

SECTION 08 71 01

DOOR HARDWARE – UPC Guide Specification for Capital Construction

[Adjust to Suit Project and Confirm with University Lock Shop]

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions of Division 01 and Section 28 05 00 Specification Sections, apply to this Section.
- B. CALgreen Submittals:
 - 1. Product Data for Section 5.504.4.1: For sealants, adhesives and caulks, provide documentation including printed statement of VOC content showing compliance with SCAQMD Rule 1168 VOC limits and CCR Title 17 for aerosols.
 - 2. Product Certificates for Section A5.405.1: For products and materials required to comply with requirements for regional materials, certificates indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. For the purposes of this requirement, "regional" is interpreted to mean within 500 miles of the project location or within the State of California.

1.2 SUMMARY

- A. This Section includes the following :
 - 1. Door hardware for the following:
 - a. Swinging doors.
 - b. Non-fire-rated sliding doors.
 - c. Non-fire-rated folding doors.
 - d. Pedestrian Gates.
 - e. Other doors to the extent indicated.
 - 2. Interior Curtainwall and Interior Storefront Door hardware.
 - 3. Exterior Fiberglass Composite Door Hardware.
 - 4. Electrified door hardware, including electric locking and release hardware, low voltage power supplies for electric hardware and wall or floor mounted electromagnetic hold-open devices
 - 5. Cylinders for doors specified in other Sections.
 - 6. Padlocks
- B. Related Sections include the following:
 - 1. Section 08 11 13 "Hollow Metal Doors and Frames" for astragals provided as part of fire-rated labeled assemblies.

2. Section 08 17 00 "Integrated Door Opening Assemblies" for integral inset exit device hardware factory installed into Hollow Metal Doors.
 3. Section 08 14 16 "Flush Wood Doors" for integral intumescent seals provided as part of fire-rated labeled assemblies.
 4. Section 08 16 13 Section "Fiberglass Composite Exterior Entrances and Exterior Storefronts" for entrance door hardware, except cylinders.
 5. Section 08 41 13 Section "Aluminum-Framed Interior Entrances and Interior Storefronts" for entrance door hardware, except cylinders.
 6. Division 08 Section "Overhead Coiling Grilles" for door hardware provided as part of overhead grille assemblies.
 7. Division 08 Section "Sound Control Door Assemblies" for hinges and gasketing provided as part of sound-rated door assemblies.
 8. Section 08 42 29 Section "Automatic Entrances".
 9. Section 08 71 13 Section "Automatic Door Operators".
 10. Section 07 92 00 "Joint Sealants"
 11. Division 26 Sections for connections to electrical power system and for low-voltage wiring work.
 12. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access system.
 13. Division 28 Section "Intrusion Detection" for detection devices installed at door openings and provided as part of an intrusion detection system.
 14. Division 28 Section "Fire Detection and Alarm" for connections to building fire alarm system.
 15. Section 28 05 00 Security General Requirements
- C. The General Contractor shall furnish and install door hardware devices, locks, hinges and other components of the system as shown and specified, including termination of wiring.
1. Electrified mortise locks.
 2. Electrified emergency exiting hardware.
 3. Electrical locking system accessories.
- D. The Contractor shall coordinate door hardware requirements with the University to achieve the specified operation of the Access Control System.
- E. 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 other Sections.
- F. Products furnished and installed by others.
1. Permanent cylinder cores to be furnished and installed by University Lock Shop.
 2. Centralized power supplies furnished and installed by Division 28.
 3. Card Readers furnished and installed by Division 28.
 4. Door Position Switches furnished and installed by Division 28.

1.3 REFERENCES

- A. Use date of standard in effect as of Bid date:
1. (ADA) - Americans with Disabilities Act of 1990.

2. (ANSI A117.1) - American National Standards Institute, Accessible and Usable Buildings and Facilities.
3. (BHMA) – Builders Hardware Manufacturers Association :
 - a. BHMA A156.1 Standard for Butts and Hinges.
 - b. BHMA A156.2 Standard for Bored Locks & Latches.
 - c. BHMA A156.3 Standard for Exit Devices.
 - d. BHMA A156.4 Standard for Door Closers.
 - e. BHMA A156.13 Standard for Mortise Locks & Latches.
 - f. BHMA A156.18 Standard for Materials & Finishes.
 - g. BHMA A156.22 Standard for Door Gasketing Systems.
 - h. BHMA A156.25 Standard for Electrified Locking Devices.
 - i. BHMA A156.26 Standard for Continuous Hinges.
 - j. BHMA A156.32 Standard for Integrated Door Opening Assemblies.
4. (DHI) - Door Hardware Institute.
 - a. DHI A115.1G Installation Guide for Doors and Hardware.
 - b. DHI Recommended Sequence and Format for the Hardware Schedule.
 - c. DHI Keying Systems and Nomenclature.
5. (DOJ) – Department of Justice.
 - a. 2010 ADA Standards for Accessible Design.
6. (NFPA) – National Fire Protection Association:
 - a. NFPA 80 Fire Doors and Other Opening Protectives.
 - b. NFPA 101 Life Safety Code
 - c. NFPA 105 Smoke Door Assemblies and Other Opening Protectives
7. (SDI) – Steel Door Institute:
 - a. SDI 100 Recommended Specifications for Standard Steel Doors and Frames.
 - b. SDI 122 Installation of Standard Steel Doors and Frames.
 - c. NFPA 252 Fire Tests of Door Assemblies.
8. (UL) – Underwriters Laboratories Inc.:
 - a. UL10C Positive Pressure Fire Tests of Door Assemblies.
 - b. Standards for Electrified Locking Equipment and Power Supplies.
9. (WDMA I. S. 1A) – Window and Door Manufacturers Association, Industry Standard for Architectural Wood Flush Doors.
10. (WHI) – Warnock Hersey Incorporated (Intertek or ITS)

B. Abbreviations

1. EACS – Electronic Access Control System
 - a. Refer to Section 28 05 00

1.4 REGULATORY REQUIREMENTS

A. Conform to the following:

1. (CBC) - California Building Code.
2. (LABC) - City of Los Angeles Building Code.
3. (Title 24, CCR) - California Building Standards Reference Code.

1.5 SHOP DRAWINGS AND SUBMITTALS

- A. In accordance with Section 01 33 00 Submittal Procedures and Section 28 05 00, Security General Requirements.
- B. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Wiring Diagrams: Power, signal, and control wiring. Furnished by Division 28.
 - 2. Description and Sequence of Operation of each electrified door hardware function.
 - a. Furnished by Division 28.
 - b. General Contractor to coordinate with Division 28.
- 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. Qualification Data: For Consultant per Part 1.7.B.
- F. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.
- G. Warranty: Provide manufacturer printed warranty data.
- H. Other Action Submittals:
 - 1. Door Hardware Schedule (Sets): Submit one electronic copy or six hard copies 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 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) Degree of swing for each door.
 - 9) Door and frame sizes and materials.
 - 10) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - a) Sequence of Operation: General Contractor to coordinate with Division 28.
 - 11) List of related door devices specified in other Sections for each door and frame.
- d. Submittal Sequence: Submit the final door hardware schedule with sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in 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 sets.
2. Keying Matrix: General Contractor to furnish a keying matrix immediately following Keying Conference under 1.7.F to be conducted a minimum of three months prior to Temporary Certificate of Occupancy (TCO) in a format provided by University.

