

08 7000 – Door Hardware

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Last Update: July 1, 2009

A. Keying

1. In existing buildings the keying system will be an extension of the system that is present in the existing building.
2. In new buildings the keying system will use a RESERVE keyway, not in use within a 100-mile radius.
3. For final keying the Purdue Lockshop will procure cylinders and keying. Cylinders will be installed by the contractor.

B. As Built Schedules:

1. Furnish 'as-built' or 'as-installed' schedule with closeout documents, including keying schedule, wiring/riser diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

C. Lever Handles:

1. Door sets will be lever style for accessibility compliance.

D. Door Closers:

1. We strongly prefer LCN 4040 Series closers for exterior doors. Care must be taken to document the acceptability of any substitution; we have had trouble with other models having enough strength to close effectively.

E. Hinges:

1. Conventional hinges are to have steel or stainless steel pins and concealed bearings. Hinge open widths to be minimum, but to have sufficient throw to permit maximum door swing.
 - a. Three hinges per leaf to 7 feet, 6-inch height. Add one for each additional 30 inches in height, or any fraction thereof.
 - b. Doors over 3 foot, 5 inches in width to have extra heavy weight hinges.
 - c. Doors with panic hardware or fire exit devices to have extra-heavy weight hinges.
 - d. Outswinging exterior doors to be non-ferrous with non-removable (NRP) pins.
 - e. Exterior doors and doors subject to corrosive atmospheric conditions to be non-ferrous material.
 - f. Provide shims and shimming instructions for proper door adjustment.
2. Continuous hinges to be pinned steel/stainless steel type:
 - a. Continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
 - b. Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise the PM if required width exceeds 8 inches.

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3. Continuous hinges at exterior doors to be geared-type aluminum:
 - a. Use heavy-duty, extra-bearing units for doors over 3 foot, 5 inches in width.
 - b. Use heavy-duty, extra-bearing units for doors with panic hardware or fire exit devices.
 - c. Use wide-throw units where needed for maximum degree of swing, advise the PM if commonly available hinges are insufficient.

F. Pivots:

1. High-strength forged bronze or stainless steel, tilt-on precision bearing and bearing pin.
2. Bottom and intermediate pivots to be adjustability of minus 1/16 inch, plus 1/8 inch.

G. Commissioning:

1. Conduct these tests three weeks prior to request for certificate of substantial completion:
 - a. Test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
 - b. Test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
 - c. Test hardware interfaced with fire/life-safety system for proper operation and release.

H. Door Swing Opening:

1. Drawings typically depict doors at 90 degrees; doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

I. Floor Closers:

1. Hydraulically controlled, cement case, maximum degree dead stop permitted by trim or adjacent structure. Special pins, floor pans and longer spindles when needed to accommodate floor and jamb conditions.

J. Warrantees:

1. Warrantees are to be part of the respective manufacturers' regular terms of sale. Provide manufacturers' warranties that meet the following minimums:

Table 1

Warranty Requirements	
Item	Warranty
Locksets	Three years
Exit Devices	Three years mechanical, one year electrical
Closers	Ten years mechanical, two years electrical

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Hinges	Life of Building
Other Hardware	Two years

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Alternate Manufacturers:

1. Listed below are the acceptable alternate manufacturers: Submit the chosen model for review to assure equivalent function and features with scheduled products.

Table 2

Manufacturer Lists		
Item	Preferred Manufacturer	Substitute Manufacturer
Hinges	(IVE) Ives	Bommer, Hager, Stanley
Continuous Hinges	(SEL) Select	Hager, Pemko, Roton
Pivots	(IVE) Ives	Rixson
Floor Closers	(RIX) Rixson	Dorma
Exterior Key System	(SCH) Schlage	No Substitution
Interior Key System	(SAR) Sargent	No Substitution
Locks	(SAR) Sargent	Schlage
Exit Devices	(VON) Von Duprin	No Substitution
Closers	(LCN) LCN	No Substitution
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	Hager
Silencers	(IVE) Ives	Hager, Rockwood
Push & Pull Plates	(IVE) Ives	Hager, Rockwood
Custom Push/Pulls	(FOR) Forms & Surface	Hager, Rockwood
Kickplates	(IVE) Ives	Hager, Rockwood
Stops & Holders	(IVE) Ives	Hager, Rockwood
Overhead Stops	(GLY) Glynn-Johnson	ABH
Thresholds	(PEM) Pemko	National Guard, Reese
Seals & Bottoms	(PEM) Pemko	National Guard, Reese
Key Cabinets	(LUN) Lund	MMF, TelKee
Aluminum Door Locks	(ADA) Adams Rite	None

K. Mortise Locksets and Latchsets:

1. Chassis to be cold-rolled steel, handing field-changeable without disassembly
2. Latchbolts to be 3/4-inch throw stainless steel anti-friction type
3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable
 - a. Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.

