

## 087100 | Access Control and Door Hardware

This section includes guidelines and requirements for the design and construction of access control and door hardware systems. Unless specifically noted, all standards apply to both the healthcare campus and the education campus.

The standards are a resource for the designer of record. The requirements are to be reviewed by the design team and incorporated into the contract documents. The standards themselves will not be included in the contract documents. It is the responsibility of the design team to incorporate them throughout the drawings and specifications.

The standard is not intended to encompass all components required in a complete access control system design, but to indicate the university's requirements where they exist. Exceptions to these standards may be considered on a case-by-case basis for extraordinary projects. All deviations must be approved by the Capital Projects Project Manager and UK Police Department.

Designers are encouraged to present the university with new or different systems, equipment, or materials when they may provide a better or more valuable product.

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**I. Architectural Design Requirements:**
**A. Introduction:**

The following reflects standard door hardware and electronic access control preferences for UK new construction projects. Variations required for additions and partial renovations should be discussed and recorded during the access control and door hardware design meeting. This document does not replace but is in addition to other published UK Access Control standards.

**B. Required Access Control and Door Hardware Design Meeting:**

The Architect shall initiate an Access Control and Door Hardware Design Meeting no less than four weeks prior to the issuance of construction documents. Virtual meetings are acceptable for smaller projects, but larger projects must have an 'in person' meeting. Participants shall include the UK Project Manager (and others recommended by the UK Project Manager such as those who will occupy and operate the new building, etc.), Construction Manager (if applicable), a representative from UKPD, Security Consultant, and an Architectural Hardware Consultant as recommended by UKPD. The Architect shall obtain the services of that Architectural Hardware Consultant as directed by UKPD to attend the access control and door hardware meeting, coordinate with the UK Security Consultant, write the Section 087100 Door Hardware specification, perform work on post-bid documents, check the door hardware submittal and perform door hardware inspections. All decisions made during this meeting shall be recorded by means of a drawing marked up for every opening. The hardware schedule is to be written using the model numbers of those products listed below as "Basis of Design".

**C. Door Configurations:**

No exterior door leaf shall be over 3'0" wide x 8'0" tall unless required for the loading of large equipment. The use of door singles rather than pairs is recommended wherever a pair is not required for the moving of large objects. For multi-use restroom doors, the use of serpentine wall configurations with adequate wheelchair maneuvering clearance and with no doors is recommended. If this is not possible then out-swinging doors are recommended due to being better for hygienic reasons than in-swinging doors. Exterior doors are recommended to be out-swinging for better vandal resistance and sealing against water leakage. No doors shall be specified which cannot comply with these door hardware standards.

**D. Procurement and Bid Packaging:**

The Security Consultant shall write their specifications and the Construction Manager (if applicable) will organize the bid packages so that all opening-related door hardware and door electronic items specified by model number in Section 087100 are furnished by **one**

Supplier.

**E. Proprietary Specifications:**

In all cases, other than as follows, a minimum of three manufacturers must be allowed to bid each specified item. No proprietary (sole source) specification of access control door hardware or mechanical door hardware is permitted other than as follows:

1. Door pairs with exit devices will have two rim exit devices with a key removable mullion, except that loading dock doors and other doors which frequently require a width greater than 2'10" for moving large objects will have Von Duprin concealed vertical cable exit devices (no substitutes allowed).
2. Card Readers, Retinal Scanners, and the Access Control Head-end System will be specified by the Security Consultant. For new construction and for all lockable doors other than residence hall individual suite entrance doors, the readers will not be integral to the locking devices, but will be separate units mounted on the walls or door frames.
3. Key Cylinders: Permanent key cylinder cores will be Best Cormax, except possibly for small additions to existing older buildings where compatibility with an existing Yale system may be permitted as directed by the UK Keyshop Supervisor.

