

## **SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)**

### **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. Mechanical door hardware for the following:
    - a. Swinging doors.
  - 2. Cylinders for door hardware specified in other Sections.
  - 3. Electrified door hardware.
- B. Related Requirements:
  - 1. Section 081113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
  - 2. Section 083113 "Access Doors and Frames" for access door hardware.
  - 3. Section 084113 "Aluminum-Framed Entrances and Storefronts" for entrance doors requiring hardware specified in this section.
  - 4. Section 281500 "Access Control Hardware Devices" for access control devices installed at door openings and provided as part of a security system.

#### **1.3 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.

## **1.4 PREINSTALLATION MEETINGS**

- A. Keying Conference: Conduct conference at Project site.
  - 1. Conference participants shall include Installer's Architectural Hardware Consultant and Owner's security consultant.
  - 2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
    - a. Flow of traffic and degree of security required.
    - b. Preliminary key system schematic diagram.
    - c. Requirements for key control system.
    - d. Requirements for access control.
    - e. Address for delivery of keys.

## **1.5 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 Samples for sheet and 4-inch long Samples for other products.
    - a. Full-size Samples, if provided, 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.

## **1.6 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. 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.
- C. 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.
- D. Sample Warranty: For special warranty.

## **1.7 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

- B. Schedules: Final door hardware and keying schedule.

## **1.8 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).

## **1.9 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.

## **1.10 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. 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.

### **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. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design".
  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.
  2. Comply with the following maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
    - b. 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 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.

### **2.3 SCHEDULED DOOR HARDWARE**

- A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.

1. Door hardware is scheduled in Part 3.

## 2.4 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Allegion plc.
  - b. Baldwin Hardware Corporation.
  - c. Bommer Industries, Inc.
  - d. Hager Companies.
  - e. Lawrence Hardware Inc.
  - f. McKinney Products Company; an ASSA ABLOY Group company.
  - g. PBB, Inc.
  - h. Stanley Commercial Hardware; a division of Stanley Security Solutions.

- B. Antifriction-Bearing Hinges:

1. Mounting: Full mortise (butts).
2. Bearing Material: Manufacturer's standard antifriction bearing.
3. Grade 1 (heavy weight).
4. Base and Pin Metal:
  - a. Hinges: Stainless steel with stainless-steel pin.
5. Pins: Non-rising loose unless otherwise indicated.
  - a. Outswinging Exterior Doors: Nonremovable.
  - b. Outswinging Corridor Doors with Locks: Nonremovable.
6. Tips: Flat button.
7. Corners: Square.
8. For use on doors with door closers.

- C. Electrified Antifriction-Bearing Hinges: Full-mortise mounting.

1. Bearing Material: Manufacturer's standard antifriction bearing.
2. Grade 1 (heavy weight).
3. Base and Pin Metal:
  - a. Hinges: Stainless steel with stainless-steel pin.
4. Pins: Nonremovable.
5. Tips: Flat button.

6. Corners: Square.
  7. Electric Feature: Concealed electric through wires.
  8. For use on doors with electrified locksets.
- D. Plain-Bearing Hinges: Grade 3 (standard weight).
1. Mounting: Full mortise (butts).
  2. Base and Pin Metal: Stainless steel with stainless-steel pin.
  3. Pins: Non-rising loose unless otherwise indicated.
    - a. Outswinging Corridor Doors with Locks: Nonremovable.
  4. Tips: Flat button.
  5. Corners: Square.
  6. For use on doors unless otherwise noted.

