

SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

PART 1 - GENERAL

1.1 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. Products furnished, but not installed, under this Section include the products listed below. Coordinating and scheduling the purchase and delivery of these products remain requirements of this Section.

1. Thresholds weather stripping to be installed under other Sections.
2. Permanent lock cores to be installed by Owner.

1.2 ACTION SUBMITTALS

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

B. Shop Drawings: Details of electrified door hardware.

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

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Door Hardware: One additional item.
 2. Electrical Parts: One item for each replaceable part.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Architectural Hardware Consultant Qualifications: A person who is 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 follows:
 1. For door hardware, and who is also an Electrified Hardware Consultant (EHC) .
- C. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies 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, unless otherwise indicated.
- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet 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.
- F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- G. 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.
- H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines ICC/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 (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 and 3/4 inch (19 mm) high for exterior sliding doors.
 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- I. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- B. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Electromagnetic Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Five years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Articles to comply with requirements in this Section.
 1. Door Hardware Sets: Provide quantity, item, size, finish or color to match existing hardware..
 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 Schedule" Article. Products are identified by descriptive titles corresponding to requirements specified in Part 2.

2.2 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. Baldwin Hardware Corporation.
- b. Bommer Industries, Inc.
- c. Cal-Royal Products, Inc.
- d. Hager Companies.
- e. IVES Hardware; an Ingersoll-Rand company.
- f. Lawrence Hardware Inc.
- g. McKinney Products Company; an ASSA ABLOY Group company.
- h. PBB, Inc.
- i. Stanley Commercial Hardware; Div. of The Stanley Works.

- B. Antifriction-Bearing Hinges:

- 1. Mounting: Full mortise (butts).
- 2. Bearing Material: Ball bearing.
- 3. Grade: Grade 2 .
- 4. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pinads.
 - b. Interior Hinges: Brass with stainless-steel pin body and brass protruding heads.
 - c. Hinges for Fire-Rated Assemblies: 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. Options: Raised barrel.

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

- 1. Bearing Material: Manufacturer's standard antifriction bearing.
- 2. Grade: Grade 1 (heavy weight).
- 3. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pin.
 - b. Interior Hinges: Brass with stainless-steel pin body and brass protruding heads.
 - c. Hinges for Fire-Rated Assemblies: Stainless steel with stainless-steel pin.

4. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Nonremovable.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
5. Tips: Flat button.
6. Corners: Square.
7. Options: Raised barrel.
8. Electric Option: Concealed electric through wires.

D. Plain-Bearing Hinges: Grade 3 (standard weight).

1. Mounting: Full mortise (butts)
2. Base and Pin Metal: Brass with stainless-steel pin body and brass protruding heads.
3. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Corridor Doors with Locks: Nonremovable.
4. Tips: Flat button.
5. Corners: Square.
6. Options: Raised barrel.

E. Electrified Plain-Bearing Hinges: Grade 3 (standard weight); full-mortise mounting.

1. Mounting: Full mortise (butts).
2. Pins: Non-rising loose unless otherwise indicated
 - a. Outswinging Corridor Doors with Locks: Nonremovable.
3. Tips: Flat button.
4. Corners: Square.
5. Options: Raised barrel.
6. Electric Option: Concealed electric through wires.

F. Swing-Clear Hinges: Reversible.

1. Mounting: Full mortise (butts).
2. Bearing, and Grade: Antifriction bearing, Grade 1 (heavy weight).
3. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Exterior Doors: Nonremovable.
 - b. Outswinging Corridor Doors with Locks: Nonremovable.
4. Tips: Flat button.
5. Corners: Square.
6. Options: Raised barrel.

