DIVISION 7

THERMAL AND MOISTURE PROTECTION

BUILDING WORK

DIVISION 7

THERMAL AND MOISTURE PROTECTION

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SECTION 07005

WATERPROOFING AND DAMPPROOFING

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all materials, labor, and equipment required to perform all waterproofing of cast-in-place concrete, damp proofing, protection board and related work necessary for the proper completion of the project as required by the drawings and as specified herein.

1.02 GUARANTY

A As a condition of this Section furnish the Employer with a written guaranty that the damp proofing membrane and the liquid waterproofing work upon completion will be waterproof for a period of ten (10) years and that during this time all defects in the waterproofing or bonding, or leaks which may develop through the surface, shall be promptly repaired at no expense to the Employer, provided such leaks and defects are not due to causes beyond control of this section.

1.03 APPLICATION SCHEDULE

A Damp proof the all surfaces of all cast-in-place concrete walls, foundations, columns and ground beams in contact with soil from the bottom of the footings up to floors damp proofing layer.

B Floors damp proofing membrane shall be applied below ground slabs and Raft foundation, wet areas and planters, as shown on drawings.

1.04 SUBMITTALS

A Submit to the Engineer, as provided in Submittals Section for shop drawings, detailed information on materials proposed & installation methods.

B Submit two sets of representative samples of any or all proposed materials required for the work of this Section as requested by the Engineer.

C Submit to the Engineer for review, the manufacturer's specifications and instructions for materials and installation. These specifications and instructions shall be as required to provide the detailed drawings.

1.05 DELIVERY, STORAGE AND HANDLING

A All perishable materials for the work of this Section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials shall be delivered and stored in their original containers, plainly marked with identification of material and maker. Materials in broken containers, or in packages showing water marks or other evidence of damage, shall not be used and shall be removed from the site.

1.06 JOB CONDITIONS

A Hot Weather Requirements

1. Protect fresh membrane from hot sun as approved.

2. Provide artificial shade, wind breaks and use cooled materials, as required.

PART2: PRODUCTS

2.01 MATERIALS

A Material for walls of basement, floors, wet areas and planter waterproofing shall be 3mm thick torch applied polyester membrane, complying with the following particular specification:

Description	**Test Method**
Thickness : 3mm	ASTM D751
Reinforcement (base): 180g/m2 woven non-woven polyester	-----
Coating material: Mixture of bitumen modified with APP and additives	-----
Softening point: 150° C	ASTM D36
Water absorption: less than 0.15 %	ASTM D570
Upper surface: flammable polyethylene film	------
Tensile strength: 950 N/5 cm long, 700 N/5 cm trans.	ASTM D146

Man: DERMABIT
DW1, Dermabit water proofing industries CO.
P.O. Box 5945-Riyadh 11432
Saudi Arabia
Tel: (01) 4645988
Fax: (01) 4634100

Man: BITUMAT
Bituminous Materials Factory
P.O. Box 7487-Dammam 31462
Saudi Arabia
Tel : 8424842

Or other equal and approved.

B Material for concrete surfaces in contact with soil, shall be two coats of cold applied black bitumen coating solution to BS 3416, Class A as manufactured by:

Man: CRODA PAINTS Ltd.
Bankside
Hull
North Humberside HU5 1SQ
England
Tel: (0482) 41441
Tlx: 52536

Ref.: Bituminous Blach High Build.

Man: FOSROC INTERNATIONAL Ltd.
(Middle East Division)
United Arab Emirates

Ref. : Nitoproof 120.

Or other equal and approved.

C Primers, bonding compounds, adhesives and the like are to be types recommended for purpose by sheet manufacturer.

D Protection sheet for Sur facces of contact with soil: shall be 20 mm thick expanded pltyrne.

PART 3: EXECUTION

3.01 GENERAL

A All installation shall conform to the acceptable shop drawings and the system and materials manufacturer's specifications and instructions as submitted and reviewed.

3.02 SUBSTRATE SURFACE

A Concrete surfaces shall be free of roughness or projections, with a clean surface, finished as specified under concrete finishes section which will allow an even application of the membrane and insulation.

