



UNIVERSITY OF NORTH CAROLINA
CHARLOTTE

APPENDIX

DOOR HARDWARE

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes items known commercially as door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. Refer to the characteristics section for each product. The criteria listed in the specifications are based on one manufacturer. No substitution of product will be accepted unless that product meets all the characteristics listed under its respective section.
- C. This Section includes the following:
 - 1. Hinges
 - 2. Key control system
 - 3. Lock cylinders and keys
 - 4. Lock and latch sets
 - 5. Bolts
 - 6. Exit devices
 - 7. Push/pull units
 - 8. Closers
 - 9. Overhead holders
 - 10. Protection plates
 - 11. Weatherstripping for exterior doors
 - 12. Thresholds
- D. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 08 1113 – Hollow Metal Doors and Frames
 - 2. Section 08 1416 – Flush Wood Doors
 - 3. Section 08 4113 – Aluminum – Framed Entrances and Storefronts
 - 4. Division 20 – Electrical

1.02 REFERENCES

- A. Standards of the following as referenced:
 - 1. American National Standards Institute (ANSI)
 - 2. Door and Hardware Institute (DHI)
 - 3. Factory Mutual (FM)
 - 4. National Fire Protection Association (NFPA)
 - 5. Underwriters' Laboratories, Inc. (UL)
 - 6. Warnock Hersey
- B. Regulatory standards of the following as referenced:
 - 1. Department of Justice, Office of the Attorney General, Americans with Disabilities Act, Public Law 101-336 (ADA).
 - 2. CABO/ANSI A117.1: Providing Accessibility and Usability for Physically Handicap People, 1992 edition.

1.03 SYSTEM DESCRIPTION

- A. Refer to applicable Headings for system description for electric hardware products.

1.04 SUBMITTALS

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 - i. Cross reference numbers used within schedule deviating from those specified.
 - 1) Column 1: State specified item and manufacturer.
 - 2) Column 2: State prior approved substituted item and its manufacturer.
 - 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 - 3. Keying Schedule: Have three meetings with the customer and the UNC Charlotte Key Shop to design and finalize the Keying schedule; an initial meeting to explain the keying requirements and expectations, a second meeting to receive the customer's keying first draft and if required a third meeting to finalize the keying structure. Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled in the electronic format specified. The format will be provided to the designer electronically.
- D. Templates for doors, frames, and other work specified to be factory prepared for the installation of 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.
- E. Contract closeout submittals:
 - 1. Operation and maintenance data: Complete information for installed door hardware.
 - 2. Warranty: Completed and executed warranty forms.

1.05 QUALITY ASSURANCE

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, exit devices, closers, etc.) from a single manufacturer.
 - 1. Refer to the characteristics section for each product. Manufacturers will be considered provided they meet all the performance criteria listed therein.
- B. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.06 QUALITY CRITERIA

- A. Supplier Qualifications:
 - 1. It is recommended that the finish hardware supplier be a factory authorized distributor with office and warehouse facilities within a 50 mile radius of Mecklenburg County, North Carolina.
 - 2. The finish hardware supplier shall have a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
 - 3. The finish hardware supplier shall employ an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the work, for consultation.
- B. The contractor must schedule a pre-installation conference with the hardware manufacturer's representative(s), a representative of the county planning and/or maintenance department, the contractor's installer and a representative of the hardware supplier to demonstrate product installation and adjustment in accordance with manufacturer's recommendations and Owner's requirements.
- C. The contractor must schedule a pre-construction coordination meeting with Owner's system integrator and electrical contractor for final card access system requirements and all low voltage hardware connection of power supplies, card readers, EL exit devices, electric strikes, power transfers and controllers.
- D. The Contractor must contact the hardware manufacturers' representative to schedule an inspection of the hardware installation to confirm that all products are installed and adjusted according to manufacturer's recommendations. A certificate of compliance shall be submitted with the project closeout documents.

NOTE: Failure to schedule and perform required meetings shall not be cause for additional costs to the Owner.

1.07 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hard-

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

ware installer until each is satisfied that count is correct.

- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.08 WARRANTY

- A. Special warranties:
 - 1. Door Closers: Ten year period
 - 2. Exit Devices: Three year period
 - 3. Locks and Cylinders: Three year period
(Manufacturer's whose standard warranty does not equal, or exceed the requirements listed above must provide a letter for each project stating that they will extend their warranty to comply with the requirements of the specification.)