2.3 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Bommer Industries, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Hager Companies.
 - e. Lawrence Hardware Inc.
 - f. McKinney Products Company; an ASSA ABLOY Group company.
 - g. PBB, Inc.
 - h. Stanley Commercial Hardware; Div. of The Stanley Works.
 - B. Spring Hinges: Grade 1; wrought steel, with torsion spring.
 1. Type: Single acting.
 2. Mounting: Full mortise (butts)
 - C. Horizontal-Spring Pivot Sets: Grade 3; double acting; non-handed; consisting of wrought steel bottom pivot hinge with antifriction bearing and nylon top pivot and socket.
 1. Type: Non-hold open.
 2. Tension: Adjustable.
 3. Bottom Pivot Trim: Brass.
 4. Bottom Plate: For bottom hinge attachment to floor.
 - D. Gate-Spring Pivot Sets: Grade 1; double acting; non-handed; consisting of bottom pivot with door and jamb bracket and top pivot assembly with jamb bracket.
 1. Mounting: Mortise.
 2. Tension: Adjustable.
 3. Base Metal: Cast, forged, or extruded brass or bronze.
 - E. Gravity Pivot Sets: Grade 3; double acting; surface mounting; non-handed; consisting of bottom pivot with door and jamb bracket and top pivot assembly with jamb bracket.
 1. Tension: Adjustable.
 2. Base Metal: Wrought brass or bronze.
- 2.4 CENTER-HUNG AND OFFSET PIVOTS
- A. Center-Hung and Offset Pivots: BHMA A156.4.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - B. Center-Hung Pivot Sets: Grade 1.

1. Top Pivots: Walking-beam type with retractable pin and oil-impregnated bronze bearing; mortised into door and frame.
2. Bottom Pivots: Recessed in floor in cement case.
3. Base Metal: Brass.

C. Offset Pivot Sets: Grade 1.

1. Offset: 3/4 inch (19 mm)
2. Top Pivot: Full-mortise mounting; walking-beam type with retractable pin and oil-impregnated bronze bearing.
 - a. Knuckle: Standard.
3. Bottom Pivot: Recessed in floor in cement case, and mortised into door; with thrust ball bearing.
4. Base Metal: Brass.

D. Offset Intermediate Pivots: Grade 1; for use with offset pivot sets; with oil-impregnated bronze bearings.

1. Mounting: Full mortise, 3/4 inch (19 mm) offset.
2. Knuckle: Standard.
3. Base Metal: Brass.

E. Pocket Pivots: Grade 1; full-mortise mounting; non-handed; allows door to nest in pocket with door surface flush with corridor wall when open; maximum 90-degree swing.

1. Base Metal: Bronze.

2.5 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Pin-and-Barrel-Type Hinges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Lawrence Hardware Inc.
 - d. Markar Architectural Products, Inc.; a subsidiary of Adams Rite Manufacturing Co.
 - e. McKinney Products Company; an ASSA ABLOY Group company.
 - f. Select Products Limited.
 - g. Zero International.
2. Grade: Grade 1-150.
3. Exterior Hinges: Stainless steel.
4. Interior Hinges: Stainless steel.

5. Hinges for Fire-Rated Assemblies: Stainless steel with steel fire pins to hold fire-rated doors in place if required by tested listing.
 6. Type: Full surface with removable continuous caps over fasteners
- C. 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bommer Industries, Inc.
 - b. Cal-Royal Products, Inc.
 - c. Hager Companies.
 - d. IVES Hardware; an Ingersoll-Rand company.
 - e. McKinney Products Company; an ASSA ABLOY Group company.
 - f. Select Products Limited.
 - g. Stanley Commercial Hardware; Div. of The Stanley Works.
 - h. Zero International.
 2. Grade: Grade 1-150.
 3. Hinges for Fire-Rated Assemblies: With steel fire pins to hold fire-rated doors in place if required by tested listing.
 4. Mounting: Full surface, with removable continuous caps over fasteners.

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).
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- D. Lock Trim:
1. Description: As indicated on Drawings.
- 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.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Falcon Lock; an Ingersoll-Rand company.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.
 - m. Yale Security Inc.; an ASSA ABLOY Group company.

G. 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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. Cal-Royal Products, Inc.
 - f. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - g. Falcon Lock; an Ingersoll-Rand company.
 - h. Marks USA.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Yale Security Inc.; an ASSA ABLOY Group company.

2.7 AUXILIARY LOCKS

A. Bored Auxiliary Locks: BHMA A156.5: Grade 1; with strike that suits frame.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Falcon Lock; an Ingersoll-Rand company.