B Surfaces shall not contain any grease, oil or any other contaminants which could affect the complete bonding of the membrane to the concrete surface.

C Surfaces shall be visibly dry and thoroughly cleaned, (remove all dust, dirt, and loose materials) immediately prior to application of membrane. Compressed air, vacuum cleaner or other suitable means shall be used.

3.03 INSTALLATION

1. Single layer bituminous sheet: lay with 75 mm side laps and 100mm end laps, torch lower surface of sheet and seal to base by firm pressure and seal laps by torching in accordance with manufacturer's instructions.

2. Pipes Etc.: where pipes etc. pass through sheeting make junctions completely watertight by forming collars fully bonded or sealed to both pipes and sheeting.

3. Inspection: inform the Engineer a reasonable length of time before covering any part of membrane with overlying construction to allow inspection.

4. Protect finished sheeting and prevent puncturing during following work. Cover sheeting with permanent overlying construction as soon as possible. Immediately prior to covering check for damage and repair as necessary.

B Installation of Coatings

1. Dry surfaces: dampen before applying water based bitumen emulsion.

2. Apply coatings generally in accordance with manufacturer's recommendations to clean, dry surfaces, in dry atmospheric conditions, after primer has dried and after previous coats have hardened.

3. Ventilation: spaces in which coatings are to be applied are to be well ventilated.

4. Cold and Hot applied bitumen: apply number of coats to thickness and at rate of application recommended by coating manufacturer or as stated in bill of quantities.

5. Chemical waterproof coating: mix dry powder with water on site and apply mixture to pre-wetted surfaces in number of coats and at rate of application recommended by coating manufacturer.

6. Brushing: work coating into recesses, edges, joints, inter sections and over surfaces generally to obtain uniform and continuous film.

7. Intersections: ensure continuity of coatings including at junctions with other membranes.

8. Covering: final covering is to be laid/applied as soon as possible after coating has hardened.

End of Section

SECTION 07500

ROOFING SYSTEM

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, equipment and incidentals required to install membrane roofing system and all roofing system accessories and finishing materials as shown on the drawing and specified herein.

1.02 SUBMITTALS

A Submit to the Engineer as provided in special conditions of contract shop drawings showing details of construction and erection of roofing system and components and detailed technical data on membrane and other materials proposed. Include independent laboratory testing results certifying that submitted components and materials meet this Specification.

B Provide, with shop drawings, certification that the roofer who will execute the work is an experienced applicator of the roofing system proposed.

C Submit to the Engineer for review, two representative samples of all roofing components and materials. Board and sheet stock samples shall be 300 mm square or long, minimum.

D Submit to the Engineer for review, the manufacturer's specifications and instructions for materials and installation of the insulated roofing system. These specifications and instructions shall be as required to provide the detailed roofing system.

1.03 DELIVERY, STORAGE AND HANDLING

A All perishable materials for the work of this Section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials, such as base sheets, felts, cement and lime, shall be delivered and stored in their original containers, plainly marked with identification of material and maker. Materials in broken containers, or in packages showing water marks or other evidence of damage, shall not be used and shall be removed from the site.

1.04 PRE-ROOFING CONFERENCE

A Well in advance of commencement of roofing operations but after roofing substrate has been constructed and prepared for roofing, a pre-roofing conference shall be held to inspect the substrate. All parties having an interest in the roofing or work on the roofs shall be informed of the conference.

B The conference shall include an inspection by all parties of the substrate and its conformance with the drawings, the approved shop drawings and the roofing system manufacturer's approved specifications, and instructions. All objections to approval of the substrate shall be submitted

in writing to the Engineer. Coordinate efforts to remedy objections and prepare substrate properly to receive roofing.

1.05 JOB CONDITIONS

A Hot Weather Requirements

1. Protect fresh membrane from hot sun as approved.

2. Provide artificial shade, wind breaks and use cooled materials, as required.

1.06 GUARANTY

A As a condition of this Section furnish the Employer with a written guaranty that the roofing system work upon completion will be waterproof for a period of ten (10) years and that during this time all defects in the waterproofing or bonding, or leaks which may develop through the surface, shall be promptly repaired at no expense to the Employer, provided such leaks and defects are not due to causes beyond control of this section.

