry Corridor~~

Each to Have:

- 1 Continuous geared hinge, aluminum
- 1 Closer
- 1 Drop plate
- 1 Mortise deadlock with thumb-turn
- 1 Mortise cylinder
- 1 Push bar
- 1 Pull
- 1 Bottom sweep
- 1 Threshold
- 1 Weatherstripping as provided by the aluminum door supplier

Hardware Set I

Doors: 1-25 ~~Corridor~~ **Pedestrian Bridge**, 2-10 Pedestrian Bridge

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5", non-ferrous with non-ferrous pins
- 1 Closer
- 1 Passage set
- 1 Kick plate
- 1 Bottom sweep
- 1 Threshold
- 1 Weatherstripping

Hardware Set J

Doors: 2-3A Stair, 2-4 Corridor

Each to Have:

- 3 Standard weight ball-bearing butts, 4.5" x 4.5", non-ferrous with non-ferrous pins
- 1 Closer
- 1 Mortise entrance lock
- 1 Cylinder
- 1 Kick plate
- 1 Bottom sweep
- 1 Threshold
- 1 Weatherstripping

Hardware Set ~~I~~**K**

Doors: Toll Booth Sliding Doors:

Each to Have:

- 1 Mortise cylinder for Adams Rite locks specified in Section 133423 "Prefabricated Toll Booths."

Hardware Set ~~J~~**L**

Provide 1 each cylinder for Toll booth cash drawer locks.

END OF SECTION 087100