

## SECTION 08 70 00

### HARDWARE

#### PART 1 GENERAL

##### 1.01 COORDINATION

- A. Coordinate Owner's keying requirements with the supplier. Because of existing security arrangements, no substitutions will be accepted for specified cylinders.
- B. Onsite key meetings are required on every project.
  - 1. Key meetings cannot occur until QA/QC has issued final approval of the hardware schedule. Final approved hardware schedule must be provided to DPS lockshop including floorplans showing all door numbers. Must provide all information 2 weeks before key meeting.
- C. All keys must be checked out from DPS lockshop use of facility keys prohibited.
- D. All existing hardware must be salvaged in working order and returned to DPS structural department.
- E. Architect must verify existing keyways and match new work to existing.
- F. Architect must hire certified hardware consultant on every project.

##### 1.02 REGULATORY REQUIREMENTS

- A. Openings designated to be fire-rated shall be provided with Finish Hardware complying with NFPA standards 80 and 101. This requirement shall take precedence over all other requirements for such hardware. Provide only listed, tested and approved Finish Hardware compatible with proposed size, type, function, and location of such doors.

##### 1.03 SUBMITTALS

- A. Shop Drawings And Product Data:
  - 1. Submit final hardware schedule to Architect. Indicate complete designation of every item required for each door or opening, arranged into hardware sets.
  - 2. Submit complete product data to Architect for each hardware item. Provide manufacturer's cut sheet(s) for each item.
  - 3. The Architect shall forward a copy of the Hardware submittals to DPS for simultaneous review.

##### 1.04 SEQUENCING/SCHEDULING

- A. Hardware orders can not be placed without final approval from QA/QC and DPS Locksmith.
- B. Hardware-related submittals shall be submitted to the Architect within 20 calendar days of the Notice to Proceed.
- C. Hardware items shall be ordered from the manufacturer within 10 days of submittal acceptance.

##### 1.05 ARCHITECT NOTIFICATION

- A. The Contractor shall be responsible for notifying the Architect of any Finish Hardware item which is inappropriate for designated fire protection rating. Such notification shall be given prior to purchase of any component of the affected opening.

##### 1.06 EXTENDED WARRANTY

- A. Submit to the Architect copies of Finish Hardware manufacturer's standard guarantees as follows:
  - 1. All hardware items: ten (10) year guarantee (all parts)
  - 2. Closers: Minimum Forty (40) year replacement guarantee against mechanical failure.
  - 3. All locksets shall have a Lifetime warranty.

## **PART 2 PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Acceptable manufacturers of products shall be as indicated in this section.
- B. Material suppliers shall have a supply warehouse located within 100 miles of the project site.

### **2.02 MATERIALS**

- A. Finish:
  - 1. Finish hardware shall be US26D finish only.
- B. Closer Shells:
  - 2. Finish of closer shells shall be lacquer or enamel finish to match other hardware.

### **2.03 KEYS**

- A. All keys provided shall be nickel silver alloy.
- B. Deliver construction core keys to the General Contractor.
- C. Deliver all keys to the DPS Structural Department (only) in individual envelopes marked with door number and room number, including but not limited to casework, lockers, showcase cabinets.
  - 1. DPS Structural Department will control key distribution. The DPS Structural Department will assure that the Building Grand Master keys are only provided to DPS Security and the Denver Fire Department (Knox Box).
- D. Keys shall be permanently engraved with appropriate identification number.
- E. Provide the quantity of keys as indicated on the key schedule.
- F. In addition to scheduled keys, provide:
  - 1. 8 interior master keys
  - 2. 8 exterior master keys
  - 3. 3 building grand master keys
  - 1. Five (5) change keys shall be furnished with each key change.
  - 2. Ten (10) construction keys (keyed to construction cores).
  - 3. Two (2) construction core control key (for removal of construction cylinder cores at the time of final keying.
  - 4. Locksets shall be furnished with temporary construction keying during construction period.
  - 5. Interior function locks required at classroom to classroom openings .
  - 6. Interior classrooms and community use rooms require thumb turn cylinder for dogging (auditoriums, cafeterias, Libraris, etc).

