

SECTION 08700

BUILDERS' HARDWARE
03/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
ASTM F 883	(1997) Padlocks

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA L & R Directory	(Effective thru Jun 1999) Directory of Certified Locks & Latches
BHMA Closer Directory	(Effective thru Jul (1999) Directory of Certified Door Closers
BHMA Exit Devices Directory	(Effective thru Aug 1998) Directory of Certified Exit Devices
BHMA A156.1	(1997) Butts and Hinges
BHMA A156.2	(1996) Bored and Preassembled Locks and Latches
BHMA A156.3	(1994) Exit Devices
BHMA A156.4	(1992) Door Controls - Closers
BHMA A156.5	(1992) Auxiliary Locks & Associated Products
BHMA A156.6	(1994) Architectural Door Trim
BHMA A156.7	(1997) Template Hinge Dimensions
BHMA A156.8	(1994) Door Controls - Overhead Stops and Holders
BHMA A156.13	(1994) Mortise Locks & Latches
BHMA A156.15	(1995) Closer Holder Release Devices

BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.17	(1993) Self Closing Hinges & Pivots
BHMA A156.18	(1993) Materials and Finishes
BHMA A156.19	(1997) Power Assist and Low Energy Power Operated Doors
BHMA A156.20	(1996) Strap and Tee Hinges and Hasps
BHMA A156.21	(1996) Thresholds
BHMA A156.23	(1992) Electromagnetic Locks
BHMA A156.24	(1992) Delayed Egress Locks

DOOR AND HARDWARE INSTITUTE (DHI)

DHI Keying Systems	(1989) Keying Systems and Nomenclature
DHI Locations for CSD	(1997) Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames
DHI Locations for SSD	(1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
DHI ANSI/DHI A115.1G	(1994) Installation Guide for Doors and Hardware
DHI ANSI/DHI A115-W	(Varies) Wood Door Hardware Standards (Incl A115-W1 thru A115-W9)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1999) Fire Doors and Fire Windows
NFPA 101	(1997; Errata 97-1; TIA-97-1) Life Safety Code
NFPA 105	(1999) Installation of Smoke-Control Door Assemblies

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Hardware and Accessories; [_____].

Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions. Spare parts data for locksets, exit devices, closers, electric locks, electric strikes, electro-magnetic closer holder

release devices, and electric exit devices, after approval of the detail drawings, and not later than [1] [3] [_____] month(s) prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

SD-04 Drawings

Hardware Devices; GA.

Detail drawings for hardware devices for computerized keying systems, magnetic cards, keyless push button access control systems, and other electrical hardware devices showing complete wiring and schematic diagrams and other details required to demonstrate proper function of units.

SD-07 Schedules

Hardware Schedule; [_____] .

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; the ANSI number specified, sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

Keying Schedule; GA.

Keying schedule developed in accordance with DHI Keying Systems, after the keying meeting with the user.

SD-13 Certificates

Hardware and Accessories; [_____] .

The hardware manufacturer's certificates of compliance stating that the supplied material or hardware item meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of the product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply. A statement that the proposed hardware items appear in BHMA L & R Directory, BHMA Closer Directory and BHMA Exit Devices Directory directories of certified products may be submitted in lieu of certificates.

1.3 PREDELIVERY CONFERENCE

Upon approval of the Hardware Schedule, the construction Contractor shall arrange a conference with the hardware supplier, Contracting Officer and the using agency to determine keying system requirements. Location of the key control storage system, set-up and key identification labeling will also be determined.

1.4 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified

with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

1.5 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, unique wrenches, and dogging keys, shall be provided as required to adjust hardware items.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.7 OPERATION AND MAINTENANCE MANUALS

[Six] [_____] complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides shall be provided. The instructions for electric locks, electric strikes, electro-magnetic closer holder release devices, and electric exit devices shall include simplified diagrams as installed.

PART 2 PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

2.3.1 Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

2.3.2 Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

2.3.3 Pivot Hinges

Pivot hinges shall conform to BHMA A156.4.

2.3.4 Spring Hinges

Spring hinges shall conform to BHMA A156.17.

2.3.5 Electric Hinges

Electric hinges shall conform to BHMA A156.1 with modification of added electric wires to insure correct operation of electric hardware items.

2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks, and all components thereof, including cylinders and removable cores, shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Strikes for wood frames and pairs of wood doors shall be furnished with wrought boxes.