1.6 DOOR REQUIREMENTS

- A. Door Position Switches shall be furnished and installed by the Security Contractor.
- B. Mechanical Request-To-Exit (REX) switches required at all exterior doors and all doors with electrified hardware, except for electro-magnetic door holders.
- C. Electrical Power Transfers (EPT) required at all exterior doors and doors with panic exit devices.
- D. All rooms must be capable of being lockable to method defined by University standards.
 1. All conference rooms to lock unless located within a lockable suite.
- E. Classroom Security Per University Door Hardware Matrix or Method prescribed by USC Lock Shop per specific project:
 1. New and existing hardwired Networked Card Reader/Electrified Hardware:
 - a. Furnish SDC 434KLDURL2 Lockdown button(s) on inside of classroom at each egress door and non-egress side(s) walls, as required.
 - 1) STI-6518 Flip Cover.
 - b. Remote Lockdown capabilities.
 2. New and existing WiFi enabled or standalone Schlage AD400 Access Control Locksets on Level:
 - a. Furnish SDC 434KLDURL2 Lockdown button(s) on inside of classroom at each egress door and non-egress side(s) walls, as required.

- 1) STI-6518 Flip Cover.
 - b. Remote Lockdown capabilities.
3. Existing standalone Schlage AD200/Omnilocks and Mechanical Classroom Function Locksets.
 - a. Furnish the following on inside of room:
 - 1) SDC 1500 Series Magnetic Lock
 - 2) SDC 602RF x RB12V4 Power Supply
 - 3) SDC 423MU Exit Button
 - 4) SDC 434KLDURL2 Lockdown button(s) on inside of classroom at each egress door and non-egress side(s) walls, as required.
 - a) STI-6518 Flip Cover.
 - 5) Field modify existing egress side mechanical operating hardware with mechanical Request-To-Exit (REX) switch
 - 6) Local Lockdown only; No remote Lockdown capabilities
 - b. Furnish the following on outside of room:
 - 1) SDC 700 Series Key Switch
 - 2) Campus Standard Mortise Cylinder for access only by DPS
4. No substitutions allowed without prior approval of Lock Shop Supervisor

1.7 QUALITY ASSURANCE

- A. Supplier Qualifications: An employer of workers trained and only as listed in University Approved Door Hardware Distributors/Installers under Basis-of-Design (BOD).
 1. Supplier's responsibilities include supplying and installing door hardware, and providing a qualified Consultant per Part 1.7.B available during the course of the Work to consult with Contractor, Architect, and University about door hardware and keying.
 2. Supplier shall have warehousing facilities in Project's vicinity.
 3. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 4. Engineering Responsibility: Preparation of 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.
- B. Architectural Hardware Consultant Qualifications: Employ a person who is currently certified by DHI as an Architectural Hardware Consultant (AHC), Door + Hardware Consultant (DHC) or Architectural Openings Consultant (AOC), 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 Consultant Qualifications: A qualified Electrified Hardware Consultant (EHC), Access Control System Consultant (ACSC) or Architectural Openings Consultant (AOC) who is experienced in providing consulting services for electrified door hardware installations.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C Positive Pressure.
 1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1016 mm) or less above the sill.

- D. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- E. Pre-Installation Conferences:
 - 1. Mechanical hardware: Arrange conference at job site to coordinate door, frame, hardware and electronic security hardware installation; to be attended by the Architect, Owner, Contractor and representative personnel of firms involved in the provision and installation of said items.
 - 2. Electrified hardware: 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:
 - a. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - b. Review sequence of operation for each type of electrified door hardware.
 - c. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Review required testing, inspecting, and certifying procedures.
- F. Keying Conference: Conduct conference at Project site after receipt of approved submittals and a minimum of three months prior to Temporary Certificate of Occupancy (TCO) to comply with requirements in Division 01 Section "Project Management and Coordination." Conference participants shall include General Contractor, Architect, University Project Manager, University Lock Shop, and General Contractor's door hardware supplier. The University Project Manager will determine additional participants from appropriate department(s). Incorporate keying conference decisions into final keying matrix 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. Requirements for key control system.

1.8 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 and permanent cores directly from manufacturer to University (Facilities Lock Shop Supervisor) by registered mail or overnight package service, with signature required.

1.9 COORDINATION

- A. Coordinate layout and installation of recessed pivots and concealed floor-closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. 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.
- C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices an access control system.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails 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: Two years from date of Substantial Completion, except as follows:
 - a. Continuous Hinges: Five years from date of Substantial Completion.
 - b. Cylindrical Lever Locksets: Five years from date of Substantial Completion.
 - c. Mortise Lever Locksets: Five years from date of Substantial Completion.
 - d. Exit Devices: Three years from date of Substantial Completion.
 - e. Manual Closers: Ten years from date of Substantial Completion.
 - f. Electrified Hardware: Two years from date of Substantial Completion.

1.11 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for University'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.
 - 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 descriptive titles corresponding to requirements specified in Part 2.
- 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. Alternate Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include manufacturers specified.
- D. Product Substitutions: Provide products as specified. The University shall be the sole judge of whether or not a submitted substitution is deemed to be "equivalent" and accepted.
- E. Fire Rated Doors: Coordinate security hardware equipment and installation so as to maintain the Fire Rating of each specific door to the satisfaction of the local Authority Having Jurisdiction.

2.2 HINGES, GENERAL

- A. 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).
- 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 Size: Provide the following, unless otherwise indicated:
 - 1. Doors up to three foot wide: Standard weight 4 ½ x 4 ½ inches.
 - 2. Doors three foot six inch wide: Heavy-weight 4 ½ x 4 ½ inches.
 - 3. Doors greater than three foot six inch wide: Heavy-weight 5 x 4 ½ inches.

- D. Hinge Type and Weight: Unless otherwise indicated, provide the following:
1. Entrance Doors, Exterior Doors, Doors with Panic Exit Devices, High-Use, High-Abuse and doors with Automatic Operators: Heavy-duty Continuous Hinges unless specified otherwise.
 2. Interior Doors: Standard-weight hinges or heavy-weight hinges as required by door size.
 3. Doors with Closers: Antifriction concealed bearing hinges.
 4. Furnish heavy-weight concealed ball bearing hinges where specified.
 5. Incombustible Mineral Core Doors: Continuous hinges or heavy-weight concealed ball bearing hinges.
- E. Hinge Base Metal: Unless otherwise indicated, provide the following:
1. Exterior Hinges: Stainless steel, with stainless-steel pin.
 2. Interior Hinges: Steel, or stainless steel, as scheduled.
 3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.
- F. Anti-friction Concealed-Bearing, Full-Mortise (Butt) Hinges: BHMA A156.1, heavy weight; Grade 1, with concealed ball bearings, standard weight with concealed ball bearings; button tips; non-rising removable pins.
- G. Hinge Options: Where indicated in door hardware sets or on Drawings:
1. Non-removable 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 reverse-bevel exterior doors.
 2. Corners: Square.
- H. 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 wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Butts and Hinges: Certified Grade 1 BHMA A156.1 and listed under Category A in BHMA's "Certified Product Directory."
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Manufacturers:
1. Specified: Hager Companies.
 2. Alternate: Bommer, Ives, McKinney, Stanley.

