

SECTION 08711

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware for the following:
 - a. Swinging doors.

1.2 SUBMITTALS

- A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

4. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.
- D. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- E. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
- G. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
- H. Warranties: Special warranties specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- E. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.
 1. Door Hardware: Provide hardware as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:

- a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - 2) Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - 3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - c. Thresholds: Not more than 1/2 inch (13 mm) high. Bevel raised thresholds with a slope of not more than 1:2.
2. NFPA 101: Comply with the following for means of egress doors:
- a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds.
 - c. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
 - d. Thresholds: Not more than 1/2 inch (13 mm) high.
- F. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- G. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 2. Preliminary key system schematic diagram.
 3. Requirements for key control system.
 4. Address for delivery of keys.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
 - B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
 - C. Deliver keys to manufacturer of key control system.
- 1.5 COORDINATION
- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of

other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of operators and door hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Manual Closers: 10 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

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

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

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

2.2 HINGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hinges:
 - a. Hager Companies (HAG).
 - b. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
 - c. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
- B. Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
 2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
 3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
 4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).
- C. The following is a guide for hinge size and type required for this project.

| | Manufacturer | Interior: | Exterior |
|----------------------------------|--------------|------------------|------------------|
| 1-3/4" Doors up to 3'-0" wide | Stanley | FBB179-4 1/2" | FBB191-4 1/2" |
| | Hager | BB1279-4 1/2" | BB1191-4 1/2" |
| | McKinney | TA-TB2714-4 1/2" | TA-TB2314-4 1/2" |

- D. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- E. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:
1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
 - a. Outswinging exterior doors.
 - b. Outswinging corridor doors with locks.
 2. Corners: Square.
- F. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 2. Wood Screws: For wood doors and frames.
 3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
 4. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 MORTISED LOCKS AND LATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Mechanical Locks and Latches:
 - a. Best Lock Corporation (BLC).
 - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).

- c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
 - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).
- B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1; Series 1000.
- 1. Provide one of the following manufacturers and designs:
 - a. Best H Series
 - b. Corbin/Russwin ML2200 Series
 - c. Sargent 8200 Series
 - d. Schlage L9000 Series
- C. Lock Trim: Comply with the following:
- 1. Lever: Cast.
 - 2. Escutcheon (Rose): Forged.
 - 3. Dummy Trim: Match lever lock trim and escutcheons.
 - 4. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
 - a. Best, 14 design
 - b. Corbin/Russwin, Newport design
 - c. Sargent, LNL design
 - d. Schlage, 06A design
- D. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

| FUNCTION | SARGENT | SCHLAGE | CORBIN/RUSSWIN | BEST |
|----------|---------|---------|----------------|------|
| A | 04 | 80 | 57 | EW |
| B | 05 | 50 | 51 | E |
| C | 15 | 10 | 10 | N |
| D | 37 | 70 | 55 | J |
| E | 16 | 60 | 42 | F |
| F | 65 | 40 | 30 | LF |
| G | 8241 | 9457 | 2072 | G |

- E. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
- 1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 - 2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.4 BORED LOCKS AND LATCHES (UNIT EXTERIOR DOORS)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Mechanical Locks and Latches:
 - a. Best Lock Corporation (BLC).
 - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
 - c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
 - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

- B. Bored Locks: BHMA Grade 1; Series 4000.
1. Provide one of the following manufacturers and designs:
 - a. Best: 9K Series
 - b. Corbin Russwin: CL3300 Series.
 - c. Sargent: 10 Line
 - d. Schlage: D Series
- C. Auxiliary Locks: BHMA Grade 1.
- D. Lock Trim: Comply with the following:
1. Lever: Cast.
 2. Escutcheon (Rose): Forged.
 3. Dummy Trim: Match lever lock trim and escutcheons.
 4. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
 - a. Best: 15 C
 - b. Corbin Russwin: NZD
 - c. Sargent: LL
 - d. Schlage: Saturn
- E. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

| FUNCTION | SARGENT | SCHLAGE | CORBIN/RUSWIN | BEST |
|----------|---------|---------|---------------|------|
| (1) | 04 | 80 | 57 | D |
| (2) | 05 | 53 | 51 | AB |
| (3) | 15 | 10 | 10 | N |
| (4) | 37 | 70 | 55 | R |
| (5) | 16 | 60 | 20 | C |
| (6) | 65 | 40 | 72 | L |

- F. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- G. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.5 BORED LOCKS AND LATCHES (UNIT INTERIOR DOORS)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Mechanical Locks and Latches:
 - a. Arrow Architectural Hardware; Div. of ESSEX Industries, Inc. (AAH).
 - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
 - c. NT Falcon Lock Co.; an Ingersoll-Rand Company (NTF).
 - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).
 - e. Yale Security Inc.; Div. of Williams Holdings (YAL).

