

## c) Hardware Standards

### Introduction

This portion of the Facility Standards includes hardware requirements to be followed by the Consultant in the course of a project at the University of Chicago. The hardware components included consist of:

1. Hinges
2. Offset Pivots
3. Locksets
4. Cylinders
5. Exit devices
6. Closers
7. Flushbolts and Strikes, Wall and Floor Stops, Coordinators
8. Electric Strikes
9. Electronic Access-controlled Locksets
10. Electromagnetic Locks
11. Electromagnetic Doorholder/Releases
12. Overhead Stops
13. Thresholds
14. Other Hardware and Finishes

### 1. Hinges

- a. Hinges shall conform to ANSI A156.1 and have the number of knuckles as specified, oil-impregnated bearings as specified with NRP (non-removable pin) feature at reverse bevel interior doors or where specified and, at all exterior reverse bevel doors. Unless otherwise scheduled, supply one (1) hinge for every 30” of door height. Hinges shall be a minimum of 4 1/2” high and 4” wide; heavyweight hinges (.180) shall be supplied at all doors where specified.
  - 1) McKinney, Hager are the preferred manufacturers.
- b. Electric hinges shall be provided with Molex standardized plug connectors to accommodate up to twelve (12) wires. Plug connectors shall plug directly into Molex through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Provide a mortar guard for each electric hinge specified.
  - 1) McKinney is the preferred vendor.
- c. Monitoring switch hinges to be magnetic reed, concealed, adjustable switch type with extra heavy magnet.
  - 1) McKinney is the preferred manufacturer.

- d. Continuous geared door hinges are to meet the following design criteria:
- Continuous geared configuration, designed to distribute loads uniformly.
  - Identical operation in each leaf, designed to reduce door opening effort.
  - UL labeled for 3 hour fire classification.
  - Durability tested to ANSI/BHMA A156.26 Grade 1, 2, 3.
- 1) Pemko, Select, Rotan are the preferred manufacturers.
  - 2) Continuous geared hinges shall be full mortise type, extruded tempered aluminum, 6063-T6 alloy, with three interlocking extrusions in pinless assembly, installed to full height of frame.
  - 3) Hinges shall be available with the following hinge options: Safety, Short leaf flush, Short leaf inset, Standard, Safety short leaf inset, Center pivot.
  - 4) Hinges shall be available with the following electrical modifications: Thru wire, monitoring, preparation for electric power transfer or removable access panel for wire connections.
  - 5) All hinges shall be heavy duty: 27 bearings each leaf for 83 inch (2108 mm) hinge, minimum door weight 540 lb, with mortise fasteners: TEK, #12 × 3/4 inch, FHUC, Phillips head screws.
  - 6) Hinges shall carry a fire Label certification and comply with ASTM E2074, NFPA 1, UBC 7-2, BS 476, UL 10B, UL 10C, [90 minutes for wood doors] [3 hours for hollow metal doors].
  - 7) All hinges shall be tested according to ANSI/BHMA A156.26.
  - 8) Electrified hinges shall have the an option for a removable section (Serviceable) module for ease of installation and the ability to upgrade without purchasing a new hinge if electrification is added at a later date. They shall use 22 gauge polyurethane coated wire, be available with 4' and 10' wire leads to facilitate installation and hook-up.
  - 9) Field cutting of hinges shall not affect the fire rating.
  - 10) Warranty:
    - Aluminum hinges carry a life of the opening warranty
    - Electrified hinges carry a 5 year warranty
- e) Continuous pin & barrel stainless steel hinges are to meet the following criteria:
- Pin & barrel stainless steel full mortise continuous hinges shall be full height providing full door support up to a 48" door maximum width and /or 600 lbs.
  - Material to be 14 gauge stainless steel, .25 diameter stainless steel pin except medical bearing option with exterior barrel diameter of .438 (7/16").
  - Hinges to be manufactured with symmetrically templated hole pattern, non-handed, with each knuckle 2" including split nylon bearing at each separation for smooth self-lubricating operation.
- 1) Markar is the preferred manufacturer.

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## 2. Offset Pivots

- a) Offset pivots are to meet the following criteria:
- All pivots and pivot sets shall be of one manufacturer.
  - All heavy duty pivots shall have a minimum of 2 bearings internal to the bottom pivot. One shall be a thrust bearing and the other a needle bearing. Separate bearing surfaces shall be in the top pivot.
  - Lead-lined door units and high traffic pivots shall have additional thrust bearing.
  - Fire rated pivot (up to 3 hour) sets shall have steel top pivots. Fire rated doors require steel intermediate pivots.
  - Unless otherwise scheduled, at door equipped with offset pivot sets, supply one (1) intermediate pivot for every 30" of door height.
  - Electrified pivots shall be available with 4, 6, 8 or 12 wires to accommodate electrical requirements and shall include a Molex type connector.
  - Units shall be available in all standard architectural finishes
- 1) Rixson is the preferred manufacturer.

