SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

1.1 DEFINITIONS

A. Fire Resisting Door: A door, which has been constructed in such a manner that when installed in an assembly and tested, it will pass ASTM E 2074 and NFPA 252 or UL 10B and 10C, and can be rated as resisting fire for the specified duration. A fire resisting door must have been tested and carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming its fire resistance rating.

B. Smoke Door: A fire-resisting door which, in addition to having intumescent seals to seal hot smoke, also has approved quality draught seals to seal cold smoke, installed in accordance with NFPA 105 “Installation of Smoke-Control Door Assemblies”. A smoke door must have been tested and carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming its rating similar to UL 1784. Provide smoke doors with automatic drop bottom seals.

C. Fire Door Assembly: The door frame, door leaf, all hardware and accessories and vision lites all labeled and tested.

D. Direction of Opening: on Architectural Drawings, the indications for direction of opening are as follows:

1. Sliding doors are indicated by an arrow indicating the direction of slide.
2. Hinged or pivoting doors are indicated by a dotted triangle, the vertex of which indicates the hinge or pivot side.

1.2 PERFORMANCE REQUIREMENTS

A. Fire Resisting Doors and Assemblies: all fire resisting doors, shutters, grilles, screens, panels and the like, together with associated component assemblies shall have been tested and must carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming their fire resistance rating. The Contractor shall demonstrate that the selected independent testing agency will conduct random field inspection follow-ups to confirm that the submitted doors are identical to the tested specimens. Alternatively, if the selected approved independent testing agency does not support a follow-up program then the Contractor can select a further approved agency, local or international, to fulfill this obligation. In addition, fire doors are to be designed and manufactured in a system conforming to ISO 9001.

B. Fire Labels: all fire labels shall be issued by the testing laboratory. Alternatively, labels may be produced by the door assembly manufacturer provided:

1. The manufacturer has a quality assurance system to ISO 9002 or approved equal.
2. The label produced shall bear a serial number, the name of the testing laboratory and the date and number of the license.
3. The testing laboratory or a certified quality control office shall certify the consistency of the door assembly production as per the tested specimen.
4. The testing laboratory authorizes the manufacturer to produce the labels on the conditions listed above.

C. Fire Resisting Door Components: all components of fire resisting doors and assemblies, including but not limited to: door leaves, frames, ironmongery, hardware, and glazing, shall have the same rating and shall carry identifying labels of an approved independent testing and inspection agency or laboratory, confirming their individual fire resistance rating.

1. Door leaves and frames shall be labeled and from same manufacturer, if possible.
2. Door Hardware shall be tested and labeled.
3. Latch throw shall be as per test report or label:
   a. 12 mm latch for single doors
   b. 19 mm latch for double doors
4. For a door assembly to comply with labeling requirements, each component must be approved for use with other components.

D. Fire rated doors are to be submitted and approved comprising all components.

1. Any deviation from the hardware size indicated on the fire test certificate should be approved by the testing laboratory.

E. Fire Resisting Door Closers: all fire resisting doors shall be fitted with door closers that automatically close and positively latch the door.

F. Fire Resisting Door Enclosures: the space between the top of the fire resisting door assembly and the structural soffit above shall be closed by a wall or an appropriate panel with a fire rating equal to or exceeding that of the door.

G. Weather Stripping: provide weather seals to all external doors.

H. Soundproof Doors: all soundproof doors, together with associated component assemblies shall have been tested and must carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming their sound rating.
1. STC Rating: As indicated in Door Schedule.

I. Fire resisting doors assemblies: all fire resisting doors assemblies, together with all associated assembly components, including but not necessarily limited to door frames and door hardware shall either be the product of the door manufacturer or otherwise approved by him, and presented under Submittals requirements as a single product package.

J. Fire resisting door components: all components of fire resisting doors and assemblies, including but not limited to: door leaves, frames, ironmongery, hardware and glazing, shall carry identifying labels of an approved independent testing and inspection system/ agency or laboratory confirming their individual fire resistance rating. The door test should cover all configurations available for the door being tested. The rating of all door components shall be equal to the rating of the door assembly, and to the same standard. Locks/ latches, overhead closers, hinges and all hardware must be as tested or labelled components of equal specification that can demonstrate contribution to the required integrity.

1.3 FIRE RESISTING FLUSH STEEL DOORS

A. Fire resisting doors with rating indicated on drawings satisfying the requirements of BS 476-20 and 22. Flush fitting steel door to the thickness, construction and infill of approved non-combustible thermal insulating material indicated on fire test report. Door assembly shall be provided complete with frame, fire resisting hardware, and all necessary accessories and fixings. Raised thresholds are not permitted.

B. Doors are to be self-closing and are to be released automatically from hold-open position in case of fire by means of electro-magnetic devices connected to fire alarm system.

1.4 FLUSH STEEL DOORS:

A. 45 mm thick steel hollow doors to BS 6510 made of pre-galvanized sheet steel to BS EN 10143 and cold rolled mild steel sections to BS EN 10162, hot dip galvanized to BS EN ISO 1461 unless

otherwise indicated with coating thickness 180 g/m2. Doors are to be flush, watertight, with closed tops and edges and reinforced internally with vertical stiffeners welded and spaced not more than 150 mm over centers.

B. Door cores are to be constructed with:
   1. Polyurethane rigid foam insulation with compressive strength minimum 0.14 N/mm2. The polyurethane shall be foamed in place or laminated to each face sheet. Voids in foam shall not exceed 13 mm in any direction.
   2. Rigid core of mineral fibreboard insulation laminated to each face sheet with adhesive.
   3. Bonded core of impregnated honeycomb insulation with crushing strength not less than 0.19 N/mm2.

C. The strength of the bond between the insulation and the steel face sheets shall exceed the strength of the insulation, so that delamination does not occur.

D. Reinforce doors and frames to receive surface-applied ironmongery and hardware. Drilling and tapping for surface applied ironmongery may be done at project site.

E. Doors are to be supplied complete with all necessary accessories and hardware, vision panels and louvres, as shown on the Drawings and door schedule.

1.5 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Extra-Heavy-Duty Doors and Frames.

   1. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
   2. Edge Construction: Model 1, Full Flush.
   3. Core: Manufacturer's standard Kraft-paper honeycomb or Polystyrene or Polyurethane or Polyisocyanurate or Mineral board or Vertical steel stiffener.
   4. Frames: Knocked down; metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
   5. Exposed Finish: Factory.