- B. Bored Locks: BHMA Grade 1; Series 4000.
1. Provide one of the following manufacturers and designs:
 - a. Arrow: Q Series
 - b. Corbin Russwin: CL3600 Series.
 - c. NT Falcon: T Series
 - d. Schlage: D Series
 - e. Yale: 5400LN Series
- C. Auxiliary Locks: BHMA Grade 1.
- D. Lock Trim: Comply with the following:
1. Lever: Cast.
 2. Escutcheon (Rose): Forged.
 3. Dummy Trim: Match lever lock trim and escutcheons.
 4. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
 - a. Arrow: SR
 - b. Corbin Russwin: NZD
 - c. NT Falcon: Dane
 - d. Schlage: Saturn
 - e. Yale: AU
- E. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

| FUNCTION | SARGENT | SCHLAGE | CORBIN/RUSWIN | BEST |
|----------|---------|---------|---------------|------|
| (1) | 04 | 80 | 57 | D |
| (2) | 05 | 53 | 51 | AB |
| (3) | 15 | 10 | 10 | N |
| (4) | 37 | 70 | 55 | R |
| (5) | 16 | 60 | 72 | C |
| (6) | 65 | 40 | 20 | L |

- F. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
 2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- G. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.6 CYLINDERS AND KEYING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cylinders: Same manufacturer as for locks and latches.
 2. Key Control Systems:
 - a. Key Control Systems, Inc. (KCS).
 - b. Telkee, Inc.

- B. Standards: Comply with the following:
 - 1. Cylinders: BHMA A156.5.
 - 2. Key Control System: BHMA A156.5.
- C. Cylinder Grade: BHMA Grade 1.
- D. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six.
 - 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
- E. Construction Keying: Comply with the following:
 - 1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 5 construction master keys.
- F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
 - 1. Master Key System: Cylinders are operated by a change key and a master key.
 - 2. Keyed Alike: Key all cylinders to the same change key.
 - a. Cylinders shall be master keyed.
- G. Keys: Provide nickel-silver keys complying with the following:
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: In addition to one extra blank key for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
- H. Key Control System: BHMA Grade 1 system, including key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers. Contain system in metal cabinet with baked-enamel finish.
 - 1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
 - 2. Capacity: Able to hold keys for 150 percent of the number of locks.
 - 3. Cross-Index System: Set up by key control manufacturer, complying with the following:
 - a. Card Index: Furnish four sets of index cards for recording key information. Include three receipt forms for each key-holding hook.

2.7 STRIKES

- A. Standards: Comply with the following:
 - 1. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 2. Strikes for Mortise Locks and Latches: BHMA A156.13.
- B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

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.

2.8 CLOSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Surface-Mounted Closers:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN).
 - b. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
- B. Standards: Comply with the following:
 1. Closers: BHMA A156.4.
- C. Surface Closers: BHMA Grade 1.
- D. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."
- E. Size of Units: Unless otherwise indicated, provide the following. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 1. LCN:
 - a. Exterior: 4140 Series
 - b. Interior: 4010 Series
 2. Sargent:
 - a. Exterior: 281
 - b. Interior: 281

2.9 ACCESSORIES FOR DOORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Coordinators:
 - a. Adams Rite Manufacturing Co. (ARM).
 - b. Door Controls International (DCI).
 - c. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - d. Ives: H. B. Ives (IVS).
 - e. Rockwood Manufacturing Company (RM).
- B. Standards: Comply with the following:
 1. Coordinators: BHMA A156.3.

2.10 STOPS AND HOLDERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Stops and Bumpers:
 - a. Manufacturers: Ives, H. B.; No. 61 stop with 3 inch projection.
- B. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.
 1. Rixson-Firemark: 990 Series
 2. Norton Door Controls: 6900 Series
 3. Sargent: 1500 Series

2.11 DOOR GASKETING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Door Gasketing:
 - a. National Guard Products, Inc. (NGP).
 - b. Pemko Manufacturing Co., Inc. (PEM).
 - c. Reese Enterprises, Inc. (RE).
 - d. Zero International, Inc. (ZRO).
 2. Door Bottoms:
 - a. National Guard Products, Inc. (NGP).
 - b. Pemko Manufacturing Co., Inc. (PEM).
 - c. Reese Enterprises, Inc. (RE).
 - d. Zero International, Inc. (ZRO).
- B. Standard: Comply with BHMA A156.22.
- C. Weatherstripping: Provide continuous weather-strip gasketing on exterior doors, No. A626A by National Guard Products or approved substitute. Provide door bottom sweep No. 95WH by National Guard Products or approved substitute. Provide meeting stile gaskets No. 600A by National Guard Products or approved substitute.
 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

2.12 THRESHOLDS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Hager Companies (HAG).
 2. National Guard Products, Inc. (NGP).
 3. Pemko Manufacturing Co., Inc. (PEM).
 4. Reese Enterprises, Inc. (RE).
 5. Zero International, Inc. (ZRO).
- B. Standard: Comply with BHMA A156.21.