- e. Hager Companies.
 - f. K2 Commercial Hardware; a Black & Decker Corp. company.
 - g. Marks USA.
 - h. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - i. PDQ Manufacturing.
 - j. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - k. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - l. Weiser Lock Corp.; a Black & Decker Corp. company.
 - m. Yale Security Inc.; an ASSA ABLOY Group company.
- 2. Backset: 2-3/8 inches (60 mm).
 - 3. Material: Stainless steel.
 - 4. Deadlatches: Deadlocking latchbolt operated by key outside and turn inside.
 - 5. Deadlocks: Deadbolt operated by key outside and turn inside.
- B. Mortise Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Arrow USA; an ASSA ABLOY Group company.
 - d. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - f. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - g. Yale Security Inc.; an ASSA ABLOY Group company.
 - 2. Backset: 2-3/8 inches (60 mm).
 - 3. Material: Stainless steel.
 - 4. Deadlocks: Deadbolt operated by key outside and turn inside.
 - 5. Deadlatches: Latchbolt and auxiliary deadlatch operated by key outside and turn inside.
 - 6. Deadlocks for Sliding Doors: Expanding- or interlocking-type deadbolt operated by key outside and turn inside.
 - 7. Deadlatches for Sliding Doors: Hook-type latchbolt operated by key outside and handle inside.
- C. Narrow Stile Auxiliary Locks: BHMA A156.5; Grade1; with strike that suits frame.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Accurate Lock & Hardware Co.
 - b. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - 2. Backset: 1.125 inches (29 mm).
 - 3. Strike: Flat.
 - 4. Case Material: Stainless steel.
 - 5. Armored Front and Strike Material: Stainless steel.
 - 6. Deadlock: Deadlocking bolt.

- a. Operation: Key outside and operating trim inside.
 - b. Door Application: Sliding door.
- 7. Deadlatch: Latchbolt with auxiliary deadlatch operated by key outside and paddle or lever inside; for single swinging doors.
- 8. Multipoint Lock: Deadlocking bolt for pairs of swinging doors.
 - a. Operation: Key outside and turn, lever, or knob inside.
 - b. Type: Two point.
- 9. Latch/Lock: Deadbolt and latchbolt; both operated by key both sides; inside handle operates only latchbolt.
- D. Push-Button Combination Locks: BHMA A156.5; Grade 1; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Kaba Ilco Corp.; a Kaba Group company.
 - 2. Lockset Configuration: Standard with inside push button.
 - 3. Auxiliary Lock Configuration: Deadbolt.
 - 4. Override: By key cylinder.

2.8 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Door Controls International, Inc.
 - b. Dortronics Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - g. Security Door Controls.
 - 2. Direct-Hold Type: Lock mounted on side of jamb; strike flush mounted on door push side.
 - 3. Strength Ranking: 1000 lbf (4448 N).
 - 4. Inductive Kickback Peak Voltage: Not more than 53 V.
 - 5. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.
 - 6. Options:

- a. Magnetic bond sensor.
 - b. Continuous housing for full width of door.
 - c. Continuous housing for full height of door.
 - d. Single LED indicators.
 - e. Double LED indicators.
 - f. Adjustable time delay with automatic relock.
 - g. Integral door position switch.
 - h. <Insert option>.
- B. Delayed-Egress Electromagnetic Locks: BHMA A156.24, electrically powered, with electromagnet attached to frame and armature plate attached to door; depressing push bar for more than 3 seconds initiates irreversible alarm and 15-second delay for egress. When integrated with fire alarm, fire alarm voids 15-second delay.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Door Controls International, Inc.
 - b. Doorguard Systems, Inc.
 - c. DynaLock Corp.
 - d. Rutherford Controls Int'l. Corp.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
 - 2. Grade: Security Grade, activated from secure side of door by initiating device.

2.9 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade [1] [2]; motor or solenoid driven; mortise latchbolt; with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Brink, R. R., Locking Systems, Inc.
 - c. DynaLock Corp.
 - d. Marks USA.
 - e. Rutherford Controls Int'l. Corp.
 - f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - g. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - h. Security Door Controls.
 - i. Yale Security Inc.; an ASSA ABLOY Group company.

2.10 SELF-CONTAINED ELECTRONIC LOCKS

- A. Self-Contained Electronic Locks: BHMA A156.25, mortise; with 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, and strike that suits

frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Kaba Ilco Corp.; a Kaba Group company.
 - c. Marks USA.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - e. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - f. Yale Security Inc.; an ASSA ABLOY Group company.
2. Actuating Device: Digital keypad.
3. Faceplate Material: Stainless steel.
4. Trim: Match trim specified for mechanical locks.
5. Function: Latch with key.