PART 2 : PRODUCTS

2.01 WATERPROOFING MATERIALS

A Waterproofing shall be single layer high performance torch applied polyester membrane complying with the following particular specification:

1. Description:

Thickness	:	4 mm
Reinforcement (base)	:	260 grms/m2 woven non woven polyester with continuous thread.
Coating material	:	APP modified bitumen, modified with plastomers and elastomers
Upper surface	:	Film finish/ or slated.
Method of application	:	Torchy apply on concrete surface.

2. Characteristics of the membrane:

Characteristic	Minimum requirement	Test Method

Flexibility at low temperature (-4°C to 10°C)	No cracking	ASTM D146
Softening point	Minimum 150°C	ASTM D36
water absorption	less than 0.15%	ASTM D570
Tensile strength N/50 mm longitudinal direction.	1200	ASTM D146
transverse direction	950	ASTM D146
Elongation		
longitudinal direction	55%	ASTM D146
transverse directions	60%	ASTM D146

B Skirtings and upstrands material shall be two layer bituminous sheet similar to paragraph A above but capsheet layer shall be 4mm thick slate finished.

C Primers and adhesives, types recommended for purpose by roof covering manufacturer.

D Cant strip shall be asphalt impregnated fiberboard by Manville, Celotex or equal.

E Portland cement shall conform to ASTM C150 Type I.

F Water for mortar and grout shall be fresh, clean, potable and free from organic matter, acids and alkalis.

G No lime will be allowed to be added to cementitious mixes used under this Section.

2.02 ACCESSORIES AND FASTENINGS MATERIALS

A Aluminum for Flashings and the like: to BS 1470, designation S1B, 0.8 mm thick, temper grade H2.

B Channel (Regret): aluminum alloy to BS 1470, designation S1B-H2, 0.8 mm thick, dovetailed channel section for casting into concrete or surface fixing, as shown on the Drawings, to receive top edges of flashings, upstands and sealants.

C EDGE TRIM: extruded aluminum section to BS 1474, designation 6063, condition TF.

D Black Bitumen Coating Solution for painting backs of flashings is to be to BS 3416, Type 1.

E Pointing Sealant shall be polysulphide rubber based compound:

Man: Expandite Ltd

Chase Road
London NW10 6PS
England
Tel: (01) 965 8877

Ref. : Thiofle 600

Or other equal and approved.

PART 3: EXECUTION

3.01 GENERAL

A All installation shall conform to the acceptable shop drawings and the system and materials manufacturer's specifications and instructions as submitted and reviewed.

3.02 SUBSTRATE SURFACE

A Concrete surfaces to receive roofing shall be free of roughness or projections, with a smooth clean surface, finished as specified under concrete finishes section which will allow an even application of the membrane and insulation. Concrete shall have damp cured for 28 days minimum before application of roofing.

B Surfaces shall not contain any grease, oil or any other contaminants which could affect the complete bonding of the membrane to the concrete surface.

C Concrete shall be free from surface laitance, loose aggregate, form release agents, curing compounds or other surface treatments.

D Surfaces shall be visibly dry and thoroughly cleaned, (remove all dust, dirt, and loose materials) immediately prior to application of membrane. Compressed air, vacuum cleaner or other suitable means shall be used.

E Notify the Engineer at least 48 hours before application of roofing commences. A representative of the roofing manufacturer shall be present while roofing is being applied to assure conformance to drawings, specifications, and good workmanship requirements.

F Notify the Engineer in writing if, when instructed to proceed with work, the surfaces to be covered are not satisfactory.

G Commencement of the installation of any material shall be considered as acceptance of the conditions of all the surfaces to be covered, and no subsequent claim on account of previous condition of surface will be entertained.

3.03 SCREEDING

A Flat roof slabs shall receive Class 18 screeding concrete cast to falls as indicated on the Drawings. The surfaces of the screeding concrete shall be

even and free from any depressions and other defects with reasonably smooth surface finish and ready to receive water proofing works.