- C. Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

2.13 PEEP HOLES

- A. Provide one-way door viewer, No. 698 by Ives or approved substitute.

2.14 FABRICATION

- A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Steel Machine or Wood Screws: For the following fire-rated applications:
 - a. Mortise hinges to doors.
 - b. Strike plates to frames.
 - c. Closers to doors and frames.
 - 3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface-mounted exit devices.
 - 4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
 - 5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.15 FINISHES

- A. Standard: Comply with BHMA A156.18.
- 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.
- D. Provide the following finishes:
- | | |
|-----------------------------|----------------------|
| 1. Butts and Hinges: | 26D |
| 2. Locks & Lock Trim: | 26D |
| 3. Door Controls - Closers: | Sprayed Alum. Finish |
| 4. Mortise Locks & Latches: | 26D |
| 5. Door Stops | 26D/32D |
| 6. Weatherstripping | Aluminum |
| 7. Threshold | Aluminum |

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be

painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
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 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.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
 2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
 3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

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 door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidders responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidders responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

UNIT ENTRANCE DOORS

HW1

Doors A1, B1, C1, D1, E1, F1, G1, H1, J1, K1

Hinges

Lockset (entrance function)

Peephole

Door stop

Weatherstripping

Balance of hardware by door supplier.

UNIT SINGLE CLOSET DOORS

HW2

Doors A2, A5, B2, B7, C2, C8, D5, E2, E6, E8, F2, F6, F8, G2, G8, G11, H2, H7, H10, J2, J7, K2, K7,

Hinges

Lockset (passage function)

Door stop

UNIT DOUBLE CLOSET DOORS

HW3

Doors B6, C9, C10, C11, D4, E7, F7, G9, G10, J6, K6,

Hinges

Pulls

Magnetic Catches

UNIT BATHROOM OR BEDROOM DOOR

HW4

Doors A3, A4, A8, B3, B4, B5, C3, C4, C5, C6, C7, D2, D3, E3, E4, E5, E6, E8, F3, F4, F5, G3, G4, G5, G6, G7, H3, H4, H5, H6, J3, J4, J5, K3, K4, K5,

Hinges

Lockset (privacy function)

UNIT EXTERIOR PATIO DOOR

HW5 no used

RATED DOORS

HW6

Building 1 Doors 2, 8
Building 2 Doors

Hinges
Closer
Lockset (function 4)
Door Stop

COMMUNITY TOILET DOORS

HW7

Building 1 Doors 6
Building 2 Doors

Hinges
Lockset (function 6)
Door Stop

COMMUNITY OFFICE OR STORAGE DOORS

HW8

Building 1 Doors 4
Building 2 Doors 19, 21

Hinges
Lockset (function 4)
Door Stop

COMMUNITY LAUNDRY DOORS

HW9

Building 1 Doors 7
Building 2 Doors 8

Hinges
Lockset (function 3)
Door Stop

INTERIOR RATED EGRESS

HW10

Building 1 Doors 13, 14, 15, 16
Building 2 Doors 5, 6, 9, 11, 12, 13, 14, 15, 16, 17, 18

Hinges
Closer
Exit Device
Door Stop

INTERIOR MECHANICAL, ELECTRICAL, UTILITY

HW11

Building 1 Doors 19
Building 2 Doors 7, 10, 22

Hinges
Closer
Lockset (function A)
Door Stop

EXTERIOR MECHANICAL, ELECTRICAL, UTILITY

HW12

Building 1 Doors 9, 10
Building 2 Doors

Hinges
Closer
Lockset (function A)
Weatherstripping
Threshold
Door Stop

EXTERIOR ROOF DECK

HW13

Building 2 Doors 20

Hinges
Closer
Lockset (function C)
Weatherstripping
Threshold
Door Stop

EXTERIOR ALUMINUM ENTRANCE DOORS

HW14

Building 1 Doors 1, 3, 11, 12
Building 2 Doors 1, 2, 3, 4

Closer
Exit Device
Door Stop

Balance of hardware to be provided by aluminum door supplier

EXTERIOR STORAGE

HW15

Building 1 Doors 19
Building 2 Doors

Hinges
Closer
Lockset (function D)
Weatherstripping
Threshold
Door Stop

ELEVATOR LOBBY DOORS

HW16

Building 1 Doors none
Building 2 Doors 23, 24, 25, 26

Hinges
Closers
Coordinator
Electromagnetic Door Holders
Locksets (function D)

END OF SECTION