**G. Key Cylinder Requirements:**

Best Cormax, seven pin; furnished by the Hardware Supplier; factory keyed and with keyway as directed by the UK Keyshop Supervisor, with three permanent keys per core factory cut as directed by the UK Keyshop Supervisor, permanent cores and permanent keys shipped directly from the factory to the UK Keyshop Supervisor. The locking devices that are to have cylinder override will be specified to have SFIC 7-pin cylinder housings, warranted to be compatible with those cores, installed into the locking devices by the Contractor. Contract is to include keyed brass construction cores for key cylinders with six construction keys, two of which are to be turned over to the UK Keyshop Supervisor.

**H. Elevator Accessibility:**

Elevators are outside of the scope of this document, but the use of 'column type' (Wikk Ingress'r) actuators for call buttons and floor buttons should be discussed with the UK Accessibility Office.

**I. Wall Blocking:**

Where wall stops and holders are to be mounted on drywall, specify wood wall blocking for support and screw anchorage.

**J. Frames:**

Equal rabbeted; for openings with jamb seals no silencer holes are to be drilled.

**II. List of Abbreviations / Definitions:**

- A. ADA: Americans with Disabilities Act.
- B. DPS: Door Position Switch. Sometimes called a "door contact", typically mounted in the top jamb for swinging doors and on the floor or sill for overhead doors or shutters.
- C. LX: Latch Monitoring. A switch in the lockset or exit device which identifies for the access control system whether or not the latchbolt is extended. Combined with a door position switch, this makes known whether the door is actually secure, meaning both

closed and locked.

- D. MEP: Mechanical/Electrical/Plumbing.
- E. RX: Request-to-Exit Monitoring. A switch in the lockset or exit device which identifies for the access control system that the inside lockset lever has been turned or the exit device touchpad has been pushed in. An explanation of how a door's 'security' is determined is needed to explain why this feature is needed. When the access control system receives a signal from a door position switch that a door has been opened, there are three possibilities: 1) someone has used a valid card; this is not an alarm condition, 2) someone on the inside is exiting - this would be identified by the RX feature and is not an alarm condition, 3) someone has either used a mechanical key or has forced the door open; both are alarm conditions. If an access control system did not employ the RX feature, then it would have to ignore alarms every time a person exited through a door; with all those ignored alarms there is no longer much of a security aspect to the access control system. The RX feature is also commonly identified as "REX" or "RQE".
- F. UKPD: University of Kentucky Police Department.

### III. Access Control and Accessibility Electronic Hardware Applications:

The following recommendations make for beneficial standardization and help reduce unnecessary electrical and hardware conflicts.

#### A. Exterior Doors

1. Have UKPD choose two remotely-located exterior doors to receive mechanical key cylinder access. Also, doors with direct MEP access shall have mechanical key cylinder access as well as card access. No other exterior doors will be accessible by key cylinders.
2. Decide which exterior entrances are to be **ADA Entrances**. These openings will include:
  - a. Proximity Card Reader on exterior. When the door is in the locked condition, these will both unlock the exterior door and enable the exterior operator actuator during the unlock period.
  - b. Utilize 36" high 'column' type operator actuators (located 3" AFF) that can be pressed at the top but also can be tapped by wheelchair footrests:
    - 1) One exterior that is enabled to open the exterior door only when the door is unlocked by card or through access control schedule.
    - 2) Two inside the vestibule: one opens exterior door and one opens interior door.
    - 3) One inside the lobby that opens the interior door for exiting.
3. Other doors as directed by UKPD may require card readers but no automatic door operators.
4. Doors must either be incapable of being left in an unlocked condition or, if capable of being left in an unlocked condition, must have fail-secure electronic locking devices that can be remotely locked by power failure or signal from UKPD.
5. Exterior doors are to have monitoring contacts for door position (DPS), latch position (LX), and for request-to-exit (RX). LX and RX contacts should be concealed inside of the exit devices where possible. Door position switches should be 3/4" diameter pop-in type with DPDT contacts. Overhead doors are to have floor-mounted door position switches but no LX or RX.

