

SECTION 08710 - FINISH HARDWARE

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work under this section is subject to requirements of the Contract Documents including the General Conditions and Supplementary Conditions and applicable portions of Division 1 - General Requirements.
- B. The work consists of all labor, material and equipment necessary and required to complete all finish hardware as shown on the drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Hardware for wood cabinets in Finish Carpentry: Section 06200.
- B. Standard Steel Doors and Frames: Section 08111.
- C. Metal Frames: Section 08113.
- D. Wood Doors: Section 08210.
- E. Exterior Clad Wood Doors: Section 08216.
- F. Access Doors: Section 08305.
- G. Access Hatch: Section 08310.
- H. Acoustical Doors and Frames: Section 08387.
- I. Hardware for Metal Toilet Compartments: Section 10160.
- J. Hardware for Fire Protection Specialties: Section 10520.
- K. Hardware for Toilet and Bath Accessories: Section 10800.
- L. Hardware for Metal Casework: Section 12301.
- M. Hardware for Plastic Laminate Faced Casework: Section 12304.
- N. Hardware for Dumbwaiters: Section 14100.
- O. Hardware for Electric Traction Elevators: Section 14220.
- P. Hardware for Pneumatic Tube System: Section 14580.

1.03 QUALITY ASSURANCE

- A. Supplier: Minimum 5 years documented experience engaged in distribution of finish hardware, employing well-trained, capable personnel.
- B. References and Standards: Where cited, and except as modified by project specifications, specified standards of following organizations apply:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. American National Standards Institute (ANSI).
 - 3. Builders Hardware Manufacturers Association (BHMA).
 - 4. Door and Hardware Institute (DHI).

- C. Accessibility Cods and Standards: Applicable portions of the following codes and standards shall apply:
1. State of Illinois Accessibility Code for the Handicapped.
 2. Uniform Federal Accessibility Standards.
 3. American National Standard for Buildings and Facilities - Providing accessibility and Usability for Physically Handicapped People.
 4. Americans with Disabilities Act.
- D. Fire-Rated Openings: Provide all required hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local and state building code requirements. Provide only hardware which has been tested and listed by U.L. or FM for types and sizes of doors required and complies with requirements of door and door frame labels.

1.04 SUBMITTALS

- A. Hardware Schedule: Submit 6 copies of Hardware Schedule including all miscellaneous items. The Architect's approval of schedule will not relive Contractor of responsibility for providing all required hardware for each door.
1. Hardware Schedule shall include the following information:
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name, product number and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
- B. Samples: Submit samples showing finish and design of proposed hardware items.
- C. Furnish templates or samples to manufacturers of doors and frames for proper reinforcement and preparation of the work.
- D. Catalog Cuts: Submit 4 sets of catalog cuts of each type of hardware item used. Submittals shall specifically indicate the products' acceptability for use in fire-rated assemblies as applicable.
- E. Keying Schedule: Review keying system schedule with Owner's representative prior to submittal to Architect for approval.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver all items in manufacturer's original packages, with each item individually packaged and carefully marked for intended opening and use. Each item shall be complete with all screws, bolts, keys, instruction and installation templates.
- B. Storage: Store off floor in dry area of building out of way of other work in progress. Provide maximum protection against loss or damage.
- C. Handling: Handle all items in a manner to prevent damage. Marred, defaced, damaged and defective items will be rejected.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated as specified. Items for the proper and complete operation of each door condition are the responsibility of the hardware supplier:

