

RAS ALAIN SOCIAL INCUBATION OFFICES

VOLUME 2

TECHNICAL SPECIFICATIONS

DEC, 2020

Technical Specifications

Item	Title	Page No.		
DIV. - 01	<u>GENERAL REQUIREMENTS</u>			
011000	Summary of Work	011000-01	thru	011000-01
013113	Project Co-Ordination	013113-01	thru	013113-03
013119	Co-ordination and Meetings	013119-01	thru	013119-05
013300	Submittals	013300-01	thru	013300-04
014000	Quality Requirement	014000-01	thru	014000-01
014529	Testing Laboratory Services	014529-01	thru	014529-03
017400	Cleaning and Waste Management	017400-01	thru	017400-02
DIV. - 04	MASONRY			
040513	Masonry Mortaring	040513-01	thru	040513-03
042000	Concrete Masonry Unit	042000-01	thru	042000-05
DIV. 06	WOOD AND PLASTIC			
06200	Finish Carpentry	06200-01	thru	06200-02
DIV. 07	THERMAL & MOISTURE PROTECTION			
071110	Modified Bitumen Membrane Waterproofing	071110-01	thru	071110-03
071116	Cementations Damp proofing	071116-01	thru	071116-04
072100	Thermal Insulation	072100-01	thru	072100-02
DIV. 08	DOORS AND WINDOWS			
08110	Steel Doors and Frames	08110-01	thru	08110-03
08210	Wood Doors and Frames	08210-01	thru	08210-02
08520	Aluminum Window and Doors	08520-01	thru	08520-03
08700	Hardware	08700-01	thru	08700-02
08800	Glazing	08800-01	thru	08800-03
DIV. 09	FINISHES			
09220	Portland Cement Plaster	09220-01	thru	09220-03
09260	Gypsum Board False Ceiling Systems	09260-01	thru	09260-04
09310	Porcelain Tiles	09310-01	thru	09310-03
09691	Natural Marble / Granite	09691-01	thru	09691-09
09900	Painting	09900-01	thru	09900-11

DIV. 10 SPECIALTIES

10800	Toilet Accessories	10800-01	thru	10800-03
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DIV. 14 CONVEYING SYSTEMS

142100	Elevators	142100-01	thru	142100-03
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DIV. 16 ELECTRICAL WORKS

Electrical Fixtures

DIVISION 1
GENERAL REQUIREMENTS

Ref.	Description
011000	Summary of Work
013113	Project Co-Ordination
013119	Co-ordination and Meetings
013300	Submittals
014000	Quality Requirement
014529	Testing Laboratory Services
017400	Cleaning and Waste Management

PART 1 GENERAL**1.01 Work Covered by Contract Documents/Requirements Included**

The Work of this Contract comprises but is not limited to the construction, completion of **RAS ALAIN SOCIAL INCUBATION OFFICES**, all as shown on the relevant drawings.

1.02 Related Requirements

- A. Instructions to Tenderers.
- B. Conditions of Contract.

1.03 Contracts

- A. Construct the Work under a "Re-measured" work contract.

END OF SECTION

PART 1 GENERAL**1.01 Section Includes**

- A. Project coordination by the Project Coordinator.
- B. Construction mobilization.
- C. Schedules.
- D. Submittals.
- E. Coordination drawings.
- F. Close-out procedures.

1.02 Related Sections

- A. General Conditions: Duties of the Supervising Engineer/Owner's Representative; unless otherwise noted.
- B. Section 011 000: Summary of Work.

1.03 Project Coordinator

- A. Project Coordinator: Main Contractor.

1.04 Construction Mobilization

- A. Cooperate with the Supervising Engineer/Owner's Representative in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- B. During construction, coordinate use of site and facilities through the Supervising Engineer/Owner's Representative.
- C. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

1.04 Construction Mobilization (cont'd)

- D. Comply with instructions of the Supervising Engineer/Owner's Representative for use of temporary utilities and construction facilities.
- E. Coordinate field engineering and layout work under instructions of the Construction Manager /Owner's Representative.

1.05 Schedules

- A. Submit preliminary progress schedule in accordance with Section 013 300 and coordinated with Project construction schedule.
- B. After review, revise and resubmit schedule to comply with revised Project schedule.
- C. During progress of work revise and resubmit as directed.

1.06 Submittals

- A. Submit preliminary shop drawings, product data and samples in accordance with Section 01300 for review and compliance with Contract Documents, for field dimensions and clearances, for relation to available space, and for relation to work of separate contracts. Revise and resubmit as required.
- B. Submit applications for payment on forms for review, and to Supervising Engineer/Owner's Representative.
- C. Submit requests for interpretation of Contract Documents, and obtain instructions through the Construction Manager / Owner's Representative.
- D. Process requests for substitutions, and change orders, through the Construction Manager /Owner's Representative.
- E. Deliver close-out submittals for review and preliminary inspection reports, to Construction Manager /Owner's Representative.

1.07 Coordination Drawings

- A. Provide information required by Construction Manager /Owner's Representative for preparation of coordination drawings.
- B. Review drawings prior to submission to Construction Manager /Owner's Representative.

1.08 Close-Out Procedures

- A. Notify Construction Manager /Owner's Representative when Work is considered ready for Substantial Completion.
- B. Comply with Engineer's instructions to correct items of work listed in executed Certificates of Substantial Completion.
- C. Notify Construction Manager /Owner's Representative when Work is considered finally complete.
- D. Comply with Construction Manager /Owner's Representative's instructions for completion of items of Work determined by Supervising Engineer/Owner's Representative 's final inspection.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 1

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 Section Includes

- A. Coordination
- B. Pre-construction meeting
- C. Site mobilization meeting
- D. Progress meetings
- E. Pre-installation meetings
- F. Examination
- G. Preparation
- H. Cutting and Patching
- I. Alteration project procedures.

1.02 Related Sections

- A. Section 01 31 13: Project Coordination: Coordination with Construction Manager

1.03 Coordination

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

1.03 Coordination (Cont'd)

- C. Coordinate space requirements and installation of mechanical and electrical work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and cleanup of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 Pre-construction Meeting

- A. Construction Manager's Representative will schedule a meeting after Notice of Award.
- B. Attendance Required: Construction Manager's Representative/ Engineer /Quantity Surveyor and Contractor.
- C. Agenda:
 - 1) Execution of Owner-Contractor Agreement.
 - 2) Submission of executed bonds and insurance certificates.
 - 3) Distribution of Contract Documents.
 - 4) Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5) Designation of personnel representing the parties in Contract, and the Supervising Engineer/Owner's Representative.
 - 6) Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract close-out procedures.
 - 7) Scheduling.

1.04 Pre-construction Meeting (Cont'd)

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Supervising Engineer/Owner's Representative, Owner, participants, and those affected by decisions made.

1.05 Site Mobilization Meeting

- A. Supervising Engineer/Owner's Representative will schedule a meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required: Supervising Engineer/Owner's Representative, Special Consultant, Contractor, and major Subcontractors.
- C. Agenda:
 - 1) Use of premises by Owner and Contractor.
 - 2) Owner's requirements.
 - 3) Construction facilities and controls provided by Owner.
 - 4) Temporary utilities provided by Owner.
 - 5) Survey and building layout.
 - 6) Security and housekeeping procedures.
 - 7) Schedules.
 - 8) Procedures for testing.
 - 9) Procedures for maintaining record documents.
 - 10) Requirements for start-up of equipment.
 - 11) Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Supervising Engineer/Owner's Representative, Owner, participants, and those affected by decisions made.

1.06 Progress Meetings

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

1.06 Progress Meetings (cont'd)

- C. Attendance Required: Main Contractor, major Subcontractors and Suppliers, Owner, Supervising Engineer/Owner's Representative, Engineer, Quantity Surveyor, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1) Review minutes of previous meetings.
 - 2) Review of Work progress.
 - 3) Field observations, problems, and decisions.
 - 4) Identification of problems which impede planned progress.
 - 5) Review of submittals schedule and status of submittals.
 - 6) Review of off-site fabrication and delivery schedules.
 - 7) Maintenance of progress schedule.
 - 8) Corrective measures to regain projected schedules.
 - 9) Planned progress during succeeding work period.
 - 10) Coordination of projected progress.
 - 11) Maintenance of quality and work standards.
 - 12) Effect of proposed changes on progress schedule and coordination.
 - 13) Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Supervising Engineer/Owner's Representative, Owner, participants, and those affected by decisions made.

1.07 Pre-installation Meeting

- A. When required in individual specification sections, convene a Pre-installation meeting at work site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Construction Manager /Owner's Representative four days in advance of meeting date.

1.07 Pre-installation Meeting (Cont'd)

- D. Prepare agenda and preside at meeting:
 - 1) Review conditions of installation, preparation and installation procedures.
 - 2) Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Supervising Engineer/Owner's Representative, Owner, participants, and those affected by decisions made.

PART 2 PRODUCTS - NOT USED-

PART 3 EXECUTION - NOT USED -

END OF SECTION

PART 1 GENERAL**1.01 Section Includes**

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed Products list.
- D. Shop Drawings.
- E. Product Data.
- F. Samples.
- G. Manufacturer's installation instructions.
- H. Manufacturers' certificates.
- I. Construction photographs.

1.02 Submittal Procedures

- A. Transmit each submittal with an approved transmittal form to the Construction Manager / Owner's Representative.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or Supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

1.02 Submittal Procedures (cont'd)

- E. Schedule submittals to expedite the Project, and deliver to Supervising Engineer/Owner's Representative at Site Office. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor and Supervising Engineer/Owner's Representative review stamps.
- H. Revise and resubmit, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with provisions.
- J. Submittals not requested will not be recognized or processed.

1.03 Proposed Products List

- A. Within 30 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.04 Shop Drawings

- A. Submit in the form of one reproducible and the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Supervising Engineer/Owner's Representative.
- B. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article above.
- C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.05 Product Data

- A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Construction Manager and one copy for the Owner's Representative.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents as per Conditions of Contract.

1.06 Samples

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Supervising Engineer/Owner's Representative selection.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples specified in individual specification sections; one of which will be retained by Supervising Engineer/Owner's Representative.
- E. Reviewed samples which may be used in the Work are indicated in individual specification sections.

1.07 Manufacturer Installation Instructions

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Supervising Engineer/Owner's Representative in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.08 Manufacturer Certificates

- A. When specified in individual specification sections, submit certification by manufacturer to the Supervising Engineer/Owner's Representative, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Supervising Engineer/Owner's Representative.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL**1.01 Requirements Included**

- A. General Quality Control.
- B. Mock-ups.
- C. Manufacturers' Field Services.

1.02 Related Requirements

- A. Conditions of the Contract: Inspection and testing required by governing authorities.

1.03 Quality Control, General

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.04 Mock-Up

- A. Erect field Samples and Mock-ups at Project site in accordance with requirements of the Specification section.
- B. Provide travel facilities for the Supervision Engineer /Owner's Representative where necessary to inspect samples or materials inside or outside Jordan.

1.05 Manufacturers' Field Services

- A. When specified in respective Specification sections, require supplier or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
- B. Representative shall submit written report to Supervision Engineer /Owner's Representative listing observations and recommendations.

END OF SECTION

SECTION 01 45 29 TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 Requirements Included

- A. Contractor shall employ and pay for the services of an Independent Testing Laboratory to perform specific services and testing.

1.02 Related Requirements

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities:
- B. Related Requirements Specified in Other Sections:
- C. Respective sections of specifications: Certification of products.
- D. Each specification section listed: Laboratory tests required, and standards for testing.
- E. Testing Laboratory inspection, sampling and testing is required as elsewhere indicated in Contract Documents.

1.03 Qualification Of Laboratory

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in Jordan.
- D. Testing Equipment:
 - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards.
 - b. Accepted values of natural physical constants.

1.04 Laboratory Duties

- A. Cooperate with the Supervising Engineer/Owner's Representative and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify the Supervising Engineer/Owner's Representative and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit five copies of written report of each test and inspection to Supervising Engineer/Owner's Representative. Each report shall include:
 - 1. Date of test.
 - 2. Project title and number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the Project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by the Supervising Engineer/Owner's Representative.
- E. Perform additional tests as required by the Supervising Engineer/Owner's Representative or the Owner.

1.05 Limitations of Authority of Testing Laboratory

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of the Work.
 - 3. Perform any duties of the Contractor.

1.06 Contractor's Responsibilities

- A. Cooperate with laboratory personnel; provide access to Work, to Manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of Products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required:
 - 1. For the Contractor's convenience.
 - 2. When initial tests indicate Work does not comply with Contract Documents.
- H. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience.
- I. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents.

END OF SECTION

SECTION 01 74 00 CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.01 Requirements Included

- A. Execute cleaning, during progress of the Work, and at completion of the Work.

