DIVISION 8

DOORS AND WINDOWS

BUILDING WORK

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DOORS AND WINDOWS

INDEX

SECTION 08114

STEEL DOORS AND FRAMES

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, equipment, and incidentals required and install the following as shown and as specified herein:

1. Decorative steel door and frames.

2. All fasteners, frame closure pieces, system reinforcing and appurtenances required.

1.02 RELATED WORK

A Other sections directly related to work covered in this section include the following:

1. Section 04200 - Masonry.

2. Section 06100 - Rough Carpentry.

3. Section 07900 - Caulking.

4. Section 08710 - Door Hardware.

5. Section 08800 - Glazing.

6. Section 09902 - Painting.

1.03 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

C. ASTM A525M - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process [Metric].

D. ASTM A591/ A591M - Steel Sheet, Electrolytic Zinc-Coated, For Light Coating Class Applications.

E. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot-Box.

F. ASTM E152 - Methods of Fire Tests of Door Assemblies.

G. ASTM E413 - Classification for Determination of Sound Transmission Class.

H. DHI (Door Hardware Institute) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

I. HMMA 802 - Manufacturing of Hollow Metal Doors and Frames.

J. HMMA 810 - Hollow Metal Doors.

K. HMMA 830 - Hardware Preparation and Locations for Hollow Metal Doors and Frames.

L. HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames.

M. HMMA 850 - Fire Rated Hollow Metal Doors and Frames.

N. NFPA 80 - Fire Doors and Windows.

O. NFPA 252 - Fire Tests for Door Assemblies.

P. UL 10B - Fire Tests of Door Assemblies.

1.04 SUBMITTALS

A Submit to the Engineer, as provided in the submittals Section, data and shop drawings of all metal doors doors, frames, panels and appurtenances.

1. Shop drawings shall show elevations and details of each frame type, schedule of doors and frames, door elevations and details, conditions at openings with various wall thicknesses and materials, location and installation requirements for hardware, thickness of materials, joints and connections and trim.

B. Manufacturer's Installation Instructions: Indicate special installation instructions.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

D Hardware templates shall be furnished to the door manufacturer by the Contractor for correct hardware alignment and reinforcing.

E Provide samples and certification as follows:

1. Door frame corner with 150 mm long legs showing construction with the galvanized material specified, welding, touch-up and priming.

2. Door panel corner, 150 mm square, showing door and insulating materials, construction and finishing as specified above.

1.05 QUALITY ASSURANCE

A. Conform to requirements of HMMA 802, HMMA 810, HMMA 830, HMMA 840, HMMA 850, and ANSI A117.1.

B. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.

1.06 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

B. Sequence installation to ensure wire connections are achieved in an orderly and expeditious manner.

1.07 DELIVERY, STORAGE AND HANDLING

A Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact. Doors and panels shall be individually wrapped in corrugated cardboard with wood strips on vertical edges and banded with metal straps. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations. Handle in accordance with manufacturer's instructions.

PART 2: PRODUCTS

2.01 MATERIALS

A Galvanized steel sheets - Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, with ASTM A525, G60 zinc coating, mill phosphatized.

B Zinc-rich primer - 95% metallic zinc dust primer in a vehicle compatible with the specified painting system. Apply to properly prepared substrates where galvanizing is damaged by fabrication. Follow with a full coat over all steel surfaces and components.

C Supports and anchors - Fabricate of not less than 1.5 mm (16 gage) sheet metal. Galvanize after fabrication units complying with ASTM A 153, Class B.

D Inserts, bolts and fasteners - Hot-dip galvanize, complying with ASTM A153, Class C or D as applicable.

2.02 FABRICATION, GENERAL

A Fabricate metal units to be rigid, neat in appearance, and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously; grind, dress, and make smooth, flush, and invisible. Metallic filler to conceal manufacturing defects is not acceptable.

B Prepare metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

C Reinforce metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

D Shop Painting

1. Surface preparation and shop prime painting shall conform to all applicable specifications in Section 09901.

2.03 STEEL DOORS AND DOOR FRAMES

A Decorative steel Doors and frames: constructed from galvanized steel hollow sections, welded and jointed of types, dimensions and patterns shown on the Drawings and supplied complete with frames. Doors are to be finished with factory applied corrosion inhibiting protection coating to receive paint.

