

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. *Uniform General Conditions for Construction Contracts, State of Texas, 2010 (UGC).*
 - 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction

1.2 SUMMARY

- A. Section includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - b. Sliding doors.
 - 2. Cylinders for door hardware specified in other Sections.
 - 3. Electrified door hardware.
- B. Related Sections:
 - 1. Section 06 41 16 "Plastic-Laminate-Faced Architectural Cabinets" for cabinet door hardware provided as part of architectural woodwork.
 - 2. Section 08 11 13 "Hollow Metal Doors and Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
 - 3. Section 08 12 16 "Aluminum Frames" for door silencers provided as part of aluminum frames.
 - 4. Section 08 14 16 "Flush Wood Doors" for astragals provided as part of labeled fire-rated assemblies.
 - 5. Section 08 31 13 "Access Doors and Frames" for access door hardware .
 - 6. Section 08 33 23 "Overhead Coiling Doors" for door hardware provided as part of overhead door assemblies.
 - 7. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for installation of entrance door hardware, including cylinders.
 - 8. Section 08 42 29.23 "Sliding Automatic Entrances" for entrance door hardware, including cylinders.

9. Section 08 42 29.33 "Swinging Automatic Entrances" for entrance door hardware, including cylinders.
10. Section 10 26 00 "Wall and Door Protection" for plastic door protection units that match wall protection units.
11. Section 28 13 00 "Access Control" for access control devices installed at door openings and provided as part of a security system.
12. Section 28 31 03 "Digital, Addressable Fire-Alarm System" for connections to building fire-alarm system.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.
 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Samples for Verification: For exposed door hardware of each type required, in each finish specified, prepared on Samples of size indicated below. Tag Samples with full description for coordination with the door hardware schedule. Submit Samples before, or concurrent with, submission of door hardware schedule.
 1. Sample Size: Full-size units or minimum 2-by-4-inch Samples for sheet and 4-inch long Samples for other products.
 - a. Full-size Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- 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. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate

submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
- c. 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.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other Sections for each door and frame.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Certificates: For electrified door hardware, from the manufacturer.
 - 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

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

1.6 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.

1.7 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.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 - 1. For door hardware, an Architectural Hardware Consultant (AHC) who is also an Electrified Hardware Consultant (EHC) .
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- 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 meets 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. at the tested pressure differential of 0.3-inch wg 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 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] [HUD's "Fair Housing Accessibility Guidelines"] [and] <Insert regulation>.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Sliding Doors: 5 lbf 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 high .
 - 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 from the latch, measured to the leading edge of the door.
- I. Preinstallation Conference: Conduct conference at Project site .
 - 1. Inspect and discuss electrical roughing-in for electrified door hardware.
 - 2. Review sequence of operation for each type of electrified door hardware.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.9 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems. Electrified

hardware shall have Quick Connect hardware all the way to the power supply: no wire nut type or crimped connections shall be allowed.

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

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Ten years from date of Substantial Completion, unless otherwise indicated.
 - a. Electromagnetic and Delayed-Egress Locks: Two 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 on Drawings to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products, unless otherwise noted.
 - 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 2 Articles following. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.

2.2 HINGES

- A. Hinges: BHMA A156.1 and A156.7. Provide template-produced hinges for swinging doors where scheduled.
1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 2. Provide five-knuckle full mortise butt hinges unless otherwise indicated ball-bearing hinges at all doors having closers.
 3. Provide non-removable pins on exterior outswinging doors.
 4. Provide non-removable pins on outswinging interior doors at access controlled doors.
 5. Provide 5 inch heavy weight hinges for doors 36 inches and over in width.
 6. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
 - a. [McKinney Products Company; an ASSA ABLOY Group company](#) TA714/TA314 (Basis of Design)
 - b. [Hager Companies](#)
 - c. [IVES Hardware; an Ingersoll-Rand company.](#)
 - d. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.3 CENTER-HUNG AND OFFSET PIVOTS

