SECTION 08 71 00

DOOR HARDWARE
02/16

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 within the text by the basic designation only.

JAPANESE STANDARDS ASSOCIATION (JSA)

JIS A 1510-2	(2019) Test Method for Door Fittings - Part 2: Fittings for Doors
JIS A 1510-3	(2001) Test Methods for Door Fittings - Part 3: Floor Concealed Door Closers, Door Closers and Hinge Closers
JIS A 1516	(1998) Windows and Doorsets - Air Permeability Test
JIS A 1541-1	(2016) Building Hardware - Locks and Latches - Part 1: Test Methods for Locks and Latches
JIS A 1541-2	(2016) Building Hardware - Locks and Latches - Part 2: Methods of the Presentation and Grade of Criteria for Practical Performance Item
JIS A 1525	(1996) Doorsets - Repeated and Opening and Closing Test
JIS A 1551	(2014) Test Method for Automatic Door Opener
JIS A 4702	(2021) Doorsets
JIS A 4721	(2005) Automatic Revolving Door - Safety
JIS A 4722	(2017) Power Operated Pedestrian Door Sets - Safety
JIS A 5756	(2013) Preformed Gaskets Used in Buildings - Classification, Specifications and Test Methods

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2021; TIA 21-1) Life Safety Code
NFPA 252	(2022) Standard Methods of Fire Tests of Door Assemblies

NFPA 70	(2023; ERTA 7 2023; TIA 23-15) National Electrical Code
NFPA 72	(2022; ERTA 22-1) National Fire Alarm and Signaling Code
NFPA 80	(2022) Standard for Fire Doors and Other Opening Protectives

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

UNDERWRITERS LABORATORIES (UL)

UL 14C	(2006; Reprint Jul 2017) UL Standard for Safety Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs
UL 437	(2013) Standard for Key Locks
UL Bld Mat Dir	(updated continuously online) Building Materials Directory

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Manufacturer's Detail Drawings; G[, [_____]]

Verification of Existing Conditions; G[, [_____]]

Hardware Schedule; G[, [_____]]

Keying System; G[, [_____]]

SD-08 Manufacturer's Instructions

Installation

SD-10 Operation and Maintenance Data

Hardware Schedule Items, Data Package 1; G[, [_____]]

SD-11 Closeout Submittals

Key Bitting

1.3 SHOP DRAWINGS

Submit manufacturer's detail drawings indicating all hardware assembly components and interface with adjacent construction.[Indicate power components and wiring coordination for electrified hardware.] Base shop drawings on verified field measurements and include verification of existing conditions.

1.4 PRODUCT DATA

Indicate fire-ratings at applicable components. Provide documentation of ABA/ADA accessibility compliance of applicable components, as required by 36 CFR 1191 Appendix D - Technical.

1.5 HARDWARE SCHEDULE

Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publi-cation Type No.	Finish	Mfr Name and Catalog No.	Key Control Symbols	UL Mark (If fire-rated and listed)	BHMA Finish Desig-nation

In addition, submit hardware schedule data package 1 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.6 KEY BITTING CHART REQUIREMENTS

1.6.1 Requirements

Submit key bitting charts to the Contracting Officer prior to completion of the work. Include:

a. Complete listing of all keys.

b. Complete listing of all key cuts.

c. Tabulation showing which key fits which door.

d. Copy of floor plan showing doors and door numbers.

e. Listing of 20 percent more key cuts than are presently required in each master system.

1.7 QUALITY ASSURANCE

1.7.1 Hardware Manufacturers and Modifications

Provide, as far as feasible, locks, hinges,[pivots,] and closers of one lock, hinge,[pivot,] or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

1.7.2 Key Shop Drawings Coordination Meeting

Prior to the submission of the key shop drawing, the Contracting Officer, Contractor, Door Hardware Subcontractor, using Activity and Base Locksmith must meet to discuss and coordinate key requirements for the facility.

1.8 DELIVERY, STORAGE, AND HANDLING

Deliver hardware in original individual containers, complete with necessary appurtenances including fasteners and instructions. Mark each individual container with item number as shown on hardware schedule.[Deliver permanent keys[and removable cores] to the Contracting Officer, either directly or by certified mail. Deliver construction master keys with the locks.]