1.09 MAINTENANCE

- 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. Warranty start and end date.

1.10 KEY SYSTEMS

- A. All access control systems to include panic buttons and licensing. Camera system to include licensing and storage and be included as part of the project.

PART 2 - PRODUCTS

2.01 MANUFACTURED UNITS

- A. Hinges:
 - 1. Manufacturer:
 - a. Ives
 - b. Stanley
 - c. Hager
 - d. McKinney
 - 2. Characteristics:
 - a. Templates: Provide only template-produced units.
 - b. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1) For metal doors and frames install machine screws into drilled and tapped holes.
 - 2) For wood doors and frames install threaded-to-the-head wood screws.
 - 3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
 - 4) Finish screw heads to match surface of hinges or pivots.
 - c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1) Interior Doors: Non-rising pins.

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- 2) Tips: Flat button and matching plug. Finished to match leafs.
 - d. Size: Where hinges are specified, unless otherwise noted, they shall be of the types and sizes as follows:
 - 1) EXTERIOR DOORS:
 - a) Use continuous hinges at all exterior doors.
 - 2) INTERIOR DOORS:
 - a) 1-3/4" thick - up to 3'0", 5BB1 -26D, 4-1/2"
 - b) 1-3/4" thick - over 3'0" wide, 5BB1HW -26D, 5"
 - 3) The width of hinges shall be sufficient to clear all trim.
 - e. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one additional hinge for each additional 2-1/2 feet or fraction thereof.
- B. Continuous Hinges:
- 1. Acceptable manufacturers:
 - a. Ives*
 - b. Select Products
 - c. Markar
 - 2. Characteristics
 - a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish or factory painted finish, as scheduled.
 - b. All hinges to be manufactured to template. Uncut hinges to be non-handed and to be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
 - c. Vertical door loads to be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves to be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180 degrees.
 - d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners to be steel, self-drilling, self-tapping 12-24 x 3/4" screws.
- C. Keying and Key Control:
- 1. Manufacturer:
 - a. Schlage Lock Company
 - 2. Characteristics:
 - a. All building key systems shall conform to the Campus Keying structure.
 - 1) Schlage Everest D for Interior Keys
 - 2) Schlage Everest D for Campus Mechanical Keys
 - 3) Schlage Primus C for Campus Entry Keys
 - b. All keys shall be Blank Bow both sides
 - c. Supply 1 change key for each key symbol used
 - d. Provide no keys with the cylinders
 - e. Provide keyblanks to equal 3 blanks per cylinder
- D. Mortise Locksets (Exterior, Non-Storefront, as scheduled):
- 1. Characteristics:
 - a. Chassis: Cold-rolled steel, handing field-changeable without disassembly.
 - b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.
 - c. Lever Trim: Through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: Independent break-away.
 - d. Thumbturns: Accessible design not requiring pinching or twisting motions to operate.
 - e. Deadbolts: Stainless steel 1-inch throw.
 - f. Electric operation: Manufacturer-installed continuous duty solenoid.
 - g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - H. **SCHEDULED LOCK SERIES AND DESIGN: SCHLAGE L SERIES, 06A DESIGN.**
 - i. Certifications:
 - 1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

2) ANSI/ASTM F476-84 Grade 30 UL Listed.

E. Extra Heavy Duty Cylindrical Locks and Latches (Interior): as scheduled, fastened with through-bolts, shall be used on all interior doors.

1. Characteristics:

- a. All lock functions shall incorporate a Vandalguard function where the outside is disengaged when in the locked mode. Vandalguard locks shall carry a 7 Year Warranty.
- b. All locks shall be prepared to accept 6-pin Large Format Interchangeable Cores (LFIC).
- c. Chassis: Cylindrical design, corrosion-resistant plated cold-rolled steel.
- d. Locking Spindle: Stainless steel, interlocking design.
- e. Latch Retractors: Forged steel. Balance of inner parts: Corrosion-resistant plated steel, or stainless steel.
- f. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
- g. All lock functions: 7 year warranty, Vandalguard function outside lever is disengaged when in the locked mode.
- h. Rosettes: Minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.
- i. Springs: Full compression type.
- j. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
- k. **Lock Series and Design: Schlage ND series. Rhodes design.**
- l. Certifications:
 - 1) ANSI A156.2, 1994, Series 4000, Grade 1. Tested to exceed 3,000,000 cycles.
 - 2) UL listed for A label single doors up to 4 ft x 8 ft.