1.02 Related Requirements

- A. Conditions of the Contract.
- B. Each Specification Section: Cleaning for specific Products or work.

1.03 Disposal Requirements

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
- B. Contractors to prevent any contamination or discharge of construction debris into the waters of the lagoons.

PART 2 PRODUCTS

2.01 Materials

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 During Construction

- A. Execute periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from demolition works, and construction operations.
- C. Provide on-site containers for the collection of waste materials, debris and rubbish.

3.01 During Construction (Cont'd)

- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 Dust Control

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 Final Cleaning

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Wash and shine glazing and mirrors.
- D. Polish glossy surfaces to a clear shine.
- E. Ventilating Systems:
 - 1. Clean permanent filters and replace disposable filters if units were operated during construction.
 - 2. Clean ducts, blowers and coils if units were operated without filters during construction.
- F. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- G. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.
- H. The Contractor will assume responsibility for final cleaning of interior and exterior surfaces of buildings before handing over.
- I. Contractor: broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

END OF SECTION

DIVISION 4
MASONRY

Ref.	Description
040513	Masonry Mortaring
042000	Concrete Masonry Unit

PART 1 GENERAL**1.01 Scope of Work**

- A. Mortar for brick masonry and concrete masonry unit.

1.02 Related Work

- A. Section 04 20 00 - Concrete Masonry Unit.

1.03 Quality Assurance

- A. Perform work in accordance with requirements of BS 4551.

1.04 Reference Standards

- A. BS 12 - Ordinary Portland Cement.
- B. BS 890 - Building limes.
- C. BS 882 - Aggregates from natural sources for concrete.
- D. BS 4551 - Methods of testing mortars.
- E. BS 4721 - Specification for ready-mixed building mortars.
- E. Jordan General Specifications 1996.

1.05 Testing

- A. Testing of mortar mix(es) will be performed by a firm appointed and paid for by the Contractor.
- B. Provide free access to all portions of work and cooperate with appointed firm.
- C. Submit proposed mortar mix design to testing firm for approval prior to commencement of work.

1.05 Testing (cont'd)

- D. Tests of mortar mix(es) will be performed to ensure conformance with requirements stated herein and to ensure mortar will not produce efflorescence.
- E. If mortar mix(es) do not conform with requirements stated herein, re-establish and re-submit for further testing. Pay costs for required retesting.

1.06 Submittals

- A. Submit manufacturer's recommendations and product data in accordance with Section 01 33 00.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Supervising Engineer\Owner's Representative the names of three manufacturers and their products which will be acceptable under this section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Mortar Materials

- A. Portland Cement: BS12 Ordinary Portland Cement; grey color, refer to Section 03 30 00 - Clause 2.01, Item "A".
- B. Aggregates: standard masonry type, BS 882, clean, dry and protected against dampness, freezing and foreign matter, refer to Section 03 30 00 - Clause 2.02, 2.03, 2.04 and 2.05.
- C. Water: clean and free from injurious amounts of oil, alkali, organic matter or other deleterious material.

2.03 Admixtures

- A. Plasticizer: water reducing type which reduces porosity and absorption to increase bond strength; as approved by the Supervising Engineer/Owner's Representative refer to Section 03 30 00 - Clause 2.08.

2.04 Mortar Mix

- A. Provide minimum 15 MPa mortar for non-load bearing walls and partitions.

PART 3 EXECUTION

3.01 Mixing Mortar

- A. Thoroughly mix mortar ingredients, in quantities needed for immediate use.
- B. Add mortar color and admixtures in accordance with manufacturer's recommendations. Ensure uniformity of mix and coloration (As necessary).
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. Use mortar within two hours of mixing at temperatures over (26 deg. C), and two and one half hours at temperatures under 10 degrees C.
- E. If necessary, retemper mortar within two hours of mixing to replace water lost by evaporation. Do not retemper mortar after two hours of mixing.

END OF SECTION

PART 1 GENERAL**1.01 Scope of Work**

- A. Concrete masonry unit walls; back-up for cavity walls, and interior partitions, complete with reinforcement and anchorages.
- B. Concrete Lintels, bond beams and stiffener columns.
- C. Form control joints.
- D. Build-in items supplied by other Sections.
- E. Cut and fit for other sections of work.
- F. 70mm thick hollow concrete block for internal partitions
- G. 100mm thick hollow concrete block for internal partitions.
- H. 150mm thick hollow concrete block for internal partitions.
- I. 200mm thick hollow concrete block for internal partitions.

1.02 Related Work

- A. Section 04 05 13: Masonry Mortaring

1.03 Quality Assurance

- A. Perform concrete masonry unit work in accordance with Supervising Engineer's / Owner Representative Instructions.
- B. When requested by the Supervising Engineer / Owner Representative, provide evidence and test data confirming that concrete masonry units conform to standards stated herein.

1.04 Environmental Requirements

- A. Maintain materials and surrounding air temperature to minimum (10 deg. C) prior to, during and 48 hours after completion of masonry work.
- B. During freezing or near freezing weather, provide adequate equipment or cover to maintain a minimum temperature of (10 deg. C) and to protect masonry work completed or in progress

1.05 Protection

- A. Maintain protective boards at exposed external corners which may be damaged by construction activities. Provide such protection without damaging completed work.
- B. Keep expansion joint voids clear of mortar.
- C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Supervising Engineer / Owner Representative the names of three manufacturers and their products which will be acceptable under this section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Masonry Units

- A. Concrete Block: modular size(s) complete with corners, bases, bond beams, lintels and fillers to match and compliment block units, standard weight.

The compressive strength after 28 days shall be 3.50 MPa for partition blocks
7.00 MPa for bearing walls blocks.

2.03 Reinforcement and Anchorages

- A. Reinforcing Steel for Bond Beams, Lintels and piers type as indicated by the Engineer and as specified.
- B. Cavity Wall Horizontal Reinforcing: ladder type without moisture drip; galvanized steel construction; (5mm) side rods with 5mm cross ties at 400 mm centers as approved by the Engineer.
- C. Anchors: Contractor to submit details for approval before start working.
- D. Wall Ties: Contractor to submit details for approval before start working.

2.04 Concrete

- A. Bond Beams, Lintels and Piers 25 MPa concrete at 28 days, 100mm slump.
- B. Cement: Ordinary Portland cement grey color.
- C. Coarse Aggregate: maximum (10 mm) size; 25% percent by volume.
- D. Fine Aggregate: minimum .02mm size; 75% percent by volume.

2.05 Accessories

- A. Control Joints: preformed neoprene material; as approved by the Supervising Engineer / Owner Representative.
- B. Joint Filler: closed cell polyethylene oversized 50%; self-expanding; (25mm) wide x maximum lengths; as approved by the Supervising Engineer / Owner Representative.

PART 3 EXECUTIONS

3.01 Preparation

- A. Supply metal anchors for placement. Provide in sufficient quantity, and direct their correct placement.
- B. Ensure items built-in by other trades for this work are properly located and sized.
- C. Establish all lines, levels and coursing. Protect from disturbance.

3.02 Workmanship and Installation

- A. Place concrete blocks in accordance with lines and levels indicated on drawings.
- B. Fully bond external and internal corners and intersections.
- C. Buttering corners of joints, deep or excessive furrowing of mortar joints is not permitted.
- D. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting with proper power tools to provide straight and true, unchipped edges.
- F. Where non-bearing partitions extend to underside of floor, roof deck or structural system, stop masonry short 10 mm to 13 mm to allow for live load deflection. Fill gap with joint filler. Provide structural anchorage in accordance with General Specifications
- G. Ensure masonry courses are of uniform height. Make vertical and horizontal joints equal and of uniform thickness.
- H. Lay concrete block in full bed of mortar, properly jointed with other work.

3.02 Workmanship and Installation (cont'd)

- A. Remove excess mortar and projections. Take care to prevent breaking block corners.
- B. Lay concrete unit masonry in common bond. Course one (1) block unit and one (1) mortar joint to equal 210 mm.
- C. Form concave mortar joints.
- D. Cut mortar joints flush where damp proofing and waterproofing is scheduled.

3.03 Tolerances

- A. Maximum variation from masonry unit to adjacent masonry unit to be (1 mm).
- B. Maintain flush face on interior masonry surfaces.

3.04 Reinforcement and Anchorages

- A. Place masonry reinforcing and anchorages for concrete unit masonry as follows:
 - 1) Provide cavity walls with horizontal masonry reinforcing in every second block joint.
 - 2) Place horizontal masonry reinforcing in first and second joints above and below openings. Place continuous in first and second joint below top of walls.
 - 3) Fully reinforce corners and intersections.
 - 4) Lap masonry reinforcing splices minimum 150mm. Extend minimum 400 mm each side of openings.

3.05 Lintels

- A. Provide reinforced masonry lintels over openings, where steel lintels are not scheduled.
- B. Construct lintels, using concrete and reinforcement specified. Maintain minimum 200 mm bearing on each side of opening. Contractor to submit details for approval.
- C. Use reinforcing bars of full lengths only.
- D. Place and consolidate concrete without disturbing reinforcement.
- E. Allow lintels to reach maximum strength before removing temporary supports.
- F. Unless otherwise shown on the drawings, the lintels shall be reinforced as follows:
 - 2 Nos. 14mm diameter bottom bars.
 - 2 Nos. 10mm diameter top bars.
 - Stirrups, 6mm diameter at 200mm spacing.

3.06 Bond Beams

- A. Reinforce with 2 Nos. 10mm diameter top and bottom bars, and stirrups, 8mm diameter at 200mm spacing Lap splices 55 bars diameters Unless otherwise shown on the drawings.
- B. Place and consolidate concrete without disturbing reinforcement.

3.07 Control Joints

- A. Do not continue horizontal masonry reinforcing across control joints.

3.08 Built-in Work

- A. As work progresses, build-in nailing strips, anchor bolts, plates, and other items supplied by other trades.
- B. Build-in items plumb and true.
- C. Bed anchors of timber and metal door frames in mortar joints. Fill masonry cores with grout minimum 300 mm from framed openings.
- D. Do not build-in organic materials which will be subjected to rot or deterioration.

3.09 Cutting and Fitting

- A. Cut and fit for chases, pipes, conduit sleeves and grounding. Cooperate fully with other sections of work to ensure correct size, shape and location.
- B. Obtain the Supervising Engineer's / Owner Representative approval prior to cutting or fitting any area which is not indicated on drawings, or which may impair appearance or strength of masonry work.

3.10 Cleaning

- A. Remove excess mortar and smears upon completion of masonry work.
- B. Point or replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces using a non-acidic solution which will not harm masonry or adjacent materials. Use non-metallic tools in cleaning operations.
- D. Leave surfaces designated to receive plaster, clean and ready to receive plaster work.

END OF SECTION

DIVISION 6
WOOD AND PLASTIC

Ref.	Description
06200	Finish Carpentry

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.01 Work Included

- A. Finish carpentry items, such as kitchen cabinets, counters complete with required hardware and attached accessories.

1.02 Related Work

- A. Section 09900: Painting.

1.03 Quality Assurance

- A. Perform finish carpentry work in accordance with recommendations of the Millwork Standards of the Architectural Woodwork Institute (AWI).
- B. Fire retardant treatment to conform to requirements of underwriters' laboratories (UL).

1.04 Reference Standards

MILLWORK STANDARDS

- A. PS 1 - Construction and Industrial Plywood.
- B. PS 51 - Hardwood and Decorative Plywood.
- C. PS 58 - Basic Hardwood.

1.05 Samples

- A. Submit sample of each type of finish carpentry items to receive field applied stain or natural finish indicating required grade and finish.

1.06 Shop Drawings

- A. Submit shop drawings in accordance with Section 01340.
- B. Indicate materials, component profiles, fastening, jointing details, finishes, accessories, to large scale.

1.07 Delivery and Storage

- A. Do not deliver finish carpentry items until, in the opinion of Engineer, Site conditions are adequate to receive the work of this Section. Protect materials from weather while in transit.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.03 Sheet Materials

- A. As shown on drawings.

2.04 Finish Materials

- A. Finish to Hardwood items as shown on drawings.

2.05 Installation

- A. Perform finish carpentry work to extent indicated in "Schedule of Items" at the end of this section. Construction joining and pre-finishing of assemblies and items: Premium grade, as established by AWI.
- B. Set and secure materials and components in place, rigid, plumb, and square.
- C. Ensure all mechanical and electrical items affecting this Section of work are properly placed, complete, and have been inspected by the Engineer prior to commencement of installation.
- D. Prime paint contact surfaces of items and assemblies in contact with cementitious materials.
- E. Install hardware and accessories supplied under other sections for installation.
- F. Install hardware in accordance with the manufacturer's instructions.
- G. Apply clear lacquer paint finishes. Adhere over entire surface. Make joints and corners hairline. Match patterns. Slightly bevel arrises.

