

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hinges
 - 2. Lock cylinders and keys.
 - 3. Lock and latch sets.
 - 4. Bolts/flush bolts/dead bolts/dust proof strikes.
 - 5. Exit devices.
 - 6. Push/pull units.
 - 7. Closers.
 - 8. Overhead holders.
 - 9. Miscellaneous door control devices.
 - 10. Door trim units.
 - 11. Protection plates/stretcher plates.
 - 12. Combination Locks.
 - 13. Weather-stripping for exterior doors.
 - 14. Astragals or meeting seals on pairs of doors.
 - 15. Thresholds.
 - 16. Folding Door Hardware

- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 8 Section "Hollow Metal Doors and Frames" for silencers integral with hollow metal frames.
 - 2. Division 8 Section "Flush Wood Doors" for factory prefitting and factory machining of door hardware.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size, label, hand and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.

- d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
- 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 - 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Templates for doors, frames, and other work specified to be factory prepared for the installation of 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.
- 1.4 QUALITY ASSURANCE
- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
 - B. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
- 1.5 PRODUCT HANDLING
- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
 - B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
 - C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
 - D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
 - E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.
- 1.6 MAINTENANCE

- 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 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hinges: Basis of Design; Ball Bearing Hinges, Hager Hinge, Model No. BB1199. Continuous Hinges, Roton, Model No. 1200-600 XHD.
 - a. Markar.
 - b. McKinney Products Company; Div. of ESSEX Industries, Inc.
 - c. Stanley Commercial Hardware; Div. of the Stanley Works.
 - d. Hager Companies.
 2. Lockset and Latchsets: Basis of Design; Best Access Systems, Cylindrical Locks, 9K Series.
 - a. Best Lock Corporation
 - b. Schlage Commercial Lock Division; An Ingersoll-Rand Company
 - c. Arrow USA; An ASSA ABLOY Group Company
 - d. Yale Commercial Locks and Hardware
 - e. Accurate Lock and Hardware
 3. Flush Bolts: Basis of Design; Manual, Ives, Model No. FB256N or FB358, Automatic, Ives, Model No. FB30 or FB40
 - a. Glynn-Johnson; An Ingersoll-Rand Company
 - b. Hager Companies
 - c. Ives: An Ingersoll-Rand Company
 4. Dust-Proof Strikes: Basis of Design; Ives, Model No. DP1 and DP2
 - a. Glynn-Johnson; An Ingersoll-Rand Company
 - b. Hager Companies
 - c. Ives: An Ingersoll-Rand Company
 5. Exit/Panic Devices: Basis of Design; Von Duprin, Monarch, 18 Series.
 - a. Von Duprin; An Ingersoll-Rand Company
 - b. Sargent Manufacturing; An ASSA ABLOY Group Company
 - c. NT Monarch; An Ingersoll-Rand Company
 6. Overhead Closers: Basis of Design; LCN, 4041 Series.
 - a. LCN Closers; An Ingersoll-Rand Company
 - b. DORMA Door Controls Inc. Member of The Dorma Group (For Cupped hold open)
 - c. Yale Commercial Locks and Hardware; An ASSA ABLOY Group Company
 - d. Sargent Manufacturing; An ASSA ABLOY Group Company
 7. Kick Plates: Basis of Design; Rockwood Manufacturing, Model No. K1050 & K1050F, Stainless Steel, 6" x 2" LDW, B4E.
 - a. Hager Companies
 - b. Ives; An Ingersoll-Rand Company
 - c. Rockwood Manufacturing
 8. Stretcher Plates and Armor Plates: Basis of Design; Rockwood Manufacturing, Model No. K1050 and K1050F, Stainless Steel, 10" x 2" LDW, B4E, 34" x 2" LDW, B4E
 - a. Hager Companies