## 3. Locksets

- a) Mortise locksets are to meet the following criteria:
- Locks shall have all functions available in one size case, manufactured from heavy gauge steel, minimum thickness 3/32 inch, completely chrome plated for corrosion resistance and lubricity of parts. Cases shall be closed on all sides to protect internal parts.
  - Locks shall have adjustable, beveled and armored fronts, secured with spanner head security screws. Standard 2-3/4 inch backset convertible from one function to another, with a full 3/4 inch throw two-piece mechanical anti-friction latch bolt and a one piece stainless steel 1" throw dead bolt. Internal parts shall be heavy gauge steel, zinc dichromate-plated for corrosion resistance and nickel steel hubs. Locks shall be available for field reversible handing without opening the lock case.
  - Locksets to have cycle testing certified by an independent third party witness, exceeding 10,000,000 cycles.
- 1) Corbin Russwin is the preferred manufacturer.
- 2) All locksets with latch bolts, regardless of trim, shall be listed by UL for A label and lesser rated doors, 4'0" x 10'0" single door or 8'0" x 10'0" pairs of doors.
- 3) Locksets to be used on specified exterior doors or doors subject to special atmospheric conditions (roofs, pool areas, chemical laboratories, greenhouses, etc.) shall have non-ferrous cases and critical internal components.
- 4) Locksets provided for doors into stairwells, exits, electrical rooms, mechanical rooms, elevator pits or any other hazardous areas shall have knurled or tactile warning lever handles.

- 5) Lock trim shall have solid steel levers (hollow or filled levers are not acceptable) with minimum 2” diameter wrought roses, through bolted through the lock case to assure correct alignment and proper operation. Lock trim to be equal to Corbin Russwin NSA design.
- 6) Lockset functions shall be determined by the UC project coordinator according to the planned usage of the opening.
- 7) Locksets to have a 10-year limited mechanical warranty.
- 8) Provide curved lipped strikes for all mortise locksets.
- 9) Locksets shall be ordered “LC” (less cylinder). The University Lock shop will supply and install all lock cylinders.
- 10) Locksets to have the following available options:
  - Occupancy indicators
  - Lead wrapped cases
  - Ergonomic – ADA-approved thumbturn levers
  - Electrified locksets – 12v or 24v
  - Electric monitor options
  - Anti-microbial coating
- 11) Lock trim to be equal to Corbin Russwin NSA, NSM or NSN design.

#### 4. Cylinders

- a) Medeco High Security cylinders are required for all University installations. The University will supply construction cores and permanent cylinders, along with necessary keys. Locksets shall be specified to coordinate accordingly.
  - 2) The lock cylinders are to be of a high security, pick resistant design with angled key cuts, rotating tumblers, a keyway side biting, and a slider mechanism. Cylinders shall be Underwriters Laboratories Listed Standard--UL437--for key locks. Cylinders shall be certified under American National Standards Institute (ANSI)/Builder’s Hardware Manufacturer’s Association (BHMA) certification A156.30 2003 (High Security Cylinders Products), “Levels M1AAAM” and ANSI/BHMA A156.5 2001 (Certified Auxiliary Locks & Associated Products) “Grade 1.”
  - 3) The cylinders shall incorporate three locking elements, consisting of a slider mechanism, a sidebar mechanism with tumbler rotation, and pin tumbler elevation. The critical parts of the locking mechanism such as pins, shear line, sidebar, and slider mechanism shall be afforded extra protection from drilling and other forceful attack by the strategic placement of hardened steel inserts in at least 7 possible locations within the cylinder. The lock tumblers shall combine a dual-axis action, with one axis utilized for pin tumbler rotation and the other axis utilized for positioning key cuts. Randomly selected tumbler pins shall incorporate a hardened steel insert for additional drill protection.
  - 4) The locking system is to be furnished in a restricted key section for which keys are not made available from the manufacturer’s factory or any other source by normal distribution methods. The key and cylinder must have utility patent protection so as to ensure against unlawful key duplication. The keys and key blanks must be capable of being furnished to allow an upgrade to a dual mechanical and electronic credential

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by the single exchange of a field removable key bow. The key thickness should be no less than .125" (one hundred, twenty-five thousandths).

- 5) The manufacturer shall have the capability of establishing a key system with a minimum of six angle cuts in six possible pin positions with the capability of two distinct positions of cut per pin chamber, if required by the parameters of the system. The manufacturer shall have the capability of producing a patent-protected keying system in either of two distinct and different keying specifications and pinning specifications. The system shall be capable of incorporating a key which is capable of more than one bitting per position to expand master keying and key changes. The key shall also incorporate the capacity to include twelve possible side bittings along the key blade located on two different planes or surfaces of the key. The system shall also have the capability to provide a single master key with over 1,000,000 (1 million) usable, non-interchangeable change keys in a single keyway.
- 6) The cylinders shall be immediately rekeyable to new combinations or a new system at any time desired and shall be serviceable on location in the field. Installation of cylinders shall require no modification to U.S. manufactured commercial grade locksets.
- 7) The University will furnish the manufacturer a list of those persons and their signatures that will be authorized and required to order additional pinned materials or duplicate keys. Orders not bearing authorized signatures will not be filled.