PART 2 PRODUCTS

2.1 TEMPLATE HARDWARE

Hardware applied to metal [or to prefinished]doors must be manufactured using a template. Provide templates to door and frame manufacturers in accordance with JIS A 1510-2 for template hinges. Coordinate hardware items to prevent interference with other hardware.

2.2 HARDWARE FOR FIRE DOORS AND EXIT DOORS

Provide all hardware necessary to meet the requirements of NFPA 72 for door alarms, NFPA 80 for fire doors, NFPA 101 for exit doors, NFPA 252 for fire tests of door assemblies, ABA/ADA accessibility requirements, and all other requirements indicated, even if such hardware is not specifically mentioned in paragraph HARDWARE SCHEDULE.[Provide swinging hardware for tin-clad fire doors in accordance with UL 14C.] Provide Underwriters Laboratories, Inc. labels for such hardware in accordance with UL Bld Mat Dir or equivalent labels in accordance with another testing laboratory approved in writing by the Contracting Officer.

2.3 HARDWARE ITEMS

Clearly and permanently mark with the manufacturer's name or trademark, hinges, pivots, locks, latches, exit devices, bolts and closers where the identifying mark is visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover. Coordinate electrified door hardware components with corresponding components specified in Division 28 ELECTRONIC SECURITY SYSTEMS (ESS).

2.3.1 Hinges

Provide in accordance with JIS A 1510-3. Provide hinges that are 114 by 114 mm unless otherwise indicated. Construct loose pin hinges for interior doors and reverse-bevel exterior doors so that pins are non-removable when door is closed. Other anti-friction bearing hinges may be provided in lieu of ball bearing hinges.

[2.3.1.1 Protection Devices

Provide full height hand and finger protection device at the hinge-side area opening of doors and gates. Provide hinge-side protection devices on both sides of doors and gates, covering hinges and space between door and

frame when doors are in the open position. The installed device must push hand and fingers out of the opening and away from a crushing hazard.

]2.3.2 Continuous Hinges

Where continuous hinges are required, provide in accordance with JIS A 1510-2.

2.3.3 Pivots

Provide in accordance with JIS A 1510-3.

2.3.4 Spring Hinges

Provide in accordance with JIS A 1510-3.

2.3.5 Locks and Latches

[a. At exterior locations provide locksets of full stainless steel type 302 or 304 construction including fronts, strike, escutcheons, knobs, bolts and all interior working parts. Marine Grade I, fully non-ferrous.

b. In non-air-conditioned interior environments or humid interior environments, provide interior locksets on the same Marine Grade I, fully non-ferrous as exterior locksets.

]2.3.5.1 Mortise Locks and Latches

Provide in accordance with JIS A 1541-1.[Provide factory installed lead lining in locks for lead shielded doors.][Provide mortise locks with escutcheons not less than 178 by 57 mm with a bushing at least 6 mm long. Cut escutcheons to fit cylinders and provide trim items with straight, beveled, or smoothly rounded sides, corners, and edges.] Provide knobs and roses of mortise locks with screwless shanks and no exposed screws.

2.3.5.2 Bored Locks and Latches

Provide in accordance with JIS A 4702.[Provide factory installed lead lining in locks for lead -shielded doors.]

2.3.5.3 Residential Bored Locks and Latches

Provide in accordance with JIS A 4702. Install locks for exterior doors with threaded roses or concealed machine screws.

[2.3.5.4 Interconnected Locks and Latches

Provide in accordance with JIS A 1541-2.

]2.3.5.5 Hospital Latches

Push-pull latch set as required to meet operational requirements, 13 mm throw, [70 mm] [127 mm] backset, to fit 161 cutout. Cover approximately 64 by 140 mm, handle approximately 38 by 114 mm, projection approximately 64 mm, covers and handles of stainless steel finish, engraved "PUSH" and "PULL" on handles, push handle pointing up, pull handle pointing down.