B. Interior Doors

1. No locking. This might include doors that have push and pull plates on multi-use restroom doors or just passage sets on storage rooms inside offices which will not be used for valuables.
2. All lockable doors shall be secured with card readers.
3. Key access. Key cylinders are only to be specified for doors on or in the path leading up to MEP room doors for emergency access only. A minimum number of other doors deemed as 'critical access' may be selected during the design meeting to have key access, subject to approval by UKPD representative. Janitor's closets are not to have key access.
4. Lower Security Card Access with no security monitoring. An example might be office doors inside an office suite where the desire is to get rid of keys, but where it doesn't matter if a professor leaves their door standing open or not, and there is not much concern about break-ins. Specify electric mortise locksets but with no security monitoring features.
5. Higher Security Card or Biometric Access with security monitoring. All doors on a space's perimeter (office suite entrances, classroom corridor doors, etc.) would have LX, RX and DPS. One or more doors on a space, such as a large classroom, would have a card reader, electronic locking, LX, RX and DPS on one door; other doors on that space would be the same less the card reader.
  - a. Doors requiring Exit Devices: specify motorized electric latch retraction and RX with separate door contacts on the top jamb. Provide with concealed electric power transfers (through-wire hinges are not permitted).
  - b. Doors not requiring Exit Devices: Specify electric mortise locksets with on-board 24VDC lock/unlock, RX, LX and DPS (security monitoring of the auxiliary dead latch is acceptable in lieu of on-board DPS). Provide with concealed power transfer (through-wire hinges are not permitted).
6. Local Dogging of Exit Devices on Exterior Doors: Sometimes it is desired to be able to locally dog down an exit device on an exterior door. Key cylinder dogging is not permitted as the door could not then be secured by signal from UKPD. Localized electric dogging of exit devices is permitted with the use of a keyswitch (Basis of Design: SDC Model 705U x L2, configured for jamb or wall mounting as required) wired to function as follows: "System Function: Free egress at all times. Panic device latch can be retracted or extended upon signal from access control system. Latch can also be held retracted by local key switch during business hours. Regardless of the state of the system, signal from UKPD cuts power to exit device and door locks against ingress. Wire key switch LED's so that green indicates unlocked door status; red indicates locked status."
7. Restroom Doors: Where serpentine wall configurations are not employed, on one Men's and one Women's multi-use restroom in the building, provide automatic door operators with full-height actuators. These enhanced accessible restrooms should be on the floor most easily accessed by the most people. Single-use Restroom Doors shall not have door electronics but shall have privacy function locksets with occupancy indicators and closers. Basis of Design: Schlage L9040 x L283-722.

8. Lactation Rooms shall have hardware per the following hardware typical set:

**Hardware Set – Lactation Example (In-swinging)**

***Mechanical Hardware***

(3)	Butt Hinges	AB700 4.5 x 4.0	652	HAG
(1)	SFIC Mortise Cylinder	Patented	626	BES
(1)	Storeroom Lock w/DB and IND	L9480 x 17A x L283-722	626	SCH
(1)	Closer, Regular Arm	4040XP Reg	689	LCN
(1)	Kick Plate	KO050 8 x 2LDW x CS x B4E	630	TRI
(1)	Wall Stop, Convex	1270CX	626	TRI

***Electrified Hardware***

(1)	Electric Strike	4100DBDL	630	TRN
(1)	Lot: Card Reader, control electronics, low voltage power (see security specifications)			

***System Function***

Free egress. Outside lever is always in locked condition. Indicator normally reads “Vacant”. Ingress by standard card which releases latchbolt portion only of electric strike so that upon entering, throwing the deadbolt changes the occupancy indicator to “Occupied” and achieves privacy against others with standard cards. Emergency ingress by personnel whose cards have been programmed to release both latchbolt and deadbolt portions of the electric strike or by mechanical key which also retracts both latchbolt and deadbolt. Turning the inside lever to exit retracts both latchbolt and deadbolt and returns occupancy indicator to read “Vacant”.