### **3.02 CYLINDERS**

- A. Cylinders shall be “interchangeable/removable core” cylinders (I-Core) with restricted keyway as designated by DPS Structural department only.
- B. Provide construction cores for all locksets to be installed under this project. Construction cores shall NOT be provided with the restricted keyway. Construction cores shall be returned to the supplier after the permanent cores have been installed in the building.
- C. Existing cylinders manufacturer, Keyway number, restricted keyway designation, etc. will be provided by the DPS Structural Department. New cylinders in existing buildings shall match existing interchangeable/removable core keyways for those buidlings. Master keying pin combinations will be provided to the hardware supplier by the DPS lock shop through DPS.
- D. All door hardware including interchangeable/removable cores shall be provided and installed by the contractor. All permanent lock cores shall be installed prior to substantial completion.

**3.03 HINGES**

A. Butt Hinges:

1. 5-knuckle, full ball-bearing hinges.
2. Only exterior door hinges shall have non-removable pins.
3. All hollow metal doors require heavy weight hinges.
4. Hinges for interior doors over 3'-0" in width shall be 5 x 5 minimum.
5. Interior door hinges (3'-0" and less in width) shall be 4-1/2 x 4-1/2 minimum.
6. Provide 1-1/2 pair of butts for each door leaf up to and including 7'-0" in height.
7. Provide 1/2 pair butts for each additional 2'-0" in height or portion thereof.

**3.04 STOPS:** All stops shall have heavy duty cast escutcheons with brushed chrome finish and rubber concave bumpers (except as otherwise indicated herein).

**3.05 LOCK FUNCTIONS**

<i>ITEM</i>	<i>MANUFACTURERS / FUNCTIONS</i>	<i>NOTES</i>
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**Cylindrical Lock Functions**

<b>Trim Design</b>	<b>Best 9K Series</b>	<b>Marks Survivor Series</b>
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**Interior Storerooms/workrooms**

General (Staff Access)	93K 0 UA 15D S3 626	195 RAB 626 *	Entrance (Used in place of Classroom Intruder)
Individual Classroom Storage	93K 0 D 15D S3 626	195 RS 626 *	Classroom (standard)
Custodial and Utility	93K 0 D 15D S3 626	195 RF 626 *	Storeroom

**Interior Storeroom (Dbl. Dr.)**

Active Leaf	93K 0 D 15D S3 626	195 RF 626 *	Storeroom
Inactive Leaf	Surface Bolt	Surface Bolt	8" Surface Flush Bolt

Classrooms/Offices	93K 0 UA 15D S3 626	195 RAB 626 *	Entrance
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**Toilets**

Private Staff	93K 0 L 15D S3 626	195 L 626	Privacy
Student Toilets			Push/Pulls
Kindergarten/ECE	93K 0 N 15D S3 626	195 N 626	Passage

**Use of deadbolts in a DPS facility is prohibited.**

**Exterior Storerooms (Dbl. Dr.)**

Active Leaf	83T 7 K STK 626	130 RK 626	
Inactive leaf	Cremona Bolt	Cremona Bolt	

**Non-rated Interior Storage**

Gym/Cafeteria Storage	93K 0 D 15D S3	195 RF 626 *	Lever Set
(Inactive Leaf)	Surface Bolt	Surface Bolt	8" Surface Flush Bolt

*Same as storeroom function above with Best cylinder. No substitutions.*

**Telecommunication Rooms**

**3.06 Panic Devices**

<i>ITEM</i>	<i>MANUFACTURERS / FUNCTIONS</i>	<i>NOTES</i>
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**Panic Hardware Functions**

**Trim Design**                      **Von Duprin 99 Series**                      **Precision Apex 2000 Series**

Building Entry (Dbl. Dr.)	99NL x	2103x1703A x	One keyed door only, pulls
Exterior Single Keyed	99NL	2103x1703A	Non-doggable
Exterior (Exit Only)	99EO	2101x1701	Non-doggable
Interior Single (Non-Rated)	99DT	2102x1702A	Non-doggable
Interior Single (Non-Rated)	99L-NL	2103CDx1703A	Classrooms – Include Thumb-turn cylinder for dogging.
Interior Single (Rated)	99L-BE-F	FL2114x4914A	Stairwells - Rim w/lever always active
Interior Classroom (Rated/Secure)	99L-F	FL2110xV4908A	Rim w/lever (keyed) - Include Thumb-turn cylinder for dogging.
Exterior Egress Pedestrian Gates	Detex V40xW		Weatherized, select trim if not exit only