2.3.5.6 Auxiliary Locks

Provide lock having a [latch bolt] or [dead bolt] operated by a [key], [paddle [and] [and/or] turn], which is used in addition to a primary lock or latching device to meet operational requirements.

2.3.5.7 Combination Locks

[Key pharmacy door locks separately from building master key system.]Heavy-duty, mechanical combination lockset with five push buttons, standard sized knobs, 20 mm deadlocking latch, 70 mm backset. Locks to operate by pressing two or more of the buttons in unison or individually in the proper sequence. Inside knob operates the latch. Provide a keyed cylinder on the interior to permit setting the combination.[Provide a keyed [removable core]cylinder on the exterior to permit bypassing the combination.][Provide a thumb turn on the interior to activate passage set function so that outside knob operates latch without using the combination.]

2.3.6 Exit Devices

Provide adjustable strikes for rim type and vertical rod devices. Provide open back strikes for pairs of doors with mortise and vertical rod devices. Provide [touch bars in lieu of conventional crossbars and arms.][Provide escutcheons not less than 178 by 57 mm.]

[Use stainless steel or bronze base metal with plated finishes. Also include stainless steel fasteners and screws.

]2.3.7 Exit Locks With Alarm

Provide [with full width horizontal actuating bar] for single doors; Type E0431 [with actuating bar] or E0471 [with actuating bar and top and bottom bolts, both leaves active] for pairs of doors, unless otherwise specified.[Provide terminals for connection to remote indicating panel.][Provide outside control key.] Provide door alarms integrated with the fire alarm system in accordance with NFPA 72.

2.3.8 Cylinders and Cores

[Provide cylinders and cores for new locks, including locks provided under other sections of this specification.]Provide cylinders and cores with [six] [seven] pin tumblers. Provide cylinders from the products of one manufacturer, and provide cores from the products of one manufacturer.[Rim cylinders, mortise cylinders, and knobs of bored locksets have interchangeable cores which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.]

[Provide cylinders for new locks, including locks provided under other sections of this specification. Provide fully compatible cylinders of Grade 1 products from products of one manufacturer with interchangeable cores that are removable by a special control key. Factory set the cores with [six] [seven] pin tumblers. Submit a core code sheet with the cores. Provide master keyed cores in one system for this project. Provide construction interchangeable cores.

][For medical projects, key pharmacy door locks separately from building master key system.

]2.3.8.1 High Security Cylinders

Provide high security cylinder with locking technology that limits the duplication of unauthorized keys or unauthorized electronic credentials that would operate the locks. High security cylinder must be able to stand up to forcing, drilling, sawing, prying, pulling, plug driving, picking and have corrosion resistance. [High security cylinder to comply with UL 437].

2.3.9 Push Button Mechanisms

Provide in accordance with JIS A 1541-1.

2.3.10 Electrified Hardware

Comply with the requirements of NFPA 70 for wiring of electrified hardware.

2.3.10.1 Electric Strikes and Frame Mounted Actuators

Provide electric strikes and actuators as required to meet operational requirements. Provide electric strikes that [release automatically] [remain secure] [remain maintained] during power failure.[Provide a separate power supply for electric strikes, other locking devices and ancillary parts.][Provide battery backup for continued operation during power failure.] Provide strikes and actuators with a minimum opening force of 101 kilonewtons (kN).

Provide facility interface devices that use direct current (dc) power to energize the solenoids. Provide electric strikes and actuators that incorporate end-of-line resistors to facilitate line supervision by the system. If not incorporated into the electric strike or local controller, provide metal oxide resistors (MOVs) to protect the controller from reverse current surges.

2.3.10.1.1 Solenoid

Provide actuating solenoid for strikes and actuators that are rated for continuous duty, cannot dissipate more than 12 Watts and must operate on 12 or 24 Volts dc. Inrush current cannot exceed 1 ampere and the holding current cannot be greater than 500 milliamperes. Actuating solenoid must move from fully secure to fully open positions in less than 500 milliseconds.

2.3.10.1.2 Signal Switches

Provide strikes and actuators with signal switches to indicate to the system when the bolt is not engaged or the strike mechanism is unlocked. Signal switches must report a forced entry to the system.

