

SECTION 08 71 00

DOOR HARDWARE

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Door hardware.
- B. Public safety key box.
- C. Coordination of interfaces among security and access control equipment, door hardware, doors, and frames.

1.02 MEASUREMENT AND PAYMENT

- A. General: Door hardware will not be measured separately for payment but will be paid for as part of the Contract lump sum price for Architectural Work.

1.03 REFERENCE STANDARDS

- A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
 - 1. ANSI/BHMA A156 Standards Set
 - 2. ANSI/BHMA A156.3 Exit Devices
 - 3. ANSI/BHMA A156.4 Door Controls - Closers
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 80 Standard for Fire Doors and Other Opening Protectives

1.04 DESIGN REQUIREMENTS

- A. Exit Doors: Openable at all times from the inside without the use of a key or any special knowledge or effort.
- B. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA 80. This requirement takes precedence over other requirements for such hardware. Provide only such hardware which has been tested and listed by a nationally recognized testing laboratory for the type and size of door required, and complies with the requirements of the door and the door frame labels. Latching hardware, door closers, ball bearing hinges, and seals are required for fire-rated openings whether or not listed in the hardware schedule.

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1. Provide hardware listed by nationally recognized testing laboratory for labeled and 20-minute openings in conformance with requirements for class of opening scheduled. Provide label or stamp of nationally recognized testing laboratory on hardware for labeled openings.
 2. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door's testing laboratory label on panic exit device indicating "Fire Exit Hardware."
- C. Furnish all items of hardware required to complete the work in accordance with Contract Documents. Provide all items required for a complete functional operation and code compliance at each door opening. Items not specifically mentioned but necessary to complete the work shall be furnished, matching in quality and finish the item specified for similar locations.
- D. Provide hardware with suitable fasteners for complete work.
- E. Quantities listed are for the Contractor's convenience; confirm quantities.
- F. If the grade of an item designated by ANSI/BHMA designation is not indicated, provide Grade 1.
- G. Hand of Door: Contract Drawings show direction of swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

1.05 SUBMITTALS

- A. General: Refer to Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Coordinate submittal of door hardware with submittals of related items including metal doors and frames and electrified components to be integrated with doors.
- C. Submit door hardware schedule organized into "Hardware Sets" with an index of doors and heading indicating complete designations of every item required for each door or opening. Include the following information:
1. Type, style, function, size, quantity, and finish of each hardware item.
 2. Name, part number, and manufacturer of each item.
 3. Fastenings and other pertinent information.
 4. Location of hardware set cross-referenced to indications on Contract Drawings both on floor plans and in door schedule.
 5. Explanation of abbreviations, symbols, and codes contained in schedule.
 6. Mounting locations including heights for hardware.

7. Door and frame sizes and materials.

- D. Wiring Diagrams: Submit wiring diagrams, if applicable, tailored for each applicable opening including electric hardware, security equipment, and access control equipment. Indicate and coordinate with door and frame rough-ins required.
- E. Product Data:
 - 1. Manufacturers' technical data and installation instructions.
 - 2. Catalog cuts, marked to indicate applicable item.
- F. Samples: If requested by the Engineer, submit one sample of each type of hardware. Samples will be returned, and approved samples may be used in the work.
- G. Templates: Where required, furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware.
- H. Keying Schedule: Submit separate detailed schedule indicating clearly how the Engineer's final instructions on keying of locks has been fulfilled.
- I. Supplier's AHC Inspection: Submit report and written statement signed by the AHC that its inspection has been completed as specified under the Article entitled "Adjusting" herein.
- J. Operation and Maintenance Manual: Submit in accordance with Section 01 78 23, Operation and Maintenance Data. Include record "as installed" copy of final hardware schedule. Include "as installed" wiring diagrams for each piece of hardware connected to power.