1.6 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Extra-Heavy-Duty Doors and Frames.

   1. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
   2. Edge Construction: Model 1, Full Flush.
   3. Core: Manufacturer's standard or Kraft-paper honeycomb or Polystyrene or Polyurethane or Polyisocyanurate or Mineral board or Vertical steel stiffener.
   4. Frames Knocked down; metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
   5. Exposed Finish: Factory.

1.7 INTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES

A. Commercial Laminated Doors and Frames.

   1. Face: Metallic-coated steel sheet; minimum thickness of 0.053 inch (1.3 mm).
   2. Edge Construction: Continuously welded with no visible seam.
   3. Frames: Knocked down; 0.053-inch (1.3-mm) thickness.
   4. Exposed Finish: Factory. .
   5. Core: Manufacturer’s Standard Kraft-paper honeycomb or Polyisocyanurate or Polystyrene or Polyurethane or Vertical steel stiffener.

1.8 EXTERIOR CUSTOM HOLLOW-METAL DOORS AND FRAMES

A. Commercial Laminated Doors and Frames.

1. Face Thickness: Metallic-coated steel sheet; minimum thickness of 0.053 inch (1.3 mm).
2. Edge Construction: Continuously welded with no visible seam.
3. Frames: Knocked down; 0.053-inch (1.3-mm) thickness.
4. Exposed Finish: Prime.
5. Core: Manufacturer's Standards Kraft-paper honeycomb or Polyisocyanurate or Polystyrene or Polyurethane or Vertical steel stiffener.

1.9 INSTALLATION

A. Metal-Stud Partitions and Concrete Walls: Frames filled with insulation.

B. Install fire-rated doors in corresponding fire-rated frames according to BS 476-20 and 22.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

1.1 QUALITY ASSURANCE

A. Manufacturer and Vendor: FSC certified for chain of custody.

B. Manufacturer: Licensed participant in AWI's Quality Certification Program.

1.2 DEFINITIONS

A. Fire Resisting Door: A door, which has been constructed in such a manner that when installed in an assembly and tested, it will pass ASTM E 2074 and NFPA 252 or UL 10B and 10C, and can be rated as resisting fire for the specified duration. A fire resisting door must have been tested and carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming its fire resistance rating.

B. Smoke Door: A fire-resisting door which, in addition to having intumescent seals to seal hot smoke, also has approved quality draught seals to seal cold smoke, installed in accordance with NFPA 105 “Installation of Smoke-Control Door Assemblies”. A smoke door must have been tested and carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming its rating similar to UL 1784. Provide smoke doors with automatic drop bottom seals.

C. Fire Door Assembly: The door frame, door leaf, all hardware and accessories and vision lites all labeled and tested.

D. Direction of Opening: on Architectural Drawings, the indications for direction of opening are as follows:

1. Sliding doors are indicated by an arrow indicating the direction of slide.
2. Hinged or pivoting doors are indicated by a dotted triangle, the vertex of which indicates the hinge or pivot side.

1.3 PERFORMANCE REQUIREMENTS

A. Fire Resisting Doors and Assemblies: all fire resisting doors, shutters, grilles, screens, panels and the like, together with associated component assemblies shall have been tested and must carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming their fire resistance rating. The Contractor shall demonstrate that the selected independent testing agency will conduct random field inspection follow-ups to confirm that the submitted doors are identical to the tested specimens. Alternatively, if the selected approved independent testing agency does not support a follow-up program then the Contractor can select a further approved agency, local or international, to fulfill this obligation. In addition, fire doors are to be designed and manufactured in a system conforming to ISO 9001.

B. Fire Labels: all fire labels shall be issued by the testing laboratory. Alternatively, labels may be produced by the door assembly manufacturer provided:

1. The manufacturer has a quality assurance system to ISO 9002 or approved equal.
2. The label produced shall bear a serial number, the name of the testing laboratory and the date and number of the license.
3. The testing laboratory or a certified quality control office shall certify the consistency of the door assembly production as per the tested specimen.

4. The testing laboratory authorizes the manufacturer to produce the labels on the conditions listed above.

C. Fire Resisting Door Components: all components of fire resisting doors and assemblies, including but not limited to: door leaves, frames, ironmongery, hardware, and glazing, shall have the same rating and shall carry identifying labels of an approved independent testing and inspection agency or laboratory, confirming their individual fire resistance rating.

1. Door leaves and frames shall be labeled and from same manufacturer, if possible.
2. Door Hardware shall be tested and labeled.
3. Latch throw shall be as per test report or label:
   a. 12 mm latch for single doors
   b. 19 mm latch for double doors
4. For a door assembly to comply with labeling requirements, each component must be approved for use with other components.

D. Fire rated doors are to be submitted and approved comprising all components.

1. Any deviation from the hardware size indicated on the fire test certificate should be approved by the testing laboratory.

E. Fire Resisting Door Closers: all fire resisting doors shall be fitted with door closers that automatically close and positively latch the door.

F. Fire Resisting Door Enclosures: the space between the top of the fire resisting door assembly and the structural soffit above shall be closed by a wall or an appropriate panel with a fire rating equal to or exceeding that of the door.

G. Weather Stripping: provide weather seals to all external doors.

H. Smoke and fire resisting flush wood doors: smoke and fire resisting solid core door to satisfy the requirements of BS 476-20 and 22. Doors are to be with vision panels, where shown on Drawings.
1. Provide intumescent strips either on door edges or on the door frame, where required by the relevant codes and standards.
2. Doors are to be self-closing and are to be released automatically from hold-open position in case of fire by means of electro-magnetic devices connected to fire alarm system.
3. Doors are to be complete with all frame necessary accessories, fire resisting hardware, concealed intumescent strips to control hot smoke and approved quality draught seals to control cold smoke.

I. Soundproof Doors: all soundproof doors, together with associated component assemblies shall have been tested and must carry the identifying label of an approved independent testing and inspection agency or laboratory, confirming their sound rating.
1. STC Rating: As indicated in Door Schedule.

1.4 DOOR CONSTRUCTION, GENERAL

A. Quality Standard: ANSI/WDMA I.S.1-A.

1. WI Quality Certification Labels.

1.5 FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Performance Grade: to BS 4787-1 or WWDA I.S. 1.2, comprising preservative treated softwood solid core faced both sides with 6 mm plywood glued and pressed to core and lipped on all edges with hardwood. Plywood facing is to be finished to receive paint or covered with hardwood or decorative veneer, as shown on the Drawings.
2. ANSI/WDMA I.S. 1A Grade: Premium.
3. Species: Walnut veneer.
4. Cut, match and assembly of veneer leaves: Contractor to provide samples to meet the design intent as shown in the Concept Design Report and as approved by the Engineer.
5. Special Matching:

    a. Pair and set match.

