

## SECTION 087100

**DOOR HARDWARE**

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:

- 1. Commercial door hardware for the following:
  - a. Swinging doors.
  - b. Other doors to the extent indicated.

- B. Related Sections include the following:

- 1. Division 08 Section "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
- 2. Division 08 Section "Wood Doors" for integral intumescent seals provided as part of fire-rated labeled assemblies.
- 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts" for entrance door hardware.
- 4. Division 08 Section "Fire Rated Glass and Framing Systems"

- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

- 1. Cylinders for locks specified in the following other Sections:
  - a. Division 8 Section "Aluminum Entrances and Storefronts."

## 1.3 SUBMITTALS

- A. General: Submittals for Sections 081113, 081416 and 087100 shall be made concurrently.
- B. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Samples for Verification: Submit minimum 2-by-4-inch plate Samples of each type of finish required, except primed finish.
- D. Product Certificates: For electrified door hardware, signed by product manufacturer.
  - 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks and closers.
- F. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.
- G. Warranty: Special warranty specified in this Section.
- H. Other Action Submittals:
  - 1. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
    - b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
    - c. Content: Include the following information:
      - 1) Identification number, location, hand, fire rating, and material of each door and frame.
      - 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
      - 3) Complete designations of every item required for each door or opening including name and manufacturer.
      - 4) Fastenings and other pertinent information.
      - 5) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
      - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
      - 7) Mounting locations for door hardware.
      - 8) Door and frame sizes and materials.
      - 9) List of related door devices specified in other Sections for each door and frame.
    - d. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in Project construction schedule. Submit the final door hardware sets after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.
  - 2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed 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.
  - 1. Installer's responsibilities include supplying door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

2. Installer shall have warehousing facilities in Project's vicinity.
  3. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- D. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.
1. Door Hardware: Provide hardware as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
    - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
    - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
  2. NFPA 101: Comply with the following for means of egress doors:
    - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
    - b. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
    - c. Thresholds: Not more than 1/2 inch high.
- E. Fire-Rated Door Assemblies: For fire rated openings, provide hardware complying with NFPA 80 and NFPA 101 without exception. Provide only hardware tested by UL for the type and size of door installed and fire resistance rating required.
- F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." In addition to Owner Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for key control system.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to electrified door hardware including, but not limited to, the following:
  1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.

2. Review sequence of operation for each type of electrified door hardware.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review required testing, inspecting, and certifying procedures.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

#### 1.6 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing 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.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of operators and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  2. Warranty Period: One year from date of Substantial Completion, except as follows:
    - a. Exit Devices: Two years from date of Substantial Completion.
    - b. Manual Closers: 10 years from date of Substantial Completion.

#### 1.8 MAINTENANCE SERVICE

- 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 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
  2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.
- C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

## 2.2 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to 60 inches.
  2. Three Hinges: For doors with heights 61 to 90 inches.
  3. Four Hinges: For doors with heights 91 to 120 inches.
  4. 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.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: Unless otherwise indicated, provide the following:
1. Entrance Doors: Heavy-weight hinges.
  2. Doors with Closers: Antifriction-bearing hinges.
  3. Interior Doors: Antifriction-bearing hinges and standard-weight hinges, as indicated.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
1. Exterior Hinges: Stainless steel, with stainless-steel pin.
  2. Interior Hinges: Steel, with steel pin.
  3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.
- E. Hinge Options: Where indicated in door hardware sets or on Drawings:

1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
2. Corners: Square.

F. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors and wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

A. Butts and Hinges: BHMA A156.1.

B. Template Hinge Dimensions: BHMA A156.7.

C. Available Manufacturers:

1. Hager Companies (HAG).
2. McKinney Products Company; an ASSA ABLOY Group company (MCK).
3. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

D. The following is a guide for hinge size and type required for this project.

	Manufacturer	Interior:	Exterior
1-3/8" Doors up to 3'-0" wide	Stanley	F179-3 1/2"	
	Hager	I279-3 1/2"	
	McKinney	T2714-3 1/2"	
1-3/4" Doors up to 3'-0" wide	Stanley	FBB179-4 1/2"	FBB191-4 1/2"
	Hager	BB1279-4 1/2"	BB1191-4 1/2"
	McKinney	TA-TB2714-4 1/2"	TA-TB2314-4 1/2"
1-3/4" Doors over 3'-0" wide	Stanley	FBB168-4 1/2"	FBB199-4 1/2"
	Hager	BB1168-4 1/2"	BB1199-4 1/2"
	McKinney	T4A-T4B3786-4 1/2"	T4A-T4B3386-4 1/2"

