# SECTION 08 71 00
# DOOR HARDWARE

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. Door hardware and related items necessary for complete installation and operation of doors.

### 1.2 RELATED WORK

A. Caulking: Section 07 92 00 JOINT SEALANTS.

B. Application of Hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES; Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

C. Painting: Section 09 91 00, PAINTING.

### 1.3 GENERAL

A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.

B. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.

C. Hardware for application on metal doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.

D. The following items shall be of the same manufacturer, if possible, except as otherwise specified:

1. Mortise locksets.

2. Hinges for hollow metal and wood doors.
3. Surface applied overhead door closers.
4. Exit devices.
5. Floor closers.

## 1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

| Hardware Item | Quantity | Size | Reference Publication Type No. | Finish | Mfr. Name and Catalog No. | Key Control Symbols | UL Mark (if fire rated and listed) | ANSI/BHMA Finish Designation |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

## 1.5 DELIVERY AND MARKING

A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

## 1.6 INSTRUCTIONS

A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters "HW" followed by a number. Each number designates a set of hardware items applicable to a door type.

B. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:

| | | |
|---|---|---|
| Adams-Rite | Adams Rite Mfg. Co. | Glendale, CA |
| Glynn Johnson | Glynn Johnson Co. | Chicago, IL |
| LCN | LCN Closers | Princeton, IL |
| Firemark | Rixon-Firemark Co. | Chicago, IL |
| Hager | Hager Hinge Company | Saint Louis, MO |
| Stanley | The Stanley Works | New Britain, CT |
| Trimco | Triangle Brass Mfg. Co. | Los Angeles, CA |
| Unican | Simplex Security Systems | Collinsville, CT |
| Von Duprin | Von Duprin Hardware Co. | Indianapolis, IN |
| Zero | Zero Weather Stripping Co. | New York, NY |

C. Keying: All cylinders shall be keyed into existing VAMC Philadelphia Great Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be either 6 or 7 pin type. Keying information shall be furnished at a later date by the Resident Engineer.

## 1.7 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.

B. American Society for Testing and Materials (ASTM):

F883-04.....Padlocks

C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):

A156.1-00.....Butts and Hinges
A156.2-03.....Bored and Pre-assembled Locks and Latches
A156.3-01.....Exit Devices
A156.4-00.....Door Controls (Closers)
A156.5-01.....Auxiliary Locks and Associated Products
A156.6-05.....Architectural Door Trim
A156.8-05.....Door Controls-Overhead Stops and Holders
A156.13-05.....Mortise Locks and Latches Series 1000
A156.15-06.....Release Devices-Closer Holder, Electromagnetic and Electromechanical
A156.16-02.....American National Standard for Auxiliary Hardware
A156.18-00.....Materials and Finishes
A156.21-06.....Thresholds
A156.22-05.....Door Gasketing and Edge Seal Systems
A156.23-04.....Electromagnetic Locks
A156.24-03.....Delayed Egress Locking Systems

A156.26-00.....Continuous Hinges
A156.31 .....American National Standard for Electric Strikes and Frame Mounted Actuators
A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):

80-06.....Fire Doors and Fire Windows
101-05.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

Building Materials Directory (2007)

**PART 2 - PRODUCTS**

**2.1 BUTT HINGES**

A. ANSI A156.1. The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:

1. Exterior Doors: Type A2112 for doors 3 feet wide or less. Hinges for exterior doors shall have non-removable pins.
2. Interior Doors: Type 8112 for doors 3 feet wide or less.

B. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

**2.2 DOOR CLOSING DEVICES**

A. Closing devices shall be products of one manufacturer for each type specified.

**2.3 DOOR STOPS**

A. Conform to ANSI A156.16.

B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.

C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.

D. Substitute floor stops Type L02141 or L02161 as appropriate, when wall bumpers would not provide an effective door stop.

E. Provide stop Type L02011 or L02181, as applicable for exterior doors.

F. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.

G. Provide door stops on doors where combination closer magnetic holders are specified.

**2.4 OVERHEAD DOOR HOLDERS**

A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment.