B Steel Door Frames:

1. Steel Door Frames For Internal Steel Doors: to the general requirements of BS 1245, but to non-standard sizes and profiles, constructed from 1.5 mm thick galvanized steel sheet, finished with factory applied corrosion inhibiting protective coating and supplied complete with transoms and glazing beads, as shown on the Drawings.

2. Steel Door Frames For External Steel Door: are to be generally as item G but constructed from 1.5 mm thick galvanized steel sheet.

3. Steel Door Frames For Fire Resisting Doors are to have a rebate minimum 25 mm deep and are to incorporate an intumescent strip.

2.04 APPURTENANCES

A Mullions and transom bars-Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.

B Head reinforcing-Where installed in masonry, leave vertical mullions in frames open at top for grouting.

C Jamb anchors. Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 1.2 mm (18 gage) galvanized steel.

1. Masonry construction-Adjustable, flat, corrugated, or perforated, t-shaped to suit frame size, with leg not less than 50 mm wide by 250 mm long. Provide U.L. approved fixed anchors at labelled openings.

Furnish at least 3 anchors per jamb up to 2250 mm height; 4 anchors up to 2400 mm jamb height; one additional anchor for each 600 mm or fraction thereof over 2400 mm height.

2. In-place concrete or masonry - Anchor frame jambs with minimum 10 mm (3/8-in) diameter concealed bolts into expansion shields or inserts for masonry and adhesion anchors for concrete 150 mm from top and bottom and 600 mm o.c., unless otherwise shown. Reinforce frames at anchor locations. Apply removable stop to cover anchor bolts unless otherwise indicated.

D Floor anchors - Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 1.9 mm (14 gage) galvanized steel sheet, as follows:

1. Monolithic concrete slabs - Clip type anchors, with 2 holes to receive fasteners, welded to bottom of jambs and mullions.

2. Separately finished tile areas and concrete slabs - Adjustable type with extension clips, allowing not less than 50 mm height adjustment. Terminate bottom of frames at finish floor surface.

E Head strut supports - Provide 10 mm x 50 mm (3/8-in x 2-in) vertical steel struts extending from top of frame to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. At frames without mullions provide struts at 1200 mm O.C. along head members. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable bolted anchorage to frame jamb members with no parts of fasteners exposed in the finished work.

F Structural reinforcing members - Provide built-in as part of frame assembly where indicated at mullions, transoms, or other locations.

G Head reinforcing - For frames over 1200 mm wide in masonry wall openings, provide continuous steel channel or angle stiffener, not less than 2.7 mm (12 gage) for full width of opening, welded to back of frame at head.

H Spreader bars - Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.

I Plaster guards - Provide galvanized sheet steel plaster guards or dust cover boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware installation.

2.05 STOPS AND MOLDINGS

A Provide stops and moldings around glazed panels in hollow metal units and in frames to receive doors and panels, where and as indicated.

B Form fixed stops and moldings integral with frame, unless otherwise indicated.

C Provide removable stops and moldings where and as indicated or required, formed of not less than 0.9 mm (20 gage) steel sheets matching steel of frames. Secure with countersunk machine screws spaced uniformly not more than 300 mm on center. Form corners with butted hairline joints.

D Coordinate width of rabbet between fixed and removable stops with type of glass or panel and type of installation indicated.

E Provide angles of not less than 1.5 mm (16 gage) for securing fixed transom panels to frames as approved.

2.06 SELANTS

A Shall be two part ploloysulphide based compound.

PART 3: EXECUTION

3.01 INSTALLATION

A Install metal units and accessories in accordance with approved shop drawings, manufacturer's data, and as herein specified.

B Coordinate installation of glass and glazing.

C Before fixing frames; Prime wood subframe.

D Setting masonry anchorage devices - Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction. Set anchorage devices opposite each anchor location, in accordance with details on shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.