2.3.10.1.3 Tamper Resistance

[Provide strike guards that prevent tampering with the latch bolt of the locking hardware or the latch bolt keeper of the electric strike. Strike guards to bolt through the door using tamper resistant screws. Provide strike guards made of 3 mm thick brass and that are 286 mm high by 41 mm, with a minimum 4 mm wide offset.

]2.3.10.1.4 Coordination

Provide electric strikes and actuators of a size, weight and profile compatible with each specified door frame. Field verify installation clearances prior to procurement.

2.3.10.1.5 Mounting Method

Provide electric strikes and actuators suitable for use with single and double doors, with mortise or rim type hardware specified, and for right or left hand mounting as specified. In double door installations, locate the lock in the active leaf and monitor the fixed leaf.

2.3.10.2 Electrified Mortise Locks

Provide electrified mortise locks that [release automatically] [remain secure] [remain maintained] during power failure. Provide facility interface devices that use dc power to energize solenoids. Provide solenoids, resisters, and signal switches in accordance with paragraph ELECTRIC STRIKES AND FRAME MOUNTED ACTUATORS.

2.3.10.2.1 Power Transfer Hinges

Provide power transfer hinges with each electrified lock that route power and monitoring signals from the lockset to the door frame. Coordinate power transfer hinges with door frames.

2.3.10.3 Card Readers and Keypad Access Control Hardware

Provide devices that are tamper alarmed, tamper and vandal resistant, solid state, and do not contain electronics which could compromise the access control subsystem should the subsystem be attacked. Provide surface, semi-flush, pedestal, or weatherproof mountable devices as specified for each individual location.[Each device to contain a visual display, either mounted on the face, or on an integral part of the device, to indicate access or exit request processing, request approval, and request denial.] Provide [proximity] [insertion] [swipe through] type card readers capable of reading [magnetic stripe] [high coercivity magnetic stripe] [Wiegand] [Hollerith] [proximity] [Transmissive Infrared] [Keypad] [[_____]/Keypad] [Smart Card] [Biometric] [_____] type access control cards. Provide keypads that contain an integral 12-digit tactile keyboard with digits [arranged in numerical order]. Provide keypads that are [a standalone device] [or] [integrated into the card reader]. Coordinate access control hardware with corresponding devices and systems specified in Division 28 ELECTRONIC SECURITY SYSTEMS (ESS).

2.3.10.4 Power Operated Pedestrian Door Hardware

Provide in accordance with JIS A 4722.

2.3.10.5 Release Devices

In accordance with JIS A 1510-3.

2.3.10.5.1 Closer Holders

Provide [floor] [door] [header] mounted closer holder devices connected by [separate releasing] [integral releasing] to [fire] [smoke] detecting devices.

2.3.10.5.2 Release Devices

Provide [wall] [floor] [door] mounted [Electromagnetic] [electromechanical] [free swinging] release devices connected to [fire] [smoke] detecting devices.

2.3.10.6 Power Assist and Low Energy Power Operated Doors

Provide in accordance with JIS A 4722.

2.3.10.7 Electromagnetic Locks

Provide electromagnetic locks that do not contain any moving parts and depend solely upon electromagnetism to secure a portal by generating at least 5.3 kN of holding force. The lock must interface with the local processors without external, internal or functional alteration of the local processor. The electromagnetic lock must incorporate an end of line resistor to facilitate line supervision by the system. Provide metal-oxide resistors (MOVs) to protect controllers from reverse current surges, if not incorporated into the electromagnetic lock or local controller.

2.3.10.7.1 Armature

Provide electromagnetic locks with internal circuitry to eliminate residual magnetism and inductive kickback. Provide atuating armature that operates on 12 or 24 Volts dc and cannot dissipate more than 12 Watts. Holding current must be less than 500 milliamperes. Actuating armature must take less than 300 milliseconds to change the status of the lock from fully secure to fully open or fully open to fully secure.

2.3.10.7.2 Tamper Resistance

Provide lock mechanism encased in hardened guard barriers to deter forced entry.