## 5. Exit devices

- a) Exit devices are to have met or exceeded the following extended cycle testing in accordance with Underwriters Laboratory:
  - Rim devices- 54,000,000 cycles
  - Mortise devices-51,000,000 cycles
  - Surface vertical rod devices-16,000,000 cycles
  - Concealed vertical rod devices- 20,000,000 cycles
  - Rim devices with electric latch retraction- 13,000,000 cycles
- 1) Von Duprin is the preferred manufacturer.
- 2) Push-through touch pad design. No exposed touch bar fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
- 3) Minimum ¾" throw deadlocking latchbolts.
- 4) No exposed screws to show through glass doors.
- 5) Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
- 6) Releasable with 32 lb. maximum pressure under 250 lb. load to the door.
- 7) Heavy cast metal flush mounted end caps finished to match exit device.
- 8) Specific features:
  - Provide standard hex key dogging on non fire-rated exit devices, with cylinder dogging as an option if requested

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- Lever Trim: Breakaway type, forged brass or bronze escutcheon min .130” thickness, match lockset lever design.
  - Rod and latch guards with surface vertical rod devices.
  - Fire-Labeled Devices: UL label indicating “Fire Exit Hardware”. Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
  - Delayed Egress Devices: Function achieved within single exit device component, including latch, delayed locking device, request-to-exit switch, nuisance alarm, remote alarm, key switch, indicator lamp, relay, internal horn, door position input, external inhibit input plus fire alarm input. NFPA 101 “Special Locking Arrangement” compliant.
  - Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
  - Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key. Furnish storage brackets for securely stowing the mullion away from the door when removed.
  - Manufacturer to furnish one (1) parts maintenance kit per project.
  - Exit devices shall have a 5 year limited warranty.
- b) Power Supplies: Power supplies are to provide filtered, regulated power to operate electrical products including electrified exit devices. Output power is to be field-selectable for either 24VDC @ 2 ampere or 12VDC @ 4 ampere. Standard input is to be 120VAC @ 1.0 ampere. Steel enclosure shall incorporate key lock and have minimum quantity of five knockout holes for conduit connection. Terminal block to accept up to 14 gauge wire.
- c) Electrical Power Transfer Devices: Fully concealed when door is closed, power transfer device is to have two 18 gauge or ten 24 gauge wires as indicated by model scheduled.

## 6. Closers

- a) Specify single manufacturer for closer units throughout the project, including surface closers, high security closers, overhead concealed closers, floor closers, low-energy door operators and electromagnetic hold-open closers.
- 1) LCN is the preferred manufacturer.
- b) Surface closers are to meet the following criteria:
- 1) Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
  - 2) ISO 2000 certified. Units stamped with date-of-manufacture code.
  - 3) Independent lab-tested 10,000,000 cycles.
  - 4) Thru-bolts at wood doors unless doors are provided with closer blocking. Non-sized, and adjustable. Place closer inside building, stairs, and rooms.

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- 5) Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
  - 6) Maximum opening pressure: Exterior doors 8.5 lb., interior doors 5 lb., labeled fire doors 15 lb.
  - 7) Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
  - 8) Extra-duty arms (EDA) at all doors scheduled with parallel arm units.
  - 9) Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
  - 10) Exterior doors do not require seasonal adjustments in temperatures from 120 degrees F to –30 degrees F, furnish data on request.
  - 11) Non-flaming fluid will not fuel door or floor covering fires.
- c) Low-Energy Door Operators:
- 1) Where a “Low Energy Power Operated Door”, as defined by ANSI Standard A156.19, is indicated for doors required to be accessible to the disabled, provide electric powered operators complying with accessibility ~~ADA~~ requirements.
  - 2) Full closing force shall be provided when the power or assist cycle ends.
  - 3) Modular design, adjustments easily accessible from the front, UL listed for use on labeled doors.
  - 4) Operators shall have “Second Chance” function to accommodate momentary resistance, “Breakaway” function in the electronically controlled clutch, “Soft Start” motor control function and “Maintain Hold-Open Switch” to hold the door open at 90 degrees.
  - 5) Operators shall have built in 12V and 24V power supply for actuators, card readers, electric strikes and magnetic door locks, inputs for both swing and stop side sensors and available to accept either 120VAC or 220VAC input power. All wiring connections between operator modules made by easy-to-handle electrical connectors. Shall comply with both UL and NEC requirements for Class 1 and Class 2 wiring by providing separate conduits for each. Provide “fail-open” or standby power for accessible egress doors where required.
  - 6) Shall have seven independent electronic adjustments to tailor the operator for specific site conditions. Opening speed, holding force at 90 degrees, sequential trigger and time delay, hold-open time at 90 degrees, opening force, clutch “breakaway” force setting, electric strike trigger and time delay.
  - 7) Shall have separate and independent adjustments for back check, main speed and latch speed.
  - 8) Furnish actuators and other controls as specified in Hardware Sets.