2.4.1 Mortise Lock and Latchsets

Mortise lock, latchsets, and strikes shall be series 1000 and shall conform to BHMA A156.13, operational Grade 1. [Strikes for security doors shall be rectangular without curved lip.] Mortise type locks and latches for doors 44 mm 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

2.4.2 Bored Lock and Latchsets

Bored lock, latchsets, and strikes shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Bored type locks and latches for doors 35 mm 1-3/8 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

2.4.3 Electro-Mechanical Locks

Electro-mechanical locks shall allow for [locking] [or] [unlocking] of doors from a remote location by means of [push buttons] [card reader] [_____]. Locks shall be [fail safe mode (unlocked when power is off)] [fail secured mode (exterior side only locked when power is off)]. Locks shall be mortise series conforming to BHMA A156.13 and bored series conforming to BHMA A156.2 with factory installed electric lock modification or manufactured electro-mechanical locks conforming to BHMA A156.13 or BHMA A156.2 test standards. [In hazardous locations, products shall use safe power supplies or be pneumatic.]

2.4.4 Auxiliary Locks and Associated Products

Bored and mortise dead locks and dead latches, narrow style dead locks and dead latches, rim latches, dead latches, and dead bolts, and electric strikes shall conform to BHMA A156.5. [Bolt and latch retraction shall be dead bolt style.] Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1. Electric strikes shall be [locked] [or] [unlocked] from a remote location in [fail safe] [fail secured] mode. Electric strike for rated openings shall be fail secured.

2.4.5 Lock Cylinders (Mortise, Rim and Bored)

Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than [six] [seven] pins. [Cylinders shall have key removable type cores.] [A [great] [grand] master keying system shall be provided.] [An extension of the existing keying system shall be provided. The cylinders shall be compatible with existing locks that were manufactured by [____], [do not] have interchangeable cores and have a [____] type keyway.] [[A construction master keying system] [Construction interchangeable cores] shall be provided.] [Disassembly of knob or lockset shall not be required to remove core from lockset.] [All locksets, lockable exit devices, and padlocks shall accept same interchangeable cores.]

2.4.6 Locksets for Lead-Shielded Doors

Locksets for lead-shielded doors shall be provided with factory-installed lead linings. Lead linings shall not be less than the thickness of the lead in the door in which the lockset is required.

2.4.7 Padlocks

Padlocks shall conform to ASTM F 883, Type [PO1] [____], Option[s] [A, B and G] [____]. Grade [6] [____]. [All padlocks shall be keyed alike]. [All padlocks shall be keyed into master key system].. Straps, tee hinges, and hasps shall conform to BHMA A156.20.

2.4.8 Push/Pull Latches

2.4.9 Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirement of BHMA A156.2 or BHMA A156.13, knobs, lever handles, roses, and escutcheons shall be 1.27 mm 0.050 inch thick, if unreinforced. If reinforced, the outer shell shall be 0.89 mm0.035 inch thick and the combined thickness shall be 1.78 mm0.070 inch except that knob shanks shall be 1.52 mm 0.060 inchthick. Knob diameter shall be 54 to 57 mm. 2-1/8 to 2-1/4 inches.Lever handles shall be of plain design with ends returned to no more than 10 mm 1/2 inch from the door face.

2.4.10 Electromagnetic Locks

Electromagnetic locks shall allow for [locking] [or] [unlocking] of doors from a remote location by means of [push buttons] [card reader] [____]. Electromagnetic locks shall be fail safe (unlocked when power is off) and shall conform to BHMA A156.23. [In hazardous locations, products shall use safe power supplies.]

2.5 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1.

2.5.1 Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for rim type and vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and

vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. [Touch bars [may] [shall] be provided in lieu of conventional crossbars and arms.] [Escutcheons shall be provided not less than 175 by 55 mm. 7 by 2-1/4 inches. Escutcheons shall be cut to suit cylinders and operating trim.]

2.5.2 Door Coordinator

Door coordinator with carry bar shall be Type 21 and shall be provided for each pair of doors equipped with an overlapping astragal. The coordinator may be [gravity] [mechanically] operated and shall be capable of holding the active door of a pair open until the inactive door has preceded it in the closing cycle. When used as fire exit hardware, the coordinator and carry bar shall be listed or labeled by a nationally recognized independent testing laboratory.