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- b. Ives; An Ingersoll-Rand Company
 - c. Rockwood Manufacturing
9. Door Stops: Basis of Design; Rockwood Manufacturing, Model No. 406
 - a. Hager Companies
 - b. Ives; An Ingersoll-Rand Company
 - c. Rockwood Manufacturing
 - d. Glynn-Johnson – IR Security and Safety; An Ingersoll-Rand Company
 10. Overhead Stops: Basis of Design; Rixson: An ASSA ABLOY Group Company, Heavy Duty 1 Series, “Checkmate”, concealed.
 - a. Glynn-Johnson – IR Security and Safety; An Ingersoll-Rand Company
 - b. Sargent Manufacturing; An ASSA ABLOY Group Company
 - c. Rockwood Manufacturing
 11. Silencers: Basis of Design; Glynn-Johnson, Model No. GJ64
 - a. Glynn-Johnson – IR Security and Safety; An Ingersoll-Rand Company
 - b. Rockwood Manufacturing
 12. Electromagnetic Hold Open Device: Basis of Design; LCN, Model No. SEM7850
 - a. LCN Closers; An Ingersoll-Rand Company
 - b. Von Duprin; An Ingersoll-Rand Company
 - c. Yale Commercial Locks and Hardware; An ASSA ABLOY Group Company
 13. Folding Door Hardware: Basis of Design, Grant Hardware, Model No. 1600
 - a. Hager Companies
 - b. Stanley Commercial Hardware; Div. of The Stanley Works
 - c. Grant Hardware
 14. Door Pulls / Push Plates: Basis of Design, Ives, Door Pull Model No. 8303-8, Push Plate Model No. 8200
 - a. Ives; An Ingersoll-Rand Company
 - b. Rockwood Manufacturing
 - c. Hager Companies
 15. Hospital Latch: Basis of Design; Glynn-Johnson; HL6
 - a. Glynn-Johnson: An Ingersoll-Rand Company
 - b. Sargent Manufacturing: An ASSA ABLOY Group Company
 - c. VonDuprin; An Ingersoll-Rand Company
 16. Combination Locks (Manual): Basis of Design; Kaba Ilco, Series 1000 with lever handle, Satin chrome finish with cylinders by ‘Best’
 - a. Kaba Ilco (formerly Simplex Uican)
 - b. Sargent Manufacturing; An ASSA ABLOY Group Company
 17. Door Gasketing, Door Bottoms and Weather stripping: Basis of Design; Perimeter Gasketing, Pemko, Model No. 290AS, Door Shoe, Pemko, Model No. 216AV
 - a. Pemko Manufacturing.
 - b. Hager Companies.
 - c. National Guard Products.
 18. Thresholds (Exterior Doors): Basis of Design; Pemko, Model No. 2005AT
 - a. Pemko Manufacturing
 - b. Hager Companies
 - c. National Guard Products
 19. Astragals: Basis of Design; Pemko, Model No. 356AV
 - a. Hager Companies
 - b. National Guard Products, Inc.

- c. Pemko Manufacturing
- 20. Cylinders
 - a. Best Lock Corporation

2.2 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:
 - 1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.
 - 2. ANSI/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.
 - a. Butts and Hinges: ANSI/BHMA A156.1.
 - b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2.
 - c. Exit Devices: ANSI/BHMA A156.3.
 - d. Door Controls - Closers: ANSI/BHMA A156.4.
 - e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
 - f. Architectural Door Trim: ANSI/BHMA A156.6.
 - g. Template Hinge Dimensions: ANSI/BHMA A156.7.
 - h. Door Controls - Overhead Holders: ANSI/BHMA A156.8.
 - i. Interconnected Locks and Latches: ANSI/BHMA A156.12.
 - j. Mortise Locks and Latches: ANSI/BHMA A156.13.
 - k. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.
 - l. Closer Holder Release Devices: ANSI/BHMA A156.15.
 - m. Auxiliary Hardware: ANSI/BHMA A156.16.
 - n. Materials and Finishes: ANSI/BHMA A156.18.
 - o. Pull / Push Plates: ANSA/BHMA A156.6

2.3 MATERIALS AND FABRICATION

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- C. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

2.4 HINGES, BUTTS, AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1. For metal doors and frames install machine screws into drilled and tapped holes.
 - 2. For wood doors and frames install wood screws.
 - 3. For fire-rated wood doors install #12 x 1-1/4-inch, threaded-to-the-head steel wood screws.
 - 4. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1. Out-Swing Exterior Doors: Nonremovable pins.
 - 2. Out-Swing Corridor and Lobby Doors with Locks: Nonremovable pins.
 - 3. Interior Doors: Nonrising pins.
 - 4. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
- D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.
 - 1. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches or less in height with same rule for additional hinges.