2.4 NOT USED

2.5 CONTINUOUS HINGES

A. Standard: Certified BHMA A156.26 Grade 1-300.

1. Continuous Hinges: Listed under Category N in BHMA's "Certified Product Directory."

B. Continuous Gear-Type Hinges: Extruded 6063-T6 aluminum alloy, pin-less. Continuous hinges for fire rated doors shall be UL10C listed for type of assembly, without restrictions for wall type and not requiring fire pins up to and including 90 minute rating.

1. Manufacturers:

- a. Specified: Pemko Manufacturing Company.
- b. Alternate: Hager/Roton, Ives, Select, Zero.

D. Continuous Pin and Barrel-Type Hinges: Stainless steel hinge leafs with knuckles formed around a stainless steel pin that extends entire length of hinge. Furnish with Hospital Tips (HT) Medical Bearings (MB option). Continuous hinges for fire rated doors shall be UL10C listed for type of assembly, without restrictions for wall type and not requiring fire pins up to an including 3-Hour rating. Continuous metal shims shall be furnished by hinge manufacturer.

1. Manufacturers:

- a. Specified: Markar Products Company; an ASSA ABLOY Group company.
- b. Alternate: Pemko, Select.

2.6 ELECTRIFIED HINGES AND POWER TRANSFERS

A. Electrified Hinges: Schedule at interior low-frequency doors which require electrified door hardware. Comply with the following:

1. Power Transfer: Concealed flexible connector high-temperature Teflon 19-strand wires, secured at each leaf, with centered access holes.

2. Wire leads: Furnish with 4 foot leads.

3. Manufacturers:

- a. Specified: Hager Companies
- b. Alternate: Bommer, Command Access, Ives, McKinney, Stanley

B. Electrified Continuous Hinges: Schedule at exterior doors, doors with panic exit hardware and automatic power operated doors equipped with continuous hinges. Comply with the following:

1. Power Transfer: Provide cutout to accommodate Command Access USC EPT(4 or 12 wire)WHMOD-24”(2X)CON Power Transfer.

2. Manufacturers:

- a. Specified: Pemko Manufacturing Company.
- b. Alternate: Markar, Select.

- C. Power Transfers: Schedule at exit doors, high-traffic doors, and all doors with electrified exit devices. Comply with the following:
1. Electrical power transfer in all-metal housing, as scheduled, completely concealed when door is closed, suited for abusive installations, UL10C listed model, designed to accommodate degree of swing.
 - a. Transfer shall be tested to minimum 1,000,000 cycles.
 - b. Wire leads: In-rush current rating minimum designed to meet required maximum amperage surge. Provide transfer with two 18 AWG wires and eight 22 AWG wires.
 2. Manufacturers:
 - a. Specified: Command Access USC EPT(4 or 12 wire)WHMOD-24”(2X)CON Power Transfer .
 - b. Alternate: None.
 - 1) For narrow jamb or stile applications only, or where above power transfers not applicable:
 - a) Specified: Adams Rite (Model 4612), an ASSA ABLOY Group company.
 - b) Alternate: Security Door Controls (Model PT-5)

2.7 NOT USED

2.8 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)" ANSI A117.1.
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 (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with CBC 1010.1.9, 11A, 11B. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall be readily operable from the inside and not require use of a key, tool, or special knowledge for free egress operation.
- C. Electrified Locking Devices: Comply with BHMA A156.25 and CBC 1010.1.9.7, 1010.1.9.8, 1010.1.9.9, 1010.1.9.12 for products as scheduled.
- D. Lock Trim:
1. Levers: Accessible design as scheduled, through-bolted, cast or solid bar wrought lever trim.
 - a. Corbin-Russwin “LWA” is University Standard for UPC Campus.
 2. Roses: Wrought , with concealed fasteners.
 3. Dummy Trim: Match lever lock trim and escutcheons.
 4. Occupancy Indicators: Furnish mortise lock with M19VN Indicator which indicates “occupied” / “vacant” at privacy units scheduled for single occupant toilet rooms.

- E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Mortise Locks: Stainless steel anti-friction, minimum 3/4-inch (19-mm) latch-bolt throw.
 - 2. Deadbolts: One-piece Stainless steel, minimum 1-inch (25-mm) bolt throw.
 - a. Only used when furnished as integral with mortise lock with simultaneous retraction.
- F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- G. Strikes: Manufacturer's standard strike with wrought steel strike box for each latch bolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
 - 1. Strikes for Mortise Locks and Latches pairs doors: ANSI straight 7/8 inch lip to center.
 - 2. Strikes for Mortise Locks and Latches single doors: ANSI curved lip for mortise locks and latches, with lip length as required for proper clearance with frame trim. Straight lip strikes are not acceptable for single doors.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
 - 4. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

2.9 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Cylindrical Locks: BHMA A156.
 - 2. Mortise Locks: BHMA A156.13.
- B. Cylindrical Lever Locks: BHMA A156.2, Certified Grade 1; Series 4000. Yale RAU5400LN, heavy-duty Cylindrical Locks with free-wheeling lever when locked and prepared to accept interchangeable core master keyed to University System. Verify model number of interchangeable core prep to be used at each project with University Lock Shop. Note: Bored locksets should be used generally **for Campus remodel construction or existing retrofit only** and are not intended for new construction or for corridor applications. Verify with University Lock Shop prior to scheduling.
 - 1. Manufacturers:
 - a. Specified: Yale Commercial Locks and Hardware; an ASSA ABLOY Group company.
 - b. Alternate: None.
 - 2. Cylindrical Lock Typical Functions:
 - a. Office: 5407LN
 - b. Classroom: 5408LN
 - c. Storeroom: 5405LN
 - d. Restroom: 5402LN
- C. Mortise Lever Locks: Campus Standard locks, stamped chrome plated steel case with heavy gauge steel or brass parts; BHMA Grade 1 Heavy-duty, Corbin-Russwin Series ML2000, with quick reversible latch bolt, which allows unit to be re-handed, without disassembling case.

1. Manufacturers:
 - a. Specified: Corbin-Russwin; ASSA ABLOY Group Co (COR).
 - b. Alternate: None.

2. Certifications:
 - a. BHMA A156.13, Certified Grade 1 Operational and Security.
 - b. UL10C Positive Pressure Fire Listed for up to and including three hour label.