## **7. Flushbolts and Strikes, Wall and Floor Stops, Coordinators**

- a) Automatic flush bolts shall be UL listed for use in pairs or as single top bolt with auxiliary latch for labeled pairs of wood or hollow metal doors. Top bolts are to have no internal spring, thus reducing reduced activation force.

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- 1) Rockwood, Ives are the preferred manufacturers.
- b) Constant latching flush bolts shall be UL listed for use in pairs or as single top bolt with auxiliary latch for labeled pairs of wood or hollow metal doors. Low actuation forces. Inactive door will re-latch automatically.
- c) Manual flush bolts shall be provided in pairs, be non-handed, fit standard ANSI metal door prep and be UL listed for use on doors with fire ratings up to 3 hours. Bolts shall have minimum 5/8" bolt throw with 7/8" vertical adjustment. Top bolt rod shall be provided in length to position activating lever not more than 80 inches above the finished floor.
- d) Dustproof strikes to be spring loaded plunger type, with locking ring for use with threshold, or mounting flange for installation where no threshold is present. Dustproof strikes shall be manufactured by the same manufacturer as flushbolts to assure proper fit. They shall have a removable faceplate for use with thresholds and be adjustable for varying flooring conditions.
- e) Wall stops shall be wrought stainless steel, concealed fastening, concave bumper that resists yellowing, cracking and aging, with fasteners to suit wall construction, back-plate should contact wall to prevent 'cookie-cutter' damage to substrate.
- f) Floor stops shall be solid cast brass with bumper that resists yellowing, cracking and aging, plastic or lead anchor options and available riser for varying floor conditions.
- g) Coordinators should be used with automatic flushbolts and non-handed. Stop mounted channel 1-5/8" x 5/8" steel tubing x length to suit door opening. Coordinator shall be UL listed. Furnish filler bars to fill gap between end of coordinator and inactive door frame. Furnish mounting brackets for all stop mounted hardware such as exit device strikes, door closer PA shoes, etc. Coordinators shall be prepared (cutout) at the factory for surface applied or concealed vertical rod panic devices if required

## **8. Electric strikes**

- a) All standard electric strikes shall be tamper resistant all stainless steel construction for corrosion resistance, strength and durability and be compatible with metal or wood applications.
  - 1) HES 1006 Series, Folger Adams 700 Series are preferred manufacturers.
  - 2) Strikes shall have been tested to withstand a forcing strength of a minimum 2400 lbs. before releasing and perform with a minimum of one million cycles of operation.
  - 3) Strikes shall be dual voltage, either 12VDC or 24VDC continuous duty, fail-secure unless otherwise specified.
  - 4) Strikes shall be non-handed with an internally mounted solenoid. Provide an in-line power controller with all electric strikes.
  - 5) 5 Year Limited Warranty.



- 6) Optional Features and Accessories:
- FAIL-SAFE
  - Latchbolt monitor (LBM)
  - Latchbolt Strike Monitor (LBSM)
  - 27 Interchangeable face plate options
  - Plug-in bridge rectifier
  - ElectroLynx adapter
  - Smart Pac III – power controller
- b) All surface mounted electric strikes shall be tamper resistant, all stainless steel construction for corrosion resistance, strength and durability and be compatible with metal or wood applications.
- 1) HES 9500 Fire-rated/9600 series is the preferred manufacturer.
  - 2) Strike shall have an internally mounted solenoid and two stainless steel independently operating locking mechanisms. All components to be completely encased within  $\frac{3}{4}$ " thick stainless steel housing – requiring no cutting to the jamb.
  - 3) Strikes shall have been tested to static strength of 1,500 lbs, and dynamic strength of 70 ft-lbs, and perform with a minimum of 500,000 cycles of operation.
  - 4) Strikes shall be field selectable to either 12VDC or 24VDC continuous duty, fail-safe or fail-secure operation.
  - 5) Strikes shall be non-handed, and be able to accommodate up to a  $\frac{3}{4}$ " Pullman latch. Provide an in-line power controller with all electric strikes.
  - 6) 5 Year Limited Warranty.
  - 7) Optional Features and Accessories:
    - a. Latchbolt monitor (LBM)
    - b. Plug-in bridge rectifier
    - c. ElectroLynx adapter
    - d. Smart Pac III – power controller

## 9. Electronic access-controlled locksets

- a) Wireless Electronic Mortise type Locksets are to meet the following criteria:
- 1) Mortise type lockset to have with 3-piece, beveled, stainless steel latchbolts with  $\frac{3}{4}$ " throw and equipped with an anti-friction latch. Chassis will accommodate ANSI standard mortise lock prep with a  $2\frac{3}{4}$ " nominal backset for  $1\frac{3}{4}$ " doors as a standard, with  $1\frac{3}{8}$ " to  $2\frac{3}{4}$ " thick doors in  $\frac{1}{8}$ " increments available. Locksets will be non-handed. Lockset to meet or exceed A156.25 and A156.13 Series 1000, Grade 1 Operational and Security.
  - 2) Lockset to meet UL10C, FCC Part15, ADA compliant, NFPA 101, NFPA 80, IBC-Ch10, Industry Canada RSS-210, Florida Building code ASTM E3300