E Placing Frames-Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

1. In masonry construction, coordinate frame setting with the building of masonry walls.

2. At in-place concrete or masonry construction, set frames and secure in place with anchor bolts as specified.

3. Make field splices in frames as detailed on final approved shop drawings, welded and finished to match factory work.

4. Remove spreader bars only after frames or bucks have been properly set and secured.

3.02 ADJUSTMENT AND TOUCH-UP

A Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

B Immediately after erection, sand smooth any rusted or damaged areas of zinc primer and apply touch-up of same primer.

3.03 SEALING JOINTS

A Preparation, depth of sealant and application are to be strictly as sealant manufacturer's recommendations.

B Joint is to be thoroughly clean, dray and free from oil; finely abrade and prime as appropriate.

C Mask adjacent surfaces which would be difficult to clean if smeared with sealant

D Apply sealant ensuring maximum adhesion to sides of joint and a neat, smooth, clean finish.

End of Section

SECTION 08211

WOOD DOORS AND FRAMES

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install flush wood doors, and wood frames including shop finishing as required and specified herein.

1.02 RELATED WORK

A. Section 06100 - Rough carpentry.
B. Section 06200 - Finish carpentry.
C. Section 08710 - Door Hardware.
D. Section 08114 - Steel doors and frames: Steel frame for wood doors.
E. Section 09902 - Painting.

1.03 REFERENCES

A. ANSI A135.4 - Basic Hardboard.
B. ASTM E152 - Methods of Fire Tests of Door Assemblies.
C. ASTM E413 - Classification for Determination of Sound Transmission Class.
D. AWI - Quality Standards of the Architectural Woodwork Institute.
E. HPMA HP - Hardwood and Decorative Plywood.
F. NEMA (National Electric Manufacturers Association) LD3-High Pressure Decorative Laminates.
G. NFPA 80 - Fire Doors and Windows.
H. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
I. UL 10B - Fire Tests of Door Assemblies.
J. Warnock Hersey - Certification Listings for Fire Doors.

1.04 SUBMITTALS FOR REVIEW

A. Section 01340 - Submittals: Procedures for submittals.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, factory machining criteria, factory finishing criteria, identify cutouts for glazing and louvers.

D. Samples: Submit one sample of flush door construction, (120 x 80 cm) in size cut from bottom corner of door.

E. Samples: Submit two samples of door veneer, (150 x 200 mm) in size illustrating wood grain, stain color, and sheen for decorative doors and illustrating plastic laminate color for flush doors.

F. Samples: Submit one sample of solid decorative door construction, (120x80 cm) in size, complete with pattern.

1.05 SUBMITTALS FOR INFORMATION

A. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard Section 1300, Premium Grade. Maintain one copy on site.

B. Finish doors in accordance with AWI Quality Standard Section 1500.

C. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Accept doors on site in manufacturer's packaging. Inspect for damage.

B. Protect doors with resilient packaging. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on site to permit ventilation.

PART 2: PRODUCTS

2.01 DOOR CONSTRUCTION AND FACING

A. Flush Doors: shall be comply with BS 459 part 2 and shall consist of a timber core of at least 50% solid wood and a timber frame faced both sides with (5 mm) thick hardboard plywood glued and pressed to the core and lipped on all edges with beach wood suitable for clear finish,

2.02 ADHESIVE

A. Facing adhesive: Type I - waterproof

2.03 FABRICATION

A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.

B. Astragals for Double Doors: Treated wood, T shaped, overlapping and recessed at face edge, specifically for double doors.

C. Sound Rating For Single Door Leaf and Frame Assembly: ASTM E413, minimum STC 35.

D. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement.

E. Vertical Exposed Edge of Stiles: Hardwood for transparent finish.

F. Fit door edge trim to edge of stiles after applying veneer facing.

G. Bond edge banding to cores.

H. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

I. Factory fit doors for frame opening dimensions identified on shop drawings.

J. Cut and configure exterior door edge to receive recessed weather stripping devices.

K. Provide edge clearances in accordance with AWI 1600.

2.04 SHOP FINISH

A. Pre-finish wood doors at factory or finish shop.

B. Comply with recommendations of AWI for finishing of doors, including final sanding immediately before application of finishing materials.