3.04 ROOFING MEMBRANE INSTALLATION

A The time of roofing operations with respect to adverse weather conditions, shall be subject to the approval of the Engineer.

B The Manufacturer shall certify that the membrane meets or exceeds the individual requirements set forth herein.

C The following tests shall be carried out by an independent laboratory on specimens from supplied material on site, cost of tests to be included in the Contractor rates:

- Low temperature flexibility.
- Softening point.
- Breaking strength and elongation at break for both directions.

D Antidust priming asphalt shall comply with ASTM-D41.

E Application shall be according to manufacturer's printed and approved instructions.

F Sheets to be arranged to give a minimum of 75 mm overlap with adjacent end sheet.

3.05 EXTERNAL AND INTERNAL CORNERS

A Internal corners shall be two layers of roofing sheet applied as following:

1. cant strip shall be applied as manufacturer instructions.
2. 300 mm wide underlayer sheet applied first.
3. Capsheet applied to primed vertical or horizontal face with 50mm overlaps.

B External corners shall be three layers of roofing sheet as following:

1. 25 mm chamfer formed in concrete assist in dressing roofing sheet around angle

2. 300 mm wide underlayer sheet applied first.

3. Roofing sheet applied to horizontal primed surfaces with 50 mm overlaps.
4. Roofing sheet applied to vertical surface with 50 mm overlaps on to primed surfaces.

End of Section

SECTION 07900

CAULKING

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all materials, labor & equipment required to install caulking materials as required by the drawings and as specified herein.

B The terms "caulking" and "sealing" as used on the drawings and in these specifications are synonymous, and either or both terms shall indicate the materials specified herein.

1.02 RELATED WORK

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

1. Section 03300-Concrete.
2. Section 04200-Masonry.
3. Section 04400-Natural stone slab cladding

1.03 SUBMITTALS

A Submit to the Engineer, as provided in the Submittals Sections, detailed information on materials proposed and installation methods.

B Submit two sets of representative samples of any or all proposed materials required for the work of this section as requested by the Engineer.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A Sealants shall be stored in unopened containers, under cover, in a cool dry place.

PART 2: PRODUCTS

2.01 MATERIALS

A Concelaed Joint Sealant for movement joints is to be oil based mastic compound unless otherwise specified.

Man: Dunlop Ltd.
Chester Road
Erdington
Birmingham B35 7AL
England
Tel: (021) 373 8101
Ref: Caulking compound DP 247-43

Man: Expandite Ltd.
Chase Road
London NW10 6PS
England
Tel: (01) 965 8877
Tlx: 25420

Ref: Secomastic

Or other equal and approved.

B Exposed Joint Sealant for movement joints is to be approved wo-part polysulphide rubber based compound unless otherwise specified.

Man: `Dunlop Ltd.

Ref: High butyl mastic 421.8

Man: Fosroc International Limited (Middle East Division)
U.A.E - Dubai
Tel : 310567
Fax : 310379

Ref: Thioflex 600

Or other equal and approved.

C Joint Sealant for movement joints in car park decks and sewage treatment works is to be two-part, compound of chemically resistant elastomeric polymers, cold applied, resistant to fuel and oil spillage.

Man: Servicised Ltd.
Ajax Avenue
Slough
Berkshire SL1 4BH
England
Tel: 0753 692929
Tlx: 846966 Servcd G.

Ref: Vertigard

Man: Forsroc International Limited
U.A.E - Dubai

Ref. : Expofelx 800

Or other equal and approved.

D Joint Sealant for movement joints in retaining walls and basements is to be bitumen based compound.

Man: Expandite Ltd.
Chase Road
London NW10 6PS
England
Tel: (01) 965 8877
Tlx: 25420

Ref: Plastiseal

Man: Servicised Ltd.
Ajax Avenue
Slough
Berkshire SL1 4BH
England
Tel: 0753 692929
Tlx: 846966 Servcd G.

Ref: Servijoint

Or other equal and approved.