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- 3) Wireless Transmission / Encryption: AES-128 bit Key minimum.
- 4) Lockset to be manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology.
- 5) Lockset to be modular in design, to have the ability to change credential reader without being removed from door.
- 6) Locking escutcheon, security lever trim and to be non-handed, operate independently of non-locking levers for extended life cycles. Handing to be field reversible.
- 7) Exterior lever to be designed with ability to rotate freely while door remains securely locked, preventing damage to internal lock components from vandalism by excessive force.
- 8) Lockset and Exit Device Trim to have the following standard status switches: Lock/Unlock Status (Clutch Position), Request-to-Exit Switch, Request to Enter Switch, Door Position Switch, Deadbolt Position, Interior Cover Tamper Guard.
- 9) Lockset to communicate Battery Status and Communication Status.
- 10) Furnish locks with following functions which will be field configurable without taking the lock off the door:
  - a. Classroom / Storeroom 70.
  - b. Apartment 60.
  - c. Office 50.
  - d. Privacy 40.
- 11) Lockset powered by a 12V or 24V DC power supply.
- 12) Should power be lost to device, Lockset to have the ability to be field configured to manage access control in one of the three field configurable methods below:
  - a. Fail locked (secured)
  - b. Fail unlocked (unsecured)
  - c. Fail As-Is
- 13) Should communication be lost between device and network, Lockset to have ability to manage access control offline in one of four field configurable methods below:
  - a. Fail locked (secured)
  - b. Fail unlocked (unsecured)
  - c. Fail As-Is
  - d. Fail to Degraded/cache mode utilizing cache memory with following selectable options:
    - Grant access up to the last 1,000 unique previously accepted User IDs
    - Grant access up to the last 1,000 unique previously accepted Facility/Site codes
  - e. Knurling option to provide tactile feedback to be available.
- 14) Lockset and Exit Trim system interface to be:
  - a. Wiegand or Clock & Data via PIM400 (Panel Interface Module).
  - b. Directly via RS485.
- 15) Lockset to have real-time communication with access control system, such that all events at Lockset are communicated real-time to network control software.
- 16) Lockset and Exit Device Trim utilized with 3rd Party software to have capability to be remotely locked down real-time, within 10 seconds or less, without user interface at the device.

- 17) Lockset and Exit Device Trim utilized with 3rd Party software to have capability to be remotely unlocked real-time without user interface at the device.
  - 18) Lockset to have visual tri-colored LED to indicate operational systems status, system error conditions and low power conditions.
  - 19) Lockset to have audible feedback that can be enabled or disabled.
  - 20) Credential reader capabilities for SMS Select/Premier/Enterprise Software or 3rd Party Partner integrated software may include and may not be limited to:
    - a. 13.56 MHz Smart card credentials:
      - Secure section (Multi-Technology and Smartcard): Schlage, XceedID ISO-X, MIFARE, ISO-X Lite, my-d, DESFire 8-EV1.
      - 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESfire, iClass, Inside Pictotag, ST Micro, TI Tagit.
    - b. Multi-Technology readers that read both 13.56 MHz Smart Cards + 125 kHz Prox cards.
    - c. Dual credential reading capabilities credential card/fob + pin.
    - d. 12 button keypad with backlit buttons.
  - 21) The lock and exit device trim will have the ability to utilize multiple manufacturer's key systems in the lever including:
    - a. Full Size cylinders for Medeco 6-pin cylinders.
    - b. Full Size Interchangeable Cores for Medeco 6 pin cylinders.
  - 22) Provide option for tamper torx screws on inside escutcheon for Higher Security.
  - 23) Acceptable Manufacturers: Schlage Electronics AD-400-MS/MD Series
- b) Wireless Electronic Access Controlled Exit Device Trim:
- 1) Exterior lever to be designed with ability to rotate freely while door remains securely locked, preventing damage to internal lock components from vandalism by excessive force.
  - 2) Modulation to be 900 MHz spread spectrum, direct sequence, 10 channels.
  - 3) Transmission / Encryption: AES-128 bit Key minimum.
  - 4) Exit device trim to have Wake-Up on radio feature which enables implementation of wireless locks in applications where centralized lockdown or unlock is required. This is to enable real-time activation at a remote battery-powered wireless lock.
  - 5) Exit device trim to retract the Von Duprin latch bolt of following exit device applications: rim, surface vertical rod, concealed vertical rod and mortise.
  - 6) Exit devices to be equipped with low current request to exit switch.
  - 7) Exit Device Trim to meet UL10C, FCC Part15, ADA compliant, NFPA 101, NFPA 80, IBC-Ch10, Industry Canada RSS-210, Florida Building code ASTM E3300
  - 8) Exit Device Trim to be manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology.
  - 9) Exit Device Trim to be modular in design, to have the ability to change credential reader in the field.
  - 10) Locking escutcheon, security lever trim and to be non-handed, operate independently of non-locking levers for extended life cycles. Handing to be field reversible.