**2.5 FLOOR DOOR HOLDERS**

A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

**2.6 LOCKS AND LATCHES**

A. Conform to ANSI A156.2. Locks and latches for doors 1-3/4 inch thick or over shall have beveled fronts. Lock cylinders shall have not less than six pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 3/4 inch throw. Provide temporary keying

device or construction core of allow opening and closing during construction and prior to the installation of final cores.

B. In addition to above requirements, locks and latches shall comply with following requirements:

1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets shall have lever handles similar to Falcon S-lever Design. Lever handle shall be fabricated from wrought stainless steel. No substitute lever design or material shall be accepted. All locks and latchsets shall be furnished with curved lip strike and wrought box. Lock function F02 shall be furnished with key plates similar to Russwin's No. A70. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks.
2. Cylindrical Lock and Latch Sets: Levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. Knobs for series 4000 lock and latch sets shall have 2-1/4 inch diameters. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.

**2.7 ELECTRIC STRIKES**

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes with fire-rated devices.

C. Manufacturers:

1. Adams Rite Manufacturing Co.
2. Folger Adam Security Inc.; an ASSA ABLOY Group company.
3. HES, Inc.; an ASSA ABLOY Group company.

4. Locknetics; an Ingersoll-Rand Company.
5. Precision Hardware, Inc.
6. Von Duprin; an Ingersoll-Rand Company.

## 2.8 KEYS

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

| **Locks/Keys** | **Quantity** |
|---|---|
| Cylinder locks | 2 keys each |
| Cylinder lock change key blanks | 100 each different key way |
| Master-keyed sets | 6 keys each |
| Grand Master sets | 6 keys each |
| Great Grand Master set | 5 keys |
| Control key | 1 key |

## 2.9 KEY CABINET

A. ANSI Standard A156.5. Provide key cabinet made of cold rolled, 0.0478 inch thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and two parasentric keys. All locks shall be nickel plated with solid brass pin tumbler cylinder keyed as directed. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent.

B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 1-1/4 inch in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."

C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the

lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.

D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the Resident Engineer.

**2.10 ARMOR PLATES, COMBINATION KICK-MOP PLATES AND DOOR EDGING**

A. Conform to ANSI Standard A156.6.

B. Provide protective plates and door edging as specified below:

1. Kick-mop plates and armor plates plastic or metal, Type J100 series, color as required.
2. Provide kick-mop plates for both sides of each door, except where noted as not required. Kick-mop plates shall be 8 inches high. On push side of doors where jamb stop extends to floor, make combination kick-mop plates 1-1/2 inches less than width of door, except pairs of metal doors which shall have plates 1 inch less than width of each door. Extend all other combination kick-mop plates to within 1/4 inch of each edge of doors. Kick mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
3. Kick-mop plates are not required on following door sides:

   a) Armor plate side of doors;
   b) Exterior side of exterior doors;
   c) Closet side of closet doors;
   d) Storage side of doors to or from storage spaces; and
   e) Both sides of aluminum entrance doors.

4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be 35 inches high and 1-1/2 inches less than width of doors, except on pairs of metal doors. Plates on pairs of metal doors shall be 1 inch less than width of each door. Where top of intermediate rail of door is less than 35 inches from door bottom, extend armor plates to within 1/2 inch of top rail. On doors equipped with panic devices, extend armor plates to within 1/2 inch of panic bolt cross bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick-mop plate in place of armor plate. Size of stretcher plate and kick-mop plate shall be 8 inches high.

**2.11 EXIT DEVICES**

A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have lever handles similar to locksets, unless otherwise specified.

B. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

**2.12 FLUSH BOLTS (LEVER EXTENSION)**

A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors. Modify flush bolts to fit stiles of aluminum doors on double-acting doors.

B. Face plates for cylindrical strikes shall be rectangular and not less than 1 inch by 2-1/2 inches.

C. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

**2.13 FLUSH BOLTS (AUTOMATIC)**

A. Conform to ANSI A156.16. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 1-1/2 by 3-1/2 inches.

**2.14 DOOR PULLS**

A. Conform to ANSI A156.6. Pull plate 3-1/2 inches by 14 inches, unless otherwise specified. Cut plates of door pulls for cylinders, or turn pieces where required.