E Joint Sealant for movement joints in drinking water reservoirs and for damp conditions is to be sulphate resistant olymeric ompound or use with cement.

Man: Servicised Ltd.
Ajax Avenue
Slough
Berkshire SL1 4BH
England
Tel: 0753 692929
Tlx: 846966 Servcd G.

Ref: Servi-gard

Or other equal and approved.

F Primer shall be as recommended by the sealant manufacturer.

G Backup Material shall be Polyethylene or polyurethance foam as recommended by the sealant manufacturer.

H Bondbreaker Tape Adhesive-backed polyethylene tape as recommended by the sealant manufacturer.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

A Colors. Colors of sealants shall be as selected by the Engineer from the manufacturer's standard line of colors. Different colors may be required for different locations.

B Backup Material. Backup material shall be provided as necessary to control the depth of sealant and shall be of suitable size so that, when compressed 25 to 50 percent, the space will be filled.

PART 3: EXECUTION

3.01 JOINT PREPARATION

A All surface to receive sealant shall be clean, dry, and free from dust, grease, oil, or wax. Concrete surfaces which have been contaminated by form oil, paint, or other foreign matter which would impair the bond of the sealant to the substrate shall be cleaned by sandblasting. All surfaces shall be wiped with a clean cloth saturated with xylol or other suitable solvent and primed before the sealant is applied.

B Unless otherwise recommended by the sealant manufacturer and permitted by the Engineer, the depth of sealant in a joint shall be equal to the width of the joint, but not more than 20 mm.

C Backup material shall be rolled or pressed into place in accordance with the manufacturer's installation instructions, avoiding puncturing and lengthwise stretching. If depth of the joint does not permit use of backup material, bondbreaker tape shall be placed at the bottom of the joint to prevent three-sided adhesion.

3.02 SEALING

A Sealing work shall be done before any field painting work is started. The air temperature and the temperature of the sealed surfaces shall be above 10 C when sealing work is performed.

B Upon completion of the sealing work, each sealed joint shall have a smooth, even, tooled finish, flush with the edges of the sealing recess, and all adjacent surfaces shall be clean. Sealant shall not lap onto adjacent surfaces. Any sealant so applied as to prevent the painting of adjacent surfaces to a clean line, or with an excess of material outside the joint and feathered onto surfaces, shall be removed and the joint resealed.

End of Section

DIVISION 8

DOORS AND WINDOWS

BUILDING WORK

DIVISION 8

DOORS AND WINDOWS

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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. Steel flush hollow-metal doors and transom panels.
2. Decorative steel door and frames.
3. Car park Doors.
4. 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, 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 thickness 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 Steel Flush Doors: constructed from 1.5 mm thick galvanized steel sheet double skin facing with lock seam joints at edges, reinforced internally with steel channel sections and with bonded core of impregnated honeycomb insulation. Doors are to be finished with factory applied corrosion inhibiting protective coating to receive paint and supplied complete with vision windows and louvre panels, as shown on the Drawings.

B Steel Full Louver Doors: constructed from galvanized steel angle channel or hollow section framing to form 100 x 45 mm perimeter frame with 75 x 2 mm zed profile horizontal fixed louvres at 50 mm spacings, with detachable flyscreens; all finished with factory applied corrosion inhibiting protective coating to receive paint.

C 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.

D Steel Door Frames:

1. Steel Door Frames 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 labeled 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 SEALANTS

A Sealant shall be of the 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 08120

ALUMINUM DOORS AND FRAMES

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, equipment and incidentals required to install aluminum doors, panels, frames and appurtenances as shown on drawings 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 07900 - Caulking.
3. Section 08710 - Door Hardware.
4. Section 08800 - Glazing.

1.03 SUBMITTALS

A Submit to the Engineer, as provided in special conditions, shop drawings of all doors, frames, and appurtenances showing materials, construction and erection details.

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

C Submit two each of the following samples. Samples shall be full size and shall show gages, configuration, construction and finish proposed for the various components. Resubmit new samples of each as required until acceptance is obtained.