2.06 Preparation for Finishing

- A. Sand work smooth and set exposed nails and screws. Apply wood filler in exposed nail and screw indentations and leave ready to receive Site-applied finishes. On items to receive transparent finishes, use wood filler which matches surrounding surfaces, and of types recommended for applied finishes.
- B. Seal, stain and varnish concealed and semi-concealed surfaces. Brush apply only.
- C. Seal surfaces in contact with cementitious materials.

2.07 Schedule

- A. Interior
 - 1. Finish: As shown on drawing.

END OF SECTION

DIVISION 7

THERMAL AND MOISTURE PROTECTION

Ref.	Description
071110	Modified Bitumen Membrane Waterproofing
071116	Cementations Damp proofing
072100	Thermal Insulation

SECTION 07 11 10

MODIFIED BITUMEN MEMBRANE WATERPROOFING

PART 1 GENERAL

1.01 Work Included

- A. Prepare, clean and repair surfaces.
- B. Supply and apply primer and waterproofing membrane.

1.02 Related Work

- A. Section 03 30 00: Cast-in-place concrete.

1.03 Shop Drawings And Product Data

- A. Submit manufacturers instructions for the Engineer's review.
- B. Submit shop drawings indicating waterproofing materials, protective covering, surface preparation and method of application for the Engineer's review and approval.
- C. Indicated jointing details to large scale.

1.04 Warranty

- A. Provide written warranties in the name of the Employer.
- B. Warranty shall provide for making good, within a period of ten (10) years, at no cost to Employer, failures of waterproofing to resist penetration of water, except where such failures are result of structural failures of the building. Hairline cracking due to temperature of a shrinkage is not considered as structural failure. Repair and make good waterproofing membrane and pay for and repair or replace all affected or damaged materials surfaces at no cost to Employer.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Supervising Engineer / Owner Representative the names of three manufacturers and their products which will be acceptable under this section. Approval of the manufacturer or product must be obtained before proceeding with associated work.
- B. Substitutions: Items of same function and performance are acceptable in conformance with Section 01630.

2.02 Materials

- A. Modified bitumen torchable membrane, 4mm thick, reinforced with 200 gm/m² non-woven fabric spunbond polyester.
- B. Primer compatible with waterproofing membrane and recommended by Manufacturer and approved by the Supervising Engineer/Owner's Representative.
- C. Sealing mastic of type recommended by waterproofing manufacturer and approved by the Supervising Engineer/Owner's Representative.

PART 3 EXECUTION

3.01 Surface Preparation

- A. Clean and prepare surfaces to receive waterproofing in accordance with manufacturers recommendations and the Engineer's acceptance and approved.

3.02 Application

The names of the application firm shall be approved by both the Engineer and the manufacturer prior to proceeding with the works.

- A. All prepared surfaces shall when dry, be painted with a coat of primer at a rate recommended by waterproofing manufacturer. All blinding surfaces must be finished fair-faced or trowel smooth to receive the waterproofing membrane.
- B. Apply the waterproofing membrane surface against prepared surfaces, in accordance with manufacturer's recommendations, ensuring that air is excluded from under membrane.
- C. Adjacent rolls of waterproofing membrane should be provided with a minimum 150 mm lap and complete adhesion must be achieved between both layers to ensure complete waterproofing.

3.02 Application (cont'd)

- D. All external and internal angles and corners shall be reinforced with an extra strip of waterproofing membrane, minimum 300 mm wide.
- E. All internal corners should be provided with a 50 mm X 50 mm minimum fillet.
- F. Where waterproofing membrane is to be terminated above ground level (150mm from G.L. or as instructed by the Engineer) a chase should be provided of minimum dimension 25 mm x 25 mm. The waterproof membrane should be dressed into the chase and immediately sealed as per the approved Shop Drawings.
- G. Pipes and other projections through waterproof membrane should be properly treated with reinforcing strips, collars etc. as per manufacturer's recommendations to ensure complete waterproofing.
- H. Where waterproof membrane is expected to be left exposed for any length of time the top edge should be batten-fixed to secure edge. The perimeter should be left with an extended edge for later continuity and the free edge shall be adequately protected while exposed. The free edge of the membrane should be carefully cleaned before further laying is commenced.
- J. Before covering, inspect to ensure no damage. Any damaged area should be cleaned and patched in accordance with manufacturer's recommendations to ensure complete waterproofing.
- K. On horizontal applications where steel reinforcement is to be fixed prior to concreting, the waterproof membrane should be protected in accordance with manufacturer's recommendations at the Contractor's own expense.
- L. The area of waterproofing membrane laid in a working day should not exceed that which can be protected in the same working day, in order to ensure that membrane is not subjected to site traffic or damage.
- M. Material having limited shelf life are to be supplied with labels indicating batch number and dates of manufacture and expiry. Materials not properly stored or which have exceeded their expiry date will not be permitted to be used in the work and are to be removed from the site.
- N. Submit (10) ten years guarantee covering materials and workmanship of waterproofing system. The guarantee should be substantiated with a certified copy of the material guarantee provided by the manufacturer.

END OF SECTION

PART 1 GENERAL**1.01 Submittals**

- A. General 1: In compliance with Manufacturer's Recommendations
- B. Shop Drawings: Plans and details of critical areas of waterproofing, including surface, intersection and joint treatment.
- C. Product Data: Specifications, brochures, application instructions, and general recommendations of waterproofing manufactures.

1.02 Quality Assurance

- A. Manufacturer's Qualifications: Manufacturer shall provide an authorized representative to inspect delivered materials, witness initial installation of materials, and provide consultation concerning project requirements.
- B. Installer Qualifications: Engage experienced firm with minimum five waterproofing projects similar to requirement for this project with satisfactory in-service performance.
 - 1. Firm experience period: Five years minimum.
 - 2. Field foreman experience: Five years minimum.
 - 3. Manufacturer's Acceptance: Installer shall be acceptable to, and approved by, material manufacturer.
- C. Single source responsibility: Obtain primary and auxiliary waterproofing material of each type required from single manufacturer.
- D. Pre-installation conference: Hold conference prior to beginning waterproofing work, to review works to be accomplished.
 - 1. Contractor, waterproofing subcontractor waterproofing system manufacturer's representative and all other subcontractors who have equipment penetrating waterproofing shall be present.
 - 2. Contractor shall notify project manager, design consultant and other attending parties minimum seven days prior to time to for conference.
 - 3. Contractor shall record minutes of meeting and distribute copies of minutes to attending parties.
 - 4. Shop drawings to be available for review at pre-installation conference.

1.03 Delivery, Storage, and Handling

- A. Deliver in manufacture's original containers, seals and labels intact.
 - 1. Identify containers with material name, date of manufacture, Lot number.
- B. Store materials off ground, in enclosed space protected from weather.

1.04 Project Conditions

- A. Do not apply waterproofing to dirty substrate, or where substrate does not comply with waterproofing manufacturer's specifications.

PART 2 PRODUCTS

2.01 Materials

- A. Manufacturer and type Cementitious capillary concrete waterproofing of blended material in powder form consisting of rapid hardening Portland cement, specially treated aggregates and active chemicals.
 - 1. Thoro Systems Products "Thoroseal", "Waterplug" and Acry1 60".
 - 2. U.S. Waterproofing, Inc. "Five Star Waterproofing" and "Five Star Waterproofing Plug".
 - 3. Vandex, Inc. "Vandex Super" and Vandex Mortar".
- B. Filler Materials: Provide primary material manufacturer's standard filler materials for cracks and tie hole fillers.
- C. Primers: Provide type of concrete primer recommended by manufacturer of waterproofing material for applications if required.
- D. Water: Clean, fresh and free of mineral and organic substances that would adversely affect performance of waterproofing materials.

PART 3 EXECUTION

3.01 Preparation

- A. Ensure proper condition of substrate to receive waterproofing.
- B. In compliance with waterproofing manufacturer's recommendations, repair surfaces of all cracks, depressions, waves, or projections detrimental to proper waterproofing installation.
- C. Seal cracks and expansion joints in compliance with manufacturer's recommendation.
- D. Thoroughly clean surfaces of dust, dirt, paint, coatings, grease, oil, laitance, loose particles and contaminants.
- E. Moisten concrete surfaces to saturation and remove excess surface water.
- F. Preparation:
 - 1. Surface Preparation: Comply with manufacturer's instructions for surface preparation:
 - Substrate Finish: Surfaces to be waterproofed shall be rough. Use mechanical roughening methods to produce firm granular surface with profile of medium grade sandpaper.
 - Positive Side Concrete: Surfaces to receive application on positive side shall be cured minimum 28 days.
 - Patching: Honeycombed or spalled concrete surface areas shall be patched with waterproofing.
 - Joint and Crack Treatment: Construction joints and visible cracks exceeding 0.03 cm in width shall be routed out to depth of 19 mm. Honeycombed pockets and faulty construction joints shall be routed out of sound concrete.
 - 2. Horizontal Surfaces:
 - Concrete Decks: Before placement of waterproofing, remove projections that might penetrate waterproofing that would interfere with installation.
 - Sealers, Hardeners, and Curing Agents: Use floor sealers, floor hardeners or curing agents compatible with waterproofing to treat concrete surfaces.
 - 3. Vertical Surfaces:
 - Surfaces: Surfaces shall have an open capillary system to assure permanent bonding of application.
 - Foundation walls: On vertical foundation walls remove projections for proper placement and adhesion of waterproofing.
 - Form Tie Holes: Leave form tie holes approximately 25 mm back from surface.

3.02 Installation

- A. General: for concrete / block walls waterproofing and other locations as indicated in Drawings.
- B. Primers: Comply with manufacturer's instructions for installation of primer materials.
- C. Horizontal Surfaces:
 - 1. Application: Apply Cementitious waterproofing to saturated concrete surfaces in slurry consistency.
 - 2. Construction Joints: Treat with two successive coatings of Cementitious waterproofing in slurry consistency on wetted surfaces immediately prior to pouring of concrete.
- D. Vertical Surfaces:
 - 1. Application: Apply Cementitious waterproofing to saturated concrete / block surface in slurry consistency. Slurry coatings shall be applied to vertical surfaces in minimum of two coatings.

3.03 Field Quality Control

- A. Horizontal In-Place Testing: before completed waterproofing on horizontal surfaces are covered by protection course or other work, test for leaks with 50mm depth of water maintained for 24hours. Repair all leaks revealed by examination of substructure and repeat test until no leakage is observed.

3.04 Cleaning

- A. Cleaning: After completion, remove all masking materials and stains from exposed surfaces caused by waterproofing installation.

3.05 Protection and Curing

- A. Completed Work: Provide for protection of completed waterproofing during installation of other materials or processes over waterproofing and throughout remainder of construction period.
 - 1. Temperature Protection: cover treated surface when temperatures fall to freezing and maintain temperature above 2 C. Minimum for period not less than 24 hours after completion of application in compliance with manufacturer's instructions.
 - 2. Precipitation Protection: Protect treated surfaces from precipitation for 24 hours minimum.
- B. Adjacent Work: Protect adjacent work form spillage and prevent materials form damaging or staining adjacent materials.
- C. Curing: Cure areas as recommended by manufacturer.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.01 Work Included

- A. Prepare surfaces to receive insulation.
- B. Rigid insulation and where applicable, as required to provide thermal barrier for building elements and spaces.

1.02 Reference Standards

- A. ASTM-C518; ASTMD-1621; ASTMD-1622; ASTMD-2842.

1.03 Product Data

- A. Submit manufacturers installation instructions for review by the Supervising Engineer\Owner's Representative.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three Manufacturers/Suppliers and their products which will be acceptable under this Section. Approval of the Manufacturer or product must be obtained before proceeding with associated work.
- B. Substitutions: Items of same function and performance are acceptable in conformance with section 01600.

2.03 Accessories

- A. Vapour Barrier: Bituminous paint in two coats.

PART 3 EXECUTION

3.01 Workmanship

- A. Install rigid insulation and vapor barrier to maintain continuous and complete thermal vapor protection for building spaces and elements.
- B. Ensure surfaces which are to receive rigid insulation are clean, free of deleterious matter and are sufficiently level to allow proper installation of insulation.
- C. Cut and trim insulation neatly to fit spaces. Butt edges and ends tight. Fit insulation tight against mechanical, electrical and other items which protrude through plane of insulation.
- D. Use insulation free of broken or chipped edges and undamaged integral vapor barrier.