F. Exit Devices:

1. **MANUFACTURER: VON DUPRIN. 98/99 SERIES – OWNER PREFERRED**
2. Electronic access points shall be Von Duprin QEL98/99 electric panic hardware operated by Owner's existing electronic access control system.
 - a. EL devices shall use a 16 amp solenoid to activate a mechanical linkage to retract the latch.
 - b. Power supplies shall be Von Duprin PS900 Series.
3. Conduit and necessary wiring shall be provided under Section 01600. See Owner's standard detail in Electrical 01600.
4. Characteristics:
 - a. All exit devices shall be of one manufacturer.
 - b. All exit devices shall have US32D touchpads. All finished parts that are not US32D shall be US26D, to the standard architectural finishes. No painted finish shall be allowed.
 - c. All exit devices shall be flush mounted. Provide manufacturer's standard shim kit to accommodate moulding for glass and vision lites. Exit devices that are not flush mounted must provide a filler bar on those doors where conflict with moulding for glass vision lites is not an issue.
 - d. Exit devices shall be attached with sex nuts and bolts on all doors. Finish on all exposed fasteners shall match devices.
 - e. On exterior pairs of doors, provide keyed removable mullions. Refer to the drawings and door schedule for locations of keyed movable mullions.
 - f. Lever handle operating trim for exit devices shall be of heavy duty construction, incorporating cast or heavy solid forged escutcheons and levers. Where listed in the hardware sets, provide "breakaway" lever incorporating an internal clutch mechanism allowing the lever to break away and drop into a "down" position when more

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

than 35 pounds of torque are applied. Lever shall be easily reset to its operating position by a simple uplift motion.

- g. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
- h. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer's requirements. (OWNER PREFERS EXIT DEVICES TO BE THRU- BOLTED, EVEN ON NON-RATED DOORS.)
- i. All trim shall be thru-bolted to the lock stile case. Lever design to match locksets.
- j. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, plated or powder coated to the standard architectural finishes to match the balance of the door hardware. Painted finishes are not accepted.
- k. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.
- l. Dogging mechanism shall be "hook and eye" type. No plastic dogging cams or friction type dogging mechanism shall be allowed.
- m. Equip rim exit devices with a roller strike.
- n. All exit devices shall be non-handed.
- o. Touchpad shall extend a minimum of 1/2 of the door width. Touchpad height shall exceed height of mechanism case or rail assembly to eliminate pinch points. If touchpad height does not exceed height of mechanism case/rail assembly provide factory installed insert/filler on top and bottom of touchpad along mechanism case/rail assembly to prevent pinch point. Plastic touchpads are not acceptable.
- p. All latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable.
- q. Provide removable mullions controlled by a key cylinder under the masterkey system.
- r. At specific locations, such as the Media Center, Auditorium, Administrative areas, etc. equip exit devices with a fluid dampening device to reduce noise associated with the operation of the exit device.
- s. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap shall be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

G. Closers and Door Control Devices:

- 1. Manufacturer: LCN, 4040XP Series X Non-Metal Cover
- 2. Characteristics:
 - a. Door closers shall be overhead type and have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
 - b. Closers utilizing pressure relief valves (PRV) are not acceptable.
 - c. ALL CLOSERS TO BE ATTACHED USING HEX NUTS AND BOLTS ONLY.
 - d. All fire rated doors shall have closers. Closers shall not be installed on classroom doors unless required by Fire Marshal's office.
 - e. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F (49 degrees C) to -30 degrees F (-35 degrees C).
 - f. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check. Closers shall be sized in accordance with manufacturer's recommendation.
 - g. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and, where specified, shall have a cast-in solid stop on the closer shoe ("cush"). Where door travel on out-swing doors must be limited, use "cush" type closers. Auxiliary stops are not required when "cush" type closers are used. Tri-

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

Pack arm assemblies are not acceptable. At exterior doors, EDA arms with Ives FS18S floor stop is preferred. Provide SCUSH arms where door does not swing to a wall or where a floor stop may create a tripping hazard.