- A. Center-Hung and Offset Pivots: BHMA A156.4.
1. [Rixson Specialty Door Controls; an ASSA ABLOY Group company.](#)
- B. **Continuous Gear Hinges**
1. **Provide continuous gear hinges as manufactured by Select or Roton, or approved equal.**

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in Part 4 - Hardware Sets.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
1. Mortise Locks: Minimum 3/4-inch latchbolt throw.
 2. Deadbolts: Minimum 1.25-inch bolt throw.
- C. Lock Backset: 2-3/4 inches, unless otherwise indicated.
- D. Lock Trim:
1. Levers: Cast.
 - a. P Lever Design.
 2. Escutcheons (Roses): Wrought .
 3. Dummy Trim: Match lever lock trim and escutcheons.
 4. Operating Device: Lever with escutcheons (roses).

- 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. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 - 3. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
- F. Mortise Locks: BHMA A156.13; Security Grade 1 ; stamped steel case with steel or brass parts; Series 1000.
 - 1. [SARGENT Manufacturing Company; an ASSA ABLOY Group company](#), 8200 series.

2.5 AUXILIARY LOCKS

- A. Mortise Auxiliary Locks: BHMA A156.5; Grade 1 ; with strike that suits frame.
 - 1. [SARGENT Manufacturing Company; an ASSA ABLOY Group company](#), 4870 series.

2.6 ELECTROMECHANICAL LOCKS

- A. Electromechanical Locks: BHMA A156.25; Grade 1 ; motor or solenoid driven; mortise deadlocking latchbolt; with strike that suits frame.
 - 1. [SARGENT Manufacturing Company; an ASSA ABLOY Group company](#), 8200 series.

2.7 EXIT LOCKS AND EXIT ALARMS

- A. Exit Locks and Alarms: BHMA A156.29, Grade 1.
 - 1. [SARGENT Manufacturing Company; an ASSA ABLOY Group company](#), 80 series.
 - 2. Von Duprin, a brand of Allegion, series 99 or 33
 - 3. Stanley Security Solutions Precision Hardware series

2.8 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
 - 1. [Basis-of-Design Product](#): Subject to compliance with requirements, provide products indicated on schedule by Ives Hardware, an Ingersoll-Rand Company, or comparable product by one of the following:
 - a. [Hiawatha, Inc., a subsidiary of Activar, Inc.](#)
 - b. [Trimco](#).
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures..

2.9 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on schedule by Ives Hardware, an Ingersoll-Rand Company, or comparable product by one of the following:
 - a. Cal-Royal Products, Inc.
 - b. Door Controls International, Inc.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Trimco.
 - e. Hiawatha, Inc. a subsidiary of Activar, Inc

2.10 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
1. SARGENT Manufacturing Company; an ASSA ABLOY Group company, 80 series.
 2. Von Duprin, a brand of Allegion, series 99 or 33
 3. Stanley Security Solutions Precision Hardware series

2.11 LOCK CYLINDERS

- A. Lock Cylinders **for renovation projects**: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, to accept Best Access Systems 7-pin IC cores -American type only.
1. Manufacturer: Same manufacturer as for locking devices.
- B. Lock Cylinders **for new construction**: **(New Specification as of July 2016) proprietary high security cylinder. Contact UH Access Control Shop for assistance**
- C. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are removable; face finished to match lockset.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.12 KEYING

- A. UH Access Shop with the end user shall develop a key schematic. Keys and combined cores shall be provided and installed by Stanley Convergent Security Solutions / Best Access control thru the project. Keying shall be complete and keys turned over to Owner prior to Substantial Completion.