3. Mortise Lock Typical Functions:
 - a. Passage Latchset: ML2010
 - b. Suite Entry: ML2067
 - c. Offices: ML2053
 - d. Classroom: ML2055
 - e. Storeroom: ML2057
 - f. Restroom:
 - 1) Single Occupant: ML2030 M19VN
 - 2) Multi-Occupant: ML2010
 - g. Student housing room entry: ML2067

2.10 AUXILIARY LOCKS AND LATCHES

- A. Auxiliary Locks: BHMA A156.5, Grade 1 unless Grade 2 is indicated. Listed under Category E in BHMA's "Certified Product Directory."
 1. Narrow Stile Auxiliary Locks: Not allowed unless approved by Lock Shop Supervisor.
 2. Sliding Door Auxiliary Locks:
 - a. Material: Stainless Steel/Brass/Bronze.
 - b. Deadlocks for Sliding Doors: Expanding- or interlocking-type deadbolt operated by key outside and ADA lever thumb-turn inside.
 - 1) Specified: Trimco 1074-2EUSC-T01.630 Munich x special cam (TRI)
 - 2) Alternate: Inox PD9550 XGT202 Munich x less cylinder (INO).
 - 3) Barn doors require Trimco WS-1074 Series Wall Strike.

2.11 ACCESS CONTROL LOCKS AND TRIM

- A. Access Control Locks: Verify Manufacturer of Access Control Locks with University Lock Shop prior to specifying. ANSI BHMA A156.25, Certified Grade 1 for cylindrical and mortise locks, intended for retrofit construction.
 1. Manufacturers:
 - a. Specified: Schlage; Division of Allegion.
 - b. Alternate: None.

 2. Models used:
 - a. Interior Retrofit, online-compatible with Lenel: AD400 Series.

- b. Interior New Construction or Interior Retrofit, offline: AD200 Series.
- B. Access control lever trim shall match standard mechanical lockset and exit device lever trim.
- C. Units will accept current facility Proximity or Magnetic Stripe card formats. Verify card format with University Lock Shop.
 - 1. Lockset Configuration: Lever lock or trim, prepared to accept facility Corbin Russwin interchangeable core.
 - 2. Provide key override capability by means of Corbin-Russwin Interchangeable Core cylinder. Keying shall be performed by University Lockshop.
 - 3. Panel Interface Modules (PIM)
 - a. When online AD400 series locks or trim are required furnish Panel Interface Module (PIM), furnished and installed under Division 28.

All types of models to receive four battery (4B) option.

2.12 ELECTRIFIED LOCKS AND LATCHES

- A. Mortise Locks: Campus Standard locks, stamped chrome plated steel case with heavy gauge steel or brass parts; BHMA Grade 1 Heavy-duty, Corbin-Russwin ML20900 ECL series, with quick reversible latch bolt, which allows unit to be re-handed, without disassembling case. Lock shall be fail secure mode, with request-to-exit (REX) monitor, except at interior stair exit doors which shall have fail-safe operation. Do not schedule fail-safe electrified trim at exterior perimeter doors. Lever trim design shall be LWA.
 - 1. Manufacturers:
 - a. Specified: Corbin-Russwin; ASSA ABLOY Group Co (COR).
 - b. Alternate: Corbin-Russwin modified by Command Access (CAT).
 - 2. Certifications:
 - a. BHMA A156.13, Certified Grade 1 Operational.
 - b. UL10C Positive Pressure Fire Listed for up to and including three hour label.
 - 3. Provide 24 VDC version.

2.13 DOOR BOLTS, GENERAL

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Fire-Rated Surface Bolts: Minimum 1-inch (25-mm) throw; listed and labeled for fire-rated doors.
 - 2. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.

- B. Dustproof Strikes: BHMA A156.16, Grade 1.
 - 1. Floor Type: Polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.
- C. Manual Flush Bolts: BHMA A156.16, Grade 1; designed for mortising into door edge. Fabricate from extruded brass or bronze, with 12-inch (305-mm) rod actuated by flat lever. Provide matching strike and equip with top rod extension.
- D. Slide Flush Bolts: Cast brass, with rod actuated by slide. Provide matching strike.

2.14 AUTOMATIC DOOR BOLTS

- A. Automatic Flush Bolts: Fabricated from steel and brass components, with spring-activated bolts that automatically retract when active leaf is opened and that automatically engage when active door depresses bolt trigger; listed and labeled for fire-rated doors. Provide brass or stainless-steel cover plate, top and bottom strikes, guides, guide supports, wear plates, and shims. Furnish two-piece, low-closing force designed units at inactive wood doors to maintain core material integrity and reduce potential delimitation. Top and Bottom bolts required; no less bottom bolt or bottom fire pins will be accepted.
 - 1. Furnish two-piece, low-closing force designed units at inactive wood doors to maintain core material integrity and reduce potential delimitation.
- B. Self-Latching Flush Bolts: Fabricated from steel and brass components, with spring-activated bolts that automatically engage when active door depresses trigger; listed and labeled for fire-rated doors. Bolts are manually retracted by a slide in the bolt face. Provide brass or stainless-steel cover plate, top and bottom strikes, guides, guide supports, wear plates, and shims. Top and Bottom bolts required; no less bottom bolt or bottom fire pins will be accepted.
- C. Dustproof Strikes:
 - 1. Floor Type: Polished wrought brass, with 3/4-inch- (19-mm-) diameter, spring-tension plunger.
- D. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1; designed for mortising into door edge.
 - 1. Manufacturers:
 - a. Specified: Door Controls International.
 - 1) Wood Doors: Model 962.
 - 2) Metal Doors: Models 842/845.
 - b. Alternate: Rockwood; an ASSA ABLOY Company; Ives, an Allegion company; Trimco, Triangle Brass Manufacturing Company.

2.15 EXIT DEVICES, GENERAL

- A. Exit Devices: BHMA A156.3, Grade 1. Listed under Category G in BHMA's "Certified Product Directory", independent lab tested 1,000,000 cycles, with push-through touch pad design.
- B. 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" and ANSI A117.1. Comply with California Building Code Title 24.
 - 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 (22 N).
- C. Exit Devices for Means of Egress Doors: Comply with CBC 1010.1.10. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Exit devices shall not require the use of a key, tool, or special knowledge for egress operation.
 - 1. All electrical rooms to receive panic exit devices regardless of rating, amperage or room size.
- D. 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.
 - 1. Furnish non-fire rated devices without dogging feature.
 - 2. Furnish Cylinder Dogging where required.
- E. 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.
- F. Removable Mullions: Provide at specified locations as directed by University, removable mullions for use with exit devices complying with UL (and NFPA80 where labeled) tested and listed by 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. Removable with single turn of building key and securely installed with stabilizer brackets.
- G. Outside Trim: Lever with cylinder, Pull with cylinder; material, finish and design to complement lever trim of locksets, unless otherwise indicated.
 - 1. Lever Trim: Break-away type model 996L x 03, unless otherwise indicated.
- H. Through-Bolts: For exit devices and trim on fire-rated wood doors.
- I. Manufacturers:
 - 1. Manufacturers:
 - a. Specified: Von Duprin; an Allegion Company.

- 1) PA99 Series at wide stiles.
 - 2) PA33 Series at narrow stiles.
- b. Alternate: None.

2.16 EXIT DEVICES

A. Rim Exit Devices:

1. Type: BHMA A156.3, Type 1, rim; Type 4, narrow stile.
2. Actuating Bar: Push pad.
3. Material: Aluminum/Brass/Bronze, as scheduled.
4. No traditional crossbar Von Duprin 55/88 Series, or other similar devices will be allowed unless prior approval of University Lock Shop Supervisor.