1.06 QUALITY ASSURANCE

- A. Supplier Qualifications: Firm with three years' experience in distribution of commercial/institutional hardware who has in its employ a certified architectural hardware consultant (AHC) who is available at reasonable times during the course of the Work for consultation to the Engineer and Contractor. AHC shall be responsible for scheduling and coordinating hardware and establishing keying schedule.
- B. Obtain each kind of hardware (latch and locksets, panic exit devices, hinges, and closers) from only one manufacturer.
- C. Keying Schedule Meeting: Conduct keying meeting with the Engineer, hardware supplier, AHC, and other District representatives. Review door security level, functionality, keying, and programming of locksets and locking hardware. Provide copies of proposed keying and programming schedule for use at the meeting.
- D. Security Hardware Coordination: For doors with electrical and electronic interfaces conduct the following coordination:

1. Conduct a detailed shop drawing review working session (Working Session) to coordinate security system, door hardware, doors and frames, and associated conduits, wiring, and power provisions.
 - a. Participants shall include the Contractor, the Engineer, AHC, and representatives of the various subcontractors and suppliers involved in the supply and installation of the work being coordinated. Schedule and hold meeting within 120 Days following the Notice to Proceed.
2. Submit one copy of each related security, door hardware, and door and frame submittals a minimum of seven Days prior to Working Session for preliminary review.
3. In Case of Incomplete Submittal:
 - a. If the Engineer notifies the Contractor that the submittals are incomplete, the Contractor shall postpone and reschedule the Working Session for a date no later than 30 Days from the date of notification.
 - b. Correct deficiencies in submittals and repeat the submittal of one copy of each of the related submittals for preliminary review a minimum of seven Days prior to Working Session. (Process shall continue until the Engineer deems that the submittals are sufficiently complete for the Working Session.)
4. Working Session Submittal: The Contractor shall compile all comments and changes discussed in the Working Session into a Working Session Submittal and submit this document along with the required number of sets of the corrected submittals (related security, door hardware, and door and frame submittals).
5. Conduct additional Working Sessions and submittal review cycles if determined necessary by the Engineer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at the Site: Deliver products in original unopened packaging with legible manufacturer's identification. Individually package each unit of finish hardware complete with proper fastening and appurtenances, clearly marked on the outside to indicate contents and specific locations in the Work. Include installation instructions. Mark hardware to correspond with approved hardware schedule.
- B. Deliver packaged hardware items at the times and to the locations (shop or field) for installation, as appropriate and in accordance with the progress schedules.

1.08 PROJECT CONDITIONS

- A. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function.

- B. Verify that doors and entrances will incorporate adequate provisions for the proper installation of hardware.

1.09 WARRANTY

- A. Provide manufacturers' guarantees as follows:
 1. Closers, Except Electronic Closers: Ten years.
 2. Electronic Closers: Two years.
 3. Panic Exit Devices and Locksets: Three years.
 4. All Other Hardware: Two years.

1.10 DISTRICT INSTRUCTION

- A. Instruct District personnel in operation and maintenance of hardware units. Refer to Section 01 79 00, Demonstration and Training.

1.11 MAINTENANCE MATERIALS

- A. Provide wrenches and tools furnished by manufacturers as required for proper maintenance of hardware. Clearly label wrenches and tools. Provide two sets of such wrenches and tools to the Engineer.

PART 2 – PRODUCTS

2.01 PRODUCTS

- A. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade names displayed in a visible location (omit removable nameplates), except in conjunction with required UL or FM labels and as otherwise approved by the Engineer.
 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Hinges: Outswinging exterior doors and doors which swing out from an employee only or private area into a public area or corridor shall have non-removable pin hinges. Specified hinge open widths shall be understood to be minimum, but shall be of sufficient size to permit door to swing 180 degrees. Hinges shall be non-rising. Furnish hinges with five knuckles and flush bearing.
 1. Furnish three hinges per leaf to seven foot six inch height. Add one for each additional 30 inches in height or fraction thereof.
 2. Provide hinges as listed in schedule.