## 2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Provide mortise locksets for all exterior doors and bored locksets for all interior doors.
- C. 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.
- D. Lock Backset: 2-3/4 inches unless otherwise indicated.
- E. Lock Trim:
1. Description: As selected by Architect from manufacturer's full range of standard designs.
  2. Levers: Wrought, forged, or cast.
    - a. Construction: Solid.
  3. Escutcheons (Roses): Wrought, forged, or cast.
  4. Dummy Trim: Match lever lock trim and escutcheons.
- F. 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. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- G. Bored Locks: BHMA A156.2; Grade 1; Series 4000.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Best Access Systems; Stanley Security Solutions, Inc.
    - c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    - d. SARGENT Manufacturing Company; ASSA ABLOY.
    - e. Yale Security Inc; an ASSA ABLOY Group company.
- H. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Best Access Systems; Stanley Security Solutions, Inc.
    - c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    - d. SARGENT Manufacturing Company; ASSA ABLOY.
    - e. Yale Security Inc; an ASSA ABLOY Group company.

## **2.6 ELECTROMECHANICAL LOCKS**

- A. Electromechanical Locks: BHMA A156.25; Grade 1; motor or solenoid driven; with strike that suits frame.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Best Access Systems; Stanley Security Solutions, Inc.
    - c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    - d. SARGENT Manufacturing Company; ASSA ABLOY.
    - e. Yale Security Inc; an ASSA ABLOY Group company.
  2. Type: Bored (interior) and Mortised (exterior).

## **2.7 MANUAL FLUSH BOLTS**

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.



1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company.
  - b. Allegion plc.
  - c. Burns Manufacturing Incorporated.
  - d. Don-Jo Mfg., Inc.
  - e. Door Controls International, Inc.
  - f. Hiawatha, Inc; a division of the Activar Construction Products Group.
  - g. INOX by Unison Hardware, Inc.
  - h. Trimco.
- B. Manual-Extension Flush Bolts: Grade 1, fabricated from extruded brass or aluminum, with 12-inch rod actuated by flat lever.
  1. Strike: Dustproof.
- C. Dustproof Strikes: Grade 1, polished wrought brass, with 3/4-inch- diameter, spring-tension plunger.

## **2.8 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.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Best Access Systems; Stanley Security Solutions, Inc.
    - c. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    - d. SARGENT Manufacturing Company; ASSA ABLOY.
    - e. Yale Security Inc; an ASSA ABLOY Group company.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.
  1. Core Type: Full size; interchangeable.
  2. Number of Pins: Six or seven.
  3. Lock Type: Mortise, rim, and bored lock types.
- C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

**2.9 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.
  - 1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
    - a. Provide three cylinder change keys and five each of master and grand master keys.
  - 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver or brass.

**2.10 OPERATING TRIM**

- A. Operating trim for storefront doors and entrances shall be provided by manufacturer as part of complete system. Operating trim shall be similar to hardware listed below.
- B. Operating Trim: BHMA A156.6; aluminum or stainless steel unless otherwise indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Burns Manufacturing Incorporated.
    - c. Don-Jo Mfg., Inc.
    - d. Forms+Surfaces.
    - e. Hager Companies.
    - f. Hiawatha, Inc; a division of the Activar Construction Products Group.
    - g. INOX by Unison Hardware, Inc.
    - h. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
    - i. Trimco.
- C. Flat Push Plates: With square corners and beveled edges; secured with exposed screws.
  - 1. Thickness: 0.050 inch.
  - 2. Size: 4 inches wide by 16 inches high.
- D. Straight Door Pulls: For interior wood and hollow metal doors.
  - 1. Type: 3/4-inch constant-diameter pull.

2. Mounting: Surface applied with concealed fasteners, through bolted with oval-head machine screws and countersunk washers, or back to back with threaded sleeves.
  3. Minimum Clearance: 1-1/2 inches from face of door.
  4. Overall Length: 9 inches.
- E. Offset Door Pulls: 1-inch constant-diameter pull for exterior hollow metal and storefront doors.
1. Mounting: Surface applied with concealed fasteners, through bolted with oval-head machine screws and countersunk washers, or back to back with threaded sleeves.
  2. Offset: 2 inches.
  3. Minimum Clearance: 2-1/4 inches from face of door.
  4. Overall Length: 9 inches.
- F. Single Push Bar: Horizontal-bar type for storefront doors.
1. Mounting: Surface applied with concealed fasteners or through bolted with oval-head machine screws and countersunk washers.
  2. Shape and Size: 1-inch constant-diameter round bar.
  3. Minimum Clearance: 1-1/2 inches from face of door.