- h. All closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
 - i. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped. Provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
 - j. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
 - k. Provide powder coated finish, certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification. Lacquer or painted finish on metal components is not acceptable.
 - l. Where indicated provide power for future ADA operators. Basis of design is LCN Senior Swing 9500 Series. Actuators are to be wired or wireless depending on the situation, with wireless being the fall back when wired is not possible.
- H. Overhead Door Holders:
- 1. Manufacturer: Glynn Johnson
 - 2. Characteristics:
 - a. Provide heavy duty door holders of stainless steel.
 - b. Holder to be installed with the jamb bracket mounted on the stop.
 - 3. Products by the following manufacturers will be considered, provided they meet all the characteristics listed above:
 - a. Rixson Firemark
- I. Floor Stops and Wall Bumpers:
- 1. Manufacturer: Ives
 - 2. Characteristics: Refer to Headings.
 - 3. Products by the following manufacturers will be considered, provided they meet all the characteristics listed above:
 - a. Trimco
 - b. Rockwood Manufacturing
 - 4. At exterior doors, Ives FS18S floor stops are preferred. Provide LCN SCUSH closers where door does not swing to wall or where a floor stop may create a tripping hazard.
- J. Push Plates:
- 1. Manufacturer: Ives
 - 2. Characteristics:
 - a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
 - b. Material to be stainless steel, per the hardware headings.
 - c. Provide plate size as shown in hardware headings.
 - 3. Products by the following manufacturers will be considered, provided they meet all the characteristics listed above:
 - a. Trimco
 - b. Rockwood Manufacturing
- K. Door Pulls & Pull Plates:
- 1. Manufacturer: Ives
 - 2. Characteristics:
 - a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- single units.
- b. Material to be forged stainless steel.
- c. Provide units sized as shown in hardware headings.
- 3. Products by the following manufacturers will be considered, provided they meet all the characteristics listed above:
 - a. Trimco
 - b. Rockwood Manufacturing

- L. Protective Plates:
 - 1. Manufacturer: Ives
 - 2. Characteristics:
 - a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
 - b. Materials:
 - 1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
 - c. Fabricate protection plates not more than 1-1/2 inches less than door width on push side and not more than 1/2 inch less than door width on pull side. Bevel all edges.
 - d. Heights:
 - 1) Kick plates to be 8 inches in height.
 - 2) Mop plates to be 8 inches in height.
 - 3) Armor plates to be 30 inches in height.
 - 3. Products by the following manufacturers will be considered, provided they meet all the characteristics listed above:
 - a. Trimco
 - b. Rockwood Manufacturing

- M. Thresholds:
 - 1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Pemko Manufacturing Company
 - c. Zero Weatherstripping Co., Inc.
 - 2. Types: Indicated in hardware headings, and shown in sill details.

- N. Weatherstripping:
 - 1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Pemko Manufacturing Company
 - c. Zero Weatherstripping Co., Inc.
 - 2. Types: Silicone rubber seals as indicated in hardware headings.

- O. Silencers:
 - 1. Acceptable manufacturers:
 - a. Hager
 - b. Ives
 - c. Rockwood Manufacturing*
 - 2. Three for each single doors; four for pairs of doors.

- P. Magnetic Door Holders:
 - 1. Acceptable manufacturers:
 - a. LCN*
 - b. Rixson-Firemark
 - c. Edwards
 - 2. Wall mounted 24vdc units with finish to match door hardware

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- Q. Key Cabinet and System:
1. Acceptable manufacturers:
 - a. Key Systems Inc. (32 Key Minimum)
 - b. GFMS Keybox – card access
 - c. Alladin
 2. Key cabinet shall be delivered directly to the Owner's representative.
 3. Need Power and Ethernet to the cabinet
 4. Add security camera, opposite cabinet with Ethernet connection.
- R. 49er Card Systems
1. Please see 03 – Annex K – 49er Card Systems, see Residence Halls.

2.02 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use 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 acceptable to Architect.
1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
 3. USE THRU-BOLTS FOR INSTALLATION OF ALL EXIT DEVICES, CLOSERS AND SURFACE-MOUNTED OVERHEAD STOPS. COORDINATE WITH ALUMINUM DOORS AND FRAMES, WOOD DOORS AND HOLLOW METAL DOORS AND FRAMES. WHERE THRU-BOLTS ARE USED, PROVIDE SLEEVES FOR EACH THRU-BOLT AS A MEANS OF REINFORCING THE WORK OR USE SEX NUTS AND BOLTS.