2.11 EXIT LOCKS AND EXIT ALARMS

A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Detex Corporation.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

B. Exit Locks: Surface mounted; battery powered, housed in metal case; with manufacturer's standard strike that suits frame; with red-and-white lettering reading "EMERGENCY EXIT PUSH TO OPEN--ALARM WILL SOUND."

1. Single-Door Type: Activated by horizontal bar.
2. Options:
 - a. Low-battery alert.
 - b. Outside key control.
 - c. Audible alarm that sounds when unauthorized use of door occurs.
 - d. Silent alarm with remote signal capability for connection to remote indicating panel.
 - e. Strike: Mortise.

C. Stand-Alone Exit Alarms: Mounted separate from door and activated by door movement switch.

1. Options:
 - a. Low-battery alert.
 - b. Outside key control.
 - c. Audible alarm that sounds when unauthorized use of door occurs.

- d. Automatic rearming after authorized use, with adjustable time delay.
- e. Remote signal capability for connection to remote indicating panel.

2.12 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Door Controls International, Inc.
 - d. IVES Hardware; an Ingersoll-Rand company.
 - e. Trimco.

B. Half-Round Surface Bolts: Grade 1, 6-inch (152-mm) polished-brass or burnished-steel, half-round rod and knob; minimum 7/8-inch (22-mm) throw; with universal strike.

2.13 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Burns Manufacturing Incorporated.
 - c. Don-Jo Mfg., Inc.
 - d. Door Controls International, Inc.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; an Ingersoll-Rand company.
 - g. Trimco.

B. Manual-Extension Flush Bolts: Grade 1, fabricated from extruded brass or aluminum, with 12-inch (305-mm) rod actuated by flat lever; listed and labeled for fire-rated doors. Provide with matching dustproof strike.

C. Slide Flush Bolts: Grade 1, cast brass, with rod actuated by slide. Provide with matching dustproof strike.

D. Tubular Bolts: Grade 1, polished-brass or polished-bronze, oval turn knob and escutcheon; minimum 9/16-inch (14-mm) steel bolt with 1/2-inch (13-mm) throw. Provide with matching dustproof strike.

E. Dustproof Strikes: Locking type, Grade 1, polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.

2.14 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
- a. Cal-Royal Products, Inc.
 - b. Door Controls International, Inc.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Trimco.
- B. Automatic Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically retract when active leaf is opened and that automatically engage when active door depresses bolt trigger[; listed and labeled for fire-rated doors]. Provide brass or stainless-steel cover plate, top and bottom [matching] [dustproof] strikes, guides, guide supports, wear plates, and shims.
- C. Self-Latching Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically engage when active door depresses trigger[; listed and labeled for fire-rated doors]. Bolts are manually retracted by a slide in the bolt face. Provide brass or stainless-steel cover plate, [matching] [dustproof] top and bottom strikes, guides, guide supports, wear plates, and shims.
- D. Dustproof Strikes: Locking type, Grade 1, polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.

2.15 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Arrow USA; an ASSA ABLOY Group company.
 - c. Cal-Royal Products, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Detex Corporation.
 - f. Door Controls International, Inc.
 - g. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - h. Dor-O-Matic; an Ingersoll-Rand company.
 - i. K2 Commercial Hardware; a Black & Decker Corp. company.
 - j. Monarch Exit Devices & Panic Hardware; an Ingersoll-Rand company.
 - k. Precision Hardware, Inc.; Division of Stanley Security Solutions, Inc.
 - l. Rutherford Controls Int'l. Corp.
 - m. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - n. Von Duprin; an Ingersoll-Rand company.
 - o. Yale Security Inc.; an ASSA ABLOY Group company.

- 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: Type 1, rim.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- E. Mortise Exit Devices: Grade 1.
 - 1. Type: Type 3.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- F. Surface Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: Type 2.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Cross bar.
 - 4. Material: Stainless steel.
 - 5. Configuration: Top and bottom rods.
 - 6. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
- G. Concealed Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: Type 6, narrow stile.