1. Provide finishes of type agreed with the Architect, to match sample held by the Architect.

2.05 PRE-FITTING AND PREPARATION FOR HARDWARE

A. Pre-fit and pre-machine wood doors at factory.

B. Comply with tolerance requirements of AWI for pre-fitting. Machine doors for hardware requiring cutting of doors.

2.6 HARDWARE

A. finish shall be brass finish as specified in section 08710

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions.

B. Trim non-rated door width by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19mm).

D. Machine cut for hardware.

E. Coordinate installation of doors with installation of frames specified in Section 08114 and hardware specified in Section 08710.

F. Coordinate installation of glass and glazing.

G. Install door louvers plumb and level.

3.03 INSTALLATION TOLERANCES

A. Conform to AWI requirements for fit and clearance tolerances.

B. Conform to AWI Section 01340 requirements for maximum diagonal distortion.

3.04 ADJUSTING

A. Adjust door for smooth and balanced door movement.

B. Adjust closer for full closure.

3.05 SCHEDULE

A. Refer to Door Schedule Drawings.

End of Section

SECTION 08520

ALUMINUM WINDOWS

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, equipment and incidentals required to install the complete aluminum window system including fixed, hopper and casement sash, glazing beads, mullions, sandwich panels, hardware, fasteners, caulking and screens within the system and appurtenances all as shown and as specified herein.

1.02 RELATED WORK

A Other sections directly related to work covered in this section include the following:

1. Section 06100 - Rough Carpentry.

2. Section 07005 - Waterproofing and Dampproofing.

3. Section 07900 - Caulking.

4. Section 08800 - Glazing.

1.03 SUBMITTALS

A Submit to the Engineer, as provided in the Submittals Section, shop drawings showing locations, size and details of construction and erection of aluminum windows, hardware, accessories, system caulking, and appurtenances. Submit complete manufacturer's product literature on the window system to be used.

B Samples

1. Submit two samples of each as follows:

a. Corner section - fixed frame and mullion.

b. Each different type of stainless steel fastener.

2. The above shall, upon approval, become the standard acceptance for the project with regard to construction and finish for each item.

1.04 QUALITY ASSURANCE

A Manufacturer shall have not less than five year's experience in manufacturer of aluminum windows.

B Erector shall have not less than five years' experience in installation of aluminum windows.

C Allowable tolerances: Size dimensions ± 2 mm.

1.05 INSPECTION BEFORE INSTALLATION

A All window components will be inspected before installation.

B All components which are abraded or dented or which are bent, bowed or show any other structural damage or distortion will be rejected and marked and shall be removed from the site. No component will be allowed to be straightened and then incorporated in the work.

PART 2: PRODUCTS

2.01 MATERIALS

A Aluminium alloy for windows and screens shall be meat the general requirements of ASTM B221 or BS 4873, constructed from aluminium alloy extruded sections and couplings, with electrostatically baked applied polyester finish, supplied complete with frames, sub-frames, mullions, transoms, sills, louvers, doors, opening portions and insect screens, as shown on the drawings, and with manufacturer's matching ironmongery, glazing beads, gaskets, weatherstrips, accessories and fixings. Units may be pre-glazed or glazed on site in accordance with the requirements of glazing section. Windows and supporting members shall be designed to withstand a wind load of 24 kg/sq m (5 PSF) and associated negative pressures.

Man: Saudi Aluminium Co. Ltd.
Riyadh - Saudi Arabia
Tel : 4054991
Fax : 4054555

Man: Aluminium Manufacturing Co. Ltd.
P.O. Box 7661, Jeddah 21472
Saudi Arabia
Tel : (2) 6915666
Fax : (2) 6915722

Or other equal and approved.

B Frames members shall be Hollow box sections and shall be designed for use with 6 mm thick single glazed, or double glazed; as shown on drawings.

C Glazing stops shall be snap-in type for either recessed or surface mounting and shall be two-piece to facilitate glazing installation. Stops shall have vinyl or neoprene seals in contact with glass.