## 2.11 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. Closers shall not be seen on the public side or hallway side of the door. The appropriate drop plate or mounting plates will be used as conditions dictate.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
    - c. DORMA USA, Inc.
    - d. Hager Companies.
    - e. Norton Door Controls; an ASSA ABLOY Group company.
    - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
    - g. SARGENT Manufacturing Company; ASSA ABLOY.
    - h. Yale Security Inc; an ASSA ABLOY Group company.
- C. Surface Closer with Cover: Grade 1; Modern type with mechanism enclosed in cover.

1. Mounting: Hinge side; parallel arm where required.
2. Type: Regular arm with dead stop where required.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Cover Material: Aluminum or molded plastic.
5. Closing Power Adjustment: At least 35 percent more than minimum tested value.

## **2.12 MECHANICAL STOPS AND HOLDERS**

- A. Wall-Mounted Stops: BHMA A156.16; polished cast brass, bronze, stainless steel, or aluminum base metal.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Architectural Builders Hardware Mfg., Inc.
    - c. Baldwin Hardware Corporation.
    - d. Burns Manufacturing Incorporated.
    - e. Cal-Royal Products, Inc.
    - f. Don-Jo Mfg., Inc.
    - g. Door Controls International, Inc.
    - h. Hager Companies.
    - i. Hiawatha, Inc; a division of the Activar Construction Products Group.
    - j. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
    - k. Trimco.
- B. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch diameter, minimum 3/4-inch projection from wall; with backplate for concealed fastener installation.
1. Bumper Configuration: Concave.

## **2.13 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.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. M-D Building Products, Inc.
    - c. National Guard Products, Inc.
    - d. Pemko Manufacturing Co.
    - e. Reese Enterprises, Inc.
    - f. Sealeze.
    - g. Zero International, Inc.

- B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:
  - 1. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
  - 2. Gasketing on Double Doors: 0.50 cfm per foot of door opening.
- C. Astragals for Meeting Stiles: Silicone, neoprene, or vinyl bulb gasket material held in place by housing; mounted with screws.
  - 1. Housing Material: Aluminum.
  - 2. Mounting: Surface mounted on face of door.
- D. Rigid, Housed, Perimeter Gasketing: Sponge silicone, sponge neoprene, silicone bulb, polyurethane bulb, or vinyl bulb gasket material held in place by housing; fastened to frame stop with screws.
  - 1. Housing Material: Aluminum or stainless steel.
- E. Door Sweeps: Neoprene, vinyl, polyurethane, or silicone gasket material held in place by flat housing or flange; surface mounted to face of door with screws.
  - 1. Housing or Flange Material: Aluminum or stainless steel.

## 2.14 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Hager Companies.
    - b. M-D Building Products, Inc.
    - c. National Guard Products, Inc.
    - d. Pemko Manufacturing Co.
    - e. Reese Enterprises, Inc.
    - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
    - g. Sealeze.
    - h. Zero International, Inc.
- B. Saddle Thresholds:
  - 1. Type: Smooth or fluted top, barrier free.
  - 2. Base Metal: Aluminum or stainless steel.

**2.15 METAL PROTECTIVE TRIM UNITS**

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Burns Manufacturing Incorporated.
    - c. Don-Jo Mfg., Inc.
    - d. Hager Companies.
    - e. Hiawatha, Inc; a division of the Activar Construction Products Group.
    - f. Inpro Corporation.
    - g. Pawling Corporation.
    - h. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
    - i. Trimco.
- B. Kick Plates: 8 inches high by door width with allowance for frame stops.