B. Concealed Vertical-Rod Exit Devices:

1. Type: BHMA A156.3, Type 6, narrow stile, Type 8, for metal doors.
2. Type: BHMA A156.3, Type 7, for wood doors.
3. Actuating Bar: Push pad.
4. Material: Aluminum/Brass/Bronze, as scheduled.
5. Configuration: Top and bottom rod. Use less bottom rod (LBR) option on interior doors.
6. Furnish all concealed vertical rod (CVR) devices with two top latch mounting brackets (Model #109324 + screws).
7. No Surface Vertical Rod devices will be allowed unless with prior approval of University Lock Shop Supervisor.
8. No traditional crossbar Von Duprin 55/88 Series, or other similar devices will be allowed unless with prior approval of University Lock Shop Supervisor.

C. Electric Latch Controlled Exit Devices: Motor operated, low voltage current draw, to retract latch for smooth, quiet retraction, self-contained in exit device rail, UL Listed; with 24 volt DC operation. Command Access VLP-UL-M-Kit. Include patented PM300 interface power module, designed to allow centralized power supplies, with extended wire runs up to 700 feet, using 18/2 wire. Centralized power supplies furnished and installed by Division 28. Furnish with integral Request to Exit (REX-Option) switch. Comply with the following:

1. Manufacturers:
 - a. Specified: Command Access Technology CAT).
 - b. Alternate: None.

D. Electric Controlled Exit Device Trim: Solenoid 24VDC operated with full wave rectification, self-contained in inside lever escutcheon. Furnish fail-safe design at interior Stair exit doors. Furnish Command Access ET25-R/V-REX x CRU3 with Request to Exit (REX-Option) switch integral with exit device and key cylinder. Comply with the following:

1. Manufacturers:
 - a. Specified: Command Access Technology.
 - b. Alternate: None

2.17 LOCK CYLINDERS

- A. Interchangeable Core Lock Cylinder Housings: BHMA A156.5, Grade 1.
 - 1. Manufacturers:
 - a. Specified: Corbin-Russwin; ASSA ABLOY Group Co.
 - b. Alternate: None.
- B. Cylinders: Interchangeable core, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Accepts Six-Pin Large Format Interchangeable Core (CT6).
 - 2. Mortise Type: Threaded cylinders with rings and appropriate type cam to properly operate locking device.
 - 3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 4. Security Collars: Equip Cylinders on exterior doors with Security Collar to prevent wrenching and rotating of cylinder.
 - a. Manufacturers:
 - 1) Specified: Corbin-Russwin 416F39.
 - 2) Alternate: None.
- C. Other Cylinder Housing and Core Requirements:
 - 1. Medeco buildings to receive Medeco Large Format Interchangeable Core on interior.
 - 2. All electrical rooms, mechanical spaces and ITS rooms to receive Medeco Large Format Interchangeable Electronic eKey cylinders.
 - 3. ASSA buildings to receive ASSA Large Format Interchangeable Cores.
 - 4. All Lenel controlled doors to receive ASSA Large Format Interchangeable Cores.
- D. Permanent Cores: Furnished and installed by University Lock Shop.
- E. Construction Keying and Cores: Comply with the following:
 - 1. Construction Master Keys: Provide 20 construction master keys.
 - 2. Construction Cores: Provide construction cores that are replaceable by permanent cores (CT6).
 - 3. Material: Brass. Plastic temporary or disposal cores will not be acceptable.
 - 4. University Lock Shop will return construction cores to General Contractor upon installation of permanent cores.
- F. Cylinder position on door or device must allow for key insertion and sufficient rotation to unlock from a minimum 4-inch diameter closed ring without interference or restrictions (University Department of Public Service, Lock Shop, FMS, etc.)
- G. Subject to compliance with requirements, provide emergency entrance key vault(s); Knox Company 3200 Series, or equal.
 - 1. Finish Color - Black, Dark Bronze or Aluminum as selected by Architect.
 - 2. Where indicated provide security key override switches for electrically activated openings.
 - 3. Coordinate and provide keying and type per fire/ police department, and other jurisdictional agency requirements.

2.18 KEYING

- A. All keying and keys supplied by University Lock Shop.

2.19 OPERATING TRIM, GENERAL

- A. Standard: BHMA A156.6 and as illustrated on Drawings.
- B. Materials: Fabricate from stainless steel, bronze, or brass as scheduled.
- C. Manufacturers:
 - 1. Trimco.
 - 2. Ives, an Allegion company.
 - 3. Rockwood; an ASSA ABLOY company.

2.20 OPERATING TRIM

- A. Push-Pull Plates: 1/8 inch (3.2 mm) thick, 4 inches wide by 16 inches high (102 mm wide by 406 mm high); with square corners, beveled edges, and raised integral lip; secured with exposed screws.
- B. Straight Door Pulls: 1-1/4-inch (19-mm) constant-diameter full height vertical pull on pull side of door only, with minimum clearance of 1-1/2 inches (38 mm) from face of door. Pull on push side of door must not obstruct bottom 10-inches of door.
 - 1. Mounting: Surface applied with concealed fasteners or Back to back with threaded sleeves.
 - 2. Straight door pulls mounting coordinating when locking cylinders as used for position on door must allow for key insertion and sufficient rotation to unlock from a minimum 4-inch diameter closed ring without interference or restrictions (University Department of Public Service, Lock Shop, FMS, etc.)
- C. Offset Door Pulls: 3/4-inch (19-mm) constant-diameter pull, with minimum clearance of 1-1/2 inches (38 mm) from face of door and offset of 2 inches (51 mm); fastened at minimum of 10 inches (203 mm) o.c.
 - 1. Mounting: Surface applied with concealed fasteners.
 - 2. Offset door pulls mounting coordinating when locking cylinders as used for position on door must allow for key insertion and sufficient rotation to unlock from a minimum 4-inch diameter closed ring without interference or restrictions (University Department of Public Service, Lock Shop, FMS, etc.)
- D. Pull-Plate Door Pulls: 1/8 inch thick plate, 4 inches wide by 16 inches high (102 mm wide by 406 mm high), with square corners and beveled edges; 3/4-inch (19-mm) constant-diameter pull, with minimum clearance of 1-1/2 inches (38 mm) from face of door; fastened at 8 inches (203 mm) o.c.
 - 1. Mounting: Surface applied with concealed fasteners.

- E. Custom Designer Pulls: Special or logo Push or Pull designs must have shop drawings submitted for approval of University Lock Shop Supervisor prior to fabrication.

