

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.
- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- D. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. UL 305 - Panic Hardware.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.

- c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
- 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.3 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures

1.4 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.6 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
 - 1. Permanent cylinders, cores, and keys to be installed by Owner.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'6": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'7" to 4'0": 5" standard or heavy weight as specified.
 - 3. Manufacturers:
 - a. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.3 CONTINUOUS HINGES

- A. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).

2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 - 2. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - 3. Manufacturers:
 - a. Rockwood (RO).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 4. Keyway: Match Facility Restricted Keyway.

- C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
- D. Security Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders to be factory keyed.
 - 1. New security key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 - 2. Manufacturers:
 - a. Sargent (SA) - Signature.
 - b. No Substitution.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- F. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2)
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
 - 4. Construction Control Keys (where required): Two (2).
 - 5. Permanent Control Keys (where required): Two (2).
- G. Construction Keying: Provide temporary keyed construction cores.
- H. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 MORTISE LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 8200 Series.
 - b. No Substitution.

2.7 DEADLOCKS AND LATCHES

- A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 4870 Series.
 - b. No Substitution.

2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 3. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. Exit devices shall have a five-year warranty.
 - 2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 - 4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 - 5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 - 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
 - 7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
 - 8. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 - 9. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 80 Series.
 - b. No Substitution.

2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 - 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
 - 1. Heavy duty surface mounted door closers shall have a 30-year warranty.
 - 2. Manufacturers:
 - a. Sargent Manufacturing (SA) - 351 Series.
 - b. No Substitution.
- C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 422 Series.
 - b. No Substitution.

2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
 - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
 - a. Rockwood (RO).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Rockwood (RO).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- E. Manufacturers:
 1. Pemko (PE).

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. 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
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

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.

3.5 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.6 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.7 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. MR - Markar
3. SA - SARGENT
4. RO - Rockwood
5. PE - Pemko
6. OT - Other

Hardware Sets

Set: 1.0

Doors: 105C, 106B, 116B, 117B, 118B, 118C, 118D, 118E, 119B, 119C

0 All Hardware	BY DOOR SUPPLIER		OT
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Set: 2.0

Doors: 108B

2 Continuous Hinge	FM300 - DOOR HEIGHT	630	MR
1 Mullion	L980	PC	SA
1 Rim Exit Device, Exit Only	LD 8810 EO	US32D	SA
1 Rim Exit Device, Storeroom	16 64 8804 862	US32D	SA
1 Cylinder	64 980C1	US26D	SA
3 Cylinder Core	10 6300	US15	SA
2 Surface Closer	351 CPS	EN	SA
2 Kick Plate	K1050 10" CSK BEV	US32D	RO
2 Astragal (split)	297AS		PE
1 Rain Guard	346C		PE
1 Gasketing (head/jamb)	S773BL		PE
1 Gasketing (mullion)	5110BL		PE
2 Sweep (w/drip edge)	3452CNB		PE
1 Threshold	2009APK MSES25SS		PE
2 Door Position Switch	BY SECURITY		OT

Set: 3.0

Doors: 105B, 108A, 110D, 116A, 120

1 Continuous Hinge	FM300 - DOOR HEIGHT	630	MR
1 Rim Exit Device, Storeroom	16 64 8804 862	US32D	SA
2 Cylinder Core	10 6300	US15	SA
1 Surface Closer	351 CPS	EN	SA

1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Rain Guard	346C		PE
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Threshold	2009APK MSES25SS		PE
1	Door Position Switch	BY SECURITY		OT

Set: 4.0

Doors: 117A

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Storeroom/Closet Lock	64 8204 LNL	US26D	SA
1	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Threshold	2009APK MSES25SS		PE
1	Door Position Switch	BY SECURITY		OT

Set: 5.0

Doors: 114

3	Hinge, Full Mortise, Hvy Wt	T4A3386 4-1/2" x 4-1/2"	US32D	MK
1	Office/Entry Lock	V40 64 8205 LNL	US26D	SA
1	Surface Closer	422 CTB2	EN	SA
1	Mop Plate	K1050 4" CSK BEV	US32D	RO
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
1	Rain Guard	346C		PE
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep	315CN		PE
1	Threshold (1/2" hgt)	169A MSES10SS		PE
1	Door Position Switch	BY SECURITY		OT