**IV. Door Hardware Manufacturers and Applications:**

Hardware finish is predominantly US26D and US32D (satin chrome and satin stainless steel); closers and thresholds and seals are US28 (satin aluminum). Deviations from this only with approval from UK Project Management:

- A. Hinges: Hager, Ives, McKinney, PBB, Stanley. Basis of Design: Hager. For wood and hollow metal doors. Three knuckle, concealed bearing. 5" x 4.5" heavyweight for hollow metal and wood doors with exit devices or automatic operators, or for 3'6" -3'10" in width. Stainless steel for exterior out swinging doors and in-swinging restroom doors. Brass base metal hinges are not permitted.
- B. Continuous Hinges: ABH, Hager, Ives, McKinney, Pemko, Select, Stanley. Basis of Design: Select SL24HD. Recommended for doors 4'0" wide and doors subject to impacts along the hinge edge of the door, such as at loading docks or wherever cart traffic is common.
- C. Pivots: ABH, Ives, Rixson. Basis of Design: Rixson 195 x M19. Recommended for aluminum storefront doors. Top pivots for doors with automatic operators shall employ needle bearings: Basis of Design: Rixson H180.
- D. Jamb-to-door Power Transfers: ABH, Hager, Securitron, Security Door Controls, Von Duprin. Basis of Design: ABH PT1200EZ. Stainless steel construction, rigid tube and two universal joints, capable of 180 degree door swing, 2-18 and 10-24 wires with Molex connectors on each end. The use of through-wire hinges is not permitted.
- E. Key Cylinder Cores: See Paragraph I.G above.
- F. Key Cylinder Housings: Best, Hager, Sargent, Schlage. Basis of Design: Schlage. SFIC, 7-pin, warranted for use with Best Cormax cores.



- G. Locksets: Best 45H series, Hager 3800, Sargent 8700 series, Schlage L9000 series, Basis of Design: Schlage L9000 series with model 17 lever and model A rose. Other trim designs only with permission of UK Project Manager.
  
- H Electric Mortise Locksets: Best, Hager, Sargent, Schlage. Basis of Design for non-cylinder fail secure single-sided locking application: Schlage L9090EU x RX x LX x DPS (no cylinder hole in face of door). Basis of Design for fail secure single-sided with cylinder override locking application: Schlage L9092EU x RX x LX x DPS. Manufacturers who do not offer the DPS feature may substitute using both the LX and an auxiliary deadlatch monitoring contact in series to achieve the same result.
  
- I. Electric Strikes: Camden Door Controls, HES, Trine. Basis of Design: Trine 4100DBDL with separate portions to individually release latchbolts and deadbolts. Only used on lactation rooms.
  
- J. Exit Devices other than Concealed Vertical Cable Exit Devices: Detex Advantex, Precision 2000 series, Sargent 80 series, Von Duprin 33A and 99 series. Basis of Design: Von Duprin 33A and 99 series. Motorized latch retraction, 24VDC, 1.0Amp or less inrush, warranted for use with other manufacturer's power supplies that are 24VDC filtered and regulated. Mullions removable by key. Pull trims for 99 series when not chosen by Architect are to be (basis of design) Von Duprin 697 series.
  
- K. Concealed Vertical Cable Exit Devices: Von Duprin 3349A, 9949 and 9950 series (no substitutes allowed). For pairs of doors where removing a mullion would be a frequent nuisance, i.e. loading dock doors.
  