END OF SECTION

**DIVISION 8
DOORS AND WINDOWS**

Ref.	Description
08110	Steel Doors and Frames
08210	Wood Doors and Frames
08520	Aluminum Window and Doors
08700	Hardware
08800	Glazing

PART 1 GENERAL**1.01 Work Included**

- A. Standard and fire rated type pressed steel hollow metal doors and panels and frames, with flush faces.
- B. Standard louvered steel doors and screens.
- C. Hardware for Class "A" labelled doors and panels.
- D. Install hardware and louvers.
- E. Paint.

1.02 Related Work

- A. Section 08111: Standard Steel Frames.
- B. Section 08700: Hardware.
- C. Section 08800: Glazing.

1.03 Reference Standards

- A. SDI-100: Recommended Specifications-Standard Steel Doors and Frames of Steel Door Institute.
- B. Underwriters' Laboratories Inc.: (UL) or Warnok Hersey and Factory Manual (FM), as applicable to fire rated hollow metal doors.
- C. ASTM A526: Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process, General Requirements.
- D. ASTM A366: Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

1.04 Shop Drawings and Product Data

- A. Submit shop drawings and product data in accordance with Section 01340.
- B. Indicate general construction, configurations, jointing methods, reinforcements, and locations of cut-outs for louvers.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Supervising Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Hollow Metal Doors [And Panels]

- A. Materials and Fabrication: SDI-100 and ANSI A151.1 except as amended in this Section.
- B. Door Frame: As required, and as shown on the approved Shop Drawings.
- C. Door Leaf: As required, and as shown on the approved Shop Drawings.
- D. Louvers: Stationary and adjustable as required, and as shown on the approved Shop Drawings.

2.03 Fire Rated Doors

- A. Fabricate fire rated hollow metal doors and panels of materials in accordance with requirements of Underwriters' Laboratories (UL). Place UL or Warnock Hersey labels where visible when installed in position.
- B. Door Leaf: 45x100mm painted steel Gauge 18 door leaf, with 16-gauge steel sheet, galvanized stiffener every 19cm and rock wool.
- C. Hardware: Consort or approved equal

2.04 Hardware

- A. for Class "A" labelled doors.
- B. Install butts on Class "A" labelled doors prior to delivery. Install in accordance with UL requirements.

2.05 Fabrication

- A. Mechanically interlock longitudinal type doors and panels with rock wool insulations. Leave seams invisible, or weld, fill and grind smooth.
- B. Reinforce and prepare doors and panels to receive hardware. Refer to Section 08700 for hardware requirements and schedules.
- C. Fill surface depressions with metallic paste filler and grind to smooth uniform finish.
- D. Touch up areas where coating has been removed due to sanding or handling.
- E. Clean and apply one coat of primer.
- F. Paint.

3.01 Installation

- A. Install doors in accordance with SDI-100 except as amended in this Section.
- B. Install hollow metal doors plumb and square, and with maximum diagonal distortion of 2 mm. Install hardware in accordance with requirements of Section 08700.
- C. Installation of glass and glazing in door.

END OF SECTION

SECTION 08210

WOOD DOORS AND FRAMES

PART 1 GENERAL

1.01 Work Included:

- A. Standard and fire rated type wooden doors, with flush faces or decorative as indicated on the relevant detailed drawings.
- B. Frames and architrave – in hardwood as indicated on drawings.
- C. Softwood sub-frames.
- D. Install door hardware as indicated.
- E. Transparent sealer, matt finish as indicated and instructed by the Engineer.
- F. Submit samples of each type of doors as per the Engineer's Instructions.

1.02 Related Work

- A. Section 08700: Hardware.

1.03 Reference Standards

- A. Jordanian General Specifications

1.04 Shop Drawings and Product Data

- A. Submit shop drawings and product data in accordance with section 01340.
- B. Indicate general construction, jointing methods and hardware locations.

1.05 Guarantee/Warranty

- A. Provide written guarantee in accordance with "Conditions of Contract".
- B. Guarantee: Provide for replacing (including cost of re-changing and refinishing), at no cost to Owner, wood doors, frames and architrave exhibiting defects in materials or workmanship including warp and delimitation within minimum period of 5 years from date of substantial completion of the work.
- C. All guarantees/warranties to be issued by the Supplier, Manufacturers and Sub-Contractors shall be countersigned by the Main Contractor and both of them will be liable for repair/replace the items/works, etc., during the warrantee/guarantee period.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Fabrication

- A. Fabricate doors, frames and architraves in accordance with requirements of the Jordanian General Specification Quality Standards.
- B. Bevel strike edge of single acting doors 3 mm in 5 mm.
- C. Prepare doors to receive hardware as Engineer's Instruction's

PART 3 EXECUTION

3.01 Installation

- A. Install wooden doors, frames and architrave plumb and square, and with maximum diagonal distortion of 1.6mm. Install hardware in accordance with requirements of section 08700.

END OF SECTION

SECTION 08520

ALUMINUM WINDOWS AND DOORS

PART 1 - GENERAL

1.01 Work Included

- A. Powder Coated aluminum windows and doors, complete with glass and glazing, hardware.
- B. Supply and install perimeter sealants.
- C. Supply and install hardware as indicated.
- D. All Aluminum windows and doors shall be powder coated, colour as selected by the Engineer.

1.02 Related Work

- A. Section 07900: Joint Sealants.
- B. Section 08800: Glazing.

1.03 Reference Standards

- A. ANSIO A134.1 - Specifications for Aluminium Windows.
- B. ASTM A36 - Structural Steel.
- C. ASTM B209 - Aluminium-Alloy Sheet and Plate.
- D. ASTM B221 - Aluminium-Alloy Powder Coated Bars, Rods, Wire, Shapes and Tubes.
- E. Jordanian Construction Specification (JCS).

1.04 Shop Drawings and Product Data

- A. Submit shop drawings and product data in accordance with section 01340.
- B. Indicate pertinent dimensioning, general construction, component connections and locations, anchorage methods and locations, hardware locations, installation details.

1.05 Delivery of Materials

- A. Deliver windows and doors in Manufacturer's packaging complete with installation instructions.

1.06. Samples

- A. Submit in accordance with section 01340, full size sample of window corner construction, including opening section, indicating profile, size and jointing method. Also submit sample of each type of operable hardware, indicated style and finish.
- B. Submit colour samples for colour selection for the Engineer approval.

1.07 Guarantee/Warranty

- A. Provide written guarantee in accordance with Conditions of Contract.

1.08 Quality Assurance

- II. Perform Work in accordance with AAMA 101.

1.09 Pre-Installation Conference

- A. Convene two weeks prior to commencing work of this Section, under provisions of Section 01039.

1.10 Delivery, Storage, And Handling

- A. Deliver, store, protect and handle products to site as per the Engineer Instructions.
- B. Protect pre-finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Components and Materials

- A. Frames: Sections will be designed to suit the installation with due allowance for wind loads, heights and location, of minimum 2mm thick Powder Coated aluminum.
- B. Operable Frames: Sized and profiled to suit frames, complete with Manufacturer's standard type glass stops of size and profile to suit.
- C. Glass Stops (fixed lights): Manufacturer's standard screw-applied type, of size and profile to suit frames.
- D. Glass (Generally): as specified in section 08800 - Glazing.
- E. Glazing Materials: Manufacturer's standard type, to suit locations and applications.
- F. Bituminous Paint: Acid and alkali resistant type, black in colour.

2.04 Fabrication

- A. Fabricate window and door units in conformance with ANSI A134.1.
- B. Fabricate aluminum windows and doors to allow for adequate clearances and shim spacing around perimeter of assemblies to enable proper installation. Allow for thermal movement within window construction.

2.04 Fabrication CONT'D

- C. Provide expansion joints where required.
- D. Provide sufficient corrosion resistant anchorage devices to securely and rigidly fit windows in place.
- E. Accurately and rigidly fit together joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections are flush, hair line and weatherproof.
- F. Provide internal reinforcing, with steel members; ASTM A36 galvanized where required to maintain rigidity.
- G. Provide for moisture entering joints, and condensation occurring within frame construction to drain to exterior.

PART 3 - EXECUTION

3.01 Installation

- A. Install aluminum windows and doors in accordance with Manufacturer's recommendations, to achieve weathertight installations. Ensure assemblies are plumb, level and free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- B. Install sufficient corrosion resistant anchorage devices to securely and rigidly fasten windows to building, without causing detrimental effects to shape or performance.
- C. Set window sills level and uniform. Accurately and rigidly fit together joints. Ensure joints are flush, hairline and weatherproof.
- D. Place batt insulation in shim spaces around perimeter to maintain continuity of thermal barrier.
- E. Install sealants and related backing materials around perimeter of windows in accordance with workmanship and installation requirements indicated in Section 07900.

3.02 Adjusting

- A. Adjust work under provisions of Section 01700.
- B. Adjust operating hardware for smooth operation.

3.03 Cleaning

- A. Clean work under provisions of 01710.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

END OF SECTION

PART 1 GENERAL**1.01 Work Included**

- A. Hardware for interior and exterior doors and other items not specifically mentioned herein but deemed to receive hardware.

1.02 Related Work

- A. Section 06200: Finish Carpentry.
- B. Section 08110: Steel Doors.
- C. Section 08210: Wood Doors and Frames.

1.03 Reference Standards

The BSI documents applicable to this section are those relevant from the following:

- A. BS 1227 - Part 14; Hinges for general building purposes AMD 1092.
- B. BS 1331 - Builders Hardware
- C. BS 1911 - Letter Plates
- D. BS 3621 - Specification for Security Locks
- E. BS 3827 - Glossary of terms – Builders hardware
 - Part 1: Locks and latches
 - Part 2: Latches
 - Part 3: Catches
 - Part 4: Doors, drawer, cupboard and gate furniture
- F. BS 4112 - Performance requirements for hardware
- G. BS 4951 - Builder's Hardware
- H. BS 5872 - Specification for locks and latches in buildings

1.04 Samples

- A. Submit samples of each type of hardware required for job, in accordance with Section 01340.
- B. Indicate style and finish.

1.05 Shop Drawings and Product Data

- A. Submit shop drawings and product data in accordance with Section 01340.

1.06 Hardware Schedule

- A. Upon award of the contract the successful Contractor shall submit a hardware schedule for approval by the Engineer\Owner's Representative in accordance with Section 01340. Items shall be identified by:
- Manufacturer - Catalogue Number - Size
 - Fastening - Finish
- B. Handing of door and window opening shall be the responsibility of the Contractor.

1.07 Keying

- A. Door locks: Master keyed, submit schedule for the Engineer's\ Owner's Representative approval for all service areas doors and main entrance door.
- B. Supply 3 keys for each lock.

1.08 Operation and Maintenance Data

- A. Provide the Engineer\Owner's Representative with manufacturer's parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.

PART 2 PRODUCTS

2.01 Hardware

- A. Provide items in accordance with drawings as per Engineer approval.
- B. Hardware shall be of guage 316 stainless Steel.

2.02 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

PART 3 EXECUTION

3.01 Installation

- A. Install hardware in accordance with manufacturer's recommendations, using proper templates.

END OF SECTION

PART 1 GENERAL**1.01 Work Included**

- A. Glass and glazing for windows, handrails, and partitions.

1.02 Related Work

- A. Section 08520 : Aluminum Windows and Doors.

1.03 Reference Standards**1- Glass Standard**

- A. ASTM C 1036 : Quality Q3 unless otherwise specified.
- B. Heat treated glass shall confirm to the requirements of ASTM C1048.
- C. Tempered glass shall also confirm to ANSI Z97.1-1984
- D. All heat treating shall be by the horizontal process, and processed in such a manner as installed on the building.
- E. FS DD-G-451C - Glass, Plate, Sheet, Figured (Flat, for Glazing, Mirrors and Other Uses).
- F. FS TT-S-230A - Sealing Compound, Synthetic Rubber Base, Single Component, Chemical Curing for Caulking, Sealing and Glazing in Building Construction.
- G. FS TT-S-001543 - Sealing Compound, Silicon Base (For Caulking and Glazing in Buildings and Other Structures).

2- Insulating glass standards

- H. Laminated glass shall comply to ASTM C1172
- J. Insulating glass comply to the following standards:
 - 1. E773 test method for seal durability of sealed insulating glass units.
 - 2. E774 specification for seal insulating glass units.
 - 3. E546 test method for frost point of sealed insulating glass unit.
 - 4. E576 test method for dew / frost of sealed insulating glass units vertical position.

1.04 Guarantee/Warranty

- A. Provide written guarantee in accordance with Conditions of Contract, in the name of the project.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. the Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.
- C. Mechanical Connections must be provided, designed to integrate the wall assembly. These must be manufactured from materials wholly compatible with glass and able to cope with and distribute the constant stress applied.