2.3.10.7.3 Mounting Method

Provide electromagnetic lock suitable for use with single and double door with mortise or rim type hardware and compatible with right or left hand mounting.

2.3.10.8 Delayed Egress Locking System

Provide delayed egress product capable of allowing the door to be opened by actuating the lock which is equipped with a 15-second maximum delayed feature including a zero-to-three second pre-delay. The door shall be allowed to close by action of the door closer. Electrically re-lock the system so that the time delay is operative. A force, not to exceed 67 N, shall be continuously applied on the door or release device allowing the door to be opened after not more than 15 seconds.

2.3.10.9 Power and Manual Operated Revolving Pedestrian Doors

Provide in accordance with JIS A 1551 for powered revolving pedestrian doors and JIS A 4721 for manual operated revolving pedestrian doors.

2.3.11 Keying System

Provide[a [great][grand] master keying system][an extension of the existing keying system. Existing locks were manufactured by [_____] and [do not] have interchangeable cores.][Provide[a construction master keying system][construction interchangeable cores].][Provide key cabinet as specified.]

2.3.12 Lock Trim

Provide cast, forged, or heavy wrought construction and commercial plain design for lock trim.

2.3.12.1 Knobs and Roses

Provide in accordance with JIS A 4702 and JIS A 1541-1 for knobs, roses, and escutcheons. For unreinforced knobs, roses, and escutcheons, provide a 1.25 mm thickness. For reinforced knobs, roses, and escutcheons, provide an outer shell thickness of 0.89 mm and a combined total thickness of 1.78 mm, except at knob shanks. Provide knob shanks 1.52 mm thick.

2.3.12.2 Lever Handles

Provide lever handles [where indicated in the Hardware Schedule]. Provide lever handle locks with a breakaway feature (such as a weakened spindle or a shear key) to prevent irreparable damage to the lock when force in excess of that specified in JIS A 1541-1 is applied to the lever handle. Provide lever handles return to within 13 mm of the door face.

2.3.12.3 Texture

Provide knurled or abrasive coated knobs or lever handles for doors which are accessible to blind persons and which lead to dangerous areas.

2.3.13 Keys

[Furnish][Provide] one file key, one duplicate key, and one working key for each key change [and for each master [and grand master] keying system]. [Furnish][Provide] one additional working key for each lock of each keyed-alike group.[[Furnish][Provide] two additional keys for each sleeping room.][[Furnish][Provide] [[_____] great grand master keys,] [[_____] construction master keys,] [and [_____] control keys for removable cores].][[Furnish][Provide] a quantity of key blanks equal to 20 percent of the total number of file keys.] Stamp each key with appropriate key control symbol and "U.S. property - do not duplicate." Do not place room number on keys.

2.3.14 Door Bolts

Provide in accordance with JIS A 4702. Provide dustproof strikes for bottom bolts, except at doors having metal thresholds. Provide automatic latching flush bolts to meet operational requirements.

2.3.15 Closers

Provide in accordance with JIS A 1510-3. Provide with brackets, arms, mounting devices, fasteners, [full size covers, except at storefront mounting,] [pivots,] [cement cases,] and other features necessary for the particular application. Size closers in accordance with manufacturer's

printed recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. Provide manufacturer's 10 year warranty.

[Use stainless steel inside bracketed or door mounted closers on exterior doors. Non-ferrous closers, such as aluminum or cast bronze, are permissible where door utilization is minimal. On interior doors use closers of 302 or 304 stainless steel or non-ferrous materials. On surface-mounted closers use or apply rust inhibiting finish on all ferrous parts. Also apply this finish on concealed closers.

]2.3.15.1 Identification Marking

Engrave each closer with manufacturer's name or trademark, date of manufacture, and manufacturer's size designation in locations that will be visible after installation.

2.3.16 Overhead Holders

Provide in accordance with JIS A 1510-3.

2.3.17 Door Protection Plates

Provide in accordance with JIS A 4702.

