PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:
   a. Swinging doors.
   b. Sliding doors.
   c. Folding doors.
   d. Other doors to the extent indicated.

2. Cylinders for doors specified in other Sections.
3. Electrified door hardware.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
2. Division 8 Section "Custom Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
3. Division 8 Section "Flush Wood Doors" for astragals provided as part of a fire-rated labeled assembly.
4. Division 8 Section "Stile and Rail Wood Doors" for astragals provided as part of a fire-rated labeled assembly.
5. Division 8 Section "Access Doors" for access door hardware, except cylinders.
6. Division 8 Section "Sound Control Doors" for gasketing provided as part of a sound-rated assembly and for door silencers provided as part of the frame.
7. Division 8 Section "Aluminum Entrances and Storefronts" for entrance door hardware, except cylinders.
8. Division 8 Section "All-Glass Entrances" for entrance door hardware, except cylinders.
9. Division 8 Section "Sliding Automatic Entrance Doors" for entrance door hardware, except cylinders.
10. Division 8 Section "Swinging Automatic Entrance Doors" for entrance door hardware, except cylinders.
11. Division 8 Section "Power Door Operators" for automatic door operators.
12. Divisions 10 Section "Wire Mesh Partitions" for wire mesh partition door hardware, except cylinders.
13. Division 13 Section "Metal Building Systems" for door hardware, except cylinders.
14. Division 13 Section "Intrusion Detection" for door switches as part of an intrusion detection system.
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 on aluminum and glass entrance doors.
2. Final replacement cores and keys to be installed by Owner.

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:

   a. System schematic.
   b. Point-to-point wiring diagram.
   c. Riser diagram.
   d. Elevation of each door.

2. Detail interface between electrified door hardware and access fire alarm, control, and security building control system.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.

D. Samples: For exposed door hardware of each type indicated below, in specified finish, full size. Tag with full description for coordination with the Door Hardware Schedule. Submit samples before, or concurrent with, submission of the final Door Hardware Schedule.

1. Door Hardware: As follows:

   a. Hinges.
   b. Pivots.
   c. Locks and latches.
   d. Flush Bolts.
   e. Exit Devices.
   f. Cylinders and keys.
   g. Operating trim.
   h. Closers.
   i. Stops and holders.
   j. Protective trim.
   k. Door Gasketing.
   l. Thresholds.
   m. Miscellaneous items.

2. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
E. 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.
   a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

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 each 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. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
      1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

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.

5. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

F. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

G. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.

   1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

H. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.

J. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

K. Warranties: Special warranties specified in this Section.

QUALITY ASSURANCE

L. 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.

M. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

a. Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

2. Scheduling Responsibility: Preparation of door hardware and keying schedules.

N. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute 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.

1. Electrified Door Hardware Qualifications: Experienced in providing consulting services for electrified door hardware installations.

O. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

P. Regulatory Requirements: Comply with provisions of the following:
1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, FED-STD-795, "Uniform Federal Accessibility Standards," as follows:

   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 (22.2 N) applied perpendicular to door.
      2) Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
      3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
   c. Thresholds: Not more than 1/2 inch (13 mm) high, Not more than 3/4 inch (19 mm) high for exterior sliding doors. 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 (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds.
   c. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
   d. Thresholds: Not more than 1/2 inch (13 mm) high.

3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

Q. Fire-Rated Door Assemblies: Provide door hardware for 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 NFPA 252.

   1. Test Pressure: Test at atmospheric pressure.

R. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." 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.
   4. Address for delivery of keys.

S. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
T. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." 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.

1.4 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 Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to manufacturer of key control system.

D. Deliver keys to Owner by registered mail or overnight package service.

1. 1. Insert name and address of Owner's representative.

1.5 COORDINATION

A. Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

B. Templates: Obtain and distribute to the parties involved 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.

C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.

1.6 WARRANTY

A. General Warranty: 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. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of operators and door hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Warranty Period: Three, (3) years from date of Substantial Completion, unless otherwise indicated.