6. Core: Particleboard or Glued wood stave or Structural composite lumber or Either glued wood stave or structural composite lumber Either glued or non-glued wood stave or structural composite lumber.
7. Construction: Five or seven plies, bonded.

1.6 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors:
1. Plastic-Laminate Faces.
2. Exposed Vertical Edges: Plastic laminate that matches faces.
3. Core: Either glued wood stave or structural composite lumber.
4. Construction: Five plies, bonded.

1.7 LIGHT FRAMES AND LOUVERS

A. Light-Opening Frames:

1. Wood beads.
2. Wood-veneered beads for fire doors.

B. Louvers: Extruded aluminum with clear or colored anodic finish, as per Engineer’s selection.

1. Fire-Door Louvers: Not acceptable.

1.8 PRIMING/FINISHING

A. Factory Finishing: All doors.

B. Transparent Factory Finishes:

1. ANSI/WDMA I.S. 1A Grade: Premium.
2. Finish: catalyzed polyurethane or water-based polyurethane.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

1.1 PRODUCTS

A. Flush access doors and frames with concealed flanges.

1. Material: Metallic-coated steel.

B. Fire-rated, flush access doors and frames with concealed flanges.

1. Fire-Resistance Rating: To match fire rating of adjacent wall.
2. Material: Metallic-coated steel.

C. Recessed access doors and frames with exposed flanges. Provide frame with no bead for installation.

1. Material: Steel.

D. Aluminum Flush Ceiling Access Door:
1. Fabricate door in the form of a pan recessed in the dimension required to receive adjacent Finish.

E. Finishes:

1. Metallic-Coated Steel: Factory finished.

END OF SECTION 083113

SECTION 083213 - SLIDING ALUMINUM-FRAMED GLASS DOORS

1.1 QUALITY ASSURANCE

A. Mockups for each form of construction.

1.2 WARRANTY

A. Door: Five years.

B. Glazing: 20 years.

C. Metal Finish: 30 years.

1.3 PERFORMANCE REQUIREMENTS

A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.
   1. Performance Class and Grade: CW30.

B. Thermal Performance:
   1. U-Value: max. 1.9 W/m2.K including assembly.
   2. Shading coefficient: 25 %.

1.4 SLIDING ALUMINUM-FRAMED GLASS DOORS

A. Glazing: Insulating glass; factory glazed.

B. Insect Screens: Aluminum wire fabric with aluminum frames.

C. Aluminum Finishes: Class I, clear anodic

1.5 FIELD QUALITY CONTROL

A. Testing: By Contractor.

END OF SECTION 083213

SECTION 083323 - OVERHEAD COILING DOORS

1.1 PERFORMANCE REQUIREMENTS

A. Operability under specified wind load is required.

B. Air-infiltration limit for exterior doors.

C. Seismic Performance: Refer to SBC Code.

1.2 DOOR ASSEMBLY

A. Service Door: Door curtain of galvanized steel.

B. Operation Cycles: Not less than, 20,000.

C. Design Wind Load: Refer to SBC Code.

D. STC Rating: Refer to the Acoustic Requirements indicated in the Concept Design Report.

E. Pass Door(s): Not required.

F. Hood: Match curtain material and finish.

G. Electric Door Operator: Heavy duty, with emergency manual chain crank] operation.

1. Obstruction-detection device.
2. Other Equipment: None.

1.3 FIRE-RATED DOOR ASSEMBLY

A. Fire-Rated Service Door: Door curtain of galvanized steel.

B. Operation Cycles: Not less than 20,000.

C. Design Wind Load: Refer to SBC Code.

D. Fire Rating: Refer to Fire Requirements indicated in the Concept Design Report, with temperature-rise limit and with smoke control

E. STC Rating: Refer to the Acoustic Requirements indicated in the Concept Design Report.

F. Pass Door(s): Not required.

G. Hood: Match curtain material and finish steel.

H. Electric Door Operator: Heavy duty, with emergency manual push-up operation.

1. Obstruction-detection device.
2. Other Equipment: None.

1.4 MAINTENANCE SERVICE

A. Initial Maintenance Service: 12 months.

1.5 DEMONSTRATION

A. Factory-authorized representative to train Employers personnel.

END OF SECTION 083323

SECTION 083473.13 - METAL SOUND CONTROL DOOR ASSEMBLIES

1.1 PERFORMANCE REQUIREMETNS

A. Sound Rating: Refer to the Acoustic Requirements indicated in the Concept Design Report.

1.2 WARRANTY

A. Materials and Workmanship: Five years.

1.3 SOUND CONTROL ASSEMBLIES

A. Steel Doors: Flush design, 44 mm thick.

B. Steel Frames: Welded unit construction.

C. Door Hardware: Sound control system, including but not limited to head and jamb seals, door bottoms, and thresholds, as required by testing to achieve STC rating. Refer to Section 087111 “Door Hardware”, and as follows:

1. Seals: As indicated in Door Hardware Schedule.
2. Door Bottoms: As indicated in Door Hardware Schedule.
3. Thresholds: As indicated in Door Hardware Schedule.

D. Glazing: Factory installed.

E. Steel Finishes: Factory-applied paint.

1. Color and Gloss: As selected by the Engineer from manufacturer's full range.

1.4 FIELD QUALITY CONTROL

A. Acoustical Testing Agency: Contractor engaged.

END OF SECTION 083473.13

SECTION 083473.16 - WOOD SOUND CONTROL DOOR ASSEMBLIES

1.1 PERFORMANCE REQUIREMENTS

A. Sound Rating: Refer to the Acoustic Requirements indicated in the Concept Design Report.

1.2 WARRANTY

A. Materials and Workmanship: Two years.

1.3 SOUND CONTROL ASSEMBLIES

A. Wood Doors: Flush design, 44 mm thick.

1. Grade, faces, veneer matching, fabrication, and finishing to match Section 081416 "Flush Wood Doors."

B. Steel Frames: Welded unit construction.

C. Door Hardware: Sound control system, including but not limited to head and jamb seals, door bottoms, cam-lift hinges, and thresholds, as required by testing to achieve STC rating. Refer to Section 087111 “Door Hardware” and as follows:

1. Seals: As indicated in Door Hardware Schedule.
2. Door Bottoms: As indicated in Door Hardware Schedule.
3. Thresholds: As indicated in Door Hardware Schedule.