2.13 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
 - 1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
 - 2. On solid doors, provide matching push plate and pull plate on opposite faces. Basis-of-Design Product: Subject to compliance with requirements, provide Ives Hardware 8103EZ pull and 8300 push plate, or comparable product by one of the following:
 - a. Rockwood Manufacturing Company, 111 pull and 70C push plate.
 - b. Trimco.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.14 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Ives Hardware COR Series with FL filler bar, or comparable product by one of the following:
 - a. Trimco, 3094 Series.
 - b. Rockwood Manufacturing Company, 1600 Series with filler bar.
- B. Astragals: BHMA A156.22.

2.15 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written 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. Provide surface-mounted, door-mounted closers unless otherwise indicated.
 - 2. Provide a door closer on every exterior door.
 - 3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
 - 4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
 - 5. At corridors, locate door-mounted closer on room side of door.
 - 6. At outswinging exterior doors, mount closer in inside of door.
 - 7. SARGENT Manufacturing Company; an ASSA ABLOY Group company, 351 series.

2.16 CONCEALED FLOOR 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. [Rixson Specialty Door Controls; an ASSA ABLOY Group company.](#)
 - a. Center hung, single acting, model PH 28 SHO with #340 top pivot.
 - b. Offset hung, model PH 127 SHO with #180 top and #119 intermediate pivots.

2.17 MECHANICAL STOPS AND HOLDERS

- A. Floor-Mounted Stops: BHMA A156.16 .
1. [Basis-of-Design Product](#): Subject to compliance with requirements, provide Ives Hardware type FS18, or comparable product by one of the following:
 - a. [Hager Companies.Rockwood Manufacturing Company.](#)
 - b. [McKinney Products Company; an ASSA ABLOY Group company.](#)
 - c. [Rockwood Manufacturing Company](#)
 - d. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.18 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic Door Holders: BHMA A156.15, Grade 1; wall-mounted electromagnetic single 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. [Basis-of-Design Product](#): Subject to compliance with requirements, provide Sargent Manufacturing Company 1560 Series, or comparable product by one of the following:
 - a. Rixson Specialty Door Controls, model 994/996,
 - b. [Substitutions](#): See Section 01 25 00 - Substitution Procedures.

2.19 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
1. [Basis-of-Design Product](#): Subject to compliance with requirements, provide Glynn-Johnson 100 Series, or comparable product by one of the following:
 - a. [Rockwood Manufacturing Company](#), 11000 Series.
 - b. [SARGENT Manufacturing Company; an ASSA ABLOY Group company](#), 690 Series.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.20 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide National Guard Products 127NA seals and 199NA sweeps, or comparable product by one of the following:
 - a. **Pemko Manufacturing Co.; an ASSA ABLOY Group company**, 375_R seals and 368_N sweeps.
 - b. **Reese Enterprises, Inc.**, DS70C seals and 323A sweeps.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.21 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening and full depth of frame.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide National Guard Products Flat Saddle, 1/4" height, thresholds, or comparable product by one of the following:
 - a. **Pemko Manufacturing Co.; an ASSA ABLOY Group company**.
 - b. **Reese Enterprises, Inc.**
 - c. **<Insert manufacturer's name>**.

2.22 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Plate Units: BHMA A156.6; fabricated from minimum 0.060-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide Trimco KX064 series plates, or comparable product by one of the following:
 - a. **Burns Manufacturing Incorporated**, K1062 series.
 - b. **Rockwood Manufacturing Company**, XP62 series.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.
- B. Metal Protective Trim Door Edge Units: BHMA A156.6; fabricated from minimum 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
1. **Basis-of-Design Product:** Subject to compliance with requirements, provide Trimco KE33-1 edge guards, or comparable product by one of the following:
 - a. **Burns Manufacturing Incorporated**, Model 303.
 - b. **Rockwood Manufacturing Company**, model 306.
 - c. Substitutions: See Section 01 25 00 - Substitution Procedures.

2.23 AUXILIARY ELECTRIFIED DOOR HARDWARE

A. Electrical Power Transfer:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Von Duprin EPT-10, or comparable product by one of the following:
 - a. Securitron Magnalock Corp.,www.securitron.com, model EPT/EPTL.