1. Locks:
 - a. Sargent MFG. – 10 Line
2. Hinges:
 - a. Stanley Works – Hardware Division.
 - b. Lawrence Metal Products, Inc.
 - c. Hager Companies.
3. Closers:
 - a. LCN Ingersoll Rand Security Technologies
 - b. Yale Commercial Locks and Hardware.
 - c. Corbin/Ruswin Architectural Hardware.
4. Exit Devices:
 - a. Von Duprin – Ingersoll Rand Security Technologies.
 - b. Corbin-Ruswin Architectural Hardware.
 - c. Yale Commercial Locks and Hardware.
5. Weather-stripping and Thresholds:
 - a. National Guard Products, Inc.
 - b. Reese Enterprises, Inc.
 - c. Pemko MFG, Inc.
6. Silencers:
 - a. Glynn-Johnson, Ingersoll Rand Security Technologies.
 - b. Rockwood Manufacturing.
7. Door Stops-Overhead:
 - a. Glynn-Johnson, Ingersoll Rand Security Technologies.
 - b. Rixson Specialty Door Controls.
 - c. Rockwood Manufacturing.
- 7A. Door Stops-Wall:
 - a. Glynn-Johnson Ingersoll Rand Security Technologies.
 - b. Hager Companies.
8. Push Plates, Pulls and Plates:
 - a. Ives
 - b. Trimco.
 - c. Rockwood Manufacturing. Co.
9. Flush Bolts:

- a. Trimco.
 - b. Glynn-Johnson Ingersoll Rand Security Technologies.
10. Sliding Door Hardware:
- a. Coburn Sliding Systems.
 - b. Stanley Hardware, Div. Stanley Works.
11. Automatic Door Operators:
- a. Horton 4100 Series
 - b. Besom
12. Key Cabinet:
- a. Key Control Systems, Inc.
 - b. Salisbury Industries.

2.02 MATERIALS

A. Screws and Fasteners:

- 1. Finish on all exposed fasteners shall match item fastened. Make fastener of the same metal as item fastened, except use stainless steel for aluminum items.

B. Locks:

- 1. Locks shall exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:
 - a. Cycle Test: Exceeds 5 times A 156.2 Grade 1 requirements.
 - b. Abusive Locked Lever Torque without entry gained: Exceeds 1.5 times A156.2 Grade 1 requirements.
- 2. Locks shall be non-handed with bi-directional lever operation, except the “G” and “Y” lever designs.
- 3. Through-bolt mounting shall be adaptable to fit a variety of standard cylindrical lock preps.
- 4. Locks shall comply with UL10C and UBC 7-2 positive pressure requirements.
- 5. Locks required for fire doors shall be listed by Underwriters Laboratories for rating of 3 hours (A label) and less, for doors up to 4’0” (1.2m) x 10’0” (3.0m) and pairs of doors 8’0” (2.4m) x 10’ (3.0m).
- 6. Lock levers shall be made of solid material.
- 7. Lock shall be available in a minimum of six different lever designs.
- 8. Locks shall have a 2-3/4 inch (70mm) backset standard.
- 9. Strikes shall be non-handed with a curved lip. Provide wrought boxes with strikes.
- 10. Locks shall have brass 6-pin cylinder standard.
- 11. Provide two nickel silver keys with each lock.
- 12. Locks shall have a seven year limited warranty.

C. Hinges:

- 1. Exterior door hinges shall be non-ferrous metal, heavy duty, ball bearing, 0.180 minimum gauge with “NRP” non-removable pins.

2. Interior door hinges shall be steel, plated 0.134 minimum gauge for doors up to and including 3 feet wide. Provide heavy duty, 0.180 minimum gauge for doors wider than 3 feet. All hinges, unless otherwise specified, shall have ball bearings.
3. Provide quantities as follows: For doors over 5 feet to 7 feet 6 inches high, use 1-1/2 pair; for doors over 7 feet 6 inches, 2 pair.
4. Hinge size for 1-3/4 inches thick doors shall be 4-1/2 × 4-1/2 unless otherwise specified.
5. Where projection of door trim is such as to prevent desired degree of opening, the proper hinge width shall be provided to allow the door to clear the trim.
6. Furnish swing clear hinges on doors where indicated. Provide 5 × 5 swing clear hinges where door frame interferes with swing.
7. Acceptable types as follows

Exterior Interior

- | | | | | |
|----|----------|---------|---------|--|
| a. | Stanley | FBB199 | FBB179. | |
| b. | Hager | BB1199 | BB1279. | |
| c. | Lawrence | BB5151A | BB4101. | |