- C. Locksets and Cylinders
1. Locksets and cylinders: Designated Matching Products specified in Contract Specifications Section 08 71 00, Door Hardware. Locksets shall be pin tumbler, standard small format interchangeable core, 7 pin, A626 finish. Keyway shall be according to security level.
 2. Lockset Backset: 2-3/4 inches.
 3. If electrified, use a 24V DC voltage fail secure.
 4. Door Lever: Designated Matching Product.
- D. Strikes: Provide lockset manufacturer's standard wrought box strike for each latch or lock bolt, with extended lips to protect frame, finish to match hardware set.
1. Provide flat lip strikes for locks with three-piece, anti-friction latchbolts as recommended by manufacturer.
 2. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
 3. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
 4. Provide 24V DC strike fail to secure if controlled electronically.
- E. Panic Exit Devices: Designated Matching Product, ANSI/BHMA A156.3, Grade 1, 626, 26D finish. Trim of exits to match trim of locksets, unless specified otherwise.
- F. Surface Door Closers: ANSI/BHMA A156.4, Grade 1. Heavy-duty arms and knuckles. Full rack and pinion type with removable non-ferrous cover, 1 1/2 inch minimum bore. Place closers inside building, stairs, and rooms. Provide appropriate closer type so that closers are not visible to public view.
1. Closers shall be non-handed, non-sized, adjustable, and multi-size one through six.
 2. Drop brackets are required at narrow head rails.
 3. Set exterior doors closers to have eight and one half pounds maximum pressure to open, interior non-rated at five pounds, rated openings at 12 pounds.
 4. Separate adjusting valves for closing and latching speed, and backcheck.
- G. Kickplates: Provide with four beveled edges, ten inches high by width less two inches on single doors and one inch on pairs of doors. Furnish pan-head countersunk screws to match finish.
- H. Screws: All exposed screws shall be Phillips head.

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- I. Silencers: Furnished under Section 08 11 00, Metal Doors and Frames. Omit where seals occur.
- J. Stops: Provide at minimum two stops for swing doors at opposite ends. Provide heavy-duty wall stops with concave rubber bumpers. Whenever wall stops are not practical use dome style heavy-duty floor stops. In instances where neither a wall nor door stop is practical, provide closer with a 90-degree swing with increased back-check.
- K. Astragal: Provide for double door set.
- L. Thresholds: Provide thresholds in single length for each opening with ends scribed or shaped to seat snugly against jamb profiles.
- M. Weatherstripping and Seals:
 - 1. Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf: heads, jambs, and astragals of doors.
 - 2. Seals: Seals shall be finished to match adjacent frame color as approved by the Engineer. Material shall be listed by a nationally recognized testing laboratory for labeled openings.
 - 3. Replaceable Seal Strips: Provide only those units where resilient or flexible silicone seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
 - 4. Weatherstripping:
 - a. At jambs and heads, provide bumper-type resilient insert with retainer strips, surface applied.
 - b. At astragals, provide a compression bulb resilient pressure sensitive door gasketing.
 - 5. Door Bottoms: Provide handed, surface mounted units with sponge neoprene seal.
- N. Door Bolts: Provide manual flush bolts at tops and bottoms of inactive leaf of each pair of doors, with minimum of one half inch diameter rods.
- O. Public Safety Key Box: Provide a public safety key box 6 inches by 6 inches in size of extra heavy-duty vault construction with drill-resistant door, recessed mounted. Finish as specified in the Contract Specifications Section 08 71 00, Door Hardware, in accordance with local Fire Department requirements.

2.02 FINISH

- A. Typical Finish: BHMA 630 satin stainless steel, unless otherwise noted.
- B. Protection Plates, Push, Pulls, Panic Exit Devices, Locksets and Mortise Locks: BHMA 630 satin stainless steel, unless otherwise noted.
- C. Door Closer Finish: Factory power coat to match other hardware, unless otherwise noted.