**2.16 AUXILIARY DOOR HARDWARE**

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

**2.17 AUXILIARY ELECTRIFIED DOOR HARDWARE**

- A. Auxiliary Electrified Door Hardware:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allegion plc.
    - b. Door Controls International, Inc.
    - c. DORMA USA, Inc.
    - d. DynaLock Corp.
    - e. GE Security, Inc.
    - f. Hager Companies.
    - g. PAMEX Inc.
    - h. PDQ Manufacturing.
    - i. Precision Hardware, Inc.; a Stanley company.
    - j. Rutherford Controls Int'l. Corp.
    - k. SARGENT Manufacturing Company; ASSA ABLOY.
    - l. Securitron Magnalock Corporation; an ASSA ABLOY Group company.

m. Security Door Controls.

- B. 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.

## 2.18 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. Wood or Machine Screws: For the following:
      - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and 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) Closers to doors and frames.
      - 2) 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.

## **2.19 FINISHES**

- A. Provide finishes complying with BHMA A156.18. Unless otherwise noted, provide stainless steel (630) or satin chrome (626) finish.
- 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.



2. Wood Doors: DHI's "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. 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 not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent.
- D. 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.
- E. Boxed Power Supplies: Locate power supplies above accessible ceilings or in equipment and storage rooms. Verify location with Architect.
1. Configuration: Least number of power supplies required to adequately serve doors.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- G. Perimeter Gasketing: Apply to head, jamb, and meeting stiles forming seal between door and frame.
1. Do not notch perimeter gasketing to install other surface-applied hardware.
- H. Door Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

### **3.4 FIELD QUALITY CONTROL**

- A. Independent Architectural Hardware Consultant: Owner may 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.
- B. Occupancy Adjustment: Approximately six 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 SERVICE**

- 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 1

Hinges  
Storeroom Lockset

#### Hardware Set 2

Hinges  
Offset Door Pull and Push Bar  
Keyed Cylinder and Thumbturn with Dead/Hook Latch  
Door Closer  
Threshold  
Perimeter Gasketing (Weather-stripping)

#### Hardware Set 3

Hinges  
Entrance Lockset on Active Leaf  
Flush Bolts Top/Bottom of Inactive Leaf  
Door Closer with Dead Stop on Active Leaf  
Threshold  
Perimeter Gasketing (Weather-stripping)  
Astragal(s) at Meeting Stiles

#### Hardware Set 4

Hinges  
Privacy Lockset  
Wall Stop

#### Hardware Set 5

Hinges  
Office Lockset  
Wall Stop

#### Hardware Set 6

Hinges  
Passage Lockset  
Wall Stop

#### Hardware Set 7

Hinges  
Privacy Lockset  
Door Closer  
Wall Stop

Hardware Set 8

Hinges  
Passage Lockset  
Door Closer  
Wall Stop

Hardware Set 9

Hinges (Provide Electric Transfer Hinge)  
Electrified Storeroom Lockset  
Power Supply  
Credential Reader

Hardware Set 10

Hinges (Provide Electric Transfer Hinge)  
Electrified Storeroom Lockset  
Wall Stop  
Power Supply  
Credential Reader

Hardware Set 11

Hinges (Provide Electric Transfer Hinge)  
Electrified Storeroom Lockset  
Door Closer  
Wall Stop  
Perimeter Gasketing (Weather-stripping)  
Power Supply  
Credential Reader

Hardware Set 12

Hinges  
Passage Lockset  
Door Closer with Dead Stop  
Kick Plate

Hardware Set 13

Hinges  
Passage Lockset  
Door Closer  
Wall Stop  
Kick Plate

Hardware Set 14

Hinges (Provide Electric Transfer Hinge)  
Electrified Storeroom Lockset  
Door Closer  
Threshold  
Perimeter Gasketing (Weather-stripping)  
Kick Plate  
Power Supply  
Credential Reader

Hardware Set 15

Hinges  
Push Plate and Pull Handles Both Leaves  
Door Closers Both Leaves  
Kick Plates Both Leaves

Hardware Set 16

Hinges  
Push Plate and Pull Handle  
Door Closer with Dead Stop  
Kick Plate

Hardware Set 17

Hinges  
Dummy Trim  
Roller Latches

**END OF SECTION 087111**