2. Grade: Grade 1.
3. Actuating Bar: Cross bar.
4. Material: Stainless steel
5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
 - f. <Insert option>.

H. Combination Exit Devices: Grade 1.

1. Type Type 12, mortise and concealed vertical rod.
2. Grade: Grade 1.
3. Actuating Bar: Cross bar
4. Material: Stainless steel.
5. Electrified Options:
 - a. Pushpad monitor switch.
 - b. Double-pushpad monitor switch.
 - c. Electric locking and unlocking.
 - d. Delayed egress.
 - e. Alarm.
 - f. <Insert option>.

I. Automatic Latching Two-Point Bolts: Grade 1.

1. Type: Type 24, surface.
2. Material: Stainless steel.

J. Extension Flush Bolt Sets: BHMA A156.3; Grade 1.

1. Type: Type 27, self-latching.
2. Material: Stainless steel.

K. Electronic Exit Bars: Nonlatching electronic actuating (releasing) device activated by an adjustable capacitance sensor and 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 (4.9 m) of cord to route wiring off the door frame.

L. Exit Device Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.

1. Match design for lock trim, unless otherwise indicated.

2.16 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. ASSA, Inc.; an ASSA ABLOY Group company.
 - c. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - d. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - e. Falcon Lock; an Ingersoll-Rand company.
 - f. Medeco Security Locks, Inc.; an ASSA ABLOY Group company.
 - g. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - h. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - i. Yale Security Inc.; an ASSA ABLOY Group company.

B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are interchangeable ; face finished to match lockset.

1. Number of Pins: Seven.
2. Type: Mortise type.

C. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type M, mechanical; permanent cores that are removable; face finished to match lockset.

1. Number of Pins: Seven.
2. Type: Mortise.

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

2.17 KEYING

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

1. No Master Key System: Only change keys operate cylinder.
2. Master Key System: Change keys and a master key operate cylinders.
3. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
4. Great-Grand Master Key System: Change keys, a master key, a grand master key, and a great-grand master key operate cylinders.
5. Existing System:

- a. Master key or grand master key locks to Owner's existing system.
- b. Re-key Owner's existing master key system into new keying system.

6. Keyed Alike: Key all cylinders to same change key.

B. Keys: Brass.

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

- a. Notation: Information to be furnished by Owner.
- 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.

2.18 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5; 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 50 percent of the number of locks.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Key Boxes and Cabinets.
 - b. GE Security, Inc.
 - c. HPC, Inc.
 - d. Lund Equipment Co., Inc.
 - e. MMF Industries.
 - f. Tri Palm International.
 - 2. 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.
 - 3. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
 - 4. Portable Cabinet: Tray for mounting in file cabinet, equipped with key-holding panels, envelopes, and cross-index system.

2.19 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Burns Manufacturing Incorporated.
 - b. Don-Jo Mfg., Inc.
 - c. Forms + Surfaces.
 - d. Hager Companies.
 - e. Hiawatha, Inc.
 - f. IVES Hardware; An Ingersoll-Rand Company.
 - g. Rockwood Manufacturing Company.
 - h. Trimco.
 - i. Dorma.

- B. Flat Push Plates: 0.050 inch (1.3 mm), 4 inches wide by 16 inches high (102 mm wide by 406 mm high) with square corners and beveled edges; secured with exposed screws.
- C. Straight Door Pulls: With minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Type: 3/4-inch (19-mm) constant-diameter pull.
 - 2. Mounting: Back to back with threaded sleeves.
 - 3. Overall Length: 9 inches (229 mm).
- D. Offset Door Pulls: 1-inch (25-mm constant-diameter pull with minimum clearance of 2-1/4 inches (57 mm) from face of door and offset of 2 inches (51 mm).
 - 1. Mounting: Back to back with threaded sleeves.
 - 2. Overall Length: 9 inches (229 mm).
- E. Flush Door Pulls: Mortised 1/2 inch (13 mm) deep; secured with screws.
 - 1. Shape: Rectangular with rectangular recess.
 - 2. Size: 3-1/2 inches wide by 4-3/4 inches high (89 mm wide by 121 mm high).
- F. Straight Pull-Plate Door Pulls: 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; pull with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Type: 3/4-inch (19-mm) constant-diameter pull.
 - 2. Mounting: Surface applied with concealed fasteners.
 - 3. Overall Pull Length: 9 inches (229 mm).
- G. Offset Push-Pull Door Pulls: 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-inch (25-mm) constant-diameter pull with minimum clearance of 2-1/4 inches (57 mm) from face of door and offset of 2 inches (51 mm).
 - 1. Overall Pull Length: 9 inches (229 mm).
- H. Single Push Bar: Horizontal bar, with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Shape and Size: 1-inch (25-mm) constant-diameter round bar.
 - 2. Mounting: Through bolted with oval-head machine screws and countersunk washers.
- I. Double Pull Bar: Two horizontal bars connected by matching vertical pull bar and spaced at 8 inches (200 mm) o.c.; with minimum clearance of 1-1/2 inches (38 mm) from face of door.
 - 1. Shape and Size: 1-inch (25-mm) constant-diameter round bars.
 - 2. Mounting: Through bolted with oval-head machine screws and countersunk washers.