D. Warranty Period for Electromagnetic Delayed-Egress Locks: One, (1) years from date of Substantial Completion.

E. Warranty Period for Manual Closers: Ten, (10) years from date of Substantial Completion.

F. Warranty Period for Concealed Floor Closers: Five, (5) years from date of Substantial Completion.

1.7 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.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products. Retain subparagraph below for electrified door hardware.
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 the Door Hardware Schedule 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 minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
2.2 HINGES AND PIVOTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Hinges:
   a. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2. Pivots and Pivot Hinges:
   a. Architectural Builders Hardware Mfg., Inc. (ABH)
   b. Markar Products, Inc. (MP).
   c. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

3. Continuous Geared Hinges:
   a. Architectural Builders Hardware Mfg., Inc. (ABH)
   b. Markar Products, Inc. (MP).
   c. Stanley Commercial Hardware; Div. of The Stanley Works (STH)

C. Standards: Comply with the following:

   2. Template Hinge Dimensions: BHMA A156.7.
   4. Pivots: BHMA A156.4.

D. Quantity: Provide the following, unless otherwise indicated:

   1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
   2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
   3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
   4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).

E. Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

<table>
<thead>
<tr>
<th>Maximum Door Size (inches)</th>
<th>Hinge Height (inches)</th>
<th>Standard Weight</th>
<th>Heavy Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 by 84 by 1-3/8</td>
<td>3-1/2</td>
<td>0.123</td>
<td>-</td>
</tr>
<tr>
<td>36 by 84 by 1-3/8</td>
<td>4</td>
<td>0.130</td>
<td>-</td>
</tr>
<tr>
<td>36 by 84 by 1-3/4</td>
<td>4-1/2</td>
<td>0.134</td>
<td>0.180</td>
</tr>
<tr>
<td>42 by 90 by 1-3/4</td>
<td>4-1/2</td>
<td>0.134</td>
<td>0.180</td>
</tr>
<tr>
<td>Maximum Door Size (inches)</td>
<td>Hinge Height (inches)</td>
<td>Standard Weight</td>
<td>Heavy Weight</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>48 by 120 by 1-3/4</td>
<td>5</td>
<td>0.146</td>
<td>0.190</td>
</tr>
</tbody>
</table>

F. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

G. Hinge Weight: Unless otherwise indicated, provide the following:

1. Entrance Doors: Heavy-weight hinges.
2. Doors with Closers: Antifriction-bearing hinges.

H. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Stainless steel, with stainless-steel pin, Brass, with stainless-steel pin body and brass protruding heads.
2. Interior Hinges: Brass, with stainless-steel pin body and brass protruding heads, Steel, with steel pin, Stainless steel, with stainless-steel pin.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin, Stainless steel, with stainless-steel pin.

I. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:

1. Hospital Tips: Slope ends of hinge barrel.
3. 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 the following applications:
   a. Outswinging exterior doors.
   b. Outswinging corridor doors with locks.

J. Electrified Functions for Hinges: Comply with the following:

1. Electrical Contact: Exposed electrical contacts for transfer of power.
2. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
4. Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.

K. Continuous-Geared Hinges: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (100 mm); fabricated to full height of door and frame. Finish components after milling and drilling are complete. Fabricate hinges to template screw locations.
L. Fasteners: Comply with the following:
   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 screws; machine screws drilled and tapped holes for metal
doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 LOCKS AND LATCHES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering
products that may be incorporated into the Work include, but are not limited to, the following:

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

   1. Mechanical Locks and Latches:
      a. Best Lock Corporation (BLC).

   2. Electromagnetic Locks and Latches:
      a. Best Lock Corporation (BLC).

   3. Electromechanical Locks and Latches:
      a. Best Lock Corporation (BLC).

   4. Self-Contained Electronic Locks and Latches:
      a. Best Lock Corporation (BLC).

C. Standards: Comply with the following:

   1. Bored Locks and Latches: BHMA A156.2.
   4. Auxiliary Locks: BHMA A156.5.
   5. Push-Button Combination Locks: BHMA A156.2.
   8. Exit Locks: BHMA A156.5.

D. Bored Locks: BHMA Grade 1, Series 4000.

E. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1, Series 1000.

F. Auxiliary Locks: BHMA Grade 1

G. Certified Products: Provide door hardware listed in the following BHMA directories:

   2. Electromagnetic Locks: BHMA's "Directory of Certified Electromagnetic & Delayed
      Egress Locks."

H. Lock Trim: Comply with the following:
   1. Lever: Forged or Cast
   2. Dummy Trim: Match lever lock trim and escutcheons.

I. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:
   1. Bored Locks: BHMA A156.2.

J. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
   1. Bored Locks: Minimum 1/2-inch (12.7-mm) latch bolt throw.
   3. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

K. Rabbeted Doors: Provide special rabbeted front and strike on locksets for rabbeted meeting stiles.

L. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

2.4 DOOR BOLTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Flush Bolts:

C. Standards: Comply with the following:
   1. Surface Bolts: BHMA A156.16.

D. Surface Bolts: BHMA Grade 1
   1. Flush Bolt Heads: Minimum of 1/2-inch- (12.7-mm-) diameter rods of brass, bronze, or stainless steel with minimum 12-inch- (305-mm-) long rod for doors up to 84 inches (2134 mm) in height. Provide longer rods as necessary for doors exceeding 84 inches (2134 mm).

E. Flush Bolts: BHMA Grade 1, designed for mortising into door edge.
F. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

2. Interlocking Surface Bolts: Minimum 15/16-inch (24-mm) throw.
3. Fire-Rated Surface Bolts: Minimum 1-inch (25-mm) throw; listed and labeled for fire-rated doors.

2.5 EXIT DEVICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Precision Hardware, Inc. (PH).

C. Standard: BHMA A156.3.
   1. BHMA Grade: Grade 1

D. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."

E. 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.

F. Fire Exit 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.

   1. Operation: Rigid

H. Outside Trim: Lever, Lever with cylinder, Pull, Pull with cylinder, material and finish to match locksets, unless otherwise indicated.
   1. Match design for locksets and latchsets, unless otherwise indicated.

2.6 CYLINDERS AND KEYING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cylinders: Same manufacturer as for locks and latches.
   2. Cylinders:
a. Best Lock Corporation (BLC).

C. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.

D. Cylinder Grade: BHMA Grade 1, 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: Seven.
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.
   a. High-Security Grade: BHMA Grade 1A, listed and labeled as complying with pick- and drill-resistant testing requirements of UL 437 (Suffix A).

E. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

1. Interchangeable Cores: Core insert, removable by use of a special key, and usable with other manufacturers' cylinders.
2. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

F. Construction Keying: Comply with the following:

1. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
   a. Replace construction cores with permanent cores, as indicated in keying schedule
   b. Furnish permanent cores to Owner for installation.

G. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:

1. No Master Key System: Cylinders are operated by change keys only.
2. Master Key System: Cylinders are operated by a change key and a master key.
3. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
4. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
5. Existing System: Master key or grand master key locks to Owner's existing system.
6. Existing System: Re-key Owner's existing master key system into new keying system.
7. Keyed Alike: Key all cylinders to the same change key.
H. Keys: Provide nickel-silver keys complying with the following:

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
   a. Notation: "DO NOT DUPLICATE."

2. Quantity: In addition to one extra blank key for each lock, provide the following:
   b. Master Keys: Five.

2.7 STRIKES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Electric Strikes:
   a. Rutherford Controls Inc.; Div. of Fritz Fuss (RC).

C. Standards: Comply with the following:

1. Strikes for Bored Locks and Latches: BHMA A156.2.
4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
5. Dustproof Strikes: BHMA A156.16.
6. Electric Strikes: BHMA A156.5.

D. 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 latch bolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

E. Dustproof Strikes: BHMA Grade 1

F. Electric Strikes: BHMA Grade 1
2.8 OPERATING TRIM

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Rockwood Manufacturing Company (RM).
2. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

C. Standard: Comply with BHMA A156.6.

D. Materials: Fabricate from aluminum, brass, bronze, stainless steel, unless otherwise indicated.

2.9 ACCESSORIES FOR PAIRS OF DOORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Coordinators:

2. Removable Mullions:
   a. Precision Hardware, Inc. (PH).

3. Astragals:

C. Standards: Comply with the following:

1. Coordinators: BHMA A156.3.
2. Removable Mullions: BHMA A156.3.

D. Carry-Open Bars: Provide carry-open bars for inactive leaves of pairs of doors, unless automatic or self-latching bolts are used.

E. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit 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. Mullions shall be used only with exit devices for which they have been tested.