2.5 LOCK CYLINDERS AND KEYING

- A. Standard System: Except as otherwise indicated, provide new masterkey system for Project.
- B. Multiple-Building System: Except as otherwise indicated, provide new grandmasterkey system for Project.
- C. Existing System: Grandmasterkey the locks to the Owner's existing system, with a new masterkey for the Project.
- D. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with Owner's existing system.
- E. Equip locks with manufacturer's standard 6-pin tumbler cylinders.
- F. Equip locks with high-security cylinders that comply with performance requirements for Grade 1 cylinders as listed in ANSI/BHMA A156.5 and that have been tested for pick and drill resistance requirements of UL 437 and are UL listed.
- G. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
- H. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
 - 1. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
- I. Key Material: Provide keys of nickel silver only.
- J. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, and 5 grandmaster keys for each grandmaster system.

1. Deliver keys to Owner.

2.6 LOCKS, LATCHES, AND BOLTS

- A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
 1. Provide flat lip strikes for locks with 3-piece, antifriction latchbolts as recommended by manufacturer.
 2. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
 3. Provide dust-proof strikes for foot bolts, except where special threshold construction provides nonrecessed strike for bolt.
 4. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- B. Lock Throw: Provide 5/8-inch minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 1. Provide 1/2-inch minimum throw of latch for other bored and preassembled types of locks and 3/4-inch minimum throw of latch for mortise locks. Provide 1-inch minimum throw for all dead bolts.
- C. Flush Bolt Heads: Minimum of 1/2-inch-diameter rods of brass, bronze, or stainless steel with minimum 12-inch-long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.
- D. Exit Device Dogging: Except on fire-rated doors where closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to keep the latch bolt retracted, when engaged.
- E. Rabbeted Doors: Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.

2.7 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
 1. Provide parallel arms for all overhead closers, except as otherwise indicated.
- B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.
- C. Provide black resilient parts for exposed bumpers.

2.8 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match US26D (satin chromium plated).

- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."
- E. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
 - 1. Rust-Resistant Finish: For iron and steel base metal required for exterior work and in areas shown as "High Humidity" areas (and also when designed with the suffix -RR), provide 0.2-mil-thick copper coating on base metal before applying brass, bronze, nickel, or chromium plated finishes.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 - 2. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance 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 final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.

- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.

3.3 HARDWARE SCHEDULE

- A. General: Provide hardware for each door to comply with requirements of Section "Door Hardware," hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

Hardware Set No. 1

- 1 1/2 Pair Heavy Duty 5 Knuckle Hinges
- 1 Office Lockset
- 1 Kick Plate
- Silencers

Hardware Set No. 2

- 3 Pair Heavy Duty 5 Knuckle Hinges
- 1 Storeroom Lockset
- 2 closers with hold open function
- 1 manual flush bolt
- 2 kick plates
- 1 astragal
- 1 HC accessible sill
- 1 Door shoe at each leaf
- Perimeter gasketing at head and jambs

Hardware Set No. 3

- 3 Pair Heavy Duty 5 Knuckle Hinges
- 2 closers
- 2 pulls
- 2 push plates
- 4 kick plates
- 1 astragal
- 1 pair of magnetic hold opens tied to fire alarm
- Silencers

Hardware Set No. 4

- 1 1/2 Pair Heavy Duty 5 Knuckle Hinges
- 1 Exit device and door strike
- 1 Closer
- 1 HC accessible sill
- Perimeter gasketing at head and jambs

Hardware Set No. 5

3 Pair Heavy Duty 5 Knuckle Hinges
2 Exit Devices
4 kick plates
Silencers
2 Latch Sets
1 pair of magnetic hold opens tied to fire alarm

Hardware Set No. 6 (Office)

Hinges
Office lock set
Mop plate
Kick Plate
Closer
Silencers (Door Gasketing @ Smoke Partition Assembly)

Hardware Set No. 6A (Office)

Hinges
Office lock set
Mop plate
Kick Plate
Silencers

Hardware Set No. 7 (Staff Toilet)

Hinges
Privacy lock set
Mop plate
Kick Plate
Silencers

Hardware Set No.7A (Staff Toilet)

Hinges
Push Button lock set
Mop plate
Kick Plate
Silencers

Hardware Set No. 8 (Closet, Storage)

Hinges
Storeroom lock set
Mop plate
Kick Plate
Silencers

Hardware Set No.9

Continuous Hinge
Passage Lock Set
Closer
Power
Electric Strike
Kick Plate
Mop Plate
Silencers
Card Reader

Hardware Set No.10

Continuous Hinge
Edge Guards
Concealed Vertical Exit (LBR)
Closers on Both Leaves
Electric Magnetic Hold Open Tied to Fire Alarm
Push/Pull Plate
Kick Plates
Mop Plates
Silencers

END OF SECTION 087100