**3.07 ELECTRIC STRIKES**

A. Electric strikes are required at card access doors. RCI 0162 or equivalent.

**3.08 STRIKES**

A. All T-strikes shall have a strike box.

**3.09 PUSH/PULLS:**

A. Push / pull plates shall be 4" x 16" with a 1" door pull and an 8" center.

B. Pulls shall be through-bolted at 2-points (minimum).

C. Pulls shall be ADA compliant.

**3.10 KICKPLATES**

A. 16 ga. (.050") stainless steel.

B. 12" high.

C. Door width less 2".

D. Mounted ½" above bottom of door.

**3.11 ARMOR PLATE (for service, kitchen and delivery doors):**

- A. 14 ga. stainless steel
- B. 32" high unless otherwise indicated.
- C. Door width less 1-1/2 inches.
- D. Mounted 1/2" from bottom of door.

**3.12 THRESHOLDS:**

- A. Extruded aluminum.
- B. 6 inch wide times full width of opening.
- C. Not cut for removable mullion floor plates.
- D. Acceptable products:
  - 1. Von Duprin
  - 2. Corbin
  - 3. Russwin
  - 4. Sargent
  - 5. Pemko
  - 6. Master
  - 7. Hager

**3.13 CLOSERS**

- A. General:
  - 1. All doors opening into a wall at 90 degrees, install closer for 110 degree opening. In all other conditions the closer must be installed to allow 180 degree opening.
  - 2. LCN 4040 XP EDA or HEDA ST3596 – TBWMS with heavy duty, high security arms.
  - 3. Stanley QDC115 EDA with extra duty arm or QDC116 HEDA with hold open extra duty arm.
  - 4. Parallel arm mounting only. "Cush Arms" are not allowed.
- B. Power Operated Closers (ADA Entrance)
  - 1. Dorma ED800.
  - 2. ADAEZ PRO – Permitted only for interior applications that occasionally require automatic operation.

**3.14 STOPS/BUMPERS**

- A. Wall Stops – Ives WS401CCX or WS402CCX
  - 1. GRAINGER 22NT80 is to be used on all exterior ballards or railings.
- B. Wall Stops
  - 1. Wall stops shall be mounted at appropriate height on a 42" high 2 1/2" x 2 1/2" grouted bollard.
- C. Floor Stops
  - 1. Required IVES FS18L or similar.

**3.15 KNOX BOX (for Fire Department):** Knox #3220xRMK (recessed mounting kit) or Knox #3200 (surface mounting).

**3.16 WEATHER-STRIPPING:**

- A. Vinyl Smoke Seal

1. Adhesive backed preformed copolymer weather-strip for metal frames; PemkoS88 (head + jamb) or equivalent by Hager (727S).
2. Adhesive backed mullion gasket; Pemko S1125, or equivalent.
- B. Silicone Smoke Seal
  1. Pemko S88D204 silicone smoke gasket.
  2. Hager (726S).
- C. Exterior Door Weatherstripping:
  1. Head and Jambs - (extruded aluminum with closed cell insert) x US26D
    1. Pemko 303 AS or similar.
    2. Hager (757SN)
  2. Sill - Pemko 368 CN (extruded aluminum w/ neoprene insert).
  3. Meeting Stile (rated): No preference. Provide appropriate product.
- D. Removable Mullions
  1. Keyed removeable mullions to be used where necessary.
  2. Locations: main entrance, auditorium to stage, multi-purpose rooms, cafeteria, service entrance and gym.
  3. ST989 stabilizers are required on all center mullions

### **3.17 PADLOCKS**

- A. Supply a padlock for every athletic walk through and drive through gate.
  1. Provide ABUS lock, model #ABU83IC/55CS. Steel, small format IC prep, shrouded 2-1/8".
- B. Supply a padlock for every interior and exterior hasp type lock. (i.e. - sprinkler box, roof hatch, ladder, flag pole, (etc.).
  1. Provide ABUS lock, model #ABU83IC/45. Brass, small format, prep, non-shrouded 1-7/8".
- C. Provide like quantity of unpinned BEST cores and key blanks to DPS Lockshop which will facilitate installation of the padlocks.