- L. Surface Closers: Hager 5100 series, Detex-Ryobi D4550 series, LCN 4040XP series, Sargent 281 series. Basis of Design: LCN 4040XP series. For exterior out-swinging doors and out-swinging doors used by students or given hard usage, provide spring-stop arms. For out-swinging aluminum doors, provide spacer blocks and angle brackets for securing the closer arm brackets to the top jambs. Parallel arm models to have double forged extra duty arms. Closers and overhead stops shall be mounted for the maximum degree of opening before the door encounters an obstruction. Closers shall be located so that doors can function properly with hardware such as wall stops, holders, etc. Closer arms should never fully extend or bottom out. Properly locating closers is in all cases the Installer's responsibility. Closers on non-rated exterior doors shall not exceed 8.5 lbf to open. Closers on non-rated interior doors shall not exceed 5 lbf to open. Closers on fire and smoke-rated doors shall be adjusted to the minimum spring power to reliably close and latch the door.
  
- M. Automatic Door Operators: Exterior Doors: LCN Senior Swing, Stanley M-Force, Besam SW200i. Interior Doors: LCN 4642, Stanley Magic Access, Besam SW100i. Basis of Design: Stanley. Automatic Door Operators are to be furnished and installed by AAADM certified companies; certificates required during submittal process.
  
- N. Operator Actuators: BEA, Camden Door Controls, Wikk Industries. Basis of Design: Wikk S-i36NAR-3 (with left and right arrows when inside vestibule). 36" high, mounted 3" AFF.
  
- O. Bollard Posts: Curran Engineering, CMPI, Wikk Industries. Basis of Design: Wikk. In-ground mounted (set into concrete 10" minimum), Satin stainless steel, factory prepped for card readers and actuators as required. Welded tops sloping down away from the card reader / actuator side.
  
- P. Overhead Stops: ABH, Glynn-Johnson, Rixson, Sargent. Basis of Design: Glynn-

Johnson. Do not mount surface overhead stops on corridor side of doors. Do not use surface overhead stops on doors that would tend to be left open. Concealed overhead stops to have adjustable degree of opening.

- Q. Operating Trim: Burns, Ives, Rockwood, Trimco. Push Plates: 0.125" thick, 4" x 16" with 1/4" radius rounded corners; centered 45" AFF (basis of design: Trimco 1809-4 x RC). Pull plates: 0.050" thick, 4" x 16" with 8"CTC 1" diameter half-moon grip centered 10" down from top of plate (basis of design: Trimco 1014-3B x RC). Decorative pulls as chosen by Architect (1" or 1-1/4" diameter grips are recommended); 5/16" minimum through-bolt fasteners.
- R. Protective Plates: Burns, Ives, Rockwood, Trimco. Basis of Design: Trimco. 0.050" thick, beveled all four edges, countersunk for bevel-headed screws, located 1/4" above bottom edges of doors.
- S. Wall Stops: Burns, Hager, Ives, Rockwood, Trimco. Basis of Design: Trimco 1270CX. Cast brass/bronze retaining rings with convex rubber inserts; located so as to be centered on lockset lever spindles; wood wall blocking provided where mounted on drywall.
- T. Floor Stops: Burns, Hager, Ives, Rockwood, Trimco. Basis of Design: Trimco. Limited applications. Use for in-swinging MEP room doors where equipment might be along the walls and the expense of a concealed overhead stop would be unwise (basis of design: Trimco 7280). Use also for out-swinging doors where trim would contact the door at almost exactly 90 degrees (basis of design: Trimco 7281). Where used, located at least 1/2 of the door width out from the hinge edge of the door and so as not to be a trip hazard.
- U. Wall Stop/holders: Burns, Hager, Trimco. Self-compensating for door sag up to 1/4", heavy cast bronze base metal, adjustable holding force, adjustable degree of opening, provided with factory shims as required for clearance. Basis of Design: Trimco 1283-6S. 1" factory shims as required: Trimco 1283-6S-S100.628.
- V. Electromagnetic Door Holders: ABH, Edwards, Hager. Basis of Design: ABH 2100 series. Single-gang, flush-mount with factory extensions as required for clearance. Closer/holder/release units are not permitted without explicit permission of UKPD representative.
- W. Door Gasketing: NGP, Pemko, Reese, Zero. Basis of Design: NGP. Vinyl is not permitted. Screwed-on with neoprene inserts.
  - 1. Doors with Coordinators: Use a hardware compatible jamb seal on all three jambs. Mount the coordinator directly to the top jamb seal. Basis of Design: NGP 700NA.
  - 2. Jamb seals for balance of Doors: Basis of Design: NGP 135NA.
  - 3. Astragals: Basis of Design: NGP 115NA.
  - 4. Sound Seals: For applications when seals are not provided with the door due to STC requirements: Basis of Design: NGP 107NA adjustable jamb seals with DHSI model SSDB3 sound sweeps – materials for sound sweeps which would catch or grab on flooring are not permitted.
  - 3. Provide overhead rain drips for the top jambs of out-swinging hollow metal doors that are not covered against 45 degree blowing rain. Basis of Design: NGP 16A.
- X. Thresholds: NGP, Pemko, Reese, Zero. Basis of Design: NGP 896N and 896HD-N. ADA compliant, 1/2" high aluminum panic-type (latchtrack, bumper) thresholds with neoprene, polyurethane or polyurethane inserts. Doors must be undercut 3/8" to properly mate with seal in threshold. Daylight under doors is not acceptable. Use heavy duty