1. Bolted tubular corner construction of each type door, 150 mm square panels or legs.
2. Door frame corner, 150 mm by 150 mm legs.

D Submit complete manufacturer's literature on the systems to be used.

PART 2: PRODUCTS

2.01 MATERIALS

A Aluminum alloy doors shall be meat the general requirements of ASTM B221 or BS 4873, constructed from aluminum 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.

B Insect screens shall be aluminum screens with aluminum frame for sliding doors.

C Aluminum sections for doors shall be hollow section rails and stiles with glazing beads and gaskets, thresholds and draught strips, designed to accept single glazed, or double glazed units, as shown on drawings.

D Provide extruded, integrally weatherstripped for sand/dust seal, aluminum astragals at multiple leaf door openings between doors. Minimum thickness of aluminum shall be 1.6 mm.

2.02 TUBULAR ALUMINUM DOORS

A Stile and rail tubes shall be 1.6 mm minimum wall thickness and approximately 100 mm face width and height as approved. Door stiles, rails and glass stops shall be accurately milled to flush, airline joints. The doors shall be constructed without welding by means of an approved structural corner assembly or shall be tie-bolted with 10mm (3/8 in) diameter plated steel rods, nuts and lock washers. The corner assemblies or rods shall be concealed into head and bottom rails of doors.

B. Provide insect screens for sliding doors.

C. Glazing stops shall be 1.5 mm (0.062-in) thick snap-in type with vinyl inserts.

D. Provide the following hardware fabricated for and installed at single or pairs of doors/frame:

1. Offset pivots of cast aluminum with steel pins, oilite top pivot bearings and ball bearing bottom pivot bearings, for each leaf.

2. Overhead concealed closers, two speed type for use with pivots, as approved, for each leaf.

3. Dead latches, less cylinders, with latch hold-back and operating tool, with lever handle for inactive leaf.

4. Flush bolts, 300 mm length, top and bottom, inactive leaf.

5. Pull handles 1 No. for each leaf.

6. Push bars 1 No. for each leaf.

7. Floor springs, 1 No. for each double swing leaf .

8. Fabricate and allow for hardware furnished under the Door Hardware Section including, cylinders and thresholds.

2.03 TUBULAR ALUMINUM FRAMES

A. Frames shall be aluminum sized as shown with 1.6 mm minimum wall thickness and with pile weatherstripped (sand/dust seal) aluminum doorstops and vinyl insert.

B. All frame joints shall be factory milled to hairline cracks and connected with concealed 5 mm minimum wall thickness aluminum channel clips and flat head 300 Series alloy stainless steel screws.

C. Prepare and reinforce for all specified hardware with 6061-T6 alloy aluminum, 6 mm minimum thickness. Where windows occur over door heads, design and provide reinforcement of same material to withstand all applied loads and forces.

D. Provide one approved frame anchor per 750 mm (2-1/2 ft), or part thereof, of frame height, for securing frames to concrete and masonry jambs.

2.04 GLAZING

A. Use 6 mm thick clear float glass.

2.05 FINISH

A Aluminum Finish shall be polyester resin powder electrostatically applied and baked to give a minimum thickness of 70 microns, colour as shown on drawing and approved, clear.

B Finish shall match the samples as approved.

C. Exposed hardware finish shall be anodized as aluminum colour.

2.06 PACKING

A Doors and panels shall be individual wrapped in corrugated cardboard with wood strips on vertical edges and banded with metal straps.

PART 3: EXECUTION

3.01 INSTALLATION

A All doors, panels, frames, hardware and appurtenances shall be installed and adjusted in strict accordance with the recommendations of the manufacturer and the shop drawings.

B Screws, nuts, washers, bolts, and other miscellaneous fastening devices shall be 300 Series alloy stainless steel, provided as required for installation of doors, frames, and appurtenances.

C After erection, precautionary methods shall be employed to adequately protect exposed surfaces of installed items from damage due to installation of other work or from lime, acid, cement, or other harmful compounds.

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 Engineer, to match sample held by the Engineer.