2.20 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; and with internal override.

- B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- C. Flat Overlapping Astragals: BHMA A156.22; flat stainless steel metal bar, surface mounted on face of door with screws; minimum 1/8 inch (3.2 mm) thick by 2 inches (51 mm) wide by full height of door.
- D. Rigid, Housed Astragals: BHMA A156.22; gasket material held in place by metal housing; fastened to face of door with screws.
 - 1. Gasket Material: Neoprene.
 - 2. Housing Material: Aluminum.
- E. Overlapping-with-Gasket Astragals: BHMA A156.22; T-shaped metal, surface mounted on edge of door with screws; with integral gasket and base metal as follows:
 - 1. Base Metal: Aluminum.
 - 2. Gasket Material: Silicone.

2.21 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 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.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - d. Dor-O-Matic; an Ingersoll-Rand company.
 - e. K2 Commercial Hardware; a Black & Decker Corp. company.
 - f. LCN Closers; an Ingersoll-Rand company.
 - g. Norton Door Controls; an ASSA ABLOY Group company.
 - h. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - i. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - j. Yale Security Inc.; an ASSA ABLOY Group company.
- B. Cast-Aluminum Surface Closers: Grade 1; Traditional Type with mechanism enclosed in cast-aluminum alloy shell.
 - 1. Mounting: Hinge side.
 - 2. Type: Regular arm.
 - 3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
- C. Surface Closer without Cover: Grade 1; Modern Type.

1. Mounting: Hinge side top jamb.
2. Type: Regular arm.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Closing Power Adjustment: At least 35 percent more than minimum tested value.

D. Surface Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.

1. Mounting: Hinge side, top jamb.
2. Type: Regular arm.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Cover Material: Aluminum.
5. Closing Power Adjustment: At least 35 percent more than minimum tested value.

2.22 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. 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.

1. Manufacturers: Subject to compliance with requirements, [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. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - b. LCN Closers; an Ingersoll-Rand company.
 - c. Norton Door Controls; an ASSA ABLOY Group company.
 - d. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

B. Concealed-in-Door Closer: Grade 1; mortised into top rail of minimum 1-3/4-inch- (44-mm-) thick doors and track mortised into head frame; with double lever arm indicated.

1. Type: Mortised soffit plate.
2. Arm: Regular.
3. Closing Power Adjustment: At least 50 percent more than minimum tested value.

C. Concealed Overhead Closer: Grade 1; mortised into head frame; with cast-metal body and exposed cover plate.

1. Type: Concealed arm and track, butt or pivot hung, single acting.
2. Arm: Regular.
3. Track: Regular.
4. Cover Plate Material: Aluminum.
5. Backcheck: Adjustable.
6. Closing Power Adjustment: At least 50 percent more than minimum tested value.

D. Concealed Floor Closer: Grade 1; with cement case and cast-iron closer body case and top pivot; for single acting doors.

1. Type: Center pivoted; include top pivot.

2. Fire Rated: Listed for use with labeled fire-rated doors where indicated.
3. Function: Regular.
4. Backcheck: Adjustable.
5. Closing Power Adjustment: At least 50 percent more than minimum tested value.
6. Case Depth: Regular, 4 inches (100 mm).
7. Floor Plates: Provide recessed floor plates with insert of floor finish material and extended closer spindle to accommodate thickness of floor finish unless thresholds are indicated.
 - a. Material: Aluminum.