2.4 SPRING HINGES

A. Self-Closing Hinges: BHMA A156.17.

B. Spring Hinges: Provide Hager 1250 full mortised, spring hinge or approved substitute.

2.5 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Electrified Locking Devices: BHMA A156.25.
- D. Lock Trim:
  1. Levers: Cast.
  2. Escutcheons (Roses): Forged.
  3. Dummy Trim: Match lever lock trim and escutcheons.
- E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
  1. Bored Locks: Minimum 1/2-inch latchbolt throw.
  2. Mortise Locks: Minimum 3/4-inch latchbolt throw.
  3. Deadbolts: Minimum 1-inch bolt throw.
- F. Rabbeted Meeting Doors: Provide special rabbeted front and strike on locksets for rabbeted meeting stiles.
- G. Backset: 2-3/4 inches, unless otherwise indicated.
- H. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
  1. Strikes for Bored Locks and Latches: BHMA A156.2.
  2. Strikes for Mortise Locks and Latches: BHMA A156.13.
  3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
  4. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  5. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  6. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

## 2.6 BORED LOCKS AND LATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Mechanical Locks and Latches:
    - a. Best Lock Corporation (BLC).
    - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
    - c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
    - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).
  2. Electromagnetic Locks and Latches:
    - a. Locknetics Security Engineering; a Harrow Company (LSE).

- 3. Electromechanical Locks and Latches:
  - a. Best Lock Corporation (BLC).
  - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
  - c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
  - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

B. Bored Locks: BHMA Grade 1; Series 4000.

- 1. Provide one of the following manufacturers and designs:
  - a. Corbin Russwin: CL3300 Series.
  - b. Sargent: 10 Line
  - c. Schlage: D Series

C. Auxiliary Locks: BHMA Grade 1.

D. Lock Trim: Comply with the following:

- 1. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
  - a. Corbin Russwin: NZD
  - b. Sargent: LL
  - c. Schlage: Rhodes

E. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

FUNCTION	SARGENT	SCHLAGE	CORBIN/RUSWIN
(1) (utility)	04	80	57
(2) (office)	05	53	51
(3) (passage)	15	10	10
(4) (classroom)	37	70	55
(5) (entrance)	16	60	72
(6) (privacy)	65	40	20

2.7 EXIT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Precision Hardware, Inc. (PH).
- 2. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
- 3. Von Duprin; an Ingersoll-Rand Company (VD).

B. Products: All exit devices for this project shall be one of the following:

- 1. Precision Olympian Series
- 2. The 80 Series exit device by Sargent & Co.
- 3. 98 Series by Von Duprin Division

C. Exit Devices: BHMA A156.3, Grade 1.



- D. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
  - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- E. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- F. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- H. Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.
- I. Top and Bottom Strikes: Where vertical rod exit devices are indicated for interior doors, provide standard surface-mounted top strike and flush or recessed bottom strike.
- J. The following functions shall be required where specified:

FUNCTION	VON DUPRIN	SARGENT	PRECISION
A	CD99NL-OP	16-8804	1103CD x 1123-38
B	CD99EO	16-8810	1101CD x 1123-38
C	99L	8813ET	1108 x 39L x 1123-38
D	99L-BE	8815ET	1108A x 39L x 1123-38
E	99EO-F	12-8810	FL-1101 x 1123-38
F	99L-F	12-8813ET	FL-1108 x 39L x 1123-38
G	99L-F-BE	12-8815ET	FL-1108A x 39L x 1123-38
H	CD9927EO	16-8710	1201CD x 1123-38
I	9927L	8713ET	1208 x 39L x 1123-38
J	9927L-BE	8715ET	1208A x 39L x 1123-38
K	CD9927EO x LBR	16-PP/PR8710	1201CD x 1123-38 x LBR
L	9927L x LBR	PP/PR8713ET	1208 x 39L x 1123-38 x LBR
M	9927L-BE x LBR	PP/PR8715ET	1208A x 39L x 1123-38 x LBR
N	9927EO-F	12-8710	FL-1201 x 1123-38
O	9927L-F	12-8713ET	FL-1208 x 39L x 1123-38
P	9927L-F-BE	12-8715ET	FL-1208A x 39L x 1123-38

2.8 LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1.
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
  - 1. Number of Pins: Six.
  - 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.

3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
4. Bored-Lock Type: Cylinders with tailpieces to suit locks.

C. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
  - a. Replace construction cores with permanent cores as indicated in keying schedule.

D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cylinders: Same manufacturer as for locks and latches.