2.5.3 Removable Mullions

Removable mullions shall be Type 22 of the box type and shall be used only with those exit devices for which the mullions were manufactured. Mullions shall be furnished with mullion stabilizers of the same manufacturer.

2.5.4 Electric Exit Devices

Electric exit devices shall conform to BHMA A156.3 with factory installed electric lock modification having the capability to [lock] [or] [unlock] from remote location by means of [push button] [card reader] [_____]. Exit devices shall comply with life safety requirements of NFPA 101. [In hazardous locations, products shall use safe power supplies or be pneumatic.]

2.5.5 Automatic Flush Bolts

Automatic flush bolts shall be Type 25 in accordance with BHMA A156.3, and shall be installed at the top and bottom of the inactive leaf of pairs of fire rated doors where specified in the hardware sets. Flush bolts shall be mortised in the strike edge of the door.

2.6 DELAYED EGRESS LOCKS

Delayed egress locking devices shall comply with BHMA A156.24. Each delayed egress lock shall have a sign that reads "PUSH UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN [15] [_____] SECONDS". Sign letters shall be 25.4 mm 1 inch high with 3 mm 1/8 inch wide stroke. The sign shall be for mounting on the [door] [wall] near the delayed egress lock. [In hazardous locations, products shall use safe power supplies.]

2.7 KEYING

Locks shall be keyed in sets or subsets as scheduled. [Locks shall be furnished with the manufacturer's standard construction key system.] Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks:	3 change keys each lock.
Master keyed sets:	[_____] keys each set.
Grand master keys:	[_____] total.
[Control keys:	[_____] total.]

[Construction keys: [_____] total.]
 [Blank keys: [_____] total.]

The keys shall be furnished to the Contracting Officer arranged [in a container] [for key control system storage] in sets or subsets as scheduled.

2.8 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified. The opening resistance of closing devices shall not exceed 67 N 15 lbf applied at the latch stile or exceed 22 N 5 lbf where low opening resistance is scheduled.

2.8.1 Surface Type Closers

Surface type closers shall be Grade 1, Series [C01000 with options PT-4C and PT-4D] [C02000 Standard Cover] [C02000 Full Cover] [C03000] with options PT-4H, Size 1 or 2 through Size 6, and PT-4D with back check position valve. [Closers for screen and storm doors shall be Type C09353.] Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.

2.8.2 Floor Closers and Pivots

Floor closers shall be Grade 1 with internal dead stop for all exterior doors. Floor closers shall have cement boxes. Pivots used on doors with floor closers shall be of the same manufacturer as the floor closers. Floor plates are not required where thresholds cover the closer cement box. Floor closers shall have independent latch and sweep speed adjusting valves, backcheck, mechanical selective hold-open (except fire rated openings), and optional delayed action. Setting tools shall be furnished for use in installing floor closers. Electric pivots and floor closers shall comply with BHMA A156.4 with modifications to ensure correct operation of electric hardware items.

2.9 DOOR CONTROLS - OVERHEAD HOLDERS

Door controls - overhead holders shall conform to BHMA A156.8.

2.10 SMOKE DETECTORS AND ELECTRO-MAGNETIC HOLDERS

[[Electro-magnetic door holders] [electro-mechanical door holders] [door closers with integral hold-open device] shall conform to BHMA A156.15 and shall release the door upon activation of [the building fire alarm system] [a ceiling mounted smoke detector] or interruption of electric power.] [Door closers with integral hold-open device and detector which senses visible and invisible particles of combustion shall conform to BHMA A156.15. The door shall be released upon activation of the detector or interruption of electric power.]

2.11 POWER ASSIST AND LOW ENERGY POWER OPERATORS

Power assist and low energy power operators shall conform to BHMA A156.19 and shall be [electrically] [pneumatically] operated.

2.12 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

2.12.1 Door Protection Plates

2.12.1.1 Armor Plates

Armor plates shall be Type [J105 plastic, [_____] in color,] [J101 [aluminum] [brass] [stainless steel],] 900 mm 36 inches in height, and 50 mm 2 inches less in width than the width of the door for single doors and 25 mm 1 inch less for pairs of doors. Edges of metal plates shall be [square] [beveled]. Where the door has a louver panel, the armor plate shall be omitted if top of louver frame is more than 500 mm 20 inches above the bottom of the door.