Set: 6.0

Doors: 119A

3	Hinge, Full Mortise, Hvy Wt	T4A3386 4-1/2" x 4-1/2"	US32D	MK
1	Classroom Security Intruder Lock	64 8238 LNL	US26D	SA
2	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 O	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep	315CN		PE

1	Threshold (1/2" hgt)	169A MSES10SS	PE
1	Door Position Switch	BY SECURITY	OT

Set: 7.0

Doors: 100, 102

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Storeroom/Closet Lock	64 8204 LNL	US26D	SA
1	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Rain Guard	346C		PE
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep (w/drip edge)	3452CNB		PE
1	Threshold	2009APK MSES25SS		PE
1	Door Position Switch	BY SECURITY		OT

Set: 8.0

Doors: 105A, 110A

1	Continuous Hinge	FM300 - DOOR HEIGHT	630	MR
1	Rim Exit Device, Storeroom	16 64 8804 862	US32D	SA
2	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 9.0

Doors: 103, 113, 115, 121

3	Hinge, Full Mortise	TA2314	US32D	MK
1	Storeroom/Closet Lock	64 8204 LNL	US26D	SA
1	Cylinder Core	10 6300	US15	SA
1	Mop Plate	K1050 4" CSK BEV	US32D	RO
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 10.0

Doors: 106A

3	Hinge, Full Mortise	TA2314	US32D	MK
1	Classroom Security Intruder Lock	64 8238 LNL	US26D	SA
2	Cylinder Core	10 6300	US15	SA

1	Surface Closer	351 O	EN	SA
1	Mop Plate	K1050 4" CSK BEV	US32D	RO
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep	315CN		PE
1	Threshold (1/2" hgt)	169A MSES10SS		PE

Set: 11.0

Doors: 107

3	Hinge, Full Mortise	TA2314	US32D	MK
1	Classroom Security Intruder Lock	64 8238 LNL	US26D	SA
2	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 12.0

Doors: 118A

3	Hinge, Full Mortise	TA2314	US32D	MK
1	Classroom Security Intruder Lock	64 8238 LNL	US26D	SA
2	Cylinder Core	10 6300	US15	SA
1	Surface Closer	351 PSH	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Gasketing (head/jamb)	S773BL		PE
1	Sweep	315CN		PE
1	Threshold (1/2" hgt)	169A MSES10SS		PE

Set: 13.0

Doors: 101

3	Hinge, Full Mortise	TA2314	US32D	MK
1	Privacy Lock	V20 8265 LNL	US26D	SA
1	Mop Plate	K1050 4" CSK BEV	US32D	RO
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 14.0

Doors: 104A, 109A

1	Continuous Hinge	FM300 - DOOR HEIGHT	630	MR
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1	Classroom Deadlock	64 4877	US26D	SA
1	Cylinder Core	10 6300	US15	SA
1	Door Pull	BF Y 110-RKW Mtg-Type 1	US32D	RO
1	Push Plate	70C (4 X 16)	US32D	RO
1	Surface Closer	351 P10	EN	SA
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 15.0

Doors: 104B, 109B, 110B, 110C

1	Continuous Hinge	FM300 - DOOR HEIGHT	630	MR
1	Door Pull	BF Y 110-RKW Mtg-Type 1	US32D	RO
1	Push Plate	70C (4 X 16)	US32D	RO
1	Surface Closer	351 O	EN	SA
1	Mop Plate	K1050 4" CSK BEV	US32D	RO
1	Kick Plate	K1050 10" CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