HD models where loading in heavy items is anticipated.

- Y. Silencers: Burns, Hager, Ives, Rockwood, Trimco. Basis of Design: Trimco 1229A. For doors without jamb seals. (2) for paired openings; (3) for single openings. Silencers must be mechanically secured to hollow metal frames; adhesive models are not permitted.

**V. Door Hardware Inspection Services**

The following paragraph shall be included in Part III of the 087100 Door Hardware Specification as follows:

**3.X FIELD QUALITY CONTROL**

**A. Provide Door Hardware Inspection Services and Field Quality Report as indicated below.**

**B. Door Hardware Inspection Services**

1. Scope
  - a. Inspection of all swinging doors and door hardware immediately following substantial completion of all hardware in entire project.
  - b. Inspector to furnish a Field Inspection Report, itemized per each individual opening, to the Architect and UKPD within 7 days of the inspection, including:
    - 1) deficiencies in workmanship and standard industry practices,
    - 2) use of allowable products,
    - 3) use of manufacturer recommended fasteners,
    - 4) compliance with the ADA,
    - 5) proper door/frame/hardware clearances,
    - 6) problems related to function, security, aesthetics or maintenance.
2. Inspector Qualifications
  - 1) Certified by the Door and Hardware Institute as an Architectural Hardware Consultant (AHC).
  - 2) Full member in good standing of Specification Consultants in Independent Practice (SCIP).
  - 3) Entirely independent of the supply side of the project, having no familial, financial, or competitive relationship with any manufacturer, manufacturer's representative, distributor, installer or supplier used on this project.
  - 4) Engaged full-time (40 hrs per week minimum) in the writing of hardware specifications and field inspections.
3. Re-inspections
  - a. Re-inspections are required until all items listed in the substantial completion field inspection report are approved by the Inspector as corrected.
4. Fees and Payment:
  - a. Payment for the first inspection at substantial completion shall be by the Architect at the fee of \$12.00 per opening (\$500.00 minimum for smaller projects).
  - b. Re-inspections by the Inspector are to be paid by the Contractor and shall be at the rate of \$500.00 per visit plus \$15.00 per door to be inspected.
  - c. Payment directly to the Inspector is to be made within 30 days of receipt of invoice.
5. All inspections are to be performed by the same Inspector, that being the one selected by the Architect as directed by UKPD (see UK Standard 087100S09).

**END OF UK ACCESS CONTROL AND DOOR HARDWARE STANDARD**