D. Glazing: Factory installed.

E. Steel Finishes: Factory-applied paint.

1. Color and Gloss: As selected by Engineer from manufacturer's full range.

F. Wood Finishes: Factory finished to match doors specified in Section 081416 "Flush Wood Doors."

1.4 FIELD QUALITY CONTROL

A. Acoustical Testing Agency: Contractor engaged.

END OF SECTION 083473.16

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1.1 PRECONSTRUCTION LABORATORY MOCKUPS

A. Preconstruction Testing Service: Contractor engaged.

1.2 WARRANTY

A. Materials and Workmanship: 10 years.

B. Finish: 30 years.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Contractor to design aluminum-framed systems.

B. Wind Loads: Refer to SBC Code.

1.4 SYSTEM COMPONENTS

A. Storefront:

1. Exterior Construction: Thermally broken.
2. Glazing System: Gaskets on two sides and structural sealant on two sides.
3. Glazing Plane: Front.

B. Shadow Box: Laminated, aluminum metal faced flat panels as follows:

1. Overall Panel Thickness: As required to achieve acoustic rating indicated in the Concept Design Report. .
2. Exterior Skin: Aluminum.
3. Interior Skin: Aluminum.
4. Insulation Core: 100 mm thick Rockwool foil faced, refer to Section 072100 “Thermal Insulation”.

C. Venting Windows: Section 085113 "Aluminum Windows."

D. Glazing: Section 088000 "Glazing."

E. Entrance Doors:

1. Door Construction: 44.5-mm overall thickness.
2. Door Design: Narrow stile.
3. Glazing stops and gaskets.

F. Entrance Door Hardware: Manufacturer’s Standards Door Hardware, as approved by the Engineer.
1. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 ALUMINUM FINISHES

A. Aluminum Finishes:
1. High Performance Powder Coating, PVF3 to comply with AAMA 2605.

1.6 SOURCE QUALITY CONTROL

A. Testing Agency: Contractor engaged.

1.7 FIELD QUALITY CONTROL

A. Testing Agency: Contractor engaged.

1.8 MAINTENANCE SERVICE

A. Entrance Door Hardware: Six months.

END OF SECTION 084113

SECTION 085113 - ALUMINUM WINDOWS

1.1 QUALITY ASSURANCE

A. Mockups for each form of construction.

1.2 WARRANTY

A. Windows: 10 years from date of Substantial Completion.

B. Glazing Units: 20 years from date of Substantial Completion.

C. Aluminum Finish: 10 years from date of Substantial Completion.

1.3 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.

1. Minimum Performance Class: CW.
2. Minimum Performance Grade: 30.

B. Energy Performance:

1. U-Value: max. 1.9 W/m2.K including assembly.
2. Shading coefficient: 25 %.

C. Condensation-Resistance Factor: To be tested according to AMMA 1503.

D. Sound Transmission Class: according to ASTM E 90 and determined by ASTM E 413, as indicated in the Design Report.

E. Wind Loads: Refer to SBC Code.

1.4 ALUMINUM WINDOWS

A. Frames and Sashes: Thermally improved aluminum extrusions.

B. Glazing:

1. Glass: Clear, insulating.
2. Glazing System: Manufacturer's standard.

C. Accessories: None.

D. Insect Screens: At each operable exterior sash, with aluminum frames and without wickets.

E. Aluminum Finish: Class I, clear anodic.

1.5 FIELD QUALITY CONTROL

A. Testing Agency: Contractor engaged.

END OF SECTION 085113

SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

1.1 WARRANTY

A. Materials and Workmanship: Three years.

1.2 PRODUCTS

A. Hardware Reference Standards
   1. Door Hardware shall comply with requirements of the ANSI/BHMA Standards Specifications as referenced in this Section, quality grade as specified.
   2. Door Hardware for fire rated hardware shall comply with following:
      a. Requirements specified in this Part.
      b. Requirements specified in other related Specifications Sections.
      c. Requirements of Fire applicable local codes.

B. Base Metal
   1. Base metal for all hardware and door furniture units including hinges, closers covers, face plates, trims... etc) shall be stainless steel. Finish of all stainless steel shall be Finish BHMA 630 (Satin Stainless Steel).

C. Scheduled Door Hardware
   1. International hardware manufacturers to establish their compliance with approved U.S. standards and these specifications.
   2. Fire rated hardware to comply with NFPA Standards referenced in this Section or in other Contract Documents.
   3. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule.
      a. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products and complying with BHMA standard referenced.
      b. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
   4. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware. Products are identified by using door hardware designations, as follows:
      a. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Access Control Systems
   1. access controlled doors with biometric readers shall be connected to security and access control system. For location of readers refer to the security layouts.

E. Hinges and Pivots
   1. Standards: Comply with the following:
      a. Butts and Hinges: BHMA A156.1.
      b. Template Hinge Dimensions: BHMA A156.7.
      c. Self-Closing Hinges and Pivots: BHMA A156.17.
      d. Pivots: BHMA A156.4.
   2. Hinges shall be full mortise, template, of exposed ball bearings, 5 knuckles, suitable for high frequency applications and of life time warranty.
   3. Quantity: Provide the following, unless otherwise indicated:
      a. Two Hinges: For doors with heights up to 1525 mm.
      b. Three Hinges: For doors with heights 1550 to 2285 mm.
      c. Four Hinges: For doors with heights 2300 to 3050 mm.

d. For doors with heights more than 3050 mm, provide 4 hinges, plus 1 hinge for every 750 mm of door height greater than 3050 mm.

4. Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
   a. Size hinge width and height in accordance with NFPA 80 requirement.
5. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, Provide only template-produced units.
6. Hinge Weight: Unless otherwise indicated, provide the following:
   a. Entrance Doors: Heavy-weight ball bearing hinges.
   b. Doors with Closers: Antifriction- ball bearing hinges Heavy weight or standard weight as per door size chart for hinge required.
   c. Interior Doors: Standard-weight ball bearing hinges.
   d. Residential building apartments: standard weight hinges.
7. Hinge Base Metal: Unless otherwise indicated, provide the following:
   a. Exterior Hinges: Stainless steel, with stainless-steel pin.
   b. Interior Hinges: Stainless steel, with stainless-steel pin.
   c. Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
8. Hinge Options: Comply with the following:
   a. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
      1) Out-swinging exterior doors.
      2) Out-swinging corridor doors with locks.
   b. Corners: Square.
9. Self-Closing Hinges and Pivot.
   a. Self-Closing Hinges and Pivots: BHMA A156.17.
   b. Spring Hinges: Grade 1; wrought steel, with torsion spring.
      1) Type: Single or Double acting.
      2) Mounting: Full mortise (butts).
10. Pivots:
    a. Comply with the following:
       1) Center Hung Pivot: For use with Rescue Hardware on Toilet Doors. Pivots shall be Heavy Duty capable of carrying the weight of the Door.
       2) Single Acting – Offset Hung Pivots: BHMA C07111 or C07121 based on the weight of the door.
    b. Sets shall be complete for each installation including bottom pivot, top pivot, intermediate pivot where required by door size and extended spindle where required by undercut.
11. Fasteners: Comply with the following:
    a. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
    b. Wood Screws: For wood doors and frames.
    c. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
    d. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors and frames. Finish screw heads to match surface of hinges.
12. Double Swinging Doors: Adjustable type, not less than 4 inch height, heavy duty, suitable for type of doors to be installed to it.
13. Concealed Hinges: Standard weight.

F. Locks and Latches.
1. Standards: Comply with the following:
   a. Mortise Locks and Latches: BHMA A156.13.
   b. Auxiliary Locks: BHMA A156.5.
   c. Delayed-Egress Locks: BHMA A156.24.
   d. Bored Locks: BHMA A156.2; Grade 2; Series 4000.
2. Generally:
   a. All locks shall be extra heavy duty, grade 1, unless bored lock indicated.
   b. All locks shall be of anti-vandalism design. This design allows the outside lever handle to swing freely in the locked mode.

c. Door Handles and Trims shall be of the Type and Design selected and approved by the Engineer.
d. Provide round (rose) cover plates for handles.
e. Where threaded bars are used to assemble the two pieces of lock spindle, minimum inner diameter of threading bar shall be 6mm.
f. These requirements for mortise locks shall remain applicable in all respects for wood doors and steel doors.

3. Mortise Locks: Stamped steel case with steel or brass parts BHMA Grade 1; Series 1000. Provide mortise locks for exterior doors, throughout the job. All locks shall be ADA compliant. Lock case to have field reversible handing without opening lock case.
4. Certified Products: Provide door hardware listed in the following BHMA directories:
   a. Mechanical Locks and Latches: BHMA's "Directory of Certified Locks & Latches."
   b. Delayed-Egress Locks: BHMA's "Directory of Certified Electromagnetic & Delayed Egress Locks."
5. Lock Trim: Comply with the following: All trims to have returns. Trims shall be ADA compliant. Trim shall be stainless steel BHMA-630 finish.
   a. For internal and external:
   b. Lever: Lever handles to be in stainless steel BHMA 630 finish. Lever handles shall be with escutcheon or sectional trim in stainless steel BHMA 630 finish. Handles shall withstand severe duty handling. Lever spindle shall be a minimum of 6mm diameter.
   c. Provide safety door handles. Straight handles are not acceptable.
   d. Escutcheon (Rose): stainless steel 630 finish. Provide round (rose) cover plates for handles.
   e. Dummy Trim: Match operable trim. Stainless steel 630 finish.
6. Bottom Rail Locks.
   a. Heavy Duty adaptable to Patch fittings, and can accommodate ANSI/BHMA cylinder.
7. Lock Functions:
   a. Mortise Locks: BHMA A156.13.
   b. Bored Locks: BHMA Grade 2; Series 4000. Provide bored locks for residential apartments doors, throughout the job. All locks shall be ADA compliant. Lock case to have field reversible handing without opening lock case.
8. Lock Features: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
   a. Mortise Locks: Minimum 19 mm latchbolt throw.
   b. Deadbolts: Minimum 25 mm bolt throw.
   c. Pairs of Doors: 16-mm minimum throw of latch.
   d. Fire-Rated Doors: Comply with UL requirements for throw of bolts and latches on rated fire openings.
   e. Heavy duty anti-friction tongue.
   f. Stainless steel armor front.
   g. Seven pin interchangeable core cylinder.
   h. Corrosion protected steel case.
9. Backset: 70 mm, unless otherwise indicated. Lock Function: Provide lock functions as described below, but not limited to:
   a. F-01 Passage (no lock).
   b. F-04 Office / Entry lock, with faceplate button depressed function.
   c. F-13 Corridor lock.
   d. F-22 Privacy with Coin Turn Outside.
10. Deadbolt:
    a. BHMA A 156.5.
    b. Case manufactured from heavy gauge steel. Cases are to be closed on all sides to protect internal parts. Standard 69 mm (2-3/4") backset, 25 mm (1") throw dead bolt with hardened steel insert.

G. Electrified Locks and Latches
1. Electromechanical Locks: Comply with the following:
   a. Conforms to BHMA A156.13: Extra heavy-duty grade, Mortise Type.

b. Provide Electrically Locked (fail safe) or Electrically Unlocked (fail secure) Mortise Type Locksets with Lever Handles and Keyed Cylinder.Electrical locking or unlocking is by 24V AC or DC. The Keyed Cylinder always allows retraction of the latchbolt by from outside, as an override feature. Inside Lever is always free for immediate egress.
c. Provide Electrically Locked or Unlocked Locksets with built-in Request-to-Exit (RX) switch inside the lock case, which is actuated upon rotation of the inside or outside Levers. The built in RX Switch signals Authorized use of the Door Opening to security Console and allows a non-disruptive means of immediate egress.

H. Mortise key pad lock: Grade 1 and Security Grade1, certified to ANSI/BHMA A156.13, Motor driven Stainless steel, battery operated.

I. Door Bolts
1. Standards: Comply with the following:
a. Automatic and Self-Latching Flush Bolts: BHMA A156.3.
b. Manual Flush Bolts: BHMA A156.16.
2. Flush Bolts: BHMA Extra heavyduty grade, designed for mortising into door edge. Finish shall be BHMA 630 Stainless Steel.
3. Extension Rods for Manual Flush Bolts: Provide 12 inch (305 mm) steel or brass upper rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.
4. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
a. Mortise Flush Bolts: Minimum 19 mm throw.