2.03 KEYING REQUIREMENTS

- A. Notify the Engineer in writing a minimum of two weeks prior to construction start the number of permanent cores to be installed. The Contractor shall submit the permanent uncoded cores and keys blanks per Article 2.03 herein to the District. The District will furnish construction pinned and keyed cores and keys for installation and use during the construction period. Construction control and operating keys and core are not part of the District's permanent key system and are not furnished on the same keyway as the District's permanent keying system.
- B. Notify the Engineer in writing a minimum of two weeks prior to occupancy to allow enough time to schedule re-keying to the permanent cores which will be performed by the District locksmith.
- C. Return construction keys to the Engineer prior to Acceptance.
- D. Permanent keys and cores shall be stamped with the applicable key mark for identification. These visual key control marks or codes shall not include the actual key cuts. Permanent keys shall be stamped "Do Not Duplicate."
- E. Furnish key blanks in the following quantities:
 - 1. Four each Masterkeys blanks per lock.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Electrified Hardware: For cable termination to electrified hardware, provide coordination so that cable is routed to door from transfer hinge to lockset, prior to buttoning up.
- C. Install hardware using fasteners provided by the respective manufacturer suitable for application. Drill and tap screw holes in metallic materials.

3.02 HARDWARE LOCATIONS

- A. Hinges:
 - 1. Bottom Hinge: 10 inches from door bottom to bottom of hinge.
 - 2. Top Hinge: Five inches from door top to top of hinge.
 - 3. Center Hinge: Center between top and bottom hinge.
 - 4. Extra Hinge: Six inches from bottom of top hinge to top of extra hinge.
- B. Lockset: Thirty-eight inches from finished floor to center of lever or knob.
- C. Panic Exit Device: Forty-four inches from bottom of door to center of bar.
- D. Push Plate: Forty-four inches from bottom of door to center of plate.
- E. Pull Plate: Forty-two inches from bottom of door to center of pull.
- F. Deadlock Strike: Locate to fit with the panic exit device.

3.03 ADJUSTING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.
- B. Manufacturer/Distributor's Field Services: After installation is complete, provide the services of hardware supplier's AHC for an inspection. AHC shall inspect completed door openings to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final approved submittals. Further adjust hardware as necessary during inspection. Perform inspection in the presence of the Engineer and District maintenance personnel.
 - 1. Check closers to ensure proper operation.
 - 2. Check latchset, lockset, and panic exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 - 3. Report findings, in writing, outlining corrective actions and recommendations.

- C. Final Adjustment: Whenever hardware installation is made more than one month prior to Revenue Service or occupancy of a space or area, as applicable, return to work during the week prior to Revenue Service or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for operation of heating and ventilating equipment.
1. For door closers, provide final adjustment of door closers to ensure that all doors close and latch properly to prevent false door held alarms or intrusions and compliance with maximum opening pressure.
 - a. Adjust closer to complete full closing cycle in less than four to six seconds without abrupt change of speed between “sweep” and “latch” speeds.
 - b. Adjust “back-check” according to manufacturer’s instructions.
 2. Power Up and Test: Provide powered up testing of doors in the presence of the installer of electrified hardware, as applicable, to ensure final adjustments to electrified components.
 3. During final adjustment of hardware, instruct District personnel in proper adjustment and maintenance of hardware and hardware finishes. This training shall be coordinated with training conducted in accordance with Section 01 79 00, Demonstration and Training.

3.04 HARDWARE SCHEDULE

- A. Schedule Designations: Typically, the numeric designations of specific manufacturers are used in the schedule for each item to indicate design, size, weight, finish function, and other features. With the exception of Designated Matching Products, products of other manufacturers will be acceptable if such products include the same features as the product listed. Refer to the General Conditions for provisions regarding trade names and alternatives.
- B. Refer to Hardware Schedule in the Contract Specifications Section 08 71 00, Door Hardware.

END OF SECTION 08 71 00