2.12.1.2 Kick Plates

Kick plates shall be Type [J106 plastic, [_____] in color.] [J102 [aluminum] [brass] [stainless steel].] Width of plates shall be 50 mm 2 inches less than door width for single doors and 25 mm 1 inch less for pairs of doors. Height shall be [250] [300] [400] mm, [10] [12] [16] inches, except where the bottom rail is less than [250] [300] [400] mm [10] [12] [16] inches the plate shall extend to within 13 mm 1/2 inch of the panel mold or glass bead. Edges of metal plates shall be [square] [beveled].

2.12.1.3 Mop Plates

Mop plates shall be Type [J107 plastic [_____] in color.] [J103 [aluminum] [brass] [stainless steel].] Width of plates shall be 50 mm 2 inches less than door width for single doors and 25 mm 1 inch less for pairs of doors. The height shall be 100 mm. 4 inches. Edges of metal plates shall be [square] [beveled].

2.12.2 Door Edge Guards

Door edge guards shall be furnished to protect door edges with the required cut-outs for hardware items such as hinges, flush bolts, and locks. Door edge guards shall satisfy fire door ratings. Door edge guards shall be Type [_____] 1.27 mm 0.50 inch thick [aluminum] [stainless steel].

2.12.3 Push Plates

2.12.3.1 Combination Push-Pull Plates

Combination push-pull plates shall be Type J303, 1.27 mm 0.050 inch thick minimum [aluminum] [brass] [stainless steel] beveled four edges.

2.12.3.2 Flat Plates

Flat plates shall be [Type J301 1.27 mm 0.50 inch thick] [aluminum] [brass] [bronze] [stainless steel] [Type J304 3.2 mm 1/8 inch thick plastic, [_____] in color], size [_____] . Edges of metal plates shall be [square] [beveled].

2.12.4 Door Pulls and Push/Pull Units

2.12.4.1 Arm Pulls

Arm pulls shall be Category J400, double base, [aluminum] [brass] [stainless steel].

2.12.4.2 Drop Ring Pulls

Drop ring pulls shall be Type J404, [aluminum] [brass] [stainless steel].

2.12.4.3 Door Pulls

Door pulls shall be Category J400 [aluminum] [brass] [stainless steel] of plain modern design. Pulls for hollow metal, mineral core wood or kalamein doors shall be Type J405 thru-bolted to Type J301 flat push plates.

2.12.5 Push and Pull Bars

Push and pull bars shall be Category J500, [aluminum] [brass] [stainless steel]. Edges of mounting plates shall be [square] [beveled].

2.13 AUXILIARY HARDWARE

Auxiliary hardware, consisting of [_____] [door holders,] [door stops,] [and] [roller latches], shall conform to BHMA A156.16. [Lever extension flush bolts shall be Type L14081.] [Dust-proof strikes shall be Type L04011 for doors that are not fire rated. Dust-proof strikes shall be Type L04021 for fire rated doors.] Other auxiliary hardware of the types listed below, shall conform to BHMA A156.16.

Garment Hooks: [_____] Garment Rods: [_____]

Hand Rail Brackets: [_____] Coat Hook: [_____]

2.14 MISCELLANEOUS

2.14.1 Automatic Door Bottoms

Automatic door bottoms shall be [surface] [mortised] [semi-mortised] type with aluminum housing cover, [anodized clear] [anodized bronze color] finish. Door bottom shall have a wool, felt, rubber, vinyl, or neoprene seal and shall be actuated by the opening and closing of the door. The door bottom shall exclude light when the door is in the closed position and shall inhibit the flow of air through the unit.

2.14.2 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be [extruded aluminum] [bronze] of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping. [Thresholds for use with floor closers shall conform to BHMA A156.4.] [Latching thresholds shall be of such height that the bottom of the door shall be 3 mm 1/8 inch over the tread of the threshold and 3 mm 1/8 inch below the top of the stop.] [Where required, thresholds shall be modified to receive projecting bolts of [flush bolts] [exit devices].] [Thresholds for doors accessible to the handicapped shall be beveled with slopes not exceeding 1:2 and with heights not exceeding 13 mm. 1/2 inch.] [Air leakage rate of weatherstripping shall not exceed 0.775 liters per

second per lineal meter 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.]