2.3.17.1 Sizes of [Armor] [Mop] [and] Kick Plates

50 mm less than door width for single doors; 25 mm less than door width for pairs of doors. Provide [[200] [1200] mm kick plates for flush doors] [and] [125 mm less than height of bottom rail for panel doors]. Provide a minimum [900] [1200] [_____] mm armor plates for flush doors [and] completely cover lower panels of panel doors, except 400 mm high armor plates on fire doors. Provide [100] [150] mm mop plates.

2.3.17.2 Edge Guards

Stainless steel, of same height as armor plates. Apply to [hinge stile] [lock stile] [meeting stiles].

2.3.18 Door Stops and Silencers

Provide in accordance with JIS A 4702. Provide three silencers for each single door, two for each pair.

2.3.19 Padlocks

Provide padlock of [solid extruded brass] [stainless steel]. [Shackle to be cut-resistant]. Provide lock functions consisting of [key retained], [non-key retained], [frangible shackle], [double lockout], [weather cover], [car seal slot].

2.3.20 Thresholds

Use vinyl or silicone rubber insert in face of stop, for exterior doors opening out, unless specified otherwise.

2.3.21 Weatherstripping Gasketing

Provide in accordance with JIS A 5756. Provide the type and function

designation where specified in paragraph HARDWARE SCHEDULE. Provide a set to include head and jamb seals[, sweep strips,] [and, for pairs of doors, astragals]. Air leakage of weatherstripped doors not to exceed [2.19 by 10-5] [5.48 by 10-5] cms per minute of air per square meter of door area when tested in accordance with JIS A 1516. Provide weatherstripping with one of the following:

2.3.21.1 Extruded Aluminum Retainers

Extruded aluminum retainers not less than 1.25 mm wall thickness with vinyl, neoprene, silicone rubber, or polyurethane inserts. Provide [clear (natural)] [bronze] anodized aluminum.

2.3.21.2 Interlocking Type

Zinc or bronze not less than 0.45 mm thick.

2.3.21.3 Spring Tension Type

Spring bronze or stainless steel not less than 0.20 mm thick.

2.3.22 [Lightproofing] [and] [Soundproofing] Gasketing

Provide in accordance with JIS A 5756. Provide adjustable doorstops at heads,jambs and automatic door bottoms in accordance with the hardware set, of extruded aluminum, [clear (natural)] [bronze] anodized, surface applied, with vinyl fin seals between plunger and housing. Provide doorstops with solid neoprene tube, silicone rubber, or closed cell sponge gasket. Provide door bottoms with adjustable operating rod and silicone rubber or closed cell sponge neoprene gasket. Provide doorstops that are mitered at corners. Provide type and function designation where specified in paragraph HARDWARE SETS.

2.3.23 Rain Drips

Provide extruded aluminum rain drips, not less than 2.03 mm thick, [clear anodized] [bronze anodized] [factory painted] [factory primed] finish. Provide the manufacturer's full range of color choices to the Contracting Officer for color selection.[Provide rain drips with a 102 mm overlap on each side of each exterior door that is not protected by an awning, roof, eave or other horizontal projection.] Set drips in sealant and fasten with stainless steel screws.

2.3.23.1 Door Rain Drips

Approximately 38 mm high by 16 mm projection. Align bottom with bottom edge of door.

2.3.23.2 Overhead Rain Drips

Approximately 38 mm high by 64 mm projection. Align bottom with door frame rabbet.

2.3.24 Auxiliary Hardware (Other than locks)

Provide in accordance with JIS A 4702.

2.3.25 Sliding and Folding Door Hardware

Provide in accordance with JIS A 1525. Finishes to match other hardware specified herein.

2.3.26 Special Tools

Provide special tools, such as spanner and socket wrenches and dogging keys, as required to service and adjust hardware items.

2.4 FASTENERS

Provide fasteners of type, quality, size, and quantity appropriate to the specific application. Fastener finish to match hardware. Provide stainless steel or nonferrous metal fasteners in locations exposed to weather. Verify metals in contact with one another are compatible and will avoid galvanic corrosion when exposed to weather.

