

**SECTION 08 71 00**  
**DOOR HARDWARE**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Hinges and Pivots.
- B. Cylindrical Locksets and Deadbolts.
- C. Cylinders.
- D. Keying.
- E. Exit Devices.
- F. Surface Door Closers.
- G. Miscellaneous Trim.

**1.2 RELATED SECTIONS**

- A. Section 05100 - Structural Metal Framing: Door Frames.
- B. Section 06100 - Rough Carpentry: Door Frames.
- C. Section 07840 - Fire Seals: Fire rated gaskets at perimeter of doors.
- D. Section 08100 - Metal Doors and Frames.
- E. Section 08200 - Wood and Plastic Doors.
- F. Section 08410 - Aluminum Entrance Systems, except cylinders.
- G. Section 08720 - Weatherstripping: Weatherstripping and thresholds.
- H. Section 13710 - Intrusion Detection: Security system.
- I. Section 13720 - Security Access: Card access system.
- J. Section 16100 - Wiring Methods: Electric lock control wiring.

**1.3 REFERENCES**

- A. ANSI A117.1 - American National Standard for Accessible and Useable Buildings and Facilities.
- B. ANSI/BHMA A156.1, "Butts and Hinges" (copyrighted by BHMA, ANSI approved).
- C. ANSI/BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches.

- D. ANSI/BHMA A156.3 - American National Standard for Exit Devices.
- E. ANSI/BHMA A156.4 - American National Standard for Door Controls - Closers.
- F. ANSI/BHMA A156.5 - American National Standard for Auxiliary Locks and Associated Products.
- G. ANSI/BHMA A156.6, "Architectural Door Trim" (copyrighted by BHMA, ANSI approved).
- H. ANSI/BHMA A156.7, "Template Hinge Dimensions" (copyrighted by BHMA, ANSI approved).
- I. ANSI/BHMA A156.8, "Door Controls - Overhead Holders" (copyrighted by BHMA, ANSI approved).
- J. ANSI/BHMA A156.13 - American National Standard for Mortise Locks and Latches Series 1000.
- K. ANSI/BHMA A156.15 - Life Safety Closer/Holder/Release Devices.
- L. ANSI/BHMA A156.16 - Auxiliary Hardware.
- M. ANSI/BHMA A156.18 - Materials and Finishes.
- N. ANSI A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors.
- O. ANSI A156.23 - American National Standard for Electromagnetic Locks
- P. ANSI A156.24 - American National Standard for Delayed Egress Locks
- Q. ANSI A156.25 - American National Standard for Electrified Locking Devices
- R. ANSI A156.28 - American National Standard for Keying Systems
- S. ANSI A156.29 - American National Standard for Exit Locks and Alarms, Exit Locks with Exit Alarms and Alarms for Exit Devices
- T. ANSI A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators
- U. NFPA 80 - Standard for Fire Doors, Fire Windows.
- V. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- W. Underwriters Laboratories (UL). - Fire Resistance Directory.
- X. ANSI/UL 10C - Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
  - 1. Comply with NFPA 80 for fire ratings indicated, based on testing according to NFPA 252.
  - 2. Comply with UL10C, Positive Pressure Fire Tests of Door Assemblies.
- B. Accessibility Requirements: Comply with requirements of Local building code, and Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's catalog cuts on each product to be used.
- C. Shop Drawings: Indicate locations and mounting heights of each type of hardware, schedules, electrical characteristics and connection requirements.
- D. Schedule:
  - 1. Submit schedule indicating each type of hardware for each door.
  - 2. List manufacturer's name with each manufacturer's hardware number together with finishes in US standards.
  - 3. Show door number/location, handing, door and frame material, manufacture and catalog numbers, all finishes and keying information. Explain fully all abbreviations.
- E. Shop Drawings:
  - 1. Indicate locations and mounting heights of each type of hardware.
  - 2. Supply templates to door and frame manufacturer(s) to enable proper and accurate sizing and locations of cut-outs for hardware.
  - 3. Detail any conditions requiring custom extended lip strikes, or any other special or custom conditions.
  - 4. Wiring diagrams including point to point and riser diagrams, function statements and system descriptions for all electrical hardware
- F. Verification Samples: For each finish product specified.
  - 1. If required by the Architect, submit one sample of each type of typical hardware required illustrating style, color, and finish.
  - 2. Approved samples may be incorporated into Work.
- G. Closeout Submittals:
  - 1. Project Record Documents: Schedule showing actual locations of installed cylinders and their master key code.