2.03 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by cer-

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

tain man- ufacturers for their products.

1. Hinges (Interior wood doors): 652 (US26D) Satin Chrome Plated Steel
2. Hinges (Interior metal doors): 600 (USP)
3. Continuous Hinges (Exterior): 628 (US28) Clear Anodized Aluminum
4. Locks, Mortise: 630 (US32D) Satin Stainless Steel
5. Locks, Cylindrical : 626 (US26D) Satin Chrome
6. Exit Devices: 626 (US26D), 630 (US32D), 628 (US28)
7. Door Closers: 689 (Powder Coated)
8. Push Plates: 630 (US32D) Satin Stainless Steel
9. Pull Plates: 630 (US32D) Satin Stainless Steel
10. Protective Plates: 630 (US32D) Satin Stainless Steel
11. Door Stops: 630 (US32D) Satin Stainless Steel or 626 Satin Chrome Plated Brass/Bronze
12. Overhead Holders: 630 (US32D) Satin Stainless Steel
13. Thresholds: 627 (US27) Mill Finish Aluminum
14. Weatherstrip: 628 (US28) Clear Anodized Aluminum

2.4 SLIDING DOOR HARDWARE

Automatic Sliding Doors: Automatic sliding doors are not acceptable unless specifically requested by the University Project Manager.

2.5 OPERATORS

- A. All visible materials shall match the existing storefront finish.
- B. All materials shall be new and shall be manufactured for the intended use. No manufacturer's or installer's logos or other decals or signs will be attached to the storefront without authorization of the Owner.
- C. All materials installed by the Contractor shall be new and UL Approved. All materials shall meet N.C. State Building Codes, and should there be any discrepancies between design and code, the more stringent requirement shall apply.
- D. The operating device installed shall allow for manual operation for persons entering the building who do not use the activating button(s). Such manual operation shall be possible without noticeable additional force by the user (compared to the force necessary prior to the installation).
 1. Pneumatic Door Openers:
 - a. Control Boxes shall contain the system air pump, valve(s) and electronics. Each circuit shall control one automatic equalizer operator.
 - b. Operators shall be pneumatically powered for the automatic equalizer system. The unit shall contain a built-in over speed control to prevent excessive speeds as the result of improper field adjustments. The operator shall slowly open the door, hold it at 90°, and then apply full spring power to close the door. The operators shall meet ADA requirements, ANSI Standards A159.19 and A117.1, **and have been tested to over one and a half million operating cycles.**
 - c. The door controlling devices shall be constructed with two integral operating chambers, a pneumatic cylinder actuator and a hydraulic door closer cylinder. The actuator shall be two piston tandem constructions. Cylinders shall be of high strength cast iron construction, be fully hydraulic, and shall have rack and pinion action. The shaft diameter shall be a minimum of 11/16 of an inch (17 mm). Closers shall utilize full complement bearings on the pinion shaft, and pistons shall be hardened.
 2. Electro-Magnetic Operators:
 - a. Wall mounted card reader shall be BLACKBOARD 4200 Series for exterior entry and exit.2.4
 - b. Control Boxes shall contain the transformer, relays, rectifiers and other elec-

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

- tronic components. Each circuit shall control one automatic operator.
- c. Operators shall be electro-mechanically powered for the automatic swing door system. The unit shall contain a built-in over speed control to prevent excessive speeds as the result of improper field adjustments. The operator shall slowly open the door, hold it at 90°, and then apply full spring power to close the door. The operators shall meet ADA requirements, ANSI Standards A159.19 and A117.1, and have been tested to over one million operating cycles.
 - d. The door controlling devices shall be completely assembled and sealed unit which shall include helical gear-driven transmission, overriding clutch, (to provide easy manual operation, spring-close) mechanical spring and bearings, all located in cast aluminum housing and filled with special lubricant including necessary transformer, cant for extreme temperature conditions. Attached to transmission system shall be a DC shunt-would permanent magnet motor with sealed ball bearings. Motor shall operate from 115-volt supply and require less than 5 amps at full power stall. Complete unit shall be resilient mounted with provisions for easy replacement, without removing door from pivots or frame.
 - e. Mounting height for card readers shall be 36" AFF.
 - f. Mounting height for automatic door openers shall be 36" AFF and 24" away from an inside corner. Opening of door shall not require operator to back up as door opens. Doors at vestibule locations shall be coordinated as to means of operation.