- 11) Exterior lever to be designed with ability to rotate freely while door remains securely locked, preventing damage to internal lock components from vandalism by excessive force.
- 12) Exit Device Trim to have the following standard status switches: Lock/Unlock Status (Clutch Position), Request-to-Exit Switch, Request to Enter Switch, Door Position Switch, Interior Cover Tamper Guard.
- 13) Exit Device Trim to communicate Battery Status and Communication Status.
- 14) Furnish locks with following functions which will be field configurable without taking the lock off the door:
  - a. Classroom / Storeroom 70.
  - b. Apartment 60.
  - c. Office 50.
  - d. Privacy 40.
  - e. Knurling option to provide tactile feedback to be available.
- 15) Exit Device Trim powered by a 12V or 24V DC power supply.
- 16) Should power be lost to device, Exit Device Trim to have the ability to be field configured to manage access control in one of the three field configurable methods below:
  - a. Fail locked (secured)
  - b. Fail unlocked (unsecured)
  - c. Fail As-Is
- 17) Should communication be lost between device and network, Exit Device Trim to have ability to manage access control offline in one of four field configurable methods below:
  - a. Fail locked (secured)
  - b. Fail unlocked (unsecured)
  - c. Fail As-Is
  - d. Fail to Degraded/cache mode utilizing cache memory with following selectable options:
    - Grant access up to the last 1,000 unique previously accepted User IDs
    - Grant access up to the last 1,000 unique previously accepted Facility/Site codes
- 18) Lockset and Exit Trim system interface to be:
  - a. Wiegand or Clock & Data via PIM400 (Panel Interface Module).
  - b. Directly via RS485.
- 19) Exit Device Trim to have real-time communication with access control system, such that all events at Exit Device Trim are communicated real-time to network control software.
- 20) Exit Device Trim utilized with brightblue software or 3rd Party software to have capability to be remotely locked down real-time, within 10 seconds or less, without user interface at the device.
- 21) Exit Device Trim utilized with 3rd Party software to have capability to be remotely unlocked real-time without user interface at the device.
- 22) Exit Device Trim to have visual tri-colored LED to indicate operational systems status, system error conditions and low power conditions.
- 23) Exit Device Trim to have audible feedback that can be enabled or disabled.

- 24) Credential reader capabilities for SMS Select/Premier/Enterprise Software or 3rd Party Partner integrated software may include and may not be limited to:
    - a. 13.56 MHz Smart card credentials:
      - Secure section (Multi-Technology and Smartcard): Schlage, XceedID ISO-X, MIFARE, ISO-X Lite, my-d, DESFire 8-EV1.
      - 13.56 MHz Serial number only (Multi-Technology and Smartcard): MIFARE, DESfire, iClass, Inside Pictotag, ST Micro, TI Tagit.
    - b. Multi-Technology readers that read both 13.56 MHz Smart Cards + 125 kHz Prox cards.
    - c. Dual credential reading capabilities credential card/fob + pin.
    - d. 12 button keypad with backlit buttons.
  - 25) The lock and exit device trim will have the ability to utilize multiple manufacturer's key systems in the lever including:
    - a. Full Size cylinders for Medeco 6-pin cylinders
    - b. Full Size Interchangeable Cores for Medeco 6 pin cylinders
  - 26) Provide option for tamper torx screws on inside escutcheon for Higher Security.
  - 27) Acceptable Manufacturers: Schlage Electronics AD-400-993 Series Exit Device Trim
- c) Panel Interface Module:
- 1) Used for communication of wireless lockset or exit device trim to the access control panel.
  - 2) To have the following certifications: NEMA1, 4, 4X, 6; 294, FCC Part 15; RoHS.
  - 3) Modulation to be 900 MHz spread spectrum, direct sequence, 10 channels.
  - 4) Wireless Transmission / Encryption: AES-128 bit Key minimum.
  - 5) Power supply required 12VDC or 24VDC.
  - 6) Acceptable Manufacturer: Schlage Electronics PIM400 Panel Interface Module.
- d) Hand Held Programming Device:
- 1) Capable of initializing lock and accessories using preloaded Schlage Utility Software.
  - 2) Used to field configure devices:
    - a. Credential Reader Formats
    - b. Lock Function
    - c. Unlock Period
    - d. Power Failure Mode
    - e. Audible Alarm ON/OFF
    - f. Battery Status
    - g. Validate hardware and software revision
    - h. Troubleshooting Status Signals
    - i. Special Access Delay (ADA)
    - j. Delayed Egress (Release Delay)
    - k. Door Propped open Delay
    - l. Lockdown Cancel Delay Time Out between credential and PIM
    - m. Number of Key presses without valid PIN before lockout
    - n. Current Date/Time
    - o. Enable/Disable Manual Programming
  - 3) Utilized to download firmware updates and door files to device.