D. Closers - Mechanical:

1. Provide delayed action and spring sizing where required in accordance with Accessibility Standards.
2. Provide all brackets, drop plates, sex nuts and bolts and all accessories required to insure proper installation.
3. Closers shall be rack and pinion construction with both rack and pinion of heat-treated steel and with a cast hydraulic case. They shall be non-sized with adjustable spring power to accommodate sizes 1 through 6. Delayed action shall be available. Closer shall be surface applied with rectangular covers, void of manufacturer's trademarks, projection not over 2-3/4 inches and capable of being applied on 1-3/4 inches top rail or top jamb for inverted mounting.
4. Closers shall be certified as meeting the ANSI A156.4 Grade 1 requirements, be listed by Underwriter's Laboratories for all classes of labeled doors and carry a 10 year limited warranty. A copy of the warranty to be furnished with the hardware schedule.
5. Acceptable types as follows:
 - a. LCN 4041/4011.
 - b. Yale 4400BF/3501BF.
 - c. Corbin/Ruswin DC2200/DC3200.

E. Exit Devices:

1. Exit devices shall have a horizontal pushbar with stainless steel channel reinforcement. Internal steel parts are to be zinc-plated and dichromated or M&T bronze plated as required. Nylon bearings and stainless steel springs shall be used for long-life and durability. Operation shall be the horizontal pushbar type requiring 3/8 inch bar movement to retract the latch and provide exit. A pivoted Pullman type latch shall be provided as standard with 3/4 inch throw of nickel steel and a 5/8 inch effective throw on rim devices. All pushbar exit devices shall have a maximum projection of 2-3/4 inches, installed on the door as an assembled unit requiring no critical aligning of active and inactive cases. Single point dogging

shall be accomplished by 1/4 turn of cylinder. Devices shall be closed at all sides with no pinch points.

2. All outside lever trim for devices shall be similar in appearance to the lockset trim lever.
3. Exit devices shall be U.L. "Accident Equipment List - Panic Hardware"; shall be listed for single wood core, mineral core and hollow metal fire doors with ratings of up to 3 hours.
4. These devices shall have met Performance Test Requirements in accordance with ANSI Standard A156.3 for Grade 1 exit devices.
5. Acceptable types as follows:
 - a. Von Duprin 99 Series.
 - b. Corbin/Ruswin ED5000 Series.
 - c. Yale 7100 Series.

F. Thresholds:

1. Thresholds: Unless otherwise shown, shall be of cast or extruded aluminum, alloy 6063, hardness T5 or T6, mill finish.

G. Weather-stripping: Unless otherwise shown or specified, shall be replaceable bumper type solid neoprene inserts conforming to MIL R 6855, Class II, Grade 40, and extruded aluminum retainer strips with non-corrosive fasteners as recommended by manufacturer. Extruded aluminum shall have color anodized finish as selected by Architect from manufacturer's standards.

H. Push Plates, Pulls and Plates:

1. Push Plates: Unless otherwise shown or specified, shall be 16 inches high by 4 inches wide, 16 gauge. Plates shall be screw fastened with 6 countersunk screws.
2. Pulls: Shall be of design selected by Architect; shall be 8 inches center to center with 2 inch clearance; shall be through-bolted. Pulls shall be located 5 inches from edge of door, except where stile width dictates otherwise.
3. Pull Plate: Shall, unless otherwise shown or specified, be as specified above for push plate and pull, as a unit.
4. Kickplates: Shall, except as otherwise specified, be 0.050 thick stainless steel, 8 inches high by 1-1/2 inches less than door width, beveled on 3 sides.

I. Provide 3 silencers per single door, and 2 silencers per pair of doors. Use GJ64 for metal frames and GJ65 for wood frames.