## 2.9 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.
2. Keyed Alike: Key all cylinders to same change key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
  - a. Notation: Information to be furnished by Owner.
2. Quantity: In addition to one extra key blank for each lock, provide the following:
  - a. Cylinder Change Keys: Three.
  - b. Master Keys: Five.

## 2.10 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

1. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

B. Cross-Index System: Multiple-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by key control manufacturer.

1. Available Manufacturers:
  - a. Key Control Systems, Inc. (KCS).
  - b. Telkee, Inc.; a division of Sunroc Corporation (SUN).

## 2.11 OPERATING TRIM

- A. Standard: BHMA A156.6.
- B. Materials: Fabricate from stainless steel, unless otherwise indicated.
- C. Available Manufacturers:
  - 1. Burns Manufacturing Incorporated (BM).
  - 2. Don-Jo Mfg., Inc. (DJO).
  - 3. Hager Companies (HAG).
  - 4. IVES Hardware; an Ingersoll-Rand Company (IVS).
  - 5. Rockwood Manufacturing Company (RM).
- D. Door Pulls, 1 inch diameter.
  - 1. Size: ADA compliant, unless indicated otherwise, provide 10 inches center to center, with 3 1/2 inch projection and 2 1/2 inch clearance.
  - 2. Available Products:
    - a. Hager Companies, H4J.
    - b. IVES Hardware; an Ingersoll-Rand Company; 8103EZ.

## 2.12 CLOSERS

- A. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Surface-Mounted Closers:
    - a. LCN Closers; an Ingersoll-Rand Company (LCN).
    - b. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
- C. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
  - 1. Comply with the following maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
    - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
    - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- D. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
- E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
  - 1. LCN:

- a. Exterior: 4040 Series
  - b. Interior: 4040 Series
2. Sargent:
- a. Exterior: 281
  - b. Interior: 281

F. Coordinators: BHMA A156.3.

### 2.13 PROTECTIVE TRIM UNITS

- A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height specified in door hardware sets.
- B. Fasteners: Manufacturer's standard machine or self-tapping screws.
- C. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
  - 1. Material: 0.050-inch- thick stainless steel.
  - 2. Available Manufacturers:
    - a. Burns Manufacturing Incorporated (BM).
    - b. Don-Jo Mfg., Inc. (DJO).
    - c. Hager Companies (HAG).
    - d. IVES Hardware; an Ingersoll-Rand Company (IVS).
    - e. Rockwood Manufacturing Company (RM).
- D. Fabricate protection plates as follows:
  - 1. Push Plates: 16" high by 8" wide.
  - 2. Kick Plates: 10" high by 1-1/2" less than door width for single doors and 1" less than door width for pairs of doors. Kick plates shall be applied to push side of all doors where noted.

### 2.14 STOPS AND HOLDERS

- A. Wall Stops: Wall type bumpers with concealed type flange shall be used where ever possible and shall be Ives, No. 404 or equivalent by one of the following:
  - 1. Door Controls
  - 2. Rockwood
- B. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

### 2.15 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Basis-of-Design Product, No. A626A by National Guard Products or approved substitute.
  2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed. Basis-of-Design Product, No. 600A by National Guard Products or approved substitute.
  3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed. Basis-of-Design Product, No. 95WH by National Guard Products or approved substitute.
- C. Air Leakage: Not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- D. 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 gasketing on fire-rated doors and on smoke-labeled doors. Basis-of-Design Product, No. 5050 by National Guard Products or approved substitute.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

## 2.16 THRESHOLDS

- A. Standard: BHMA A156.21.
- B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.
- D. Manufacturers:
1. T1: Provide No. 8425 by National Guard Products or approved substitute.
  2. T2: Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

## 2.17 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  2. Steel Machine or Wood Screws: For the following fire-rated applications:
    - a. Mortise hinges to doors.
    - b. Strike plates to frames.
    - c. Closers to doors and frames.
  3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
    - a. Surface hinges to doors.
    - b. Closers to doors and frames.
    - c. Surface-mounted exit devices.
  4. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
  5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

## 2.18 FINISHES

- A. Standard: BHMA A156.18, as indicated in door hardware sets.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide the following finishes:
- |     |                          |                      |
|-----|--------------------------|----------------------|
| 1.  | Butts and Hinges:        | 26D                  |
| 2.  | Locks & Lock Trim:       | 26D                  |
| 3.  | Exit Devices:            | 32D                  |
| 4.  | Door Controls - Closers: | Sprayed Alum. Finish |
| 5.  | Mortise Locks & Latches: | 26D                  |
| 6.  | Door Stops               | 26D/32D              |
| 7.  | Weatherstripping         | Aluminum             |
| 8.  | Threshold                | Aluminum             |
| 9.  | Kickplates               | 32D                  |
| 10. | Pulls                    | 32D                  |

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine doors and frames, 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. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 Series.
  - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.