2.24 FABRICATION

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Closers to doors and frames.
 - 2) Surface-mounted exit devices.
 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 4. 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.

2.25 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

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

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 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. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Furnish permanent cores to Owner for installation.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings . Verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."
- H. Stops: Provide floor stops for doors unless overhead stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.3 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.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

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

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

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

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

3.6 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. Refer to Section 01 79 00 "Demonstration and Training."

PART 4 - HARDWARE SETS

4.1 GENERAL

A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.

B. Pairs of Swinging Doors: Provide one of each specified item on each leaf unless specifically stated otherwise. Treat pairs as two active leaves unless otherwise indicated.

C. HW-CYL: Doors Whose Hardware is Specified in Other Sections But Which Must Be Keyed to Building System:

1. Lock Cylinder, Mortise.

D. HW-0: Doors/Openings Whose Hardware is Specified in Other Sections, and No Locking is Required.

4.2 SWING DOORS - NOT REQUIRING KEY LOCKING

A. HW-1: Push/Pull, Non-Fire Rated:

1. Closer.
2. Push/Pull.

B. HW-1P: Push/Pull, Non-Fire-Rated, Protection:

1. Closer.
2. Push/Pull.
3. Armor Plate.
4. Edge Guards.

C. HW-2: Latchset, Non-Fire-Rated

1. Latchset, Passage.

D. HW-2P: Latchset, Non-Fire-Rated, Protection:

1. Latchset, Passage.
2. Armor Plate.
3. Edge Guards.

E. HW-2AP: Latchset, Automatic, Fire-Rated (and not fire-rated if closer required), Protection:

1. Closer.
2. Latchset, Passage.
3. Power Operator, Power-Assist.
4. Actuators, Wall-Mounted, both sides, location as indicated on drawings.
5. Armor Plate.
6. Edge Guards.

F. HW-2FP: Latchset, Fire-Rated (and not fire-rated where closer required), Protection:

1. Closer.
2. Latchset, Passage.
3. Armor Plate.
4. Adge Guards.

G. HW-5: Privacy Lockset, Non-Fire-rated:

1. Lockset, Privacy.

H. HW-5F: Privacy Lockset, Fire-Rated:

1. Closer.
2. Lockset, Privacy.

4.3 SWING DOORS - LOCKABLE, MAY BE LEFT UNLOCKED, KEY NOT REQUIRED TO LOCK

A. HW-10: Office, Non-Fire-Rated:

1. Lockset, Office

4.4 SWING DOORS - KEY REQUIRED TO LOCK, MAY BE LEFT UNLOCKED

- A. HW-20: Secure Classroom Lock, Non-Fire-Rated:

1. Lockset, ANSI F13.

- B. HW-20P: Secure Classroom Lock, Non-Fire-Rated, Protection:

1. Lockset, ANSI F13.
2. Kick Plate.

- C. HW-20F: Secure Classroom Lock, Fire-Rated on Non-Fire-Rated Where Self-Closing is Required:

1. Closer.
2. Lockset, ANSI F13.
3. Pair: One leaf inactive; automatic or self-closing flush bolts as required to comply with code. If door fire rating requires astragal, provide coordinator.

4.5 SWING DOORS - ELECTRICAL ACCESS CONTROL

- A. HW-52: Entry Control, Electrified Lock, Fail-Secure, Fire-Rated and non-Fire-Rated:

1. Card Reader, located where indicated on drawings.
2. Closer.
3. Lockset, Always-Locked, Electric Bolt Retraction:
 - a. Fail-Secure, remaining locked in event of fire alarm activation or power failure.
 - b. Key override and free egress at all times.
 - c. Entry Control: Upon signal from access control device, outside trim unlocks.
4. Power Supply.
5. Electrical Power Transfer

END OF SECTION 08 71 00