2.10 CLOSERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface-Mounted Closers:
   a. Ryobi Closers (RY)

2. Concealed Closers:
   a. Ryobi Closers (RY)

C. Standards: Comply with the following:

1. Closers: BHMA A156.4.
2. Closer Holder Release Devices: BHMA A156.15.

D. Surface Closers: BHMA Grade 1

E. Concealed Closers: BHMA Grade 1

F. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."

G. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.

H. Flush Floor Plates: Provide finish cover plates for floor closers unless thresholds are indicated. Match door hardware finish, unless otherwise indicated.

I. Recessed Floor Plates: Provide recessed floor plates with insert of floor finish material for floor closers, unless thresholds are indicated. Provide extended closer spindle to accommodate thickness of floor finish.

J. Power-Assist Closers: As specified in Division 8 Section "Power Door Operators" for access doors for the disabled or where listed in the Door Hardware Schedule. Provide electro hydraulic, electromechanical, and pneumatic types as indicated.

K. 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.

2.11 PROTECTIVE TRIM UNITS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Metal Protective Trim Units:

C. Standard: Comply with BHMA A156.6.
D. Materials: Fabricate protection plates from the following:

1. Aluminum: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
2. Brass: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
3. Bronze: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
4. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.
5. Plastic Laminate: 1/8 inch (3.2 mm) thick; NEMA LD 3, Grade HGS; beveled 4 sides.
6. Rigid Plastic: 0.060-inch- (1.5-mm-) thick, PVC or acrylic-modified vinyl plastic; beveled 4 sides.
7. Acrylic: 1/8 inch (3.2 mm) thick; beveled 4 sides.
   a. Color and Texture: As indicated by manufacturer's designations.
   c. Color and Texture: As selected by Architect from manufacturer's full range.

E. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.

F. Furnish protection plates sized 2” less than door width on push side and 1” less than door width on pull side, by height specified in Door Hardware Schedule.

2.12 STOPS AND HOLDERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Architectural Builders Hardware Mfg., Inc. (ABH).

C. Standards: Comply with the following:

1. Stops and Bumpers: BHMA A156.16.
2. Mechanical Door Holders: BHMA A156.16.
3. Electromagnetic Door Holders: BHMA A156.15.
4. Combination Overhead Holders and Stops: BHMA A156.8.
5. Door Silencers: BHMA A156.16.

D. Stops and Bumpers: BHMA Grade 1

E. Mechanical Door Holders: BHMA Grade 1

F. Combination Floor and Wall Stops and Holders: BHMA Grade 1

G. Combination Overhead Stops and Holders: BHMA Grade 1

H. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.

I. Floor Stops: For doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.
1. Where floor or wall stops are not appropriate, provide overhead holders.

J. Silencers for Wood Door Frames: BHMA Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch (16 by 19 mm); fabricated for drilled-in application to frame.

K. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

2.13 DOOR GASKETING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

1. Door Gasketing:

2. Door Bottoms:

C. Standard: Comply with BHMA A156.22.

D. 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.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

E. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

F. 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 20-minute-rated doors and on smoke-labeled doors.

G. 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 10B or NFPA 252.

H. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

I. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

2.14 THRESHOLDS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

C. Standard: Comply with BHMA A156.21.

2.15 FABRICATION

A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

   1. Manufacturer's identification will be 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 for finishes. 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. 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 of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.16 FINISHES

A. Standard: Comply with BHMA A156.18.

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. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. BHMA 600: Primed for painting, over steel base metal.
2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
3. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
4. BHMA 630: Satin stainless steel, over stainless steel base metal.
5. BHMA 652: Satin chromium plated over nickel, over steel base metal.
6. BHMA 689: Aluminum painted, over any base metal.

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. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. 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 SDI 107.

B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION
A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

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 9 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: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.

D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings, in equipment room. Verify location with Architect.

1. Configuration: Provide one power supply for each door opening.
2. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 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. **Electric Strikes**: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3. **Door Closers**: 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 (75 mm) from the latch, measured to the leading edge of the door.

**B. Six-Month Adjustment**: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

2. Consult with and instruct Owner's personnel on recommended maintenance procedures.

3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

**3.6 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 door hardware is without damage or deterioration at time of Substantial Completion.

**3.7 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.

**3.8 DOOR HARDWARE SCHEDULE**

END OF SECTION 08711