J. Exit Devices
1. Standard: BHMA A156.3.
a. BHMA Grade: Extra heavy-duty grade.
2. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."
3. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
4. Panic Exit Devices: For non-fire rated doors are to be as specified in Sub-Clause “C” here before but with facility to hold latchbolts in retracted position so that the doors may be used as push/pull. Dogging is to be accomplished by a hex key cylinder installed on the body of touch bar devices. Panic exit devices shall be of construction that resists vandalism and strong abuse.
5. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
6. Outside Trim: To match material and finish to match locksets, unless otherwise indicated.
a. Match design for locksets and latchsets, unless otherwise indicated.
7. Rim Exit Device:
a. Type 1, Grade 1.
b. Actuating bar – Push pad.
c. Electrified options: Provide to meet design intent.
d. Stainless Steel.
8. Concealed Vertical Rod:
a. Type 1, Grade 1.
b. Actuating bar – Push pad.
c. Electrified options: Provide to meet design intent.
9. Electrified Exit Device Options: Types and functions indicated as follows:
a. Requested-for-Exit Function: Signal initiated when push bar is actuated.
b. Electric Locking/Unlocking: Remote signal controls locking of outside trim; complying with the following:
10. Exit Device Style:

a. Aluminum Doors: Pad type, narrow style or wide stile, to be accommodated by the Aluminum Door Stile.
b. Hollow Metal Doors: Pad type, wide style.
c. Wood Doors: Pad type, wide style.

K. Cylinders and Keying
1. Standards: Comply with the following:
a. Cylinders: BHMA A156.5.
b. Key Control System: BHMA A156.5.
2. Cylinder Grade: BHMA Extra heavyduty grade.
3. Cylinders: Manufacturer's standard tumbler type, constructed from stainless steel, or nickel silver, and complying with the following:
a. Number of Pins: Six or Seven.
b. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
c. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
d. Anti-drill, anti-pick, non-copiable protected high security profile.
4. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
a. Interchangeable Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.
5. For Residential unit entrance doors shall have keyless solution relying on biometric credentials.
6. Construction Keying: Comply with the following:
a. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
b. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
1) Replace construction cores with permanent cores, as directed by the Employer.
2) Furnish permanent cores to the Employer for installation.
7. Keying System: Key system shall be expandable to unlimited number, proprietary. Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
a. Key system shall be a proprietary type expandable to an unlimited number.
b. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
8. Keys: Provide nickel-silver keys complying with the following:
a. Stamping: Permanently inscribe each key and core with a visual key control number and include the following notation:
1) Notation: Information to be furnished by the Employer.
b. Quantity: In addition to two extra blank key for each lock, provide the following:
1) Cylinder Change Keys: Three with two blanks.
2) Master Keys: Five.
3) Grand Master Keys: Five.
4) Great-Grand Master Keys: Five.
5) Provide master Key that open all the Main telecom room in all buildings in the project.
9. Key Control System: BHMA Grade 1 system, including key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers. Contain system in metal cabinet with baked-enamel finish.
a. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
b. Capacity: Able to hold keys for 150 percent of the number of locks.
c. Cross-Index System: Set up by key control manufacturer.
d. Provide adequate number of Wall Cabinets to accommodate all keys in the Project.

L. Strikes
1. Standards: Comply with the following:

a. Strikes for Mortise Locks and Latches: BHMA A156.13.
b. Strikes for Auxiliary Deadlocks: BHMA A156.5.
c. Dustproof Strikes: BHMA A156.16.

2. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   a. Flat-Lip Strikes: For locks with three-piece anti-friction latchbolts, as recommended by the manufacturer.
   b. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   c. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   d. Provide double lip strike for use with Rescue Hardware.
   e. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
   f. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
   g. Provide separate special strike plates with extended flat lip bent to cover cutout in door frame face resulting from electric door strike preparation and delayed installation of electric strikes. Special strike plates shall match conventional lock strike plates in thickness, attachment, and finish, and shall serve as standard lock strikes during the initial use of door hardware without electric strikes.

M. Dustproof Strikes: BHMA Grade 1.

N. Operating Trim.
1. Standard: Comply with BHMA A156.6.
2. Materials: Fabricate from stainless steel, unless otherwise indicated.
3. Push-Pull Design:
   a. Offset Pull.
      1) Finish: BHMA 630 (Satin stainless steel).
      2) Diameter: 25 mm (1 inch).
      3) Offset: 90 degrees.
   b. Pull Plates: BHMA 630 (Satin stainless steel), 1.3 mm thick, 102 mm x 406 mm with square corners, beveled edges, and raised integral lip; secured with exposed screws, with “Pull” engraving.
   c. Push Plate:
      1) Finish: BHMA 630 (Satin stainless steel).
      2) Size: 406 mm (16 inches) high x 100 mm (4 inches) wide.
      3) Thickness: 1.3 mm (0.05 inches).
      4) Edges: Beveled 4 sides.
      5) Corner: Square.
      6) Screws: Countersunk flat head screws.
      7) “Push” engraving.
   d. Straight Pull:
      1) Finish: BHMA 630 (Satin stainless steel).
      2) Size: Center to center 250 mm (10 inches).
      3) Diameter: 25 mm (1 inch).

O. Closers and Door Control Devices
1. Closers, General: Unless otherwise indicated, provide closers on all fire rated doors, exterior doors, toilet and locker room doors, sound retardant doors, corridor doors, doors between heated/cooled and unheated / uncooled areas, elevator equipment room doors, and other doors as required. Closer shall be tested for at least 10 million cycles and shall withstand 57 degree ambient temperature and will be provided with all-weather hydraulic fluid. Cylinder shall be cast iron. Piston and main arm shall be of forged steel construction. Pinion to be double heat treated. Closer will be equipped with the function of variable back check and delayed action. Closer shall be provided with ten years warranty and warranty against leaks. Closer shall be provided with adjustable speed and hold open facility and

positive stop option. Concealed door closer shall be completely concealed and components shall minimize tempering and vandalism.

a. Size of Units: Unless otherwise indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather and drafts, and anticipated frequency of use.
b. Arms: Provide Push Side parallel arms for all overhead closers required on out swinging doors, unless otherwise indicated. Provide closer unit one size larger than recommended for use with standard arms.
c. Closing Cycle: Comply with requirements of authorities having jurisdiction or the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," whichever are more stringent.
    1) Opening Force: Comply with the following maximum opening force requirements for locations indicated:
        a) Exterior Doors: 67 N.
        b) Interior Doors: 22.2 N.
d. Construction: Provide marine grade construction for closers in non-air conditioned areas, consisting of nonferrous and stainless steel components.
e. Door closer shall be selected based on the capacity of the door.
f. Surface Closers: ANSI/BHMA A l56.4, Grade 1, surface type. Provide parallel arms or top-jamb mount closers for out swinging exterior doors. Provide narrow-projection closers for doors close to a wall so as not to strike the wall at the 90-degree open position. Where indicated on Drawings, provide closers for inactive leaf of pair of doors to allow 180-degree open position.
    1) Provide stainless steel covers, arms and brackets for closers in all areas.
g. Overhead Concealed Closers: ANSI/BHMA. A 156.4, Grade 1, overhead concealed with concealed arm, to fit within door frame head. Where indicated on Drawings, provide closers for inactive leaf of pair of doors to allow 180-degree open position.

2. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

P. Door Coordinators

1. Door Coordinators (stop strip coordinators): ANSI/BHMA A156.3, Type 21, where pair of doors is equipped with Automatic Flush Bolts, an Astragal or other Hardware that will require sequential closing of door leaves, provide Door Coordinator to be capable of holding the active door of a pair open until the inactive door has preceded it in the closing cycle. Door Coordinators shall be bar type, surface applied to the underside of frame head stop. Door Coordinator shall be painted to match the door frame finish.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for mounting of parallel arm door closers and surface vertical rod exit device strikes.
3. Do not use gravity type coordinators.

Q. Protective Trim Units

1. Standard: Comply with BHMA A156.6.
2. Doors for corridors, or any door, that may be opened by direct contact with a trolley (for example main doors of toilets and janitor's rooms) shall have armor plates on both faces.
3. Armor plates and kick plates shall be screw fixed to doors. Minimum thickness for kick plates is 2 mm and for armor plates is 2 mm. Countersink screw heads in plate metal. Only flat head countersunk screws shall be provided. Bevel top and two side edges (B3E). Armor Plates shall be 914 mm high by full width of door less clearance for stops on door frame.
4. Kick Plates: Bevel top and two side edges (B3E). Provide two Stainless Steel kick plates for toilet doors. Kick plate to ensure that the door bottom is protected. Countersink screw heads in plate metal. Only flat head countersunk screws shall be provided Kick Plate height 400 mm.
5. Mop Plate: 200 mm high by door width with allowance for door frame stop, with flat head countersunk screws.

6. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
7. Protection plates shall be sized to full width of the door less clearance for stops on door frame on push side and 13 mm less than door width on pull side, height to be selected by the Engineer.
    a. Metal Plates: Stainless steel, 2 mm thick

R. Stops and Holders
1. Stops: Comply with the following:
    a. ANSI/BHMA A156.16, Grade 1, floor- or wall mounted concave door stop, as appropriate for door location indicated, with integral rubber bumper.
    b. Do not mount floor stops where they will impede traffic.
    c. Where floor or wall stops are not appropriate, provide overhead holders.
2. Concealed Overhead Stops/ Holders: ANSI/BHMA A156.8, Grade 1, adjustable, shock absorbing type, for use with single acting doors.
3. Electromagnetic Holders: ANSI/BHMA A156.15, floor mounted or wall mounted as applicable. For Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.
4. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by smoke detection system, loss of power and Fire Alarm System.

S. Door Gasketing
1. Standard: Comply with BHMA A156.22.
2. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
    a. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
    b. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
    c. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
3. Air Leakage: Not to exceed 0.000774 cu. m/s per m of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
4. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
    a. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
5. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL 10B or NFPA 252.
6. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
7. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by the manufacturer.
8. Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.
9. Weatherstripping and Seal Types: Unless otherwise indicated, provide the following:
    a. Automatic Door Bottoms: Mortise type, extruded aluminum with neoprene insert for doors to achieve up to STC 45 or gretaer. For a pair of doors with Flush Bolts, provide surface mount type Automatic Door Bottom.
    b. Meeting Stile Seals (Astragal Seals): Extruded anodized aluminum, with silicon seal.
    c. Overlapping Astragal: Extruded Anodized, with Silicon seal.
    d. Weatherstripping, Smoke Seals, and Sound Retarding Gaskets: Compression-type self-adhesive silicone gasket applied to door stops, dark bronze color.

T. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 13 mm; fabricated for drilled-in application to frame.

U. Silencers for Wood Door Frames: BHMA Grade 1; neoprene or rubber, minimum 16 by 19 mm; fabricated for drilled-in application to frame.

V. Thresholds
1. General: Unless otherwise indicated, provide standard metal threshold units of type, size, and profile. Comply with ANSI/BHMA A156.21.
   a. Material: Extruded aluminum, nonslip finish, except as otherwise specified.
   b. Exterior Hinged Doors: Provide units not less than 100 mm wide, and not more than 12 mm high, with beveled edges providing a floor level change with a slope of not more than 1:2, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames.
2. Exterior Thresholds: ANSI/BHMA A156.21, extruded aluminum. Provide flat saddle type with fluted surface or interlocking type with resilient insert as shown.
3. Threshold for Aluminum Entrance Doors: Manufacturer's standard threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 12 mm high, with beveled edges providing a floor level change with a slope of not more than 1:2, formed to accommodate change in floor elevation where indicated.
4. Interior Thresholds: Extruded aluminum flat saddle type with fluted surface.

W. Boxed Power Supplies
1. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems. Power Supply shall have adequate AMPS capacity to accommodate all the electrified hardware of the door opening. Power Supply shall be provided with Fire Alarm interface card/accessories for doors with required connection to, and interface with, the Fire Alarm System.

X. Power Transfers
1. Electrical Power Transfer (EPT): To provide concealed secure power conduit between door frame and door leaf, to transmit power to electrified locking devices. EPT shall be mortised type with Stainless Steel Finish and shall be completely concealed when the door is in closed position. The EPT shall suite swinging doors with Butt Hinges and Pivot hinges up to 3/4 Inch offset. EPT shall have Ten - 24 gauge wires and shall be UL Listed for use on fire rated doors.

Y. Door Position Switch
1. Door Position Switch shall be mortised type in to the upper door jamb and into the door leaf. The Door Position Switch shall have concealed/flush mount rectangular metal plates with Stainless Steel finish and shall be UL listed. The Door Position switch is used to detect the closed or open status of the door leaf, and is also used to perform other function(s) as an integral part of the Security Access Control door operation. Round shape Door Position switches are not acceptable.