2. Parts lists and maintenance instructions including data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
3. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A manufacturer with a minimum of ten years experience manufacturing door hardware.
- B. Supplier Qualifications: A supplier with a minimum of two years demonstrated experience in the sale and distribution of builders' hardware for commercial projects and who has successfully completed at least three projects of similar complexity to the project specified.
- C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) or equally qualified person to supervise and prepare all schedules, details, and services required for the project.

#### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually with necessary fasteners and installation templates when necessary; label and identify each package with door opening code to match hardware schedule.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- D. Store materials in a dry, warm, ventilated weathertight location.

#### **1.8 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### **1.9 WARRANTY**

- A. Provide factory warranty against defects in material and workmanship as follows:
  1. Overhead Surface Closers, Grade 1, 25 Year Warranty.
  2. Cylindrical locks, Grade 1, 5 Year Warranty.
  3. Exit Devices, Grade 1, 10 Year Warranty.
  4. Standard and Interchangeable Cylinders, 1 Year Warranty.
  5. Electrical components 2 Year Warranty.
  6. Door Closers and continuous hinges: 10 year warranty.

#### **1.10 MAINTENANCE MATERIALS**

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

#### **1.11 COORDINATION**

- A. Coordinate work with other directly affected components involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
- B. Coordinate work with other directly affected components involving electrical wiring and components.

#### **1.12 INSTRUCTIONS**

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Keying: All cylinders shall be keyed into existing Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Keying information shall be furnished at a later date by the Resident Engineer.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Basis of Design: Dorma Architectural Hardware, which is located at: Dorma Dr. Drawer AC ; Reamstown, PA 17567-0411; Toll Free Tel: 800-523-8483; Tel: 717-336-3881; Email: [request info](mailto:request info); Web: [www.dorma-usa.com](http://www.dorma-usa.com)
- B. Other approved manufactures are: HINGES- McKinney, Ives, Stanley, and PBB. LOCKSETS- Best 93K Series no substitutions. CLOSERS- LCN 4041, and Norton 7500 Series. EXIT DEVICES- Von Duprin 99 Series and Precision 2000 Series. FLATGOODS- Rockwood and Trimco. THRESHOLDS and GASKETING- Pemko and National Guard.
- C. Where S-IS or IS pull side stop arm is specified approved closer manufacture must match the application or provide regular arm closer with an overhead stop.

#### **2.2 HINGES AND PIVOTS**

- A. Hinges: ANSI A156.1, full mortise template type complying with following general requirements unless otherwise scheduled.
  - 1. Widths: Sufficient to clear trim projection when door swings

- 180 degrees.
2. Number: Furnish minimum three hinges to 90 inches (2 286 mm) high, four hinges to 120 inches (3 048 mm) high for each door leaf.
    - a. Fire Rated Doors To 86 inches (2 184 mm) High: Minimum three ball bearing hinges.
    - b. Residential Wood Doors: Furnish minimum two hinges.
  3. Size and Weight: 4-1/2 inch (114 mm) heavy weight typical for 1-3/4 inch (44 mm) doors.
    - a. Doors Over 40 inches (1 016 mm) Wide: Extra heavy weight ball or oilite bearing hinges.
    - b. Doors 1-3/8 inch (35 mm) Thick: 3-1/2 inch (89 mm) size.
    - c. Doors 2 inch (50 mm) Thick: 5 inch (125 mm) extra heavy weight ball or oilite bearing.
    - d. Doors Over 48 inches (1 220 mm) Wide: 5 inch (125 mm) extra heavy weight ball or oilite bearing.
  4. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked outswinging doors, non-rising pins at interior doors.
  5. Tips: Furnish with matching plug.
  6. Material: Steel - Polished and plated.
  7. Material: Stainless Steel at all exterior fire rated doors, and interior doors exposed to high humidity (shower rooms, toilet rooms, kitchens, janitor rooms, etc.) - Polished and satin finished.