2.14.3 Rain Drips

Extruded aluminum, not less than 1.78 mm 0.07 inch thick, [mill finished] [clear anodized] [bronze anodized] [painted]. Door sill rain drips shall be 38 mm to 44 mm 1-1/2 inches to 1-3/4 inches high by 16 mm 5/8 inch projection. Overhead rain drips shall be approximately 38 mm 1-1/2 inches high by 63 mm 2-1/2 inches projection and shall extend 50 mm 2 inches on either side of the door opening width.

2.14.4 Aluminum Housed Type Weatherseals

Weatherseals of the type indicated shall consist of extruded aluminum retainers not less than 1.78 mm 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be [clear (natural)] [bronze] anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions. Air leakage rate of weatherstripping shall not exceed 0.775 liters per second per lineal meter 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.14.5 Gasketing

Gasketing shall be a compression type seal, silicon based, self-adhesive product for use on steel door frames with [wood] [steel] doors for [20-minute] [45 minute C-label] [1-hour B-label] [1-1/2 hour B-label]. Color shall be [white] [bronze]. Air leakage rate of weatherstripping shall not exceed 0.775 liters per second per lineal meter 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.14.6 Key Control Storage System

Key control storage system shall conform to BHMA A156.5, Type [____], capacity [____], and shall be properly labeled for key identification. Set up, identification labeling and location of the key control storage shall be as directed at the Predelivery Conference.

2.14.7 Door Stops

Wall stops, floor stops and combination stop and holders shall conform to BHMA A156.16.

2.15 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

2.16 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18. Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

2.17 HARDWARE FOR FIRE DOORS

Hardware for fire doors shall conform to the requirements of NFPA 80 and NFPA 101.

PART 3 EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI Locations for CSD and DHI Locations for SSD, except that deadlocks shall be mounted 1220 mm 48 inches above finish floor. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI ANSI/DHI A115.1G or DHI ANSI/DHI A115-W. Door control devices for exterior doors such as closers and holders, shall be attached to doors with thru bolts and nuts or sex bolts. Alternate fastening methods may be approved by the Contracting Officer when manufacturers' documentation is submitted to verify that the fastening devices and door reinforcements are adequate to resist wind induced stresses. Electric hardware items and access control devices shall be installed in accordance with manufacturer's printed installation procedures.

3.1.1 Hardware for Fire Doors and Smoke-Control Door Assemblies

Hardware for fire doors shall be installed in accordance with the requirements of NFPA 80. Exit devices installed on fire doors shall have a visible label bearing the marking "Fire Exit Hardware". Other hardware installed on fire doors, such as locksets, closers, and hinges shall have a visible label or stamp indicating that the hardware items have been approved by an approved testing agency for installation on fire-rated doors. Hardware for smoke-control door assemblies shall be installed in accordance with NFPA 105.

3.1.2 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.3 Key Control Storage Systems

Key control storage system shall be [installed where directed] [furnished to the Contracting Officer].

3.1.4 Kick Plates and Mop Plates

Kick plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors. Mop plates shall be installed on the pull side of the single acting doors.

3.1.5 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

3.1.6 Thresholds

Thresholds shall be secured with a minimum of three fasteners per single door width and six fasteners per double door width with a maximum spacing of 300 mm. 12 inches. Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws, except that bronze or anodized bronze thresholds shall be installed with expansion anchors with brass screws. Minimum screw size shall be No. 10 length, dependent on job conditions, with a minimum of 19 mm 3/4 inch thread engagement into the floor or anchoring device used.

3.1.7 Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbet. Drips shall be set in sealant and fastened with stainless steel screws.

3.1.8 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

3.1.9 Gasketing

Gasketing shall be installed at the inside edge of the hinge and head and latch sides of door frame. Frames shall be toleranced for a 3 mm 1/8 inch clearance between door and frame. Frames shall be treated with tape primer prior to installation.

3.2 OPERATIONAL TESTS

Prior to acceptance of any electrical hardware system, an operational test shall be performed to determine if devices are operating as intended by the specifications. Wiring shall be tested for correct voltage, current carrying capacity, and proper grounding. Stray voltages in lock wiring shall be eliminated to prevent locking devices from releasing in critical situations.

3.3 FIELD QUALITY CONTROL

[Architectural Hardware Consultant] [Supplier] shall inspect the completed installation and certify that the hardware has been furnished and installed in accordance with the manufacturers' instructions [and as specified]. The inspection report shall identify any malfunctioning items and recommend adjustment or replacement as appropriate.

3.4 HARDWARE SETS

HW-1 []
 HW-2 []
 HW-3 []

-- End of Section --