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- 4) Utilized to download audit files from device.
- 5) Hand Held Device to have:
  - a. 3.5 inch LCD display minimum
  - b. Touch Screen/Keypad Backlit
  - c. 32-bit processor minimum
  - d. Memory: 128MB RAM/256 MB ROM
  - e. Battery: Rechargeable Li-ion
- 6) Acceptable Manufactures: Schlage Electronics HHD series with Schlage Utility Software

## 10. Electro-magnetic locks

- a) Wireless Electronic Mortise type Locksets are to meet the following criteria:
  - Surface mounted magnetic lock shall be capable of providing a pull-apart or tensile holding force of at least 1200 pounds. Magnetic lock shall have automatic dual voltage – no field adjustment required.
- 2) Securitron M62 Series is the preferred manufacturer.
- 3) Locks shall operate on 24VDC input and shall not consume more than three (3) watts of power (150mA @ 24VDC).
- 4) The strike plate shall be mounted using a steel sex bolt and roll pin to provide a “floating” movement to assure automatic self-alignment with the lock. Anti-tamper caps shall be provided for the exposed holes.
- 5) The lock shall be full sealed to make it tamper and weather proof.
- 6) The lock shall contain a suppression circuit to prevent residual magnetism and inductive kickback. The circuit also shall provide accelerated field collapse and radiation suppression.
- 7) The lock shall have a universal threaded conduit fitting and ten feet of jacketed stranded conductor shall be provided for electrical connection.
- 8) The lock and strike shall be plated to provide corrosion proofing.
- 9) Locks shall have a lifetime replacement warranty
- 10) Lock shall have available options such as magnetic bond sensor, integrated door position switch, split and offset strike plates, dress cover, wide assortment of installation brackets
- 11) Hardware accessories shall include brackets, housings and dress covers.

## 11. Electromagnetic door holder/releases

- a) Electromagnetic door holder/releases are to meet the following criteria:
  - All electromagnetic door holder releases shall be supplied by the architectural hardware supplier to properly coordinate with locking devices.
  - All units shall have a single coil to accommodate 12vdc, 24vac, 24vdc and 120vac. Coils shall be independently wound employing a fuse.
  - Armatures will have a positive release button.

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- 1) Rixson is the preferred manufacturer.
- 2) Electromagnetic door holder/releases are to be coordinated with the fire protection system and as required by code.

## 12. Overhead Stops

- a) Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide overhead type.
  - 1) Rixson, Glynn-Johnson are the preferred manufacturers.
  - 2) All overhead stops and holders shall be from a single manufacturer.
  - 3) Standard-duty models shall be used for interior or low to medium traffic doors.
  - 4) Heavy-duty models shall be used for exterior or high traffic doors or doors subject to abuse.
  - 5) For extremely abusive areas or high winds use double lever arm type.
  - 6) Coordinate dead-stop and/or hold open location with concealed floor closers where used.
  - 7) Stop, friction hold open and/or dead-stop units shall be available
  - 8) Units shall contain a heavy duty shock absorbing spring providing 5-7 degree compression before dead-stop.
  - 9) Units shall be non-handed, single or double acting and have complete mounting screws for wood or metal doors.

## 13. Thresholds

- a) Thresholds are to meet the following criteria:
  - Architectural bronze/brass thresholds shall be manufactured of CDA alloy C38500.
  - Roll Formed Aluminum Plate assemblies shall be manufactured from 5052-H32 Aluminum.
  - 1) Pemko, Reese, National Guard are the preferred manufacturers.
  - 2) Thresholds shall be available in numerous configurations and finishes for most applications, be full depth of frame and span width of opening
  - 3) Threshold heights shall not exceed ½” in height
  - 4) Weather-stripping for exterior doors shall have an aluminum housing with neoprene seals mechanically fastened with stainless steel screws.
  - 5) All fire doors shall have fire-rated gasketing.
  - 6) All sound doors shall have sound seals with STC ratings equivalent to the door assembly
  - 7) Exterior thresholds shall have a non-skid surface of nickel-aluminum fused to surface by exothermic reaction.
  - 8) Thresholds shall be beveled 1:2 maximum.