D Concealed fasteners for window system shall be stainless steel, Type 305. Exposed fasteners shall be aluminum oval head matching aluminum components in finish.

E Insect screens shall be aluminium screens with aluminum frame for hinged and sliding windows and sliding doors.

F Sealant for caulking within the window system shall be an approved one part, gun grade, Thiokol polysulfide base sealant. Primer shall be as recommended by the manufacturer.

G Joint backing where required shall be accepted closed cell polyethylene foam rods of diameters to suit joint conditions.

H Anchors, clips, bolts and screws necessary to secure windows shall be provided, and unless otherwise specified shall be either aluminum or nonmagnetic stainless steel, or zinc coated steel.

I Ironmongery for opening windows are to have manufacturer's standard hinges, friction pivot hinges, sliders, handles and locks as necessary.

2.02 FABRICATION

A Fabricate windows in accordance with accepted shop drawings. Frame corners and intersections shall be mortised, double tenoned and riveted. Where frame sections are reversed, joints shall be coped and reinforced with splice plates. No applied weathering adaptors or liners will be accepted.

B Weather stripping shall be securely interlocked into both the inside and outside weathering grooves of the operating sash and shall run continuously. Adhesive applied weather stripping will not be allowed.

2.03 FINISHING

A Aluminium Finish shall be polyester resin powder electrostatically applied and baked to give minimum thickness of 70 microns, to meet the requirements of BS 6496. Colour as shown on drawing and approved by the Engineer. Manufacturer is to provide a 10year warranty, agreeing to repair or replace defective coating, defined as abnormal deterioration, aging or weathering or loss of adhesion.

B. Exposed hardware finish shall be as aluminum colour.

2.04 GLAZING

A. External Windows:

Use 6mm thick blowgreen tinted float glass for external sheet and 6mm thick clear float glass for internal sheet.

B. For internal sheet of bathroom windows, use 6 mm thick obscured glass.

C. Internal Windows

Use 6 mm thick clear float glass.

2.05 CLEANING

A After fabrication, all aluminum components shall be chemically cleaned of all fabricating oils and foreign materials, matching samples as approved.

PART 3: EXECUTION

3.01 INSTALLATION

A All installation shall be performed by workmen experienced in the erection of these types of window. All work shall be done in strict conformance with the details shown, the shop drawings and the manufacturer's recommendations.

B Caulk metal-to-metal joints where required within window system as windows are installed.

C Windows shall be totally free of abrasions, nicks, scars, and other damage, and in good operating condition at final acceptance.

End of Section

SECTION 08710

HARDWARE

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish and deliver to the project site all finish hardware for doors and additional padlocks as shown on drawings and hereinafter specified.

B Furnish all templates required by the manufacturers of the doors and frames to enable the manufacturers to make proper provision in their work to receive the finish hardware. All locks, lock strikes, and flush bolts shall be made to ANSI standard dimensions.

C. Types of hardware required include the following:

1. Hinges.
2. Pivots and floor springs.
3. Lockcases.
4. Lock cylinders and keys.
5. Bolts.
6. Exit devices.
7. Push/ pull units.
8. Overhead door closers.
9. Door furniture and special handles.
10. Door selectors.
11. Door trim units.
12. Protection plates.
13. Weatherstripping for exterior doors.
14. Sound stripping for interior doors.

1.02 RELATED WORK

A Other sections directly related to work covered in this section include under the following:

1. Section 06100 - Rough Carpentry.

2. Section 08114 - Steel Doors and Frames.

3. Section 08120 - Aluminum Doors and Frames.

4. Section 08211 - Wood Doors and Frames.

1.03 SUBMITTALS

A Samples

1. If required by the Engineer, submit a sample of any or all items of hardware proposed for review.

B Hardware Schedules

1. Submit to the Engineer for review a complete hardware schedule as provided in the Submittals Section for shop drawings.