### **2.3 CYLINDRICAL LOCKSETS AND DEADBOLTS**

- A. Lockset: BEST 93K Series, Heavy Duty.
  1. Standards:
    - a. ANSI Conformance - ANSI A156.2, Series 4000, Grade 1.
    - b. U.L. and C.U.L. listed for use on 3-hour fire-rated doors and for all positive pressure applications.
    - c. U.L. and C.U.L. listed for UL 10B/10C and UBC 7.2 (1997).
    - d. Lever trim meets ANSI A117.1 and ADA requirements.
  2. Features:
    - a. Stainless steel latch.
    - b. Auxiliary deadlocking latch bolt.
    - c. Cast stainless steel latch retractor with bronze bearings.
    - d. Lock chassis constructed of steel and stainless steel components.
    - e. Key-in-lever lock through-bolted.
  3. Trim:
    - a. Lever: 14D, 3-1/2 inch rose.
  4. Finish:
    - a. Chrome: 626 (Satin).

### **2.4 CYLINDERS**

- A. Interchangeable Core Lock Cylinder: ANSI A156.5.
  1. Pin Count: 7 Pin. All cylinders shall be compatible with BEST locksets.

### **2.5 KEYING**

- A. Keying:
  1. Keying: Factory Keyed to existing Best system.

2. Keying: Factory Keyed as directed by Architect and Owner.
  3. Keying: Factory Master keyed.
  4. Keying: Factory Grand master keyed.
  5. Include construction keying.
  6. Interchangeable Core with temporary construction cores.
  7. Supplier must submit key schedule for approval before ordering the hardware.
- B. Keys:
1. Nickel silver. Stamp keys with "DO NOT DUPLICATE".
  2. Supply keys in the following minimum quantities:
    - a. Master keys 2.
    - b. Grand master keys 2.
    - c. Construction keys 10.
    - d. Change keys 2.
- C. Key Cabinet:
1. Construction: Sheet steel or aluminum construction, piano hinged door with cylinder type lock master keyed to building system.
  2. Size: Size for Project keys plus sufficient space for 10 percent growth.
  3. Key and key hook labeling system.
  4. Finish:
    - a. Manufacturer's standard as selected by the Architect.

## 2.6 EXIT DEVICES

- A. General:
1. DORMA exit devices are listed by U.L. and C.U.L. under their continuing reinspection programs and conform to standards U.L. 10C and U.B.C. 7-2 (1997) positive pressure testing. They are BHMA certified to the requirements of ANSI A156.3 for Grade 1 exit devices.
  2. Exit Devices: Exit devices shall be type and function as listed in hardware sets. Use fire exit hardware where exit devices are scheduled for fire door assemblies. Where lever handle trim is specified, match lever trim on locksets. Furnish free wheeling lever trim as standard. Construct device touchbar, rail and cover assemblies of heavy gauge solid wrought materials for true architectural finishes. Provide cylinder dogging on all non-rated devices. Furnish all devices with stainless 3/4 inch (19 mm) throw deadlocking latchbolts.
  3. All exit devices must have past a 2.5 million cycle test.
- B. 9000 Series Heavy Duty Exit Device: ANSI A156.3, Grade 1, heavy duty exit devices.
1. Model: 9300 Rim Device, panic listed only.
  2. Model: F9300 Rim Device, panic and fire listed.
  3. Model: 9400 Surface Vertical Rod Exit Device, panic listed only.
  4. Model F9400 Surface Vertical Rod.
  5. Strikes: Provide types suitable for opening.
  6. Finish:
    - a. Stainless: 630 (Satin).
- C. Removable Mullions:

1. F1340KR-8 Key Removable Steel Mullion: For use with U.L. listed fire exit devices. Standard in 8 foot length.
  - a. Finish: Prime 600.
2. 1340KR-8 Key Removable Steel Mullion: 8 foot non-fire rated
  - a. Finish: Prime 600.