J. Door Stops:

1. Stops (Wall, Floor and Overhead) shall be furnished for all doors. Stops shall control the desired limit of opening, to prevent damage to adjacent walls, equipment, the door or its hardware.
2. Wall Stops shall be used in areas where floor stops are prohibited. Stops shall have a convex gray rubber bumper except where levers have push or turn buttons, then concave rubber bumpers shall be used.
3. Overhead stops shall be used where specified and in areas where wall stop is not possible.
5. All stops to be fastened to concrete shall use expansion shields and machine screws.

K. Flushbolts:

1. Flushbolts shall be U.L. listed, shall have minimum 1/2 inch diameter rod of brass, bronze or stainless steel, with minimum 12 inch long rod for doors up to 7 feet in height. Provide longer rods as necessary for doors exceeding 7 feet in height. Automatic flushbolts shall have automatic latching and unlatching mechanism. Bolts shall have throw of 3/4 inch. Provide dust-proof strikes for floor bolts, except where special threshold construction provides non-recessed strike for bolt. Provide coordinators as applicable.

L. Astragals:

1. Provide steel astragals for all "B", and "C" R Zoning label wood fire and smoke doors to comply with requirements of authorities having jurisdiction. Astragals shall, unless shown otherwise, be a minimum of 1/8 inch thick by 1-3/4 inches wide by the full height of the door. Astragals for "A" and "B" label metal smoke doors shall be provided under Section 08111.

M. Key Cabinet:

1. Furnish a key control cabinet of size sufficient for the key storage required for this project plus 50 percent additional capacity. The key control cabinet shall be a wall-mounted type as selected by the Architect; shall be complete in all respects. Perform all gathering, tagging and indexing work necessary to place the keying system in proper condition for operation.

N. Automatic Door Operators:

1. Automatic door operators and controls shall be provided for swing doors where indicated on drawings. Door controls shall be push plates located where shown on drawings, or where directed. Electric power and wiring to controls shall be as specified in Division 16. Automatic door operators and controls shall meet the requirements of ANSI A 156.19. Provide automatic door decals, located as recommended by automatic door operator manufacturer.
2. Drawings and specifications are based on products manufactured by Horton Automatics HD Swing Series 4100 LE. Other manufacturers must meet requirements specified herein and as shown on drawings.
3. HD-SWING™ Type 4100LE: Surface Applied Operator with Connecting Arms: The operator header shall be mounted to the surface of the existing door frame or wall. Connecting hardware shall be a double arm arrangement that can either push the door or pull the door open to suit the job condition. When the operator mounting is on the pull side and adjacent wall is within 4" of the door frame.

A. HD-SWING™ HEADER: Shall be available in the following configurations:

1. Side Access: Shall be extruded aluminum case 6" x 6" (152 mm x 152 mm)
2. Bottom Access: Shall be extruded aluminum case 4 1/2" x 6" (114 mm x 152 mm). This configuration will allow for bottom of header to be flush with ceiling.

B. OPERATOR: The Electric Operating Mechanism shall be Series 4000. Maximum current draw shall not exceed 3.15 amps. Operator shall be isolation mounted and concealed in an extruded aluminum case for smooth and quiet operation.

1. Opening action shall be accomplished by a 1/8 HP D.C. permanent magnet motor working through reduction gears to the output shaft. Gear train bearings shall be sealed ball bearing types.
2. Closing action shall be accomplished by a maximum-duty Quadracoil™ spring (four independent coil springs separated by teflon discs and enclosed in an

external spring box) with a lifetime warranty. Close speed control shall be supplied by dynamic braking of the motor and shall be fully adjustable. Operator to act as a manual closer when power is off or when the master control unit is removed. An On/Off/Hold Open switch shall be supplied.

3. Master Control: Shall incorporate the following features:
 - a. Adjustable time delay of 2 to 30 seconds (ANSI A156.19 requirement is 5 second minimum time delay).
 - b. Infinite adjustment to opening and open check speeds including adjusting the opening force without affecting the opening speed.
 - c. Immediate reversal of door motion without undue strain on the drive train. This will be accomplished by supplying stepped voltage to the motor. The door shall reverse when closing if an object stops the door.
 - d. Motor Protection Circuit: A locked door motor protection circuit will be supplied that will shut off current to the motor when the door is inadvertently locked or otherwise prevented from opening.
 - e. Emergency Breakout for Inswinging doors (overhead concealed): When door is in emergency breakout position, power shall be removed from the operator.