**2.15 PUSH PLATES**

A. Conform to ANSI A156.6. Plastic, Type J302, 8 inches wide by 14 inches high. Provide plastic Type J300 plates 4 inches wide by 14 inches high where push plates are specified for doors with stiles less than 8 inches wide. Cut plates for cylinders, and turn pieces where required.

**2.16 COMBINATION PUSH AND PULL PLATES**

A. Conform to ANSI 156.6. Type J303, stainless steel 1/8 inch thick, 3-1/3 inches wide by 16 inches high, top and bottom edges shall be rounded.

**2.17 COORDINATORS**

A Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated.

**2.18 THRESHOLDS**

A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be

installed in a bed of sealant with machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.

B. For thresholds at elevators entrances see other sections of specifications.

**2.19 WEATHERSTRIPS (FOR EXTERIOR DOORS)**

A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length.

**2.20 MISCELLANEOUS HARDWARE**

A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.

B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified.

**2.21 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES**

A. ASTM E883, 2 inch wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.

B. Key padlocks as follows:

1. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.
2. Roof Access and Scuttles: Engineer's set.

**2.22 FINISHES**

A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds,

etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.

B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.

C. Miscellaneous Finishes:

1. Hinges --exterior doors: 626 or 630.
2. Hinges --interior doors: 652.
3. Pivots: Match door trim.
4. Door Closers: Factory applied paint finish, Dull or Satin Aluminum color.
5. Thresholds: Mill finish aluminum.
6. Cover plates for floor hinges and pivots: 630.
7. Other primed steel hardware: 652.

D. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.

**2.23 BASE METALS**

A. Apply specified U.S. Standard finishes on different base metals as following:

| **Finish** | **Base Metal** |
|---|---|
| 652 | Steel |
| 626 | Brass or bronze |
| 630 | Stainless steel |

**PART 3 - EXECUTION**

**3.1 HARDWARE HEIGHTS**

A. Locate hardware on doors at heights specified below unless otherwise noted:

B. Hardware Heights from Finished Floor:

1. Exit devices centerline of strike (where applicable) 40-5/16 inches.
2. Locksets and latch sets centerline of strike 40-5/16 inches.
3. Deadlocks centerline of strike 48 inches.
4. Centerline of door pulls to be 40 inches.
5. Push plates and push-pull shall be 50 inches to top of plate.
6. Push-pull latch to be 40-5/16 inches to centerline of strike.
7. Centerline of deadlock strike to be 33 inches when used with push-pull latch.
8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

## 3.2 INSTALLATION

A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted regular arm. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.

B. Substitute parallel arm or top jamb mounting for regular arm mounting where the following conditions occur:

1. Where door swing, in full open position, would be limited to less than 90 degrees due to partition construction and closer location.
2. Where exterior doors open outward.

C. Hinge Size Requirements:

| **Door Thickness** | **Door Width** | **Hinge Height** |
|---|---|---|
| 1-3/4 inch | 3 feet and less | 4-1/2 inches |

D. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim.

E. Hinges Required Per Door:

| | |
|---|---|
| Doors 5 ft or less in height | 2 butts |
| Doors over 5 ft high and not over 7 ft 6 in high | 3 butts |

| | |
|---|---|
| Doors over 7 feet 6 inches high | 4 butts |
| Dutch type doors | 4 butts |
| Doors with spring hinges 4 feet 6 inches high or less | 2 butts |
| Doors with spring hinges over 4 feet 6 inches | 3 butts |

F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

G. After locks have been installed; show in presence of Resident Engineer that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Resident Engineer for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

**3.3 HARDWARE SETS**

A. Only those hardware sets that are indicated on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.

B. Refer to drawing Sheets R2.3 and R2.4 for door and door hardware replacement required on the project.

END OF SECTION 08 71 00