## 2.7 SURFACE DOOR CLOSERS

- A. Closers used in conjunction with overhead stops and holders shall be templated and coordinated to function properly. Properly detail closers to meet application requirements by providing drop plates, brackets, etc. to meet application and installation requirements as indicated.
- B. 8900 Series: ANSI A156.4, Grade 1, heavy duty surface door closer.
  1. Model 8916 for interior and exterior applications features adjustable spring sizes from 1 to 6 and meets ANSI A117.1 and ADA for barrier-free accessibility.
  2. Model 8956 features adjustable spring sizes from 5 to 6 plus 50 percent adjustment for wide, tall or heavy doors.
  3. Compliant with UL10C and UBC 7.2 (1997) for positive pressure.
  4. Certified to 10 million cycles by a recognized test lab.
  5. Non-handed.
  6. Featuring full range spring power adjustment and backcheck, with a narrow projection full cover and flatform style arm.
  7. Door control also features a backcheck positioning adjustment for parallel arm applications, to maintain an ANSI backcheck range similar to regular and top jamb applications.
  8. Independent sweep and latch non-critical closing speed adjustment.
  9. Finish: As specified in the Door Hardware Schedule.
  10. Standard Sprayed Finish: As selected.
    - a. 689 (Aluminum).
- C. Spring Assist Arm Dead Stop: ANSI A156.4, Grade 1, DORMA Spring Assist Arm Systems for high volume high traffic applications. Meets requirements for UL10C and UBC 7.2 (1997) for positive pressure (non-hold open).
  1. Model S-DS heavy duty, dead stop, parallel arm, pull side mount.
  2. Model S-IS regular, dead stop and top jamb mount, push side mount.
  3. Arms:
    - a. Heavy-Duty Parallel Arm x Spring Door Saver:
    - b. Regular x Spring Integra Stop Arm:
    - c. Top Jamb x Spring Integra Stop Arm
  4. Finish: 689 (Aluminum).

## 2.8 MISCELLANEOUS TRIM

- A. Push/Pulls: ANSI A156.6; push plates minimum 0.050 inch (1.27 mm) thick.
  1. Type:
    - a. Push-pull plate.
  2. Size: Push plates shall be ANSI J302, size 4 inches (102 mm) by 16 inches (406 mm), thickness .050 inch.
  3. Size: Pull plates shall be ANSI J405, size 4 inches (102 mm) by



- 16 inches (406 mm), thickness .050 inch.
  - 4. Cut plates for cylinder or thumb piece when used with deadlock.
  - 5. Provide with through bolts to secure from opposite door face.
  - 6. Finish: As specified in the Door Hardware Schedule.
- B. Flush Bolts: ANSI A156.16 Grade 1 top and bottom flush bolts, with dust-proof floor strike.
- 1. Manual.
  - 2. Automatic.
  - 3. Provide as indicated on the Schedule.
  - 4. Finish: As specified in the Door Hardware Schedule.
- C. Kickplates, Mop Plate, Armor Plates: ANSI A156.6, metal; height indicated in Schedule, by 2 inch (25 mm) less than door width:
- 1. Minimum 0.050 inch (1.27 mm) thick stainless steel.
  - 2. Width: 2 inches (51 mm) less than the width of each door..
- D. Stops: Provide for all doors to control the desired limit of opening helping to prevent damage to adjacent walls, columns, equipment, the door or its hardware
- 1. Provide floor or wall stops when overhead stops have not been listed except in areas where their location would impede traffic. Stops of correct height shall be used on exterior and interior doors.
  - 2. Doors with surface closers may be provided with S-DS or S-IS dead stop arms
  - 3. Use roller type stops in areas where the interfering swing of one door may cause damage through contact with another door.
  - 4. Wall Stops: ANSI A156.1, Grade 1, with no visible screws:
    - a. Concave pad wall stop.
    - b. Finish: As specified in the Door Hardware Schedule.
- E. Heavy Duty Door Stops and Holders: 900 Heavy-Duty door stops and holders. Conforms to ANSI A156.8 Grade 1.
- 1. Type:
    - a. 900S: Surface applied stop only.
    - b. 900H: Surface applied stop and hold open.
  - 2. Built-in cushioned stop
  - 3. Non-handed
  - 4. Standard Sprayed Finish: As selected.
    - a. 689 (Aluminum).
- F. Silencers for Metal Door Frames: ANSI A156.16, Type L03011; grey rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame, specifically designed to form an air pocket to absorb shock and reduce noise of door closing. Provide 2 silencers for each pair of doors, 3 silencers for each single door.
- G. All thresholds must comply with ADA guidelines.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.

- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.
- C. Verify electric power is available to power operated devices and is of correct characteristics.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- C. Install with fasteners provided by hardware item manufacturer.
- D. Adjust hardware for smooth operation.

### 3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### HARDWARE SCHEDULE

#### Manufacture's Abbreviations:

- 1. PBB Hinges-PBB
- 2. Best-BE no substitutions
- 3. DORMA-DM
- 4. Rockwood-RW
- 5. Pemko-PM
- 6. Rixson-RX

All finishes, lever design, and locksets must match existing.

#### Hardware Set 01:

Opening: 1074

3 Hinges 4B81 4 ½ x 4 ½	626	PBB
1 Lockset 93K7R14D (classroom)	626	BE
1 Closer 8916 DS	689	DM
1 Kickplate K1050 10 x 2" LDW	630	RW
1 Wallstop 409	630	RW
1 Set of Smoke Gasketing S88D 20'		PM

#### Hardware Set 02:

Opening: 1073

3 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Lockset 93K7N14D (passage)	626	BE
1 Kickplate K1050 10 x 2" LDW	630	RW
1 Wall Stop 409	630	RW

3 Silencers 608	Grey	RW
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**Hardware Set 03:**

Opening: 402; 503; 504; 602; 603; 1070; 1075

3 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Lockset 93K7D14D TL Knurled (storeroom)	626	BE
1 Closer 8916 AF89P	689	DM
1 Kickplate K1050 10 x 2" LDW	630	RW
1 Wall Stop 409	630	RW
1 Set of Smoke Gasketing S88D 17'		PM

**Hardware Set 04:**

Opening: 401; 502; 601

6 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Lockset 93K7D14D TL Knurled (storeroom)	626	BE
2 Flushbolts 557 12"	626	RW
1 Dust Proof Strike 570	626	RW
2 Closers 8916 DS	689	DM
2 Kickplates K1050 10 x 2" LDW	630	RW
1 Set of Smoke Gasketing S88D 22'		PM

**Hardware Set 05:**

Opening: 403; 500; 1076

1 Exit Device F9300 x YC09C	630	DM
1 Mortise Cylinder	626	BE
Reuse all other existing hardware		

**Hardware Set 06:**

Opening: NOT USED

**Hardware Set 07:**

Opening: 400

3 Hinges 4B81 4 ½ x 4 ½	626	PBB
1 Lockset 93K7D14D TL Knurled (storeroom)	626	BE
1 Closer 8916 DS	689	DM
1 Kickplate K1050 10 x 2 " LDW	630	RW
1 Wallstop 409	630	RW
1 Set of Smoke Gasketing S88D 20'		PM

**Hardware Set 08:**

Opening: 501; 600; 604

3 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Exit Device F9300 x YC09C	630	DM
1 Mortise Cylinder	626	BE
1 Closer 8916 AF89P	689	DM
1 Kickplate K1050 10 x 2" LDW	630	RW
1 Wall Stop 409	630	RW
1 Set of Smoke Gasketing S88D 17'		PM

**Hardware Set 09:**

Opening: 1071

3 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Exit Device 9300 x YC09C	630	DM
1 Overhead Stop 9-336	630	RX
1 Kickplate K1050 10 x 2" LDW	630	RW
1 Weatherstrip 303 AS 1x36" 2x84" TKSP8		PE
1 Raindrip 346 C 40" TKSP8		PE
1 Threshold 2005 AT 36"		PE

Note: Knurled lever at exterior

**Hardware Set 10:**

Opening: 1072

6 Hinges BB81 4 ½ x 4 ½	626	PBB
1 Exit Device 9300 x YC09C	630	DM
2 Flushbolts 557 12"	626	RW
1 Dustproof Strike 570	626	RW
2 Overhead Stop 9-336	630	RX
2 Kickplate K1050 10 x 2" LDW	630	RW
1 Weatherstrip 303 AS 1x72" 2x84" TKSP8		PE
1 Raindrip 346 C 76" TKSP8		PE
1 Threshold 2005 AT 72"		PE

Note: Knurled lever at exterior  
Astragal by door manuf.

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