C. OPERATION: Automatic and/or Manual:

1. Automatic: Pushbutton switch actuates door open; door closes after time delay expires. Opening and closing force, measured 1" (25.4 mm) out from the lock stile of the door, not to exceed 15 pounds (67 N) of force to stop the door when operating in either direction. Operator to include the following variable adjustments so as to comply with ANSI Standard A156.19: Opening speed - 4 to 6 seconds; Closing speed - 4 to 6 seconds.
2. Manual: Push-N-Go™: Manually pushing door activates automatic opening cycle; door closes after time delay expires (approximately 30% less than after pushbutton actuation).

D. ACTIVATING DEVICE: Shall be located on each side of the opening as per ANSI Safety Standard A117. Activating device shall be one of the following:

1. Pushbutton: 1" Diameter (25 mm) round, red pushbutton switch.
2. Push plate: 6" Diameter (152 mm) round, stainless steel switch.

E. ELECTRICAL: 120 VAC, 60 cycle, 1 phase, 15 amp. Non-North American voltages can be 240 VAC (operator must have 240 volt power supply)

F. GLASS AND GLAZING: Glazing Materials: Glass stops, glazing vinyl and setting blocks for field glazing as per Safety Glazing standard ANSI Z97.1.2. General contractor to coordinate acquisition of glass in thickness and type in accordance with manufacturer's recommendations for prescribed design.

G. EXTRUDED ALUMINUM: ASTM B221, 6063-T5 alloy and temper, anodized:

1. Structural Header Sections: Minimum 1/8" (3 mm) thickness.
2. Structural Frame Sections: Minimum 1/8" (3 mm) thickness.
3. Structural Panel Sections: Commercial grade.

H. FINISHES (for all exposed aluminum surfaces): Shall be one of the following:

1. 204-R1 Clear: Arch. Class II Clear Anodized Coating, AA-MI2C22A31.

I. PANEL CONSTRUCTION:

1. Corner block type with 3/16" steel backup plate construction, mechanically secured with minimum of four hardened steel screws. Sash consists of snap-in glass stops, snap-in glazing beads and vinyl gaskets.
2. Weatherstripping material captured in extruded aluminum door panel. Door nosing weatherstrip to be spring-loaded adjustable astragal type. Surface applied self-adhesive weatherstripping not acceptable.
3. Panel to be supplied with adjustable glass setting block to allow for adjusting of door to meet site conditions eliminating the need for additional shims.

J. FRAME CONSTRUCTION: Butt joints, mechanically secured by means of screws and formed aluminum corner brackets.

K. OPERATOR CONSTRUCTION: Electromechanical.

L. Door operators and controls shall be installed by a factory trained contractor in strict accordance with the manufacturer's recommendations

2.03 FINISHES

A. The finish of all hardware items shall be 626, satin chrome.

<u>PRODUCTS</u>	<u>SYMBOLS</u>	<u>DESCRIPTION</u>
Locksets	626	Satin Chrome
Hinges	626	Satin Chrome
Closers	689	Painted Aluminum
Exit Devices	626	Satin Chrome
Thresholds		Mill finish
Weather-stripping and Seals		Clear Anodized
Push Plates and Pulls	626	Satin Chrome
Door Stops	626	Satin Chrome
Kick Plates	626	Satin Chrome
Flush Bolts	626	Satin Chrome
Automatic Door Operators	204.R1	Clear Anodized