#### 14. Other Hardware and Finishes

- a) Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware. Where specified on the push side of accessible doors, kickplates shall be smooth, seamless, and 10” high minimum.
- b) Roller Latches: Provide roller latches for doors as scheduled.
  - 1) Projection of the roller to be easily adjusted by turning knob on back of latch.
  - 2) Projection of the roller should be up to ½” to allow for variance in the door clearance.
  - 3) Meets ANSI A156.16
- c) Seals: Specially formulated to withstand greater temperature extremes while providing maximum protection against air infiltration. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material’s thickness and durability. Proposed substitutions: submit for approval.
  - 1) Meets UL10B and ASTM E283 classification.
  - 2) Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings.
  - 3) Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacturer – careful coordination required.
- d) Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- e) Sweeps: Specially formulated to withstand greater temperature extremes while providing maximum protection against air infiltration. Neoprene or nylon brush type as scheduled.
- f) Panic Pulls: When specified for use with exit devices pulls shall be 1” round bar offset type with 10” center-to-center offset pulls.
- g) Pulls: Provide 1” diameter round bar stock with 8” center-to-center pulls. Provide 2-1/2” clearance.
- h) Push Plates: Push plates shall be minimum .050” thickness brass, bronze or stainless steel as appropriate for specified finish. Plates are to be in size scheduled in Hardware Sets. Beveled four sides, and provided with fasteners appropriate for attaching to doors. Where “CFC” or “CFTP” is indicated in Hardware Sets, factory drill holes in face of push plates to accommodate deadbolt cylinder or turnpiece.



- i) Pull Plates: Where pull plates are listed in the Hardware Sets, provide half round pull, 8” center-to-center, with 2-1/2” projection, factory attached to push plate in size indicated.
- j) Push/Pull Bars: Where push/pull bars are listed in the Hardware Sets, provide 1” diameter round bar stock with 10” center-to-center offset pulls.
- k) Flush Pulls: Where flush pulls for use with mortise locks are called for in the Hardware Sets provide cast brass or bronze 4-1/4” diameter drop ring type pull, factory modified with spindle appropriate for operation of the mortise lock.
- l) Latch Guards: Where shown in Hardware Sets at out-swing single and out-swing or in-swing pairs of doors, provide stainless steel latch guard to cover latch area or gap between door and frame, or between doors in pairs. Latch guards to be thru-bolted through door, with fasteners above and below mortise lock case. Provide proper width latch guard for use with specified lock operating trim.
- m) Electromagnetic Wall Holders: Electrically controlled, fail-safe, holds door open until current is interrupted. Furnish model to hold door away from wall to allow for any trim or levers on pull side of door.
- n) Sliding/Folding Track and Hardware: Provide heavy duty extruded aluminum track in width to accommodate scheduled door opening. For sliding doors, provide track with integral aluminum fascia. Pulls for sliding doors shall be recessed flush type; for folding doors provide track manufacturer’s wood knob listed in Hardware Sets.
- o) Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- p) Silencers: Interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- q) Finishes: Finish selections should generally be limited to, or matching, the following:
  - Satin Bronze, US10
  - Satin Chrome, US26D
  - Satin Stainless Steel, US32D
- r) Related Work: Door frames shall be prepared by the manufacturer to accept security/access hardware and wiring. Provide 3/4” conduit minimum to controllers.

## **d) Accessory Standards**

### **Introduction**

All accessories shall comply with accessibility requirements. Placement and installation of accessories including approach clearances, clear floor space, reach ranges, and protrusion limit shall comply with applicable accessibility requirements. This portion of the facility standards includes toilet room and custodial accessory requirements to be followed by the Consultant in the course of a project at the University of Chicago:

#### **1. Toilet Partitions**

- a) Provide floor-to-ceiling anchored partitions with wall reinforcement blockings, concealed overhead bracing/support, corrosion-resistant anchoring assemblies complete with threaded rods, lock washers and leveling adjustment at connection to structural support without transmitting load to finished ceiling.
- b) Panel door material options to include: metal, polymer, laminate, stone, or wood.
- c) Provide heavy-duty operating hardware and accessories, exposed fasteners of stainless steel or chrome-plated steel or brass to match hardware.
- d) Comply with all applicable accessible ~~ADA~~ requirements.

#### **2. Soap Dispenser**

- a) Kutol is the University's preferred manufacturer.

#### **3. Paper Towel Dispensers/Disposals**

- a) Georgia-Pacific Cormatic automated dispenser is the University standard. Specific installations may consider other types.

#### **4. Toilet Paper Dispensers**

- a) Georgia-Pacific Compact dispenser is the University standard. Specific installations may consider other types.

#### **5. Air hand Dryers (Preferred)**

- a) Dyson Airblade is the University's preferred manufacturer. Specific installations may consider other types, designer to consult with University.

#### **6. Trash and Recycling Bins**

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- a) Typically, the University collects building trash by two means, trash and comingled recycling containers. Container types and locations are to be reviewed with the building users and Maintenance & Operations group during the course of the project.
- b) Busch Systems, Clean River/Midpoint, and Max-R recycling bins are the preferred manufacturers, sizes will vary according to building location.

#### **7. Baby Changing Stations**

- a) Koala Kare is the University's preferred manufacturer. Specific installations may consider other types. Designer should consult with the University.
- b) Units should be constructed from high-density polyethylene, which prohibits the retention of moisture and odor. Units should contain reinforced steel rods aiming to increase unit stability, and gas shocks should be completely hidden or a safer bed retraction.
- c) Comply with all applicable accessible requirements.