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 Aluminum alloy for windows and screens shall be meat the general requirements of ASTM B221 or BS 4873, constructed from aluminum 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 Aluminum Co. Ltd.
Riyadh - Saudi Arabia
Tel : 4054991
Fax : 4054555

Man: Aluminum 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 aluminum 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 Aluminum 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 10 year 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 Architect.

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 Owner'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 Architect to finalize 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 Architect 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 owner 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 Architect 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 aluminum 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 Aluminum Doors: anodized finish, as aluminum 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 recognized 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

SECTION 08800

GLAZING

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to install all glazing and bath mirror 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 08120 - Aluminum Doors and Frames.

2. Section 08520 - Aluminum Windows.

3. Section 08610 - Wood Windows and Screens.

1.03 SUBMITTALS

A. Submit to the Engineer, two representative samples of each type glazing material specified below. Provide samples of glass in 300 mm square minimum size. Resubmit any or all as required until accepted.

B Submit to the Engineer, as provided in Submittal Section, full size shop drawings showing step-by-step glass setting and sealing procedures.

1.04 DELIVERY, STORAGE AND HANDLING

A. All materials for the work of this Section shall be delivered, stored and handled so as to preclude damage of any nature. All glass shall be delivered and stored in it's original container, plainly marked with identification of material and maker. Materials in broken containers or in packages showing water marks or other evidence of damage shall not be used and shall be removed from the site.

B Each piece of glass shall bear the manufacturer's label showing the strength, grade, thickness, type, and quality of the glass, and all labels shall remain in place until the glass has been set and inspected by the Engineer. When glass is not cut to size by the manufacturer and is furnished from local stick, submit an affidavit stating the strength, grade, thickness, type, quality, and manufacturer of the glass furnished.

PART 2: PRODUCTS

2.01 GLASS MATERIALS

A Glass Generally: to BS 952, free from bubbles, inclusions, cracks, rippling, dimples and other defects.

1.	Tolerance in thickness	:	± 0.2 mm
2.	Tolerance in length up to 2000 mm	:	± 2 mm
3.	Tolerance in length above 2000 mm	:	± 3 mm

B Clear Float Glass: float glass has flat, parallel surfaces which provide clear, undistorted vision and reflection.

Minimum performance to be as follows:

1.	Thickness	:	6mm unless otherwise specified
2.	Day light reflection	:	8%
2.	Shading coefficient	:	0.98
3.	U. Value	:	5.8 W/m2.K (ASHRAE)

C Solar Control Glass: body tinted float glass, with selected and approved colour. Solar control glass reduces ultra violet and infrared radiation.

D Toughened Glass: impact performance to BS 6206, Class A, clear float glass. When it breaks, toughened glass fragments into small, comparatively harmless pieces.

E Tinted Solar Reflective Glass: body tinted solar reflective glass, with selected and approved colour.

2.02 MIRROR GLASS

A. Mirror Glass: float glass, silvered to give maximum reflection, free from tarnishing, discolouration, scratches and other defects visible in the designed viewing conditions and with polished beveled edges.

B. Brass Frame for Mirrors: All bathrooms mirrors are with brass frame

C. Clips for Fixing Mirrors: brass nickel plated fixed bottom clips and adjustable top clips with resilient packing.

2.03 ACCESSORIES AND COMPOUNDS

A Glazing Compounds, Tapes Strips, Gaskets and Sealants are to be types recommended by glass and surround manufacturers, unless otherwise specified and are to be obtained from approved manufacturers.

B Rubber Gaxkets: to BS 4255, Part 1.

C Silicone Sealant: to BS 5889, type A, colour to be selected by the Engineer.

D One Part Polysulphide Sealant: to BS 5215, colour to be selected by the Engineer.

E Two Part Polysulphide Sealant: to BS 4254, colour to be selected by the Engineer.

PART 3: EXECUTION

3.01 QUALITY OF WORK:

A Glazing must be wind and water tight under all conditions with full allowance made for deflections and other movements

B Panes are to be accurately sized with clean, undisfigured and undamaged edges and surfaces

C Keep materials dry until fixed

D Ensure that glass, surround materials, primers, sealers and paints which are to be used together are compatible

E Preparation of surrounds, dimensions of edge cover and clearance, positions and materials of distance pieces, setting and location blocks are to be BS 6262 and to glass and sealant manufacturers' recommendations.