### **3.18 MISCELLANEOUS**

- A. Silencers:
  1. IVES SR64 or equivalent, 3 ea. at latch jamb of all doors (except weather-stripped).
    2. Cremone Bolt
  2. Controlled Products Corp #1028.00310.008.
- B. Key Cabinets
  1. Steel cabinets designed specifically for key storage.
  2. Provide cabinet locking cylinders. If more than one cabinet is required to accommodate the quantity of keys to be stored, provide cabinets with door cylinders keyed the same.
  3. Provide key tags (unlabeled), key hooks and other accessories required for fully functional system.
  4. Key cabinets shall be wall mounted.
  5. Quantity of keys to be stored: Provide cabinet storage for 200 for Elementary Schools. Provide Cabinet storage for 300 keys for Middle Schools and K-8 Schools. Provide cabinet storage for 500 keys for High Schools.

### **3.19 SPARE PARTS**

- A. Provide one spare interchangeable/removable core for each 50 cylinders provided to a maximum of 6 spare interchangeable/removable cores per project.

- B. Provide spare restricted keyway key blanks at a rate of 1 for each 10 cylinders provided to a maximum of 50 key blanks per project.

#### **4 EXECUTION**

##### **4.01 PREPARATION**

- A. A detailed schedule shall be submitted to the architect and DPS QAQC.
- B. No manufacturing orders shall be placed until written final approval from DPS QAQC
- C. Furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work to confirm that adequate provisions will be made for the proper installation of hardware.

##### **4.02 FIELD MEASUREMENTS**

- A. Field verify all dimensions of existing doors and frames to receive new hardware.

##### **4.03 INSTALLATION**

- A. Factory Training And Certification:

- 1. All hardware installers must successfully complete the highest level of professional training on the installation, operation and maintenance and troubleshooting practices provided by the hardware manufacturer or authorized vendor. Provide installer certifications at time of product submittals.

- B. Mounting:

- 1. General:

- 1. Wood Doors: Mount all hardware to wood doors and wood transom panels with six bolts.

- 2. Hollow Metal Doors: Mount all hardware to metal doors with six bolts.

- 2. Silencers

- 1. Install three (3) rubber door silencers to latch side of each metal door frame unless frame is to receive weather-stripping or smoke seals.

- 3. Closers:

- 1. Mount to wood doors with through bolts and grommet nuts.

- 2. Must be installed to allow door to open to maximum capacity.

- 3. Mount to hollow metal doors with through bolts and grommet nuts.

- 4. Use factory supplied, metal installation template, not paper template, NO EXCEPTIONS.

- 5. Masonry and concrete:

- i) Mount hardware to concrete and brick masonry with cast-in or built-in anchors.

- ii) Where cast-in or built-in anchors are not possible, mount hardware to concrete and brick masonry with drilled expansion anchors.

- iii) Mount hardware to hollow masonry with toggle bolts.

- 4. Mount hardware to gypsum board and plaster framed partitions with wood screws through to solid blocking. Provide plaster rings behind all surface door stops.

- 5. Sill sweeps: Where sill sweeps are mounted on doors with continuous hinges, hinge shall be stopped above bottom of door so that the sweep can be mounted full door width.

- 6. Panic devices must have set screws installed in head of device and must be thru bolted.

##### **4.04 MOUNTING HEIGHTS:**

- A. Hardware shall be mounted at the following heights (center line) unless indicated otherwise:

Item:	Kindergarten	Other
Lever Set	36"	36"
Push Plates	39"	46"
Pulls	36" to bottom of pull	39" to bottom of pull
Exit Devices	36"	39"

B. Where needed in remodel and small addition projects, match existing hardware heights.

**4.05 TOLERANCES**

A. Door undercuts shall not exceed 1/2" (3/8" at thresholds) unless otherwise noted.

B. Door fit tolerances for all doors must meet NFPA requirements.

1. Jamb to door stile -- 1/8" maximum.

2. Head to door head -- 1/8" maximum.

C. Full length (continuous) hinges shall not be installed with any shims, etc. to adjust door fit.

**4.06 ADJUSTING AND CLEANING**

A. Clean, adjust, and lubricate each hardware item in final building environment (air handlers running, smoke seals installed).

B. Check for proper operation.

C. Replace items that cannot be adjusted to operate as intended.

D. Self-closing door devices shall be adjusted to the specifications of appropriate ADA Standards for Accessible Design.

E. Adjust closer spring tension, closer speed, backcheck and latch speed for each device per manufacturer's installation instructions.

**END OF SECTION 08 70 00**