2.23 CLOSER HOLDER RELEASE DEVICES

- A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by [smoke detection system] [loss of power].
 1. Manufacturers: Subject to compliance with requirements, [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. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - c. LCN Closers; an Ingersoll-Rand company.
 - d. Norton Door Controls; an ASSA ABLOY Group company.
 - e. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 2. Type: Single-point hold open.
 3. Mounting: Surface mounted on face of door.
 4. Options: Adjustable backcheck.

2.24 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Baldwin Hardware Corporation.
 - c. Burns Manufacturing Incorporated.
 - d. Cal-Royal Products, Inc.
 - e. Don-Jo Mfg., Inc.
 - f. Door Controls International, Inc.
 - g. Hager Companies.
 - h. Hiawatha, Inc.
 - i. IVES Hardware; an Ingersoll-Rand company.

- j. Rockwood Manufacturing Company.
- k. Stanley Commercial Hardware; Div. of The Stanley Works.
- l. Trimco.

- B. Rigid-Type Floor Stop: Grade 1; with rubber bumper; for surface-screw application.
- C. 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 ; provide with extruded aluminum riser for carpet installations.
- D. Combination Floor Stop and Holder: Grade 1; for surface-screw application; with automatic hold open and release by pushing door.
- E. Manual Combination Floor Stop and Holder: Grade 1; 3-1/2 inches (89 mm) long, with holder, keeper, and rubber bumper; for surface-screw application.
- F. Chain Door Stops: Grade 2; welded chain, each end attached to compression springs, both covered with protective sleeve; for surface-screw application.
- G. 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; with concave bumper configuration.
- H. Roller-Type Wall Bumpers: Grade 1; minimum 4-3/8-inch (111-mm) projection from wall; for surface-screw application.
- I. Lever-Type Door Holders: Grade 1; minimum 4-inch- (102-mm-) long arm that swings up and remains in vertical position; with replaceable rubber tip; for surface-screw application.
- J. Plunger-Type Door Holders: Grade 1; minimum 1-1/8-inch (29-mm) plunger throw; with replaceable rubber tip; for surface-screw application.

2.25 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; [wall-mounted electromagnetic single] [floor-mounted electromagnet single] [floor-mounted electromagnet double] unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.26 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8; type and grade as indicated in door hardware schedule.

1. Manufacturers: Subject to compliance with requirements, [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. Architectural Builders Hardware Mfg., Inc.
 - b. Glynn-Johnson; An Ingersoll-Rand Company.
 - c. Rockwood Manufacturing Company.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.27 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; 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] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Sealeze; a unit of Jason Incorporated.
 - g. Zero International.
- B. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame rabbet with self-adhesive.
- C. Spring-Metal Perimeter Gasketing: Minimum 0.012-inch- (0.30-mm-) thick aluminum gasket material fastened to frame rabbet with nails or screws.
- D. Rigid, Housed, Perimeter Gasketing: Sponge silicone gasket material held in place by aluminum housing; fastened to frame stop with screws.
- E. Adjustable, Housed, Perimeter Gasketing: Screw-adjustable sponge silicone gasket material held in place by aluminum housing; fastened to frame stop with screws.
- F. Interlocking Perimeter Gasketing: Minimum 0.018-inch- (0.46-mm-) thick zinc gasket material consisting of two pieces, one fastened to door and one fastened to frame, that interlock when door is closed; mounted with screws.
- G. Overlapping Astragals for Meeting Stiles: Vinyl strip gasket material held in place by aluminum housing and overlapping when doors are closed; mounted to face of meeting stile with screws; surface mounted to each door.
- H. Meeting Astragals for Meeting Stiles: Silicone bulb gasket material held in place by aluminum housing; mounted with screws.
 1. Mounting: Mortised into edge of one door.

- I. Adjustable Astragals for Meeting Stiles: Screw-adjustable silicone gasket material held in place by aluminum housing; mounted with screws.
 - 1. Mounting: Mortised into edge of each door.
- J. Door Sweeps: Silicone gasket material held in place by flat aluminum housing or flange; surface mounted to face of door with screws.
- K. Door Shoes: Brush pile gasket material held in place by aluminum housing; mounted to bottom edge of door with screws.
 - 1. Extended Housing: One side of door.
 - 2. Mounting: Mortised into bottom edge of door.
- L. Automatic Door Bottoms: Sponge silicone gasket material held in place by aluminum housing that automatically drops to form seal when door is closed; mounted to bottom edge of door with screws.
 - 1. Mounting: Semimortised into bottom of door.
 - 2. Type: Low-closing-force type for doors required to meet accessibility requirements.