3.02 FIXING GENERALLY

A Preparation: all surfaces to receive glazing are to be clean, dry, unobstructed and free from grease at time of priming, sealing and glazing. Allow primers or sealers to dry between coats and before glazing. Ensure that priming or sealing by others has been carried out and, if unsatisfactory, report to the Engineer before glazing commences.

B Bead Fixing: fix beads at pre-determined centres in accordance with surround manufacturer's recommendations, unless otherwise specified.

3.03 GLAZING METHODS

A Generally: comply with the requirements of FGMA - Flat Glass Marketing Association (Glazing System Manual and Glazing Manual), and shall also conform to the shop drawings.

B Non-Setting or Rubberizing Compounds:

1. Fully bed glass and beads in compound and fix beads securely

2. Trim excess compound to form smooth, neat chamfer.

C Tapes and Capping Sealant:

1. Apply tape of sufficient thickness to produce minimum 3 mm bed both sides of glass after compression; butt joint tape at corners, leaving no gaps; use tape of sufficient width to fill inside joint after compression and to finish approximately 6 mm below sight line on outside to receive capping sealant.

2. Bed beads to frame in bedding sealant, filling all voids, press firmly into position to compress tape and fix securely

3. Trim excess tape to a smooth chamfer

4. Apply capping sealant to fill outside joint, finishing to a smooth chamfer.

D Tapes, Sealant and Inside Trim:

1. Apply tape of sufficient size to produce minimum 3 mm bed and to fill joint after compression; butt joint tape at corners, leaving no gaps

2. Apply sealant, overlapping pane by at least 3 mm.

3. Fix beads securely, compressing sealant to form a complete seal.

4. Insert internal trim between bead and glass in continuous lengths, leaving no gaps and allowing for shrinkage.

5. Trim excess tape to a smooth, neat chamfer.

E Gaskets (Channel Type):

1. Ensure that fixing surfaces are smooth, undistorted and free from burrs, weld spatter and projections; any required painting is to be carried out before glazing

2. Lay out gaskets in flat, warm area for 24 hours before glazing.

3. Ensure that edges of glass are arrissed or covered with self adhesive tape.

4. Fit gasket to frame, butt jointing any ends in centre of top of opening, leaving no gaps

5. Lubricate gaskets and zipper strips with water or liquid paraffin.

6. Insert glass carefully using hardwood or plastic spatulas.

7. Equalize edge clearance with setting blocks.

8. Insert zipper strips and allow to retract for at least 4 hours before mitring corners and pushing into position, leaving no gaps.

F Gaskets (Single Sided)

1. Ensure that fixing surfaces are smooth, undistorted and free from burrs, weld spatter and projections; any required painting is to be carried out before glazing

2. Apply load bearing strip to rebate upstand with butt joints at corners, leaving no gaps.

3. Support glass on setting blocks.

4. Insert gaskets into groove to seal glass, leaving no gaps and allowing for shrinkage.

E Mirrors:

1. Fix accurately and securely, but do not overtighten fastenings.

2. Ensure undistorted reflection both within and between adjoining panes.

3.04 PROTECTION AND CLEANING

A Indicators: do not use painted or stuck on indicators on solar control or coloured glass. Whitewash on ordinary glass must be restricted to small central areas of panes.

B Cleaning: remove cement and plaster based spillage whilst wet. Remove all smears and excess glazing materials. Leave glazing clean and free from scratches inside and out.

C Clean and remove all labels from all glass when directed and clean glazing compound from frames around glass installed under this Section upon completion of the work. All defective or broken glass and glass broken because of faulty setting shall be replaced under this Section.

D All glass shall be protected under this Section from accidental damage with tapes or streamers attached to the sash or frame. No tape or streamer shall contact the glass.

E Aluminum panels shall be cleaned as recommended by the panel manufacturer. All labels shall be removed without damage or staining of exposed faces.

End of Section