2.6 MISCELLANEOUS

- A. At all new doors, Contractor shall install ½" diameter rubber silencers, (minimum 3 per door) Glynn Johnson #64 or equal. Products of equal design, finish, and functions as manufactured by Baldwin, Ives, Rockwood, Quality, or Trimco will be considered equal.
- B. All exterior screws and fasteners shall be Stainless Steel, preferably with "Phillips" heads.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 - a. On doors with glass lite kits, coordinate the mounting height of the exit devices so that the devices are not visible through the glass on the pull side of the door.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

to the extent installation requirements are not otherwise indicated.

3.02 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- B. Clean adjacent surfaces soiled by hardware installation.

- C. Door Hardware Supplier's Field Service
 - 1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
 - 2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
 - 3. File written report of this inspection to Architect.

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

3.03 HARDWARE SCHEDULE

A. HW SET:
DOOR NUMBER:
TYPICAL HOLLOW METAL DOOR EXTERIOR ENTRY PAIR – PREPPED FOR FUTURE
ADA OPERATOR
EACH TO HAVE:

1	CONTINUOUS HINGE	224HD	IVE
1	CONTINUOUS HINGE	224HD CUT FOR EPT	IVE
1	POWER TRANSFER	EPT-10	VON
1	MULLION	KR4954	VON
1	EXIT DEVICE	99DT	VON
1	EXIT DEVICE	HD-EL99NL	VON
1	MORTISE CYLINDER	80-132	SCH
1	RIM CYLINDER	80-159	SCH
2	CYLINDER CORES	80-037	SCH
1	CARD READER	BY SYSTEMS INTEGRATOR	
1	POWER SUPPLY	PS914-2RS-BB	VON
2	DOOR POSITION SWITCHES	679-05 HM	SCE
2	SURFACE CLOSERS	4041 EDA MC	LCN
2	KICK PLATES	8400	IVE
2	FLOOR STOP	FS18S	IVE
1	THRESHOLD	425	NGP
1	SET SEALS	5050B	NGP
2	DOOR SWEEPS	C627A	NGP
1	MULLION SEAL	5100S	NGP
1	DRIP CAP	16A	NGP

COORDINATE SECURITY HARDWARE WITH SECURITY AND ELECTRICAL SYSTEM
WIRING FOR ALL ELECTRIC SECURITY ITEMS TO BE IN CONDUIT OR FLEX FROM
FRAME CONNECTION TO ABOVE DROPPED CEILING.
PREP HEAD OF FRAME FOR 120VAC FOR FUTURE ADA OPERATOR.

B. HW SET:
DOOR NUMBER:
TYPICAL ALUMINUM DOOR EXTERIOR ENTRY PAIR
EACH TO HAVE:

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

1	CONTINUOUS HINGE	112HD	IVE	
1	CONTINUOUS HINGE	112HD CUT FOR EPT	IVE	
1	POWER TRANSFER	EPT-10	VON	
1	MULLION	KR4954	VON	
1	EXIT DEVICE	99DT	VON	
1	EXIT DEVICE	HD-EL99NL	VON	
1	MORTISE CYLINDER	80-132 (FOR KR)	SCH	
1	RIM CYLINDER	80-159	SCH	
2	CYLINDER CORES	80-037	SCH	
1	CARD READER	BY SYSTEMS INTEGRATOR		
1	POWER SUPPLY	PS914-2RS-BB	VON	
2	DOOR POSITION SWITCHES		679-05	SCE
2	SURFACE CLOSERS	4041 EDA MC X 30/61	LCN	
2	FLOOR STOP	FS18S	IVE	
1	THRESHOLD	425	NGP	
1	SET SEALS	BY DOOR MANUFACTURER		
2	DOOR SWEEPS	BY DOOR MANUFACTURER		
1	MULLION SEAL	BY DOOR MANUFACTURER		
1	DRIP CAP	16A	NGP	

COORDINATE SECURITY HARDWARE WITH SECURITY AND ELECTRICAL SYSTEM WIRING FOR ALL ELECTRIC SECURITY ITEMS TO BE IN CONDUIT OR FLEX FROM FRAME CONNECTION TO ABOVE DROPPED CEILING