2.04 KEYING

- A. Keying shall be an extension of the existing hospital master key system. Allow for 50 percent expansion. For the protection of the Owner all cylinders shall be keyed at the factory where permanent records shall be established and maintained.
- B. During construction, all cylinders shall be keyed alike. The General Contractor shall receive 4 copies of this key. Under no circumstances will the General Contractor receive any of the permanent building masterkeys or change keys. Provide temporary cylinders for all exterior doors for use during construction, plus 24 temporary cylinders for use on select interior doors as determined by Owner.
- C. All cylinders shall be manufactured of either brass, bronze, stainless steel or nickel, maintaining close tolerances to reduce excessive wear. All keys shall be manufactured of nickel-silver material. All ball and bottom tumbler pins which come in contact with the key shall be nickel-silver. All master and driver pins shall be brass. Driver springs shall be stainless steel. Cam

screws to be secured with a nylon patch to help prevent loosening.

- D. 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 manufacturer's key symbol and notation "DO NOT DUPLICATE".
- E. Furnish:
1. 2 grand masterkeys.
 2. 2 masterkeys.
 3. 4 construction masterkeys.
 4. 2 keys per lockset.
 5. 100 conventional key blanks.
- F. Provide a key control system including envelopes, labels, tags, with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by the system manufacturer, with capacity for 150 percent of the number of locks required for the project. Key control system shall be manufactured by Telkey.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mount hardware unit at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames, Wood Doors and Frames" by the Door and Hardware Institute (DHI), except as otherwise specifically indicated or to comply with the requirements of governing regulations, requirements for the handicapped, or if otherwise directed by the Architect.
- B. Degree of opening for doors with overhead holders, closers, etc., shall be included in the hardware schedule for the Architect's approval.
- C. All hardware shall be installed by tradesmen skilled in the application of commercial grade hardware.
- D. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Securely fasten all parts to be attached. Fit faces of mortised parts snug and flush. Make sure all operating parts move freely and smoothly without binding, sticking or excessive clearance. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, the hardware shall be removed and stored prior to the painting or finishing. Items shall then be reinstalled only when the finishes have been completed on the surface to which the hardware is to be applied.
- E. After installation, representative templates, instruction sheets and installation details shall be placed in a file folder to be turned over to the Owner when the building is accepted. Included shall be at least five each of any special adjusting and installation tools furnished with the hardware by the manufacturers.
- F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealer complying with requirements specified in Division 7 Section "Joint Sealers".
- G. Weather-stripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.02 ADJUSTING AND CLEANING

- A. Adjust and check each operating item of hardware to ensure correct operation and function. Units which cannot be adjusted to operate as intended for the application made shall be replaced.
- B. Final Adjustment: Wherever hardware installation is made more than one month prior to building acceptance or occupancy of a space or area, the installer shall return to work during the week prior to acceptance or occupancy and make final check and adjustments of all hardware items. Hardware shall be cleaned as necessary to restore correct operation, function and finish. Door control devices shall be adjusted to compensate for final operation of heating and ventilating equipment.

3.03 PROTECTION

- A. Whenever hardware is located in areas where it may be subject to damage during construction by handling, cleaning, etc., (i.e., painting) it shall be protected or removed from its location until the hazardous condition is terminated.

3.04 DEFECTIVE WORK

- A. Where hardware is found defective in materials or installation, rework, restore, replace or otherwise correct as detailed. The following will be considered as defective materials:
 - 1. Unauthorized substitutes.
 - 2. Items delivered with missing, broken, damaged or defaced parts.
 - 3. Items of incorrect hand or function.
- B. The following will be considered as defective installation.
 - 1. Items broken, damaged or defaced after delivery.
 - 2. Items incomplete, misaligned or incorrectly located.

3.05 HARDWARE SET SCHEDULE

- A. Refinements such as, U.L. Ratings, appropriate size and quantity of door hinges in accordance with 2.02C, appropriate type and quantity of stops in accordance with manufacturer's recommendations, size and quantity of closers, brackets, parallel arms, size of plates, spacer kits for lights for use with exit devices, shall be the responsibility of the hardware supplier.
- B. Refer to schedule of hardware sets on Drawings.

END OF SECTION 08710