## 3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise 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. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's 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 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

## 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.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  2. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

### 3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

### 3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

### 3.7 DOOR HARDWARE SETS

- A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidder's responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidder's responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

#### HW1

Doors 100A.1, 125A, 125 B, 143A, 143A.1, 143.1, 144.1

Exit Devices (Function 5)

Offset Pulls

Closer

Automatic H.C. Door Operator (Doors 100A.1, 143.1 only)

Electronic Lockset

Weatherstripping

Door bottom sweep

Threshold

Door stop

- Notes:
1. Doors 100A.1, 143A, 143A.1, 143.1, and 144.1 are existing doors scheduled for new hardware. Inspect existing hardware to determine extent of existing components that can be re-used.
  2. Balance of Hardware by Aluminum Door Supplier



3. See Electrical Drawing E3.5 for additional information on electronic components

## HW2

Doors 100A, 200.3, 200.4

Exit Devices (Function 5)

Offset Pulls

Closer

Automatic H.C. Door Operator

Electronic Card Reader

Electronic Lockset

Weatherstripping

Door bottom sweep

Threshold

Door stop

- Notes:
1. Doors 100A, 200.3, 200.4 are existing doors scheduled for new hardware. Inspect existing hardware to determine extent of existing components that can be re-used.
  2. Balance of Hardware by Aluminum Door Supplier.
  3. See Electrical Drawing E3.5 for additional information on electronic components

## HW3

Doors 100, 143

Exit Devices (Function 5)

Offset Pulls

Closer

Electronic Card Reader

Electronic Lockset

Door stop

- Notes:
1. Balance of Hardware by Aluminum Door Supplier.
  2. See Electrical Drawing E3.5 for additional information on electronic components

## HW4

Doors 106, 113, 139.1

Exit Devices (Function 5)

Hinges

Closer

Electronic Card Reader

Electronic Lockset

Weatherstripping

Door Botom Sweep

Kick Plate  
Threshold  
Door Stop

- Notes:
1. Doors 106, 113, 139.1 are existing doors scheduled for new hardware. Inspect existing hardware to determine extent of existing components that can be re-used.
  2. Door 113 has Electronic Lock but no Electronic Card Reader
  3. See Electrical Drawing E3.5 for additional information on electronic components

HW5

Doors 142.1, 224.1A

Lockset (Function 5)  
Hinges  
Closer  
Weatherstripping  
Door Bottom Sweep  
Kick Plate  
Threshold  
Door Stop

HW6

Doors 108, 108.1, 139, 139.2, 224, 224.2, 226, 226.1,

Hinges  
Closer  
Fire Rated Exit Device (function 5)  
Electronic Card Reader (Door 108.1)  
Electro Magnetic Door Holders (Doors 108, 226, 226.1)  
Kick Plate  
Door Stop  
Silencers

- Notes:
1. See Electrical Drawing E3.5 for additional information on electronic components
  2. Doors 139, and 224 do not require an exit device that is rated.

HW7

Doors 144

Closer  
Lockset (function 5)  
Electro Magnetic Door Holders  
Door Stop

- Notes:
1. Balance of Hardware by Fire Rated Door & Frame Supplier.

2. See Electrical Drawing E3.5 for additional information on electronic components

HW8

Doors 120, 121, 141, 141A, 200, 200.1, 207, 209

Closer  
Lockset (Function 4)  
Electronic Card Reader  
Hinges  
Door Stop  
Silencers

- Notes: 1. See Electrical Drawing E3.5 for additional information on electronic components

HW9

Doors 105, 142A, 142B, 211, 212, 213, 220, 221, 222, 223

Lockset (Function 6)  
Hinges  
Door Stop  
Silencers

HW10

Doors 109, 110, 136, 137, 214, 215

Hinges  
Push Plate  
Pulls  
Closer  
Kick Plate  
Door Stop  
Silencers

HW11

Doors 107, 111, 112, 114, 127, 135, 136A, 138, 210, 224.1  
Lockset (Function 4)  
Hinges  
Closer (Door 114 only)  
Door Stop  
Silencers

- Notes: 1. Lockset Function C at Doors 138, 210

HW12

Doors 140, 225

Lockset (Function 37)

Hinges

Door Stop

Silencers

HW13

Doors 128.1, 128.2, 128.3, 128.4, 200.2, 216

Hinges

Pulls

Magnetic Catch

Silencers

Door Stops

END OF SECTION