2.03 Glazing Compounds

- A. Glazing Compound: Modified oil type; colour to match aluminum framing sections.
- B. Silicon compound for all joints of glass walls or approved equal.
- C. Sealants.

PART 3 EXECUTION

3.01 Exterior Dry Method (Preformed Glazing Channel)

- A. Clean contact surfaces with solvent and wipe dry.
- B. Cut glazing spline to proper length and install on glass pane. Weld joints by butting channel and dabbing with sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 150mm from corners.
- D. Rest glass on setting blocks, and push against stop with sufficient pressure to ensure full contact and adhesion at perimeter.
- E. Install removable stops, avoid displacement of glazing Spline, exert pressure for full continuous contact.

3.02 Interior Dry Method (Tape and Tape)

- A. Cut glazing tape to length and install against permanent stop, projecting 1.6 mm above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 150mm from corners.
- C. Rest glass on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glass in same manner described above.
- E. Install removable stop, avoid displacement of tape, exert pressure on tape for full continuous contact.
- F. Knife trim excess or protruding tape.
- G. Glass walls are a specialist item. Installation must be carried out by trained experts in accordance with approved procedures. The walls must be supplied and installed under one contract accompanied by a ten-year warranty for both material and installation.

3.03 Cleaning

- A. After installation mark glass with X by using tape or removable paste.
- B. Immediately remove droppings from finished surfaces. Remove labels after work is completed.

END OF SECTION

DIVISION 9
FINISHES

Ref.	Description
09220	Portland Cement Plaster
09260	Gypsum Board False Ceiling Systems
09310	Porcelain Tiles
09691	Natural Marble / Granite
09900	Painting

SECTION 09220

PORTLAND CEMENT PLASTER

PART 1 GENERAL

1.01 Work Included

- A. Three coat cement plaster with wood float trowelled finish coat.
- B. Two coat cement plaster with rough finish coat to receive wall tiles.

1.02 Related Work

- A. Section 03300: Cast-in-place concrete.
- B. Section 04220: Concrete Masonry Unit.

1.03 Reference Standards

- A. ASTM C150 - "Portland Cement".
- B. ASTM C144 - "Sand for Cement Plaster Work".
- C. ASTM C6 - "Normal Finishing Hydrated Lime".
- D. ASTM C206 - "Special Finishing Hydrated Lime".
- E. ASTM C35 - "Inorganic Aggregates for Use in Gypsum Plaster".
- F. UL - "Underwriters' Laboratories Incorporated".
- G. ASTM C631 - "Bonding Compounds for Interior Plastering".

1.04 Sample Panel

- A. Construct 1000 mm wide x 1000 mm high sample panel with finished surface, using materials and methods specified herein, for review by the Engineer.
- B. Accepted surface finish of sample establishes minimum standard of quality and workmanship of cement plaster work on job.

1.05 Environmental Conditions

- A. Provide sufficient heat and ventilation in areas where work of this Section is being performed, so as to allow cement plaster to properly cure. Take precautionary measures necessary to ensure that excessive temperature changes do not occur.

PART 2 PRODUCTS

- A. Plaster Materials: To requirements of the referenced standards.
- B. Water: Clean, potable, free of sulphides, chlorides and soluble organic matter.
- C. Sand: To BS 1200, graded 3 mm down, washed free of chlorides and sulphides, sampled and tested to BS 812 and ASTM C 897.
- D. Cement: Portland, gray, normal to BS PD 6472, BS EN 197-1-CEM I 42.5 N and ASTM C 150 Type 1.
- E. Single Coat Ready Mix Rush-Coat: To BS 5262:1991, BS 5492:1990, BS 4551: Part 2: 1998, ASTM C 150, ASTM C 926, ASTM C 897 such as PREMIX SRC from SODAMCO or equally approved.
- F. Single Coat Ready Mix Plaster: To BS 5262:1991, BS 5492:1990, BS 4551: Part 2: 1998, ASTM C 150, ASTM C 926, ASTM C 897 such as PREMIX SP from SODAMCO or equally approved, with the following technical characteristics:
 - Density of wet product: 1.78.
 - Compressive strength: approx. 5 MPa @ 28 days.
 - Flexural strength: approx. 2 MPa @ 28 days

2.03 Metal Accessories

- A. Angle Beads, Corner Mesh and Plaster stops: Minimum 0.50mm thick steel with rust inhibitive coating of longest possible lengths; sized and profiled to suit application. Angle beads to have bullnosed edges.
- B. Expansion Joints: Back to back plaster stops of longest possible lengths.
- C. Anchorages: Nails, staples, or other metal supports, of type and size to suit application and to rigidly secure metal accessories in place.

PART 3 EXECUTION

3.01 Preparation

- A. Prior to application ensure mechanical and electrical services behind surfaces to receive cement plaster have been tested and approved.
- B. Clean concrete and concrete block surfaces of dust, laitance, efflorescence, loose particles, grease or other foreign matter. Thoroughly wet surfaces before using acid solutions, solvents or detergents to perform cleaning. Thoroughly wash surfaces with clean water immediately following their use. Ensure mortar joints are flush.
- C. Roughen smooth concrete surfaces so as to allow adequate adhesion. Use method acceptable to the Engineer.
- D. Apply a bonding agent on concrete and concrete block surfaces which are to receive cement plaster. Apply in accordance with manufacturer's recommendations, ensuring complete coverage.
- E. Ensure metal lath has been properly installed and rigidly secured.
- F. Wet Concrete and Concrete block surfaces to reduce excessive suction.
- G. Place metal accessories true to lines and levels.

3.02 Plastering

- A. Apply cement plaster using two coat system and three coat system respectively.
- B. Apply each basecoat to minimum thickness of 10 mm. Moist cure and allow each coat to slowly dry for minimum period of 24 hours.
- C. Allow each coat to cure for minimum 3 days prior to application of the following coat.
- D. Evenly dampen each coat, to ensure uniform suction, and apply the following coat. Apply to thickness sufficient to secure required texture but in no case less than 3 mm. Apply finish coat subject to requirements.
- E. Maintain surface flatness, with maximum variation of 3.2mm in 3.000 m.
- F. Provide surfaces receiving paint with a steel trowel finish, to match approved sample pane.
- G. Avoid excessive working of surface. Delay trowelling as long as possible to avoid drawing excess fines to surface.
- H. Moist cure finish coat for minimum period of 48 hours.

3.03 Fire Rated Assemblies

- A. Perform cement plaster work for fire rated assemblies in accordance with drawings and as recommended by Underwriter's Laboratories.

END OF SECTION

SECTION 09260 GYPSUM BOARD FALSE CEILING SYSTEMS

PART 1 GENERAL

1.01 Work Included

- A. Metal Framing required for gypsum board suspended ceilings.
- B. Blocking.
- C. Acoustical and sound insulation.
- D. Thermal Insulation for z-furring channel installation.
- E. Gypsum Board, fire rated, sound and thermal insulating.
- F. Radiation Protection Gypsum Board.
- G. Acoustical Sealant.
- H. Taped and sanded joint treatment.

1.02 Related Work

- A. Section 09900: Painting

1.03 Quality Assurance

- A. Perform gypsum board systems work in accordance with recommendations of:

Gebr. Knauf

Westdeutsche Gipswerke

Export Department

D 8715 Iphofen, West Germany

Tel. No. 09323 31-1

Fax. No. 09323 31277

Telex 689300 29-9K

Or any approved equal.

- A. The contractor shall submit to the engineer the names of three manufacturers and their products which will be acceptable under this section, approval of the manufacturer or product must be obtained before proceeding with the associated work.

1.04 Submittals

- A. Submit samples of gypsum board systems and exposed joint covers in accordance with Section 01340. Include a sample of each material, texture, and color specified.
- B. Submit manufacturer's recommendations for installation of thermal insulation and gypsum board.

1.05 References

- A. GA 216 - Recommended Specifications for installation of thermal insulation and gypsum board.
- B. Complies with ASTM C-36, 0-630 method C-473.
- C. DIN 18180 - Insulation Blankets, Thermal Mineral Wool. DIN 4102 - Building Material Class B1 - Flame Resistance - Building Material Class A2 - Non-Combustible

PART 2 PRODUCTS

2.01 Metal Framing

- A. Provide metal framing materials in accordance with GA 216.
- B. Studs: 60 X 60 cm both directions.
- C. Runners: Match studs.

2.02 Materials

- A. Gypsum board false ceiling shall be 12.5mm thick concealed system similar to Knauf Gypsum Ceiling System D113.
- B. Gypsum board false ceiling in toilets and kitchenettes' areas shall be moisture resistant type, 12.50 mm thick, and as for item "A" above.
- C. Radiation protection gypsum board shall be 12.50mm thick concealed system similar to Kanuf Gypsum Ceiling System K151.

PART 3 EXECUTION

3.01 Metal Framing Erection - General

- A. Erect metal framing in accordance with ASTM C764.
- B. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8 inch in 10 feet in any direction.

3.02 Ceiling Framing Installation

- A. Coordinate location of hangers with other work.
- B. Install ceiling framing independent of walls, columns, and above ceiling work.
- C. Space main carrying channels at maximum 600 mm on center, not more than 150 mm from perimeter walls. Lap splices minimum 300 mm and secure together 50 mm from each end of splice.
- D. Place furring channels perpendicular to carrying channels at 600 mm on center not more than 150 mm from perimeter walls. Lap splices minimum 200 mm and secure together 25 mm from each end of splice.
- E. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 600 mm past each end of openings.
- F. Laterally brace entire suspension system where required.

3.03 Gypsum Board Installation

- A. Install gypsum board in accordance with recommendations of GA 216, the manufacturer's recommendations, or both.
- B. Erect single layer standard gypsum board in direction most practical and economical, with ends and edges occurring over firm bearing.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- D. Erect exterior gypsum sheathing board horizontally, with edges butted tight and ends occurring over firm bearing.
- E. Use screws when fastening gypsum board to metal furring or framing. Use nails or screws when fastening gypsum board to wood furring or framing. Staples may only be used when securing the first layer of double layer applications.
- F. Erect patterned gypsum board horizontally/vertically, complete with exposed batten fastening system. Erect in accordance with manufacturer's recommendations.
- G. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- H. Place control joints to be consistent with lines of building spaces and in consistent pattern and as directed by Engineer.
- I. Place corner beads at external corners. Use longest practical lengths. Place edge trim where gypsum board abutts dissimilar materials.
- J. Tape, fill, and sand exposed joints, edges, corners, openings and fixings, to produce surface ready to receive surface finishes.
- K. Remove and re-do defective work.

3.04 Warranty/Guarantee

All warranties/guarantees to be issued by the Supplier, Manufacturers and Sub-Contractors shall be counter- signed by Main Contractor and both of them will be liable for repair/replace the items/works, etc., during the warrantee/guarantee period.

END OF SECTION

SECTION 09310

PORCELAIN TILES

PART 1 GENERAL

1.01 Work Included

- A. Porcelain tile flooring, installed using the full mortar bed method, with cementitious grouted joints.
- B. Porcelain tiled walls, installed using adhesive, with cementitious grouted joints. Adhesive and grout from an approved manufacturer.
- C. Approved fine aggregate underlay of appropriate thickness.
- D. Cement and sand mortar bed.

1.02 Related Work

- A. Section 03251 Expansion and Contraction Joints.

1.03 Reference Standards

- A. ANSI A108.5 - Porcelain Tile installed in the Dry-Set Portland Cement Mortar on Latex-Portland Cement Mortar.
- B. ANSI A118.4 -Latex-Portland Cement Mortar.
- C. ANSI A136.1 - Organic Adhesives for Installation of Porcelain Tile.
- D. ANSI A42.4 - Interior Lathing & Furring.
- E. Tile Council - Handbook for Porcelain Tile Installation. of America
- F. TCA137.1 - Recommended Standard Specifications for Porcelain Tile.

1.04 Samples

- A. Submit a 1000mm X 1000mm sample of Porcelain wall and floor tile installation, clearly indicating pattern, coloration and grouted joints. Submit in accordance with the Construction Manager's instructions.

1.05 Environmental Conditions

- A. Provide sufficient heat and ventilation in areas where work of this section is being performed, so as to allow Porcelain tile to properly set. Take all precautionary measures necessary to ensure that excessive temperature changes do not occur.

1.06 Delivery and Storage

- A. Deliver materials and store on site in original containers with seals unbroken and labels intact until time of use.

1.07 Extra Materials

- A. Provide 25 sq m of each size, color, and surface finish of tile specified, packaged with labels clearly describing contents

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this section. Approval of the manufacturer or product must be obtained before proceeding with associated works.

2.02 Trim and Accessories

- A. Threshold: Hand finish, beveled two sides, sizes and shapes as indicated on drawings
- B. Trim shapes: provide bullnose, outside corners, caps and other trim section necessary, same type tiles as floor tiles.