2.5 FINISHES

[Provide in accordance with JIS A 1541-2. Provide hardware in satin stainless steel, unless specified otherwise. Provide items not manufactured in stainless steel in satin chromium plated over brass or bronze, except [aluminum paint] [prime coat] finish for surface door closers, and except satin chromium plated [primed for painting] for steel hinges. Provide hinges for exterior doors in stainless steel finish [or chromium plated brass or bronze finish]. Furnish exit devices in satin chrome finish in lieu of stainless steel finish [except where specified under paragraph HARDWARE SETS]. Match exposed parts of concealed closers to lock and door trim. Match hardware finish for aluminum doors to the doors.

][Provide in accordance with JIS A 1541-2. Provide hardware in satin bronze, unless specified otherwise. Finish surface door closers [bronze paint] [prime coat] finish. Provide steel hinges in [satin bronze plated] [primed for painting]. Provide exposed parts of concealed closers finish to match lock and door trim. Match hardware finish for aluminum doors to match the doors. Provide hardware showing on interior of [bathrooms] [shower rooms] [toilet rooms] [washrooms] [laundry rooms] [and kitchens] in bright stainless steel or bright chromium plated.

]2.6 KEY CABINET AND CONTROL SYSTEM

Provide in accordance with project requirements, [[(25 hooks)] [(125 hooks)] [(150 hooks)] [(600 hooks)] [(700 hooks)].] [Type required to yield a capacity (number of hooks) 50 percent greater than the number of key changes used for door locks.]

PART 3 EXECUTION

3.1 INSTALLATION

Provide hardware in accordance with manufacturers' printed installation instructions. Fasten hardware to wood surfaces with full-threaded wood screws or sheet metal screws. Provide machine screws set in expansion shields for fastening hardware to solid concrete and masonry surfaces. Provide toggle bolts where required for fastening to hollow core construction. Provide through bolts where necessary for satisfactory installation.

3.1.1 Weatherstripping Installation

Provide full contact, weathertight seals that allow operation of doors without binding the weatherstripping.

3.1.1.1 Stop Applied Weatherstripping

Fasten in place with color matched sheet metal screws not more than 225 mm on center after doors and frames have been finish painted.

3.1.1.2 Interlocking Type Weatherstripping

Provide interlocking, self adjusting type on heads and jambs and flexible hook type at sills. Nail weatherstripping to door 25 mm on center and to heads and jambs at 100 mm on center.

3.1.1.3 Spring Tension Type Weatherstripping

Provide spring tension type on heads and jambs. Provide bronze nails with bronze. Provide stainless steel nails with stainless steel. Space nails not more than 38 mm on center.

3.1.2 [Lightproofing] [and] [Soundproofing] Installation

Provide as specified for stop applied weatherstripping.

3.1.3 Threshold Installation

Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws[in expansion sleeves]. For aluminum thresholds placed on top of concrete surfaces, coat the underside surfaces that are in contact with the concrete with fluid applied waterproofing as a separation measure prior to placement.

3.2 FIRE DOORS AND EXIT DOORS

Provide hardware in accordance with NFPA 72 for door alarms, NFPA 80 for fire doors, NFPA 101 for exit doors, and NFPA 252 for fire tests of door assemblies. [Provide tin-clad fire doors in accordance with UL 14C].

3.3 HARDWARE LOCATIONS

Provide as indicated or specified otherwise.

a. Kick and Armor Plates: Push side of single-acting doors. Both sides of double-acting doors.

b. Mop Plates: Bottom flush with bottom of door.

3.4 KEY CABINET AND CONTROL SYSTEM

Locate where [directed][indicated]. Tag one set of file keys and one set of duplicate keys. Place other keys in appropriately marked envelopes, or tag each key. Provide complete instructions for setup and use of key control system. On tags and envelopes, indicate door and room numbers or master or grand master key.

3.5 FIELD QUALITY CONTROL

After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of work. Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Contracting Officer. Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly. Demonstrate that permanent keys operate respective locks, and give keys to the Contracting Officer. Correct, repair, and finish, errors in cutting and fitting and damage to adjoining work.

3.6 HARDWARE SETS

Provide [hardware for aluminum doors under this section. Deliver Hardware templates and hardware, except field applied hardware, to the aluminum door and frame manufacturer for use in fabricating doors and frames.]

-- End of Section --