2.28 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - g. Sealeze; a unit of Jason Incorporated.
 - h. Zero International.
- B. Compressing-Top Thresholds: Metal member with compressible vinyl seal on top of threshold that seals against bottom of door; and base metal of aluminum.
- C. Saddle Thresholds:
 - 1. Type: Fluted top, barrier free.
 - 2. Base Metal: Aluminum.
- D. Half-Saddle Thresholds: Fluted-top metal member; and base metal of aluminum.
- E. Saddle Thresholds for Floor Closers: Fluted top.
 - 1. Type: Type B, for offset-hung doors; ends not mitered.
 - 2. Base Metal: Aluminum.

2.29 SLIDING DOOR HARDWARE

- A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Cox, Arthur, & Sons, Inc.
 - b. Hager Companies.
 - c. Henderson, PC, Inc.
 - d. Johnson, L. E., Products, Inc.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Pocket Sliding Door Hardware: Grade 1; rated for doors weighing up to 240 lb (108 kg), overhead box rails and door hardware that allows vertical adjustment.
- 1. Rail Material: Extruded aluminum.
 - 2. Door Type: Biparting.
 - 3. Rail Configuration: I-beam.
 - 4. Wheel Assembly: Two wheel or four wheel, roller bearings.
 - 5. Pulls: Flush, mortised into door.
 - 6. Accessories:
 - a. Bumper stops; wrought steel.
 - b. Floor guides installed within pocket.

2.30 FOLDING DOOR HARDWARE

- A. General: BHMA A156.14; complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. Cox, Arthur, & Sons, Inc.
 - b. Hager Companies.
 - c. Henderson, PC, Inc.
 - d. Johnson, L. E., Products, Inc.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Multiple Folding Door Hardware: Rated for door panels weighing up to 50 lb (23 kg) Grade 1; with rails and door hardware that allows horizontal and vertical adjustment.
- 1. Rail Material: Extruded aluminum.
 - 2. Rail Configuration: I-beam.
 - 3. Mounting: Mounted overhead.
 - 4. Wheel Assembly: Two wheel or four wheel, with roller bearing.

2.31 FABRICATION

- A. 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.
 - 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. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.32 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.

PART 3 - EXECUTION

3.1 INSTALLATION

- 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 DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

- C. 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. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. 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.
- E. 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.
- F. 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).
- G. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Furnish permanent cores to Owner for installation.
- H. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- I. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- J. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- K. 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.
- L. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- M. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- N. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

- O. 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.

3.2 FIELD QUALITY CONTROL

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

3.3 DOOR HARDWARE SCHEDULE

Door Hardware Set 1

Locations:

Door number 100B,
104B, 105A, and
106B

Qty.	Item	Finish
2	Continuous Hinge.	628
2	Exit Devices (Concealed Rod).	630
2	Rim Housing.	626
2	Mortise Cylinder.	626
3	Perm. Core (Best IC 7 pin installed by Owner)	
2	Offset Pull.	630
1	Closer.	689
1	Auto Operator.	689
1	Flush Mounted Push Plate	689
1	Key Switch.	626.

Door Hardware Set 2

Locations:

Door numbers 08A,
100A, 104A and
115C

Qty.	Item
3	5BB1 4.5 x 4.5
1	Exit Device (Concealed Rod)
1	Rim Housing
1	Mortise Cylinder
3	Perm Core (Best IC 7 pin installed by Owner)
1	Kick Plate
1	Trim – Match existing
3	Silencers

Door Hardware Set 3

Locations:

Door Numbers 102A,
103A, 115A, 115B

Qty.	Item
3	5BB1 4.5 x 4.5
1	Classroom Lock
3	Perm Core (Best IC 7 pin installed by Owner)
1	Kick Plate
1	Closer
1	Trim – “Dorma” R Trim
3	Silencers

END OF SECTION 087111