2.21 ACCESSORIES FOR PAIRS OF DOORS

- A. Carry-Open Bars: Provide carry-open bars for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
 - 1. Material: Satin chrome plated, or dark bronze as scheduled, with strike plate.
- B. Flat Overlapping Astragals: Flat metal bar, surface mounted on face of door with tamper proof screws; minimum 1/8 inch (3.2 mm) thick by 2 inches (50 mm) wide by full height of door; and base metal as follows:
 - 1. Base Metal: Dark bronze anodized, painted steel, or stainless steel, as scheduled.
- C. Rigid, Housed Meeting Stile Astragals: Gasket material held in place by metal housing; fastened to face of door with screws.
 - 1. Gasket Material: Nylon brush.
 - 2. Housing Material: Aluminum, or dark bronze anodized, as scheduled.
 - 3. Manufacturers:
 - a. Specified: Pemko 29324_NB.
 - b. Alternate: National Guard, Zero.
- D. Overlapping-with-Gasket Astragals: T-shaped metal, surface mounted on edge of door with screws; with integral gasket and base metal as follows:
 - 1. Base Metal: Aluminum, or dark bronze anodized, as scheduled.
 - 2. Gasket Material: Silicone.
 - 3. Manufacturers:
 - a. Specified: Pemko 355_S.
 - b. Alternate: National Guard, Zero.
- E. Coordinators: BHMA A156.3.
 - 1. Bar type mounted on frame stop soffit, complete with filler bar and mounting brackets, painted to complement finish of other scheduled door hardware.
 - 2. Manufacturers:
 - a. Specified: Door Controls International.
 - b. Alternate: IVES Hardware; an Allegion Company, Rockwood; an ASSA ABLOY Company; Trimco, Triangle Brass Manufacturing Company

2.22 CLOSERS, GENERAL

- A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the 2020 Department of Justice “ADA Standards for Accessible Design” and U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and ANSI A117.1. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction, not to exceed maximum of 15 pounds.
- B. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.
- C. Power-Assist Closers: As specified in Division 08 71 13 Section "Automatic Door Operators" for access doors for people with disabilities or where listed in door hardware sets.
- D. 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 multi-sized closers, adjustable to meet field conditions and requirements for opening force.
- E. Surface Closers: BHMA A156.4, Grade 1. Listed under Category C in BHMA's "Certified Product Directory." Provide type of arm required for closer to be located on non-public side of door, inside rooms, stairs and interior of building.
 - 1. Manufacturers:
 - a. Specified: LCN Closers (model 4040XP/4041DA); an Allegion Company.
 - 1) Inswinging Doors with closer mounted on pull side:
 - a) Furnish 4040XP/4041DA to 120-degrees.
 - b) Furnish TJ4040XP-T x 4040T-18TJ at 180-degrees.
 - 2) Outswing doors with closer mounted on push side:
 - a) Furnish 4040XP-EDA
 - b. Alternate: None.
 - 2. Student housing rooms only: Norton Door Controls (model 1601/1601BF Series); an ASSA ABLOY Group Company.
- F. Overhead Concealed Closers: Not allowed unless approved by USC Lock Shop Supervisor.
- G. Floor Concealed Closers: Not allowed unless approved by USC Lock Shop Supervisor.
- H. Closer Holder Release Devices: BHMA A156.15. Listed under Category C in BHMA's "Certified Product Directory."

1. Life-Safety Type: On release of hold open, door becomes self-closing. Automatic release is activated by smoke detection system.
2. Manufacturers:
 - a. Specified: LCN Closers; an Allegion Company.
 - b. Alternate: None.

2.23 CLOSERS

- A. Modern-Type-with-Cover Surface Closers: Non-handed, rack-and-pinion hydraulic type; with adjustable sweep and latch speeds controlled by key-operated valves; with forged-steel main arm; enclosed in cover indicated; complying with the following:
 1. Mounting: Hinge side or Parallel arm, type as scheduled.
 2. Type: Delayed action closing, where scheduled.
 3. Back-check: Adjustable, effective between 60 and 85 degrees of door opening.
 4. Closing Power Adjustment: Fully-adjustable with at least 50 percent more than minimum tested value.
 5. Cover Material: Molded plastic Aluminum Painted or Plated steel, as scheduled.
 6. Arm Options: Furnish regular or parallel arm units as required to mount closer inside rooms or stairs.
 7. Stop Arm Options: Furnish with separate concealed or surface mounted overhead stop where required to limit swing of door due to obstruction or where use of conventional wall or floor stop is prohibited.
 8. Mounting Plates: Provide closer with drop and full decorative back plates, as required to properly mount unit to door and frame installation.

2.24 PROTECTIVE TRIM UNITS, GENERAL

- A. Size: 2 inches (38 mm) less than door width on push side and 1 inch (13 mm) less than door width on pull side, by height specified in door hardware sets.
- B. Countersunk Fasteners: Manufacturer's standard machine or self-tapping screws.
- C. Metal Protective Trim Units: Furnish at reverse bevel doors in corridors and exterior doors, beveled on four sides; fabricated from the following material:
 1. Material: 0.050-inch- (1.3-mm-) thick stainless steel or bronze, type as scheduled.
 2. Manufacturers:
 - a. IVES Hardware; an Allegion Company.
 - b. Rockwood; an ASSA ABLOY Company.
 - c. Trimco, Triangle Brass Manufacturing Company.

2.25 PROTECTIVE TRIM UNITS

- A. Armor Plates: 36 inches (914 mm) high by door width, with allowance for frame stops.
 1. Per NFPA-80 protection plates over 16 inches (406 mm) high shall bear a UL Listing.

- a. Engraved, embossed, or stamped label will be required:
 - 1) Specified: Trimco KA050 Series "ULS".
 - 2) Alternate: Approved equal as listed above.
 - b. No adhesive type mylar or paper labels will be acceptable.
- B. Kick Plates: 10 inches (305 mm) high by door width, with allowance for frame stops.
- C. Mop Plates: 6 inches (152 mm) high by 1 inch (25 mm) less than door width.

2.26 STOPS AND HOLDERS, GENERAL

- A. Stops and Bumpers: BHMA A156.16, Grade 1, unless Grade 2 is indicated.
- 1. Provide at exterior doors; heavy-duty base unit 2-1/2 inch by 2-1/4 inch height floor stops with exterior pack three fastener machine screws by expansion anchors, or heavy-duty anti-vandal unit with flame resistant molded rubber two inch diameter by 3-1/2 inch height (Trimco 1209HA).
 - 2. Where floor type stop will present a pedestrian hazard furnish heavy-duty overhead concealed stop, or closer with integral stop, type as required.
 - 3. Furnish Trimco model 7280 floor stops at interior in-swing doors, Trimco model 7281 floor stops at doors with panic or exit devices.
 - 4. Wall stops not allowed unless approved by USC Lock Shop Supervisor.
 - 5. Do not mount floor stops where they will impede traffic. Where floor stops are not appropriate, provide overhead stops or holders.
- B. Mechanical Door Holders: BHMA A156.16, Grade 1 unless Grade 2 (Trimco 1260 Series).
- C. Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch (16 by 19 mm); fabricated for drilled-in application to frame.
- D. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame. Silencers shall not be used at fire-rated frames.
- E. Manufacturers:
- 1. Specified: Trimco, Triangle Brass Manufacturing Company.
 - 2. Alternate: Ives Hardware; an Allegion Company; Rockwood, an ASSA ABLOY Company.
- F. Electromagnetic Door Holders: Coordinate with fire detectors and interface with fire alarm system for labeled fire door assemblies.
- 1. Listed under Category C in BHMA's "Certified Product Directory."
 - 2. Manufacturers:
 - a. Specified: Rixson Specialty Door Controls; an ASSA ABLOY Group Company.
 - b. Alternate: LCN; an Allegion Company.