2.03 Materials And Components For Floors

- A. Porcelain Floor Tile: Square edges, of thickness as indicated on drawing; smooth surface; unglazed to the manufacturer properties and subject to the Engineer's approval.
- B. Approved fine aggregate (sand) underlay of appropriate thickness, well leveled and tamped to receive the cement sand mortar bed.
- C. Setting Bed: Full mortar bed, 30mm thick, or tile adhesive as approved by the Construction Manage.
- D. Grout: Waterproof cementitious type; with latex additive, color selected by the Construction Manage; uniform in color and resistant to shrinking.
- E. Water: Clean, fresh and free of deleterious substances.
- F. Adhesive: as approved by the Construction Manage.

2.04 Materials And Components For Walls

- A. Porcelain Wall Tile: cushioned edges; glazed surfaces to the manufacture properties and subject to the Engineer's approval.
- B. Scratch Coat and Mortar Bed: Standard cementitious mortar materials for use in full bed setting methods; and/or wall tile adhesive.
- C. Grout: Waterproof cementitious type; color selected by the Engineer; uniform in color and resistant to shrinking.

PART 3 - EXECUTION

3.01 Installation

- A. Prior to installing floor tile, ensure surfaces are level, with maximum surface variation of 6mm in 3.00 meters, and are steel trowelled. Ensure surfaces slope to drains.
- B. Prior to installing wall tile, ensure surfaces are level, with maximum surface variation of 3 mm in 3.00 meters.
- C. Ensure surfaces are clean and well cured.
- D. Do not commence until surface conditions are within tolerances required for proper installation.
- E. Neatly cut tile around fixtures and drains. Accurately form corners, base, intersections and returns.
- F. Ensure tile joints are uniform in width, subject to normal variance in tolerance allowed in tile size. Ensure joints are watertight, without voids, cracks, excess mortar or grout.
- G. Form internal wall angles square and external angles rounded.
- H. Sound tile after setting. Remove and replace hollow sounding units.
- I. Keep expansion/contraction control joints free of mortar or grout.
- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Completed installation to be free of broken, damaged or faulty tile.

3.02 Cleaning

- A. Clean work under provisions of 01700.
- B. Clean tile and grout surfaces.

3.03 Protection Of Finished Work

- A. Protect finished Work under provisions of Section 01500.
- B. Do not permit traffic over finished floor surface for 4 days after installation

END OF SECTION

PART 1 GENERAL**1.01 Work Included**

- A. Marble / Granite, for floors, standard and cut to size tiles.
- B. Marble / Granite wall tiles
- C. Metal anchors.
- D. Mortar and Joint Grouting.
- E. Joint Sealant.
- F. Polished brass divider strips where shown on the drawings.

1.02 Related Work

- A. Section 07900-Sealants: Sealants for control and expansion joints, including back-up materials in conjunction with interior and granite works.

1.03 References

- A. ASTM A36 - Structural Steel

1.04 Submittal

- A. General: Refer to Section 01340, Shop drawings, Product Data and Samples for submittal provisions and procedures.
- B. Shop Drawings and Product Data:
 - 1) Submit shop drawings and product data in accordance with Section 01340.
 - 2) Indicate Pertinent dimensioning, layout, anchorages, construction details, method of installation and adjacent construction.
 - 3) Indicate all units of marble/granite, their configuration and size, materials and types of anchorage items and their locations.
 - 4) Submit marble /granite supplier's installation instructions, and field erection drawings.
 - 5) Submit manufacturer's instructions for use of pointing colour and admixtures.
- C. Design Calculations
 - 1) Submit two copies of marble/granite anchorage assemblies as specified in paragraph 1.09.

1.04 Submittal CONT'D

D. Samples

- 1) Submit two sets of each type of marble/granite including thresholds, paving slabs, ... etc. of sizes and thicknesses as indicated on the drawings, to the project site, in sufficient number to indicate the full range of specified marble/granite colors, and the type of finish. One of each of the duplicate samples approved by the Engineer will be retained by him at the project site, the other being returned to the marble/granite supplier for his guidance.
- 2) The material type and colour of the marble/granite items shall be as selected and approved by the Owner or his representative.
- 3) The following physical data on all proposed marble/granite shall be submitted by the marble/ granite supplier:
 - a. Analysis of mineral composition.
 - b. Analysis of chemical composition.
 - c. Thermal coefficient of expansion.
 - d. Permeability.
 - e. Methods of cleaning.
 - f. History of colour change.
 - g. Abrasion resistance.
- 4) Anchors: Two of each type to be incorporated in the work.
- 5) Manufacturer's recommended marble/granite cleaning agent and application procedure.
- 6) Submit samples of colour mortar, indicating varying shades of colour closely matching the colour of each type of marble/granite.
- 7) Submit samples of other materials specified herein upon request by the Engineer.

1.05 Guarantee/Warranty

- A. Attention is directed to the provisions of the Conditions of Contract regarding guarantees/ warranties for the Work.
- B. Manufacturers shall provide their standard guarantees for work under this Section. However, such guarantees shall be in addition to and not in lieu of all other liabilities which the manufacturer and Contractor may have by law or by other provisions of the Contract Documents.
- C. All warranties/guarantees to be issued by the Supplier, Manufacturers and Sub-contractors shall be counter-signed by Main Contractor and both of them will be liable for repair/replace the items/works, etc. during the warrantee guarantee period.

1.06 Standards

- A. Applicable provisions of the following standard publication shall apply throughout the work:
 - 1) Building Stone Institute: "Recommended Practices for the Use of Natural Stones in Building Construction".
 - 2) Marble Institute of America (MIA) incorporated: American Standards Specifications for Interior and Exterior Marble, latest revision.
 - 3) American Welding Society (AWS): AWS D1.1 Structural Welding Code.
 - 4) Industrial Fasteners Institute (IFI): Handbook of Bolt, Nut and Rivet Standards.

1.07 References

- A. National standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable subject to their timely submission, review and acceptance by the Engineer.
- B. Refer to SECTION 01090 - REFERENCE STANDARDS for references.

1.08 Qualifications

- A. Fabricator: A firm having an adequate supply of the specified types of marble/granite and an annual rated production capacity to deliver the marble/granite to the project site on schedule, within a time limit established by the Engineer as required to assure no delay to the progress or completion of the Work.
- B. Installer: A Firm with a minimum of five years successful experience in the erection and laying of marble/granite works.

1.09 Design Criteria

- A. The method of installation of all marble/granite work shown on the Drawings is diagrammatic only and is not to be used for the purpose of bidding or construction. It shall be the responsibility of the Contractor to design and guarantee the structural support and the permanent water-tight sealing of all marble/granite work. The installation shall be designed to allow for expansion, contraction and differential deflection of supporting floors of the building structure. All fastenings into marble/granite such as plates, bolts, anchors, shelf angles, inserts, etc. are to be stainless steel.
- B. Design and calculations for marble/granite anchor system design shall be based on a minimum safety factor of five for aspects related to marble/granite strength and anchor strength in masonry or concrete.

1.10 Delivery, Storage & Handling

- A. **Packing and Loading:** Finished marble/granite shall be carefully packed and loaded for shipment using all reasonable and customary precautions against damage in transit. No material which may cause staining or discoloration shall be used for blocking or packing.
- B. **Site Storage:** Upon receipt at the building site or storage yard, the marble/granite shall be stacked on timber or platforms at least 100 mm. above the ground, and extreme care shall be taken to prevent staining during storage. If storage is to be for a prolonged period, polyethylene or other suitable plastic film shall be placed between any wood and finished surfaces, and shall be used also as an overall protective covering. Salt shall not be used for melting of ice formed on pieces, or for any purpose involving its contact with the marble/granite.
- C. **Defective Marble/Granite:** Any piece of marble/granite showing flaws, cracks, or imperfections such as vents, shelly bars, shakes and starts upon receipt at the storage yard, or at the building site, shall be discarded and removed from the work site, and at the supplier's own expense.

1.11 Environmental Requirements

- A. The following environmental requirements are applicable to marble/granite set in mortar, and when caulking marble/granite joints with sealant.
- B. During freezing or near freezing weather, provide equipment and cover to maintain a minimum of 4 degrees C⁰ and to protect marble/granite work completed or in progress.
- C. At the end of working day, or during rainy weather, cover marble/granite work exposed to weather with waterproof coverings, securely anchored.
- D. Maintain materials and surrounding air to a minimum 10 degrees C⁰ prior to, during and 48 hours after completion of work.

PART 2 PRODUCTS

2.01 Marble/Granite Materials and Fabrication

A. General

- 1) All marble/granite slabs shall be sound, free from cracks, earth veins, objectionable discoloration, structural weaknesses and other defects that would impair their strength, durability, and appearance. The texture grain and colour variations shall be established by approved samples by the Engineer.
- 2) Marble/granite shall be of the thickness and dimensions shown on the approved Shop Drawings. All marble/granite slabs shall be obtained from approved quarries having adequate capacity and facilities to meet the specified requirements.
- 3) Cutting and finishing shall be performed by a firm equipped to process the material promptly on order and in strict accordance with the specifications. Evidence to this effect shall be provided by the Marble/Granite Supplier.
- 4) The fabricator must pay attention during the process of cutting to ensure that the marble/granite block orientation will yield finished material with visual characteristics complying with the approved samples.
- 5) Marble/granite rejected for noncompliance with the submitted samples or the requirements of this Specification shall be replaced with material acceptable to the Engineer. Replacement shall be prompt and at the Supplier's own cost. Inspection of marble/granite by the Engineer shall not relieve the Contractor of his responsibility to perform all work in accordance with the Contract Documents.

B. MARBLE/GRANITE SCHEDULE

Refer to the Drawings for locations, sizes and thickness of the various types of marble/granite specified herein:

The material type and colour of the marble/granite items shall be approved by the Engineer.

For the appropriate dimensions refer to detail relevant details.

- Size and types as shown on bills of quantities and drawings.

2.01 Marble/Granite Materials and Fabrication CONT'D

C. Marble/Granite Finish

- 1) Generally, marble/granite whether utilized for paving or wall cladding shall be polished with high gloss finish on all exposed surfaces, unless otherwise indicated on the drawings or specified herein.
- 2) Sanded or gritted finish may be used, obtained by light sand blasting to obtain a non-slip finish where required by the Engineer.
- 3) All exposed surfaces shall be free from scratches, chippings or hollows and other defects.

D. Marble/Granite Fabrication

- 1) Fabrication of marble/granite shall be in strict accordance with approved shop drawings for manufacture, and with this specification.
- 2) The Contractor shall be responsible for all measurements at the job site that may be required for the fabrication.
- 3) All work shall be of the highest quality, in accordance with the best trade practices, and performed by skilled workmen. All materials and workmanship shall conform to the highest industrial standards.
- 4) Use no materials, equipment, or practices that may adversely affect the functioning, or durability of marble/granite work, or work of other trades.
- 5) Marble/Granite tile paving... etc. shall be of the shapes, sizes and thicknesses shown on the approved shop drawings, and no variation shall be permitted.
- 6) Thresholds shall be of the shape, size and thickness shown on drawings. Edges shall be beveled to profiles with cut out ends to engage into door frame jambs; thresholds shall be in single pieces unless otherwise approved by the Engineer.
- 7) Arrises in all marble/granite work shall be cut perfectly true, even and sharp, and of the full thickness, with exposed edges slightly rounded to prevent snipping.
- 8) Fascias shall be of the shape, size and thickness, including all bevelling works as shown on drawings; fascias shall be in single pieces unless otherwise approved by the Engineer (N/A).
- 9) The dimension of all marble/granite individuals shall be worked to within plus or minus 1mm from those shown on the drawings and/or the approved Shop Drawings.
- 10) All bed and joint surfaces shall be straight and at right angles to the faces, unless otherwise shown.
- 11) All cuttings to marble/granite items shall be performed properly to form close joints. The marble/granite setter shall cooperate fully with other trades to do all cutting, drilling and fitting to accommodate work of others.
- 12) All drilling, cutting including cut outs to receive anchors, etc. shall be carefully drilled or cut to avoid stunning or fracture of the material adjacent to the hole or mortice. The cutting and drilling work shall be done at the plant.
- 13) All marble/granite works shall be based on requirements established under the American Standards Specifications for Interior and Exterior Marble/Granite, of the Marble Institute of America Incorporated (MIA) latest revision.