2. No templates shall be distributed until the hardware schedule has been accepted by the Engineer.

3. Provide approved physical hardware items to door manufacturers if and as required for fabrication onto doors.

1.04 PRODUCT HANDLING

A Packing and Marking

1. All hardware shall have the required screws, bolts and fastenings necessary for proper installation, wrapped in paper and packed in the same package as the hardware. Each package shall be legibly labeled, indicating that portion of the work for which it is intended.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A All hardware shall be best grade, entirely free from imperfections in manufacture and finish. Qualities, weights, and sizes specified herein are the minimum that will be accepted.

2.02 MATERIALS AND FABRICATION

A Hand of Door: Drawings shown direction of slide, swing or hand of each door leaf. Furnish each item or hardware for proper installation and operation of door movement as shown.

B. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Engineer.

1 - Manufacturer's identification will be permitted on rim of lock cylinders only.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

D. Furnish screws for installation, which match each hardware item. Provide Phillips type flat-head screws and not less than 5 sets of matched screwdrivers for each size of screw.

E. Provide concealed fasteners for hardware units which are exposed when door is closed. Do not use through bolts for installation where bolt head is exposed in other work. In such cases, provide sleeves for each through bolt or use sex screw fasteners.

F. Tools and Maintenance Instructions for Maintenance:

Furnish a complete set of specialized tools and maintenance instructions as needed for Employer's continued adjustment, maintenance, and removal and replacement of hardware.

2.03. HINGES, BUTTS AND PIVOTS

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Screws: Comply with 2.02 section C,D and E.

C. Hinges shall have caged ball bearing races, (washer bearing type and similar will not be accepted). Hinge pins shall be stainless steel.

D. Number of Hinges: Provide a minimum of three hinges per door leaf up to a height of 2300 mm and one additional hinge for every 750 mm thereafter.

E. Provide intumescent plugs for all hinge screws.

2.04 LUCK CYLINDERS AND KEYING

A. General: Supplier will meet with Engineer to finalise keying requirements and obtain final instructions in writing.

B. Multiple-building System: Except as otherwise indicated, provide new grandmaster key system for project.

C. Equip locks with cylinders which are construction keyed, only construction keys to be issued to the contractor and on instruction from the Engineer invalidate such construction keys by operation of the grandmaster key in each keyway.

D. Equip locks with high security cylinders which comply with performance requirements for Grade 1 cylinders as listed in ANSI A156, which also UL listed and incorporate the double locking system as utilized in the designated HS74 series cylinders.

E. Lock cases shall be UL listed and comply with ANSI 115, shall be performance tested and certified to compare with the designated standard lockcase HD99 series. All lock cases shall have intumescent cover protection for the case body and intumescent plugs for the screw fasteners for the forend plates. Locks shall be provided that allow furniture such as lever roses to screw directly into the lock case using machine screws, to provide strength of fitting and rigidity.

F. Latch Bolt: Shall be a guided, three part, latch bolt with a minimum throw of 19 mm, be fully reversible without removal of case cover, contain an anti thrust bolt for security and shall be made of high grade stainless steel.

G. Deadbolt: For use on deadlocks shall have a minimum throw of 25mm and contain hardened steel rollers and incorporate a reinforced strike plate.

H. Strikes: Provide standard wrought box strike for al locks and latches, with curved lip extending to protect frame. Finish to match hardware set.

I. Metals: Construct cylinders from brass/ bronze, stainless steel or nickel silver.

J. Comply with Employer's instructions for masterkeying and, except as otherwise noted, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

1. Permanently inscribe each key with the number or lock differ and the notation "DO NOT DUPLICATE".

K. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each suite of locks within the project and 5 grandmaster keys for the overall project.

All keys shall be delivered to the Employer or Employer's representative either by security courier service or by the authorized manufacturer's representative.

L. Provide a key control system including tags and secure key boxes, to the Engineer requirements and including tags with self locking clips, receipt forms, 3 way visible card index, temporary markers, permanent markers, and standard security metal cabinet to allow for 150 percent capacity of the total locks used in the project.

1. Provide complete cross index system set up by key manufacturer and place keys on markers and hooks in the cabinet as determined in the final key schedule.