2.27 STOPS AND HOLDERS

- A. Wall Bumpers: Not allowed unless approved by USC Lock Shop Supervisor.
- B. Rigid Floor Stops: Cast brass or bronze with rubber bumper; expansion-shield application.
- C. Electromagnetic Door Holders: BHMA A156.15, Grade 1; electromagnet attached to wall or floor as indicated, and strike plate attached to swinging door.
 - 1. Configuration: Wall-mounted single unit.
 - 2. Options: Provide adjustable length armature extension unit where required due to wall-depth.

2.28 OVERHEAD STOPS AND HOLDERS

- A. Overhead Concealed Slide Holders: BHMA A156.8, Type 1; hold open and release by push and pull of door unless control is set in inactive position; with stop and shock absorber; adjustable holding pressure; for single acting doors opening 110 degrees.
- B. Overhead Concealed Slide Stops: BHMA A156.8, Type 1; release by push and pull of door unless control is set in inactive position; with stop and shock absorber; adjustable holding pressure; for single acting doors opening 110 degrees.
 - 1. Manufacturers:
 - a. Specified: Rixson Specialty Door Controls; an ASSA ABLOY Group Company.
 - b. Alternate: Architectural Builders Hardware (ABH), Glynn-Johnson; an Allegion Company.

2.29 DOOR GASKETING, GENERAL

- A. Standard: BHMA A156.22. Listed under Category J in BHMA's "Certified Product Directory."
- 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 non-corrosive fasteners for exterior applications and elsewhere as required for wet locations.
 - 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.
- C. 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.
- 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 S-labeled doors and at fire-rated doors.

- E. 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 Standard UL-10C.
 - 1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1016 mm) or less above the sill.
- F. 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. Sound seals shall realize a 97% rating as tested under requirements of E90 and BS EN ISO 140-3
- G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- H. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
- I. Manufacturers:
 - 1. Specified: Pemko Manufacturing Co., an ASSA ABLOY Group company.
 - 2. Alternate: National Guard; Zero, an Allegion Company.

2.30 DOOR GASKETING

- A. Adhesive-Backed Perimeter Smoke Gasketing: Gasket material applied to frame rabbet with self-adhesive.
 - 1. Gasket Material: Silicone.
 - a. Pemko, an ASSA ABLOY Company
 - 1) Specified: Model S88, or S44 as required.
 - 2) Alternate: National Guard; Zero, an Allegion Company.
- B. Adhesive-Backed Perimeter Sound Gasketing: Gasket material applied to frame rabbet with self-adhesive.
 - 1. Gasket Material: Silicone.
 - a. Specified: Pemko, an ASSA ABLOY Company, one set model S773.
 - b. Alternate: National Guard; Zero, an Allegion Company.
- C. Rigid, Housed, Perimeter Gasketing: Gasket material held in place by metal housing; fastened to frame stop with screws.
 - 1. Gasket Material: Silicone.
 - a. Specified: Pemko, an ASSA ABLOY Company, model 2891_S, type as scheduled.
 - 2. Alternate: National Guard; Zero, an Allegion Company. Housing Material: Clear anodized aluminum or dark bronze anodized aluminum, type as scheduled.
- D. Overlapping Astragals for Pair's Doors: Gasket material held in place by metal housing and overlapping when doors are closed; mounted to face of meeting stile with screws.
 - 1. Gasket Material: Silicone bulb.

2. Housing Material: Clear anodized aluminum, dark bronze anodized aluminum or stainless steel, type as scheduled.
 3. Mounting: Surface mounted to one door.
- E. Meeting Astragals for Meeting Stiles: Gasket material held in place by metal housing; mounted with screws.
1. Gasket Material: Nylon brush.
 - a. Specified: Pemko, an ASSA ABLOY Company, model 29324_NB.
 - b. Alternate: National Guard; Zero, an Allegion Company.
 2. Housing Material: Clear anodized aluminum or dark bronze anodized aluminum, type as scheduled.
 3. Mounting: Surface mounted on face of each door.
- F. Door Sweeps: Gasket material held in place by flat metal housing or flange; surface mounted to face of door with screws, concealed by smooth extruded housing.
1. Gasket Material: Nylon brush.
 - a. Specified: Pemko, an ASSA ABLOY Company, model 57_V.
 - b. Alternate: National Gurad; Zero, an Allegion Company.
 2. Housing Material: Clear anodized aluminum or dark bronze anodized aluminum, type as scheduled.
- G. Automatic Door Bottoms: Gasket material held in place by metal housing that automatically drops to form seal when door is closed; mounted to bottom edge of door with screws.
1. Gasket Material: Sponge silicone.
 2. Housing Material: Clear anodized aluminum, or dark bronze anodized aluminum, type as scheduled.
 3. Mounting: Mortised into bottom of door, type as scheduled.
 4. Type: Low-closing-force type for doors required to meet accessibility requirements.

2.31 THRESHOLDS, GENERAL

- A. Standard: BHMA A156.21. Listed under Category J in BHMA's "Certified Product Directory."
- 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)." ANSI A117.1 and CBC Chapter Eleven Accessibility.
1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- C. Manufacturers:
1. Specified: Pemko Manufacturing Co., an ASSA ABLOY Group company.
 2. Alternate: National Guard; Zero, an Allegion compny.

2.32 THRESHOLDS

- A. Saddle Thresholds: Type and base metal as follows:
 - 1. Type: Smooth top, Fluted top, type as scheduled.
 - 2. Base Metal: Aluminum or dark bronze anodized aluminum, type as scheduled.
- B. Half-Saddle / Offset Thresholds: Fluted-top metal member; and base metal of aluminum with beveled slope on one side, not steeper than 1:2 inch slope.
 - 1. Base Metal: Aluminum or dark bronze anodized aluminum, type as scheduled.

2.33 FOLDING AND SLIDING DOOR HARDWARE, GENERAL

- A. General: BHMA A156.14; consisting of complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
 - 1. Interior Doors: Provide door hardware for interior bi-folding and bi-passing doors when not furnished as part of door package.
- B. Bi-folding and Sliding Door Hardware: Rated for door panels weighing up to 300 lb.
- C. Multiple Folding and Sliding Door Hardware: Rated for door panels weighing up to 600 lb.
- D. Opening force must comply with Accessibility Requirements.
- E. Track assembly must have dampers that slow end of opening/closing cycle to prevent injury.
- F. Manufacturers:
 - 1. Specified: KN Crowder Catch'N'Close
 - 2. Alternate: None.