END OF SECTION 087100

Mark	Config	Width	Height	Thickness	Fire Rating	Hardware	Arch Door Material	Arch Door Type	Arch Frame Material	Arch Frame Type
100A	SG	3' 0"	7' 0"	1 3/4"		7.0	HM (INSULATED)	A	HM-E	HM-1
100B	OH	2' 0"	4' 0"	1"		1.0	ALUM	F	ALUM	MANUF.
100C	OH	2' 0"	4' 0"	1"		1.0	ALUM	F	ALUM	MANUF.
101	SG	3' 0"	7' 0"	1 3/4"		13.0	HM	A	HM	HM-2
102	SG	3' 0"	7' 0"	1 3/4"		7.0	HM (INSULATED)	A	HM-E	HM-1
103	SG	3' 0"	7' 0"	1 3/4"		9.0	HM	A	HM	HM-2
104A	SG	3' 0"	7' 0"	1 3/4"		14.0	HM	A	HM	HM-2
104B	SG	3' 0"	7' 0"	1 3/4"		15.0	HM	B	HM	HM-2
105A	SG	3' 0"	7' 0"	1 3/4"		8.0	HM	B	HM	HM-2
105B	SG	3' 0"	7' 0"	1 3/4"		3.0	HM (INSULATED)	B	HM-E	HM-1
105C	OH	10' 0"	9' 0"	1"		1.0	METAL	D	METAL	MANUF.
106A	SG	3' 0"	7' 0"	1 3/4"		10.0	HM	B	HM	HM-2
106B	OH	10' 0"	9' 0"	1"		1.0	METAL	D	METAL	MANUF.
107	SG	3' 0"	7' 0"	1 3/4"		11.0	HM	B	HM	HM-2
108A	SG	3' 0"	7' 0"	1 3/4"		3.0	HM (INSULATED)	B	HM-E	HM-1
108B	AI	6' 0"	7' 0"	1 3/4"		2.0	HM (INSULATED)	C	HM-E	HM-3
109A	SG	3' 0"	7' 0"	1 3/4"		14.0	HM	A	HM	HM-2
109B	SG	3' 0"	7' 0"	1 3/4"		15.0	HM	B	HM	HM-2
110A	SG	3' 0"	3' 0"	1 3/4"		8.0	HM	A	HM	HM-2
110B	SG	3' 0"	7' 0"	1 3/4"		15.0	HM	B	HM	HM-2
110C	SG	3' 0"	7' 0"	1 3/4"		15.0	HM	B	HM	HM-2
110D	SG	3' 0"	7' 0"	1 3/4"		3.0	HM (INSULATED)	A	HM-E	HM-1
113	SG	3' 0"	7' 0"	1 3/4"		9.0	HM	A	HM	HM-2
114	SG	3' 0"	7' 0"	1 3/4"		5.0	HM (INSULATED)	A	HM-E	HM-1
115	SG	3' 0"	7' 0"	1 3/4"		9.0	HM	A	HM	HM-2
116A	SG	3' 0"	7' 0"	1 3/4"		3.0	HM (INSULATED)	A	HM-E	HM-1
116B	OH	4' 0"	7' 0"	1"		1.0	ALUM	F	ALUM	MANUF.
117A	SG	3' 0"	7' 0"	1 3/4"		4.0	HM (INSULATED)	A	HM-E	HM-1
117B	OH	10' 0"	9' 0"	1"		1.0	METAL	D	METAL	MANUF.
118A	SG	3' 0"	7' 0"	1 3/4"		12.0	HM	A	HM	HM-1
118B	OH	5' 0"	4' 0"	1"		1.0	ALUM	E	ALUM	MANUF.

118C	OH	5' 0"	4' 0"	1"		1.0	ALUM	E	ALUM	MANUF.
118D	OH	5' 0"	4' 0"	1"		1.0	ALUM	E	ALUM	MANUF.
118E	OH	9' 0"	7' 0"	1"		1.0	ALUM	F	ALUM	MANUF.
119A	SG	3' 0"	7' 0"	1 3/4"		6.0	HM (INSULATED)	A	HM-E	HM-1
119B	OH	5' 0"	4' 0"	1"		1.0	ALUM	E	ALUM	MANUF.
119C	OH	5' 0"	4' 0"	1"		1.0	ALUM	E	ALUM	MANUF.
120	SG	3' 0"	7' 0"	1 3/4"		3.0	HM (INSULATED)	A	HM-E	HM-1
121	SG	3' 0"	7' 0"	1 3/4"		9.0	HM	A	HM	HM-2