2.02 Mortar Materials And Accessories

- A. Cement
 - 1) Cement for Setting Mortar: Non-staining Portland Cement conforming to ASTM C150, (BS 12) Type I, except containing not more than 0.03% water soluble alkali.
 - 2) Cement for Pointing Mortar: Non-staining white Portland Cement conforming to ASTM C150 (BS 12). NOTE: Grey non-staining cement may be used for pointing mortar if the colour of pointing mortar, as selected by the Engineer, does not require White Portland Cement.
- B. Water: Shall be potable, clean and fresh from Public Water System.
- C. Sand: Well graded non-staining masonry sand conforming to ASTM C144 (BS 882). Use white Silica sand for pointing mortar. Other sand shall be approved by the Engineer.
- D. Lime: Approved brand of plastic hydrated, such as New England 4X, conforming to ASTM C207, Type "S", or BS 890.
- E. Integral Waterproofing: integral liquid waterproofer, as manufactured by an approved manufacturer and conforming to ASTM C494: Type A.
- F. Integral Color: as manufactured by an approved manufacturer and conforming to BS 1014.
- G. Grout for Marble Pavers: as shall be approved by the Engineer and conforming to BS 5385: Part 1, and ANSI 118.1 and ANSI 118.4 "Latex Portland Cement Mortars".

2.03 Marble/Granite Anchorage Materials - Generally

- A. Anchors, dowels, cramps, relieving angles and the like, as shown on the approved Shop Drawings, or as may be required at special conditions for fastening standing marble/granite work shall be fabricated from type 302 or 304 stainless steel.

The type, location and number of anchors shall be determined by calculations, applicable codes, and recommended practices of the BSI and the MIA for placement of anchors.

PART 3 EXECUTION

3.01 Conditions at Site

- A. Examine all surfaces and parts of the structure to receive marble/granite work and notify the Engineer in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with installation until such conditions have been corrected and are acceptable to the Engineer.
- B. Verify all measurements and dimensions, coordinate the installation of this work, and coordinate and schedule this work with the work of other trades. Give particular attention to the location and size of cutouts required to accommodate mechanical, electrical, and other work or adjoining construction, in accordance with the reviewed shop drawings for such trade.
- C. The marble/granite tile setter shall install all work using lighting conditions that will represent the proposed lighting required in the areas involved. This requirement will be insisted upon in order to achieve uniformity in laying out work.

3.02 Marble/Granite Installation

- A. Marble/Granite Floor Installation (Conventional Set)
 - 1) Setting bed for floors shall be composed of one- part Portland Cement, four parts damp sand by volume with integral waterproofing admixture in the quantity and manner recommended by the manufacturer.
 - 2) The setting bed, when mixed with water, the mortar mix shall be of such consistency or workability as to promote maximum density, determined by stroking the mortar surface with a trowel. When of correct consistency, the trowelled surface readily assumes a smooth slickened appearance. Screed and tamp setting bed firmly.
 - 3) The setting bed shall be 30mm thick on an appropriate thickness of white sand bed underlay.
 - 4) Once the setting bed is applied and tamped to a true and even surface, set the marble/granite tile in place and tamp with a mallet until firmly bedded, then remove. Trowel or brush a thin layer, 1/32 in. (.8mm) to 1/16 in. (1.6 mm) in thickness, of neat Portland Cement paste over the back of marble/granite. A thin layer of dry Portland Cement, 1/32 in. (.08 mm) to 1/16 in. (1.6mm) thick over the setting bed and working lightly with a trowel may be permitted. These areas (setting bed and cement paste) shall be limited to what can be covered with tile before the mortar sets. Marble/granite shall be pressed back firmly into the bed tamping with wood blocks to obtain smooth surface.
 - 5) All tiles shall be aligned properly with straight closed joints 1/32 in. (.8mm) wide. All edges of tiles shall be buttered with colored cement before closing joints, wipe off excess immediately with sponge and clear water.
 - 6) Tamping shall be completed within one (1) hour after placing tile. Adjusting work out of line, shall be done within the one (1) hour period.

3.02 Marble/Granite Installation CONT'D

- 7) All expansion joints shall be left clear of grout to receive sealant.
 - 8) Lay tiles to pattern as indicated on the drawings.
 - 9) Thresholds shall be set by marble/granite tile setter.
- B. Sealant Application
1. Apply approved sealants in accordance with Section 07900, to joints, expansion joints and other areas where shown on the drawings.
 2. Where marble/granite terminates at floor drains, or joints, these joints shall be sealed with approved sealant; coordinate with trades affecting these items.

3.03 Cleaning And Protection - Generally

- A. After marble/granite work has thoroughly set, sponge and wash thoroughly. Remove all surface cement and take care not to damage marble/granite or adjacent materials.
- B. Do not use acid or abrasive cleaners. The type of cleaner shall be approved by the Engineer prior to application.
- C. Marble/granite surfaces shall be dried using soft, dry cloths.
- D. Protect marble/granite work as the work proceeds, with non-staining heavy kraft paper or other approved coverage for both paved or cladded areas.
- E. All pavings including treads shall be properly protected by covering the entire areas with gypsum at least five (5) centimeters thick on top of the kraft paper. This gypsum protective layer shall be removed prior to polishing.
- F. Protect all facings against the weather or damage and staining by other trades, taking special precautions against staining by timbers, wet straw, oil, washings from steel work or scaffoldings, or other injurious substances.

3.04 Final Cleaning and Polishing

- A. On completion of all building operations, the Contractor shall remove all kraft paper and gypsum layer and dispose of the site, thoroughly clean down the completed marble/granite work and attend to any defects in the finished marble/granite work. All damage shall be made good to the satisfaction of the Engineer at the Contractor's own expense.
- B. All surfaces shall be polished with silicone wax polish (either liquid or paste). When the wax has dried, it shall be polished with a mechanical buffer to a lustrous finish free from tackiness.

END OF SECTION

PART 1 GENERAL**1.01 Work Included**

- A. Prepare surfaces which are to receive finish.
- B. Supply and apply paint finish in accordance with the finishing schedule.
- C. Spot priming and painting of materials delivered to the site, factory finished.
- D. Emulsion paint on rendered/plastered and fair-face concrete surfaces, internally
- E. Oil paint and varnish to woodwork.
- F. Gypsum Boards Paint
- G. Paint for concrete surfaces, where required.
- H. Exterior grade finishing to external wall panels and other concrete and masonry surfaces.

1.02 Related Work

- A. Section 03346: Concrete Floor Finish
- B. Section 05500: Miscellaneous Metals
- C. Section 08110: Steel Doors & Frames
- D. Section 08210: Wood Doors and Frames
- E. Section 09220: Portland Cement Plaster

1.03 Mock-Up

- A. Before proceeding with paint application, finish one complete surface of each color scheme required, clearly indicating selected colors, finish texture, materials and workmanship.
- B. If approved, sample area will serve as a minimum standard for work throughout building.

1.04 Samples

- A. Prepare 500 mm x 100 mm samples of finishes when requested by Engineer. When possible, apply finishes on identical type materials to which they will be applied on job.
- B. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.
- C. Colors to be selected by Engineer prior to commencement of work.

1.05 Maintenance Materials

- A. Leave on Premises, where directed by Engineer, not less than one (1) five liter can of each color used.
- B. Containers to be tightly sealed and clearly labeled for identification.

1.06 Delivery, Storage And Handling

- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing.
- B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 7 degrees C in well ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.07 Environmental Conditions

- A. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture contents of surfaces are below following maximums:
 - 1) Plastered surfaces: 12%
 - 2) Masonry, concrete and concrete block: 12%.
- B. Ensure surface temperatures or the surrounding air temperature is above 5 degrees C before applying finishes. Minimum application temperatures for latex paints for interior work is 7 degrees C and 10 degrees C for exterior work.
- C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 7 degrees C for 24 hours before, during and 48 hours after application of finishes.

1.08 Protection

- A. Before painting is commenced floors shall be swept and washed over; surfaces to be painted shall be cleaned before applying paint as specified, and all precautions taken to keep down dust whilst work is in progress.
- B. No paint shall be applied to surfaces structurally or superficially damp and all surfaces must be ascertained to be free from condensation efflorescence, etc. before the application of each coat.
- C. No painting shall be carried out externally during humid, rainy, damp foggy or freezing conditions, or conditions where surfaces have attained excessively high temperatures or during dust storms.
- D. No new, primed or undercoat woodwork and metalwork shall be left in an exposed or unsuitable situation for an undue period before completing the process.
- E. No dilution of paint materials shall be allowed unless stated otherwise and except strictly as detailed by the manufacturer's own direction, either on the containers, or their literature, and with the special permission of the Engineer. For external work dilution of paints will not be allowed whatsoever. For internal work, where permitted by the Engineer, undercoats may be thinned by the addition of not more than 5% thinners. Gloss finish shall not be thinned at all.
- A. Metal fittings such as ironmongery, etc., not required to be painted shall first be fitted and then removed before the preparatory process are commenced. When all painting is completed the fittings shall be cleaned as necessary and refixed in position.

1.08 Protection (cont'd)

- G. New concrete shall be allowed to age a minimum of 28 days prior to coating application. The surface must then be chemically treated or sweep blasted to remove the laitance layer. The PH of the concrete surface should be within the 6.8 - 8.0 range for safe coating application. If the surface PH is outside this range, the fresh water rinse should be repeated until PH is within the required range.
- H. Plaster work shall be prepared by removing all loose friable materials by wire brushing/sanding. Surfaces are to be cleaned to remove dust, dirt, oil grease, etc.
- I. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- J. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- K. Place cotton waste, cloths and material which may constitute a fire hazard in closed metal containers and remove daily from site.
- L. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.

1.09 Guarantee/Warranty

- A. All warranties/guarantees to be issued by the Supplier, Manufacturers and Sub-Contractors shall be countersigned by Main Contractor and both of them will be liable for repair/replace the items/works, etc., during the warrantee/guarantee period.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.
- B. Substitutions: Items of the same function and performance are acceptable in accordance with Section 01630.

2.02 Materials

- A. Powder coated paint, Varnish, Stain, Enamel, clear Lacquer, Polyurethane, Dico and Fillers: Type and brand or equivalent products, approved by Engineer.
- B. Paint Accessory Materials: (Linseed oil, shellac, turpentine and other materials not specifically indicated herein but required to achieve the finishes specified) of high quality and approved manufacturer.
- C. Paints: Ready-mixed except field catalysed coatings. Pigments fully ground maintaining a soft paste consistency, capable of readily and uniformly dispersed to a complete homogeneous mixture.
- D. Paints to have good flowing and brushing properties and be capable of dry or curing free of streaks or sags.
- E. Powder coated paint shall be applied as recommended by the manufacturer for metal work.

PART 3 EXECUTION

3.01 Inspection

- A. Thoroughly examine surfaces scheduled to be painted prior to commencement of work. Report in writing to Engineer, any condition that may potentially affect proper application. Do not commence until such defects have been corrected.
- B. Correct defects and deficiencies in surfaces which may adversely affect work of this section.
- C. No priming coats shall be applied until the surface have been inspected and the preparatory work has been approved by the Engineer. No undercoats or finishing coats shall be applied until the previous coat has been similarly inspected and approved.

3.02 Preparation of Surfaces

- A. Remove mildew, by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry completely.
- B. Remove surface contamination from aluminum surfaces requiring a paint finish by steam, high pressure water or solvent washing. Apply etching primer or acid etch. Apply paint immediately after acid etching.
- C. Remove dirt, oil, grease and sand if necessary to provide adhesion key, when asphalt, creosote or bituminous surfaces require a paint finish. Apply latex based compatible sealer or primer.

3.02 Preparation Of Surfaces (cont'd)

- D. Remove dirt, grease and oil from canvas and cotton insulated coverings.
- E. Remove contamination, acid etch and rinse new concrete floors with clear water. Ensure required acid-alkali balance is achieved. Allow to thoroughly dry.
- F. Remove contamination from copper surfaces requiring paint finish by steam, high pressure water or solvent washing. Apply vinyl etch primer or acid etch. Apply paint immediately after acid etching.
- G. Remove surface contamination and oils from galvanized surfaces and wash with solvent. Apply coat of etching type primer.
- H. Remove surface contamination and oils from zinc coated surfaces and prepare for priming in accordance with metal manufacturer's recommendations.
- I. Remove dirt, loose mortar, scale, powder and other foreign matter from concrete and concrete block surfaces which are to be painted or to receive a clear seal. Remove oil and grease with a solution of tri-sodium phosphate, rinse well and allow to thoroughly dry.
- J. Remove stains from concrete and concrete block surfaces caused by weathering of corroding metals with a solution of sodium meta silicate after being thoroughly soaked with water. Allow to thoroughly dry.
- K. Fill hairline cracks, small holes and imperfections on plaster surfaces with patching plaster. Smooth off to match adjacent surfaces. Wash and neutralize high alkali surfaces where they occur.
- L. Remove grease, rust, scale, dirt and dust from steel and iron surfaces. Where heavy coatings of scale are evident, removed by wire brushing, sandblasting or any other necessary method. Ensure steel surfaces are satisfactory before paint finishing.
- M. Clean unprimed steel surfaces by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned. Prime surfaces to indicate defects, if any. Paint after defects have been remedied.
- N. Sand and scrape shop primed steel surfaces to remove loose primer and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime steel including shop primed steels.
- O. Wipe off dust and grit from miscellaneous wood items and millwork prior to priming. Spot coat knots, pitch streaks and sappy sections with sealer. Fill nail holes and cracks after primer has dried and sand between coats. Back prime interior and exterior woodwork.