2.34 FOLDING AND SLIDING DOOR HARDWARE

- A. Door Hardware: Rails and door hardware that allow horizontal and vertical adjustment.
 - 1. Rail Material: Galvanized wrought steel or aluminum as specified.
 - 2. Rail Configuration: I-beam.
 - 3. Mounting: Surface mounted overhead.
 - 4. Wheel Assembly: Two wheel or four wheel, with roller bearings.
 - 5. Wheel Material: Steel or nylon as specified.
- B. Multiple Door Hardware: Rails and door hardware that allows horizontal and vertical adjustment.
 - 1. Rail Material: Galvanized wrought steel.
 - 2. Rail Configuration: I-beam.
 - 3. Mounting: Surface mounted overhead.
 - 4. Wheel Assembly: Two wheel or four wheel, with roller bearing.

5. Wheel Material: Steel or nylon as specified.

2.35 FABRICATION

- A. 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.
- B. 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, painted to match door face.
 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 (SNB) Bolts: University generally requires concealed fasteners to be specified, unless Manufacturers' installation requires use of through-bolts. The following fire-rated applications may require use of sex-nut bolts unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface-mounted exit devices.
 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.36 FINISHES

- A. Standard: BHMA A156.18, finish as selected by project designer and 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.

PART 3 - EXECUTION

3.1 SPECIAL INSTRUCTIONS

A. Emergency Exiting Requirements

1. Free Egress at Controlled Doors: Electrically controlled doors shall be operable from the secured side without the use of access cards, keypads or requiring any special knowledge. Mechanical Request-To-Exit (REX) switches integral with door hardware shall sense a person needing egress and automatically bypass the alarm function. Motion or Passive Infrared Sensors will not be allowed.
 - a. Doors equipped with electrified Mortise Locks or Electrified Exit Hardware:
 - 1) The hardware configuration on access controlled doors shall enable egress without requiring electrical release of its associated mortise lock or electrified exit device.
 - 2) Door handles on the egress side shall retract latch bolt from the strike.
 - 3) The access system shall detect the normal egress of a user at any individual portal with a Request To Exit switch built directly into the mechanism used to egress and shall bypass any alarm associated with the portal for an individually programmable duration.
 - b. Stairwell Door Locks:
 - 1) Stairwell doors which are locked from the stairwell side shall have the capability to be unlocked simultaneously upon a signal from the Fire Command Center and the Security Command Center.
 - 2) Stairwell locking systems shall comply with the requirements of the applicable Building Code relating to Means of Egress.
 - 3) Contractor shall provide clearly labeled switches in the required locations to unlock all stairwell doors simultaneously. Coordinate wall or desk mounted switch style with the University and the Authority Having Jurisdiction.
 - 4) This interface shall not depend on the EACS Host or Remote Controllers for its operation. Locate interface relays for each stairwell door electrically ahead of EACS lock control to independently override EACS control.

2. Request-To-Exit Activation: Request-To-Exit devices shall always be connected to EACS inputs for processing and control. Independent Request-To-Exit devices shall never be connected directly to electrified locks, local control relays, or power supplies.
3. Mechanical Lock Operation: Electrified locks shall be mechanically keyed to permit manual unlocking in an emergency. Mechanical operation shall not override door monitoring functions.
4. Lock Failure Configuration:
 - a. Electrified Stairwell Locks: Electrified stairwell locks, including panic hardware that is locked in the direction of egress, shall be configured as fail-safe, i.e.: the lock shall lock only when powered. Coordinate the selected hardware with the University to assure its suitability for the purpose intended.
 - b. Other electrified locks: All other electrified locks and exit devices shall be configured as fail-secure, i.e.: the lock or exit device shall unlock only when powered. Coordinate the selected hardware with the University to assure its suitability for the purpose intended.
5. Fire Alarm Interface: Electrified locks and exit hardware which are a part of this work and which are locked in the path of legal exiting shall be connected to the building Fire Alarm System in accordance with University requirements such that they automatically unlock in the event of activation of the Fire Alarm System. This shall occur whether the activation is a result of a manual pull station, smoke detector or sprinkler flow switch.
 - a. A fire alarm “general/common alarm relay” shall be programmed at the fire alarm control panel to activate the EACS interface relays located in each Lock Power Supply cabinet. The Contractor shall research and provide all necessary fire alarm system conduit, wire, hardware and programming to perform the required interface.
 - b. This interface shall not depend on the EACS Host or Remote Controllers for its operation. Locate these interface relays electrically ahead of lock power distribution as shown on the drawings. The Contractor shall supply and install programmed alarm interface relay(s) with sufficient capacity to control the power supplied to all controlled locks under Division 28.

3.2 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. Notify Architect of any incompatibilities, prior to commencing affected work.
- 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.

3.3 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.

3.4 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. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 - 3. 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.
 - 3. Set units to allow maximum door swing, unless door encounters obstruction. In such case install hardware to allow minimum 90 degree swing, set to limit from encountering obstruction.
 - 4. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use Riv-Nuts, Nut-Serts, or similar anchoring device fasteners.
- C. Door Closers: Install door closers inside rooms, stairs and within building interior, with fasteners that are not exposed on door. Coordinate with Wood Door Division to insure doors are supplied with required top rail blocking reinforcement to enable non-through bolted installation. For special doors where blocking reinforcement construction is not available furnish closer with sex-nut bolt sleeve fasteners, painted to match door face finish.
- D. Power Supplies: Locate power supplies as indicated, in equipment rooms. Verify location with Architect. Furnished and installed by Division 28.
 - 1. Configuration: Provide the least number of power supplies centrally located, 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 07 Section "Joint Sealants." Install thresholds with ¼ - 20 Stainless steel or dark bronze machine screws, type as scheduled and expansion shields.
- F. Floor Stop: Adjacent to wall; not to exceed 4 inches from face of wall; located 3 inches from latch edge of door; in any case never more than 50 percent of door width from latch edge of door.

3.5 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: General Contractor to coordinate with Architect who will engage a University Basis-of-Design approved 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, and prepare a specific list of any deficiencies, a copy of which shall be provided to the Architect.
 - 2. Contractor shall correct all deficiencies noted in above report.
 - 3. Independent Architectural Hardware Consultant shall re-inspect door hardware and prepare a report certifying correction of deficiencies and compliance with requirements.

3.6 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. Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. 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 (75 mm) from the latch, measured to the leading edge of the door.
- B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, General Contractor 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.

3.7 CLEANING AND PROTECTION

- A. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products.

- B. Clean adjacent surfaces soiled by door hardware installation. Remove construction debris from project site and legally dispose of debris.
- C. Clean installed products in accordance with manufacturer's instructions prior to University's acceptance.
- D. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.8 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."

3.9 FINAL PROCEDURES

- A. Perform final procedures in accordance with
 - 1. Section 28 05 00, Security General Requirements.
- B. Independent Fire and Egress Door Assembly Inspector (FEDAI), certified by the Door & Hardware Institute (DHI) and audited as an Intertek Qualified Personnel (IQP), shall inspect new and existing fire and egress swinging doors with Builders Hardware after any required corrective actions performed in accordance with NFPA-80, NFPA-101, NFPA-105.
 - 1. Issue report in format approved by University to be used for subsequent Annual Fire and Egress door inspection requirements.

3.8 DOOR HARDWARE SCHEDULE (SETS)

(TO BE ENGINEERED FOR SPECIFIC PROJECT BY DHI CERTIFIED AHC AS DESIGNATED)

END OF SECTION 087101