- C. HW SET:
DOOR NUMBER:
TYPICAL ALUMINUM DOOR EXTERIOR ENTRY PAIR – PREPPED FOR FUTURE ADA OPERATOR
EACH TO HAVE:

1	CONTINUOUS HINGE	112HD	IVE	
1	CONTINUOUS HINGE	112HD CUT FOR EPT	IVE	
1	POWER TRANSFER	EPT-10	VON	
1	MULLION	KR4954	VON	
1	EXIT DEVICE	99DT	VON	
1	EXIT DEVICE	HD-EL99NL	VON	
1	MORTISE CYLINDER	80-132 (FOR KR)	SCH	
1	RIM CYLINDER	80-159	SCH	
2	CYLINDER CORES	80-037	SCH	
1	CARD READER	BY SYSTEMS INTEGRATOR		
1	POWER SUPPLY	PS914-2RS-BB	VON	
2	DOOR POSITION SWITCHES		679-05	SCE
2	SURFACE CLOSERS	4041 EDA MC X 30/61	LCN	
2	FLOOR STOP	FS18S	IVE	
1	THRESHOLD	425	NGP	
1	SET SEALS	BY DOOR MANUFACTURER		
2	DOOR SWEEPS	BY DOOR MANUFACTURER		
1	MULLION SEAL	BY DOOR MANUFACTURER		
1	DRIP CAP	16A	NGP	

COORDINATE SECURITY HARDWARE WITH SECURITY AND ELECTRICAL SYSTEM

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

WIRING FOR ALL ELECTRIC SECURITY ITEMS TO BE IN CONDUIT OR FLEX FROM FRAME
CONNECTION TO ABOVE DROPPED CEILING
PREP HEAD OF FRAME FOR 120VAC FOR FUTURE ADA OPERATOR.

- D. HW SET:
DOOR NUMBER:
TYPICAL CLASSROOM
EACH TO HAVE:
- | | | | |
|---|----------------|----------|-----|
| 3 | HINGES | 5BB1 | IVE |
| 1 | CLASSROOM LOCK | ND95HD | SCH |
| 2 | CYLINDER CORE | 80-037 | SCH |
| 1 | WALL STOP | WS407CCV | IVE |
| 1 | SET SEALS | 5050B | NGP |
- E. HW SET:
DOOR
NUMBER:
TYPICAL
OFFICE EACH
TO HAVE:
- | | | | |
|---|---------------|----------|-----|
| 3 | HINGES | 5BB1 | IVE |
| 1 | OFFICE LOCK | ND92HD | SCH |
| 1 | CYLINDER CORE | 80-037 | SCH |
| 1 | WALL STOP | WS407CCV | IVE |
| 1 | COAT HOOK | 571MB26D | IVE |
- F. HW SET:
DOOR NUMBER:
TYPICAL SINGLE TOILET
EACH TO HAVE:
- | | | | |
|---|-------------|----------|-----|
| 3 | HINGES | 5BB1 | IVE |
| 1 | PRIVACY SET | ND40 | SCH |
| 1 | WALL STOP | WS407CCV | IVE |
| 1 | SET SEALS | 5050B | NGP |
| 1 | COAT HOOK | 571MB26D | IVE |

University of North Carolina at Charlotte Design Standards and Guidelines
Appendix – Door Hardware

G. HW SET:

DOOR NUMBER:

TYPICAL CROSS CORRIDOR PAIR OF DOORS ON MAGNETIC HOLD OPEN

EACH TO HAVE:

6	HINGES	5BB1HW	IVE
2	EXIT DEVICES	9927 L LBR	VON
2	RIM CYLINDER	80-159	SCH
2	CYLINDER CORE	80-037	SCH
2	SURFACE CLOSERS	4041 EDA MC	LCN
2	KICK PLATES	8400	IVE
2	MAGNETIC HOLD-OPENS	SEM 7850	LCN
1	SET SEALS	5050B	NGP

MAGNETIC HOLD-OPEN TO BE WIRED TO FIRE ALARM SYSTEM BY ELECTRICAL SECTION

H. HW SET:

1	KEY CABINET	TCA-334-S	TEL
---	-------------	-----------	-----