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4. Thumbturns to be of accessible design not requiring pinching or twisting motions to operate
5. Deadbolts to be stainless steel with 1-inch throw
6. Electric operation to be manufacturer-installed continuous duty solenoid
7. Strikes to be 16 gage curved steel, bronze or brass with 1-inch deep box construction, lips of sufficient length to clear trim and protect clothing.
8. Sargent 8200 Series, LW1J design.
 - a. Accepted substitutions: Schlage
9. Certifications:
 - a. ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
 - b. ANSI/ASTM F476-84 Grade 31 UL Listed.

L. Specific features:

1. Non-Fire Rated Devices: cylinder dogging.
2. Lever Trim: Breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
4. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
5. Inpact recessed devices: 1-1/4inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
6. 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.
7. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.
8. 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.

M. Surface Closers:

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. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.

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6. Opening pressure: Exterior doors 8.5 lb., interior doors 5 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 exterior 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.
 12. Pressure Relief Valves (PRV): unsafe, not permitted.
- N. Electromagnetic Hold-Open Closers:
1. Integrate with UL listed fire/life-safety alarm systems.
 2. Multi-point units: hold-open bypass at 80 deg or 140 deg. Swing-free/no-drift arms at pull-side mounted units.
- O. Automatic Flush Bolts:
1. Low operating force design, "LBR" type where scheduled.
- P. Overhead Stops:
1. Stainless steel (100 series). Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- Q. Kick Plates:
1. Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- R. Door Stops:
1. Provide stops to protect walls, casework or other hardware.
 2. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 3. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- S. Seals:
1. Finished to match adjacent frame color. Resilient seal material: polypropylene, nylon brush, or solid high-grade neoprene. 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.

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2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
3. Non-corroding fasteners at in-swinging exterior doors.
4. 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. Adhesive mounted components not acceptable. Fasten applied seals over bead of sealant.
5. Fire-rated Doors, Resilient Seals: UL10C / IBC Section 714 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
6. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / IBC Section 714. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.

T. Low Operating Force Units:

1. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.

U. Thresholds:

1. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
2. Exteriors: Seal perimeter to exclude water and vermin. Use butyl-rubber or polyisobutylene sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
3. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
4. Fire-rated openings, 3hour duration: Thresholds, where scheduled, to extend full jamb depth.
5. Acoustic openings: Set units in full bed of Division-7-compliant butyl-rubber or polyisobutylene sealant, leave no air space between threshold and substrate.
6. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

V. Fasteners:

1. 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.

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W. Through-bolts:

1. Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

X. Silencers:

1. Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

Y. Wall- & Floor-mounted Electromagnetic Door Holders:

1. LCN's SEM series or approved equivalent. Incorporate into U.L.-listed fire & life-safety system, doors release to allow closure and latching when door's zone is in alarm state. Use minimum projection required to allow door to open as widely as allowed by wall conditions and projection of door hardware.

Z. Schlage Key System:

1. Schlage Everest utility-patented restricted D125 keyway, conventional cylinders. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. Furnish Owner's written approval of the system.
2. Existing master key system.
 - a. Non-I.C. construction keying: furnish inserted type partial key. At substantial completion, remove inserts in Owner's presence; demonstrate consequent non-operability of construction key. Give all removed inserts and all construction keys to Owner.
 - b. Furnish 10 construction keys.
 - c. Furnish 2-construction insert extractor tool 35-057.
 - d. Furnish 2 construction control keys.
 - e. Key Cylinders: Furnish utility patented, 6-pin solid brass construction.
 - f. Permanent keys: Furnish secured shipment direct from point of origination to Owner.
 - g. Bitting List: Furnish secured shipment direct from point of origination to Owner upon completion.

AA. Sargent Key System:

1. Existing Sargent restricted B Series system. Purdue Lockshop will initiate and conduct meeting(s) with building personnel to determine system structure, furnish Owner's written approval of the system. Furnish temporary construction-keyed and permanent cylinders.
2. Existing master key system.

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- a. Non-I.C. construction keying: furnish inserted type partial key. At substantial completion, remove inserts in Owner's presence; demonstrate consequent non-operability of construction key. Give all removed inserts and all construction keys to Owner.
- b. Furnish 10 construction keys.
- c. Furnish 2-construction insert extractor.
- d. Furnish 2 construction control keys.
- e. Key Cylinders: Furnish utility patented, 6-pin solid brass construction.
- f. Permanent keys: Furnish secured shipment direct from point of origination to Owner.
- g. Bitting List: Bitting will be done by Purdue Lockshop.