2. Provide hinged-panel type cabinet, for wall mounting.

2.05 BOLTS AND EMERGENCY EXIT DEVICES

A. Provide dust-proof sockets for bolts, except where special threshold detail provides non-recessed socket for bolt.

B. Provide rebated flushbolts of the lever action type with a minimum size of 300 mm to door leaves of up to 2300 mm and longer bolts to suit doors over 2300 mm high.

C. Finish of bolts and sockets shall match related hardware.

D. Panic exit devices shall be made from high grade stainless steel, shall comply with BS 5725, provide dogging or holdback functions on doors used as day time entrances and external access via locks within the master key system to the direction of the Engineer.

E. Rabbetted Doors: Provide suitable rebate sets where meeting stiles of doors are indicated as being rabbetted. Such fittings shall match the related hardware on such doors.

2.06 PUSH/PULL UNITS

A. Concealed Fasteners: Provide manufacturer's special concealed fastener system in particular for "back to back" fixing requirements.

2.07 CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: except as otherwise specifically indicated, comply with the manufacturers recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

B. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

C. Flush Floor Plates: Provide finished metal flush floor plates for flush closers except where thresholds are indicated and cover plate is specified to be an integral part of threshold. Finish floor plate to match hardware, unless otherwise indicated.

E. Recessed Floor Plates: Provide recessed floor plates where no thresholds are indicated and floor closers are located in an area of resilient flooring, stone flooring or terrazzo. Recess plates at receive an insert of the floor finish materials, of the normal thickness as indicated. Provide extended spindle on floor springs as may be necessary to accommodate thick floor finish inserts.

2.08 DOOR TRIM UNITS

A. Fasteners: Provide manufacturer's standard concealed fasteners for door trim units (edge trim, viewers, roses, levers, escutcheons and similar).

2.09 WEATHERSTRIPPING

A. General: Except as otherwise indicated, provide continuous weatherstripping at each edge of each exterior door leaf. Provide type, sizes and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from local stocks maintained by the manufacturer or distributor.

C. Weatherstripping at Jambs and Heads:

1. Provide bumper-type resilient insert and metal retainer strips, surface-applies unless shown as mortised or semi-mortised, or following metal, finish or resilient bumper material.

2. Provide Brush Pile insert of polypropylene or nylon woven pile and aluminium strip backing, complying with AAMA 701.2.

D. Weatherstripping at Door Bottom:

1. Provide threshold consisting of contact type resilient insert and metal housing of design and size shown, of following metal, finish and resilient seal strip.

2.10 HARDWARE FINISHES

A. Exposed hardware finishes shall be:

1. For Aluminium Doors: anodised finish, as aluminium colour.

2. For full flush and solid wood doors: Polished and Bright brass finish.

3. For steel doors: satin stainless steel - finish.

4. For wood costume casework: bright brass finish.

B. Provide fully matching finishes for all items where possible, to ensure uniformity of finish only one suite of internationally recognised hardware should be used, in accordance with requirements previously specified.

C. Provide quality of finish, including thickness of material, composition, hardness and other qualities complying with the designated standard units referenced in the Hardware Schedule.

PART 3: EXECUTION

3.01 INSTALLATION

A. Mount hardware in accordance with BS 4787 except as specifically indicated or required to comply with governing regulations, and except as the Engineer may otherwise direct.

B. Install each hardware item according to manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation of hardware or provide surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finished have been completed on the substrate.

C. Set units level, plumb and true to line and location Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Set thresholds for exterior doors in full bed of butyl - rubber of polyisobutylene mastic sealant.

3.02 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Final adjustment: Wherever hardware installation is made more than one month prior to acceptance or during the week prior to acceptance or occupancy, and make final check and adjustment to all hardware items in such space or area. Adjust door control devices to compensate for final operation of heating & ventilating equipment.

D. Instruct Employer's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

E. Continue Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the hardware manufacturer shall inspect and rectify any faults found. Faults of a major nature shall be detailed in a report to the Employer's representative.

F. The hardware manufacturer must be able to demonstrate to the satisfaction of the Employer and Engineer that they will supply suitably qualified personnel to the project both during construction and in a advisory capacity to ensure rectification of any maintenance problems after acceptance.

End of Section