Z. Key Switch
1. Key Switch shall be heavy duty recessed type for flush mounting into the wall or into the Door Frame. Key Switch Cover Plate shall be wide Stile Stainless Steel and shall be provided flush with the adjacent surfaces. Provide Narrow Stile Type Key Switch where it is required for mounting onto the Door frame.
2. Key Switch shall allow installers to configure both Clockwise and Counter Clockwise key turn direction. Also, Key Switch shall have options of momentary and/or maintain action. Provide wall back (gang) boxes for installation of key switches.
3. Cover Plate shall be heavy duty weather resistant (single gang size only), with 2 LED lights (Red and Green).

AA. Sliding Door Hardware

1. Sliding Door Hardware: BHMA A156.14; grade 1, rated for door weight of 200 kg consisting of complete sets including rails, hangers, supports, bumpers, floor guides and accessories indicated.
2. By passing Sliding Door Hardware: Rails and door hardware that allow vertical adjustment and rated for doors weighing up to 100 kg (Grade 1).
    a. Rail Material.
    b. Rail Configuration.
    c. Mounting.
    d. Wheel Assembly: Two wheel or four wheel, with roller bearings.
        1) Bumper stops ;wrought steel.
        2) Floor guides.

1.3 MAINTENANCE SERVICE

A. Full-Maintenance Service: 12 months.

1.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Contractor engaged.

B. Occupancy Adjustment: After six months.

END OF SECTION 087111

SECTION 088000 - GLAZING

1.1 QUALITY ASSURANCE

A. Install glazing in mockups specified in other Division 08 Sections.

1.2 WARRANTY

A. Laminated Glass: 10 years.

B. Insulating Glass: 10 years.

1.3 PERFORMANCE REQUIREMENTS

A. Engineering design of glass by Contractor.

B. Wind loads: Refer to SBC Code.

C. Insulated Glass -Vision Panel: Refer to SBC 201 Code, for Safety Glazing.

D. Energy Performance:
1. U-Value: max. 1.9 W/m2.K including assembly,
2. Shading coefficient: 25 %,

E. Sound Transmission Class (STC): According to ASTM E 90 and determined by ASTM E 413, as indicated in the Design Report

F. Safety Glazing: Glass shall comply with Category II CPSC 16 CFR Part 1201 as per Section 2406 of SBC 201.

G. Fire-Resistance-Rated Glass: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263 as per Section 716 of SBC 201.

1.4 MATERIALS

A. Silicone Glazing Sealants: Neutral curing, Class 100/50.

B. Glazing Tapes: Back-bedding-mastic type.

C. .
1. Light Transmission: 3%.
2. Light Reflection- glass side: 55%.
3. Light reflection-coated side: 59%.

1.5 INSULATING-LAMINATED-GLASS TYPES

A. GL1- Curtain wall:
1. Minimum indicative 6 mm heat strengthened for outer pane.
2. Minimum indicative 20 mm air space with aluminum spacer – color black.
3. Minimum indicative 11.52 mm laminated heat strengthened for inner pane.

B. GL2- Doors
   1. Minimum indicative 6 mm Fully tempered for outer pane.
   2. Minimum indicative 12 mm air space with aluminum spacer – color black.
   3. Minimum indicative 11.52 mm laminated heat strengthened for inner pane.

C. GL-3 Windows (valid for residential)
   1. Minimum indicative 6 mm heat strengthened for outer pane.
   2. Minimum indicative 12 mm air space with aluminum spacer – color black.
   3. Minimum indicative 11.52 mm laminated heat strengthened for inner pane.

END OF SECTION 088000

SECTION 088300 - MIRRORS

1.1 RELATED SECTIONS

A. Section 018113 – Sustainable Design Requirements: This section is to be read in compliance with Section 018113 to ensure coordination, drawings, key personnel assignment and project meetings, throughout design, procurement and construction stages, all include requirements for sustainable compliance during design and construction as required by NEOM standards and procedures and in compliance with sustainability guidelines and third-party certifications, as applicable.

1.2 SUSTAINABILITY REQUIREMENTS

A. LEED v4.1: Refer to Section “Sustainable Design Requirements”.

1.3 WARRANTY

A. Materials and Workmanship: Five years.

1.4 PRODUCTS

A. Tempered Glass Mirrors: Clear.

1. Nominal Thickness: 6.0 mm.

B. Film backing for safety mirrors.

C. Mirror Hardware: Mirror clips.

D. Mirror Edges: Beveled polished.

END OF SECTION 088300

SECTION 089119 - FIXED LOUVERS

1.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: As per SBC Code.

B. Wind Loads: As per SBC Code.

C. Seismic Performance: As per SBC Code.

1.2 PRODUCTS

A. Architectural-Aluminum Louvers:

1. Horizontal Non-Drainable-Blade Louver:

a. Depth: Not less than 150 mm.
b. Blade Profile: Blade with center baffle.
c. Mullion Type: Fully recessed.
d. Free Area: 50%.

B. Exhaust Extruded-Aluminum Louvers:

1. Horizontal Non-Drainable-Blade Louver:

a. Depth: Not less than 150 mm.
b. Blade Profile: Blade with center baffle.
c. Mullion Type: Fully recessed.
d. Free Area: 50 %– 70 %.

C. Fixed Extruded Aluminum Vertical Blade Sand Trap Louver:

1. made of extruded aluminum construction; frame with channel profile and sloped sill to drain sand out by gravity; corner joints mitered and mechanically fastened, with continuous recessed caulking channel each side; capable of long vertical spans.

2. Louver Depth: 101.6 mm.

3. Blade Profile: Vertical- Sandtrap.

4. Frame and Blade Nominal Thickness: Not less than 2 mm for frames and 1.6 mm for blades.

5. Louver Sand Rejection and Air Performance Ratings tested in accordance with EN 13181:2001 standards.

SAND GRADE	SAND REJECTION EFFICIENCY %			
	0.5 m/s	1.0 m/s	1.3 m/s	2.0 m/s
76 - 699 microns (Standard)	88.1%	58.0%	36.6%	5.4%
355 - 425 microns (Coarse)	96.3%	89.5%	78.7%	20.1%

6. Free Area: 30 percent, minimum. Based on test sample of 1220 mm x 1220mm.
7. Static Pressure Loss: Max. 0.066 inch wg (16 Pa), @ 256 fpm core velocity.

8. Discharge loss Coefficient Cd: 0.20.

D. Louver Screens:

1. Provided at each louver.
2. Screening Type: Insect screening.

E. Finishes:

1. Aluminum: Class I, clear anodic.

END OF SECTION 089119