3.03 Paint Application

- A. Each coat of paint shall be so applied as to produce a film of uniform thickness. All paint shall be applied in accordance with the manufacturer's instructions. Special attention shall be given to ensure that all surfaces including edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of adjacent painted. Surfaces paint to plaster is to brush applied.
- B. Each coat of paint is to be slightly darker than preceding coat unless otherwise approved by Engineer.
- C. Sand lightly between coats to achieve required finish.
- D. Do not apply finishes on surfaces that are not sufficiently dry.
- E. Heated Surfaces:
 - 1. Heated surfaces such as radiators and pipes shall remain cold until each coat applied is completely dry.
- F. Drying:
 - 1. All coats shall be thoroughly dried before succeeding coats are applied. Allow a minimum of 24 hours between application on any one surface, unless otherwise specified by the manufacturer.
- G. Plastered Surfaces:
 - 1. Plastered surfaces shall be rubbed down smooth and any cracks cut out and filled. The Contractor shall also apply one coat of Tropaline Putty Filler to the plastered surface prior to the application of paint to provide an absolutely smooth surface.
- H. Unprimed Woodwork:
 - 1. Unprimed woodwork scheduled to be painted shall be rubbed down with abrasive paper and dusted off. Care shall be taken to prevent 'burnishing' of the surface. All knots and resinous areas shall be coated with two coats of knotting. Pitch on large, open unseasoned knots and all other beads or streaks of pitch shall be scraped off, or if still soft, shall be removed with white spirit, before applying the knotting. Apply one coat priming to all surfaces, two coats grained ends, to all, to be subsequently painted. Backs of all wood frames in contact with concrete, brickwork, blockwork and metal work or similar materials shall be primed before fixing. After priming all joints, holes cracks shall be stopped and filled, rubbed down and dusted off.
 - 2. The primer for non-resinous wood shall be low lead oil-based primer to B.S 5358 or aluminum wood primer to B.S. 4576.
 - 3. The primer for resinous wood shall be aluminum wood primer to B.S. 4576.

3.03 Paint Application (Cont'd)

I. Primed Woodwork:

1. Woodwork delivered primed shall be lightly rubbed down with abrasive paper, and dusted off. Touch up bare areas with a similar priming including open grained ends. After touch priming all joints, holes, cracks and open grained ends the woodwork shall be stopped and filled, rubbed down and dusted off.

J. Plywood and Blockboard:

1. Edges of exterior plywood and blockboard shall be sealed with two coats of aluminum primer and the backs treated with a lead primer.

K. Clear Finished Woodwork:

1. All woodwork scheduled to receive a clear finish shall be well sanded with the grain removing all dirt, etc., to give as smooth a surface as possible. resinous timber shall be swabbed down with White Spirit and dried thoroughly. Split or end grain shall be filled with suitable filler recommended by the clear lacquer manufacturer, in accordance with their instructions, and of the appropriate shade.

L. Colors:

1. The colour will be selected by the Employer and/or the Engineer from the paint manufacturer's standard colour range.

M. Protection:

1. Proper care must be taken to protect surfaces while still wet by the use of screens, and 'wet paint' signs where necessary.

N. Damage:

1. Care must be taken when preparing surfaces, or painting, etc. not to stain or damage other work. Dust sheets and covers to the satisfaction of the Engineer shall be used to protect adjacent work. Any such stains or damage shall be removed and made good at the Contractor's expense.

O. Cleanliness:

1. All brushes, tools, pails kettles and equipment shall be clean and free from foreign matter. They shall be thoroughly cleaned after use and before being used for different color's types or classes or material. Painting shall not be carried out in the vicinity of other operations that may cause dust. Waste liquids, oil soaked rag, etc., shall be removed from the building each day. Waste liquids shall not be thrown down any sanitary fittings or drains.

3.03 Paint Application (Cont'd)

P. Performance :

1. If, while the work is in progress, the paint appears to be faulty, such as consistency of colour, drying time or quality of finish, the work shall be stopped at once and the manufacturer consulted.
2. The manufacturer of the materials shall be given every facility for inspecting the work during progress in order to ascertain that the materials are being used in accordance to their directions, and to take samples of their products from the site if they so desire for tests.
3. The finishing coats of the various paints or surface finishing shall be free from sags, brush marks, runs, wrinkling, dust, bare or 'starved' patches, variations in colour and texture, and other blemishes.
4. When the work has been completed, the finished surfaces shall not be inferior in quality, colour and finish to the samples approved by the Engineer, and imperfections in manufacture shall not be apparent through these finished surfaces. In the event the Engineer is not satisfied with the quality of finish (does not comply with the required standards and/or the sample panel) the Contractor will be required to repaint at his own expense, such work to the satisfaction of the Engineer. In the opinion of the Engineer it is necessary to remove completely the unsatisfactory paint work this shall also be done under the direction of the Engineer at the expense of the Contractor.

Q. Emulsion Paints and Undercoats (Based On the approved manufacturer's written instructions and recommendations):

1. The internal paint finish to rendered walls and for fair face concrete ceilings and/or gypsum board ceilings shall be as follows and of colour as selected by the Engineer:
 -
 - a) Apply two coats of primer coat (vinyl primer sealer) at the rate of 40m² per gallon.
 - b) Spot putty and spot prime
 - c) apply two coats of putty filler
 - c) Apply 1st coat of emulsion paint at the rate of 35m² per gallon.
 - d) Apply 2nd coat of emulsion paint at the rate of 30-35 m² per gallon.
 - e) Sand down between coats.

R. The internal partitions finish to gypsum partitions, shall be of "Special" coat paint and shall be as follows and of color as selected by the Engineer.

- 1) Remove dirt and grease on the surface and the surface should be kept dry.
- 2) apply two coats of primer coat (Special Paint) at the rate of 11.3 m²/l/coat
- 3) apply two coats of intermediate coats at the rate of 13.2m³/l/coat
- 4) apply one coat of top coat (Special) at the rate of 3.3m²/l/coat.

3.03 Paint Application (Cont'd)

S. Wood Surface:

1) The gloss finish /eggshell finish oil paint shall be as follows:

- a) Primer coat pink wood primer or linseed oil.
- b) Enamel undercoat.
- c) One full coat of oil-based putty.
- d) Enamel under coat.
- e) 1st coat eggshell or gloss finish.
- f) 2nd coat eggshell or gloss finish.

T. Metal Surfaces Other Than Aluminum:

- 1) Primer coat: zinc chromate primer
- 2) Enamel under coat.
- 3) 1st coat eggshell or gloss finish.
- 4) 2nd coat eggshell or gloss finish.

U. Lead Based Paints:

- 1) The use of lead-based paints will not be permitted.

V. Exterior Concrete Surfaces

1) System "A" Smooth Surfaces.

- a) Primer coat acrylic Filler at the rate of 45 M2 per gallon.
- b) 1st coat Acrylic Emulsion at the rate of 35 M2 per gallon.
- c) 2nd coat Acrylic Emulsion at the rate of 35 M2 per gallon.

2) System "B" Textured Surfaces

- a) Primer coat Acrylic Block Filler at the rate of 35 M2 per gallon.
- b) Acrylic Textured coating at the rate of 1 to 1.2 Lt. per square meter, type of paint shall be approved by the Engineer before proceeding with associated work.
- c) The surface to be coated shall be deemed to be in accordance with the manufacturers recommendations and shall be free from agents which may affect the adhesion of the surface coating.

3.03 Paint Application (Cont'd)

2) System "B" Textured Surfaces (Cont'd)

- d) All fragile or loose matter on surface of concrete is to be removed prior to coating to provide a hard and stable base. All cement burrs, efflorescence, cement powder and the like shall be removed by scraper, sand paper or wire brush.
- e) The coating shall be applied in accordance with the manufacturers printed instructions.
- f) Application of paint shall not be carried out when winds or rain.
- g) Thinners shall only be permitted to be used in accordance with the manufacturers written instructions, and shall be of a type recommended by the manufacturer.
- h) Sealers, bases and hardeners shall be thoroughly mixed in the exact proportions as specified by the manufacturer, and shall be mixed in clean containers specifically for the sole use of the coating.

Y. Varnish:

- 1) The varnish shall be obtained from approved manufacturer.
- 2) The first coat shall be applied by brush to obtain saturation. Final coats may be applied by brush or by spray.

AD. Fillers:

- 1. The fillers for internal joinery shall be the type recommended by the paint manufacturer for use with his type of paint or lacquer.
- 2. Stoppers and fillers shall be tinted to match the undercoat, and shall be compatible with both undercoats and primers.
- 3. All materials shall be used strictly in accordance with the manufacturer's instructions.

AE Brushwork:

- 1. Unless otherwise specified by the manufacturer all primers and undercoats shall be stopped flush and rubbed down to a smooth surface with an abrasive paper and all dust removed before each succeeding coat is applied. Care shall be taken to prevent burnishing of the surface.
- 2. The stopping/filling shall be applied by spatula or putty knife.

3.04 Mechanical And Electrical Equipment

- A. Refer to mechanical and electrical sections with respect to painting and finishing requirements, color coding identification banding of equipment, ducting, piping and conduit.
- B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.
- C. Finish paint primed equipment to color selected.
- D. Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating.
- E. Replace identification markings on mechanical or electrical equipment when painted over or spattered.
- F. Paint interior surfaces of air ducts, convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed immediately behind louvers, grilles, convector and baseboard cabinets to match face panels.
- G. Paint exposed conduit and electrical equipment occurring in finished areas. Color and texture to match adjacent surfaces.
- H. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.
- I. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. Color banding and identification (flow arrows, naming, numbering, etc.)

3.05 Cleaning

- A. As work proceeds and upon completion, promptly remove paint where spilled, splashed or spattered.
- B. During progress of work keep premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.
- C. Upon completion of work leave premises neat and clean, to the satisfaction of Engineer.

END OF SECTION

DIVISION 10

SPECIALTIES

Ref.	Description
10800	Toilet and Bath Accessories

SECTION 10800

TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.01 Work Included

- A. Toilet and bath accessories.
- B. Rough-in frames supplied to other sections.
- C. Attachment hardware.

1.02 Related Work

- A. Section 09310 Porcelain tiles.

1.03 Reference Standards

- A. ASTM – A167.
- B. ASTM – A366.
- C. Jordanian General Specifications.

1.04 Samples

- A. Submit samples in accordance with section 01340.
- B. Provide one sample of each type of fixture specified herein.

1.05 Product Data

- A. Submit manufacturers product data in accordance with section 01340.
- B. Data to illustrate each accessory at large scale and show installation method.

1.06 Delivery, Storage And Handling

- A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- B. Pack accessories individually in a manner to protect accessory and its finish.

1.07 Protection

- A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this section.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers

- A. The Contractor shall submit to the Engineer the names of three manufacturers and their products which will be acceptable under this Section. Approval of the manufacturer or product must be obtained before proceeding with associated work.

2.02 Materials

- A. Liquid Soap Dispenser: Basin type chrome plated.
- B. Soap Dish and Holder: Chrome
- C. Roll Holder: Chrome.
- D. Towel Roll Holder: Chrome
- E. Bin: stainless steel, features push – flap door and removable stainless-steel waster receptacle.
- F. Paper towel dispenser: stainless steel provided with removable interior waste container.
- G. Adhesive Epoxy type contact cement.
- H. Fasteners, Screws, and Bolts Hot dip galvanized. Expansion Shields Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.03 Fabrication

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from one sheet of stock, free of joints.
- C. Provide steel anchor plates and anchor components for installation on building finishes.
- D. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.
- F. Hot dip galvanized ferrous metal anchors and fastening devices.
- G. Shop assemble components and package complete with anchors and fittings.

2.04 Electrical Connections

- A. Items requiring connection to electric supply shall have characteristics in accordance with the Electrical Drawings and shall be installed in accordance with appropriate paragraphs of Section 16.

PART 3 EXECUTION

3.01 Preparation

- A. Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates and rough-in measurements as required.
- B. Before starting work notify the Engineer in writing of any conflicts detrimental to installation or operation of units.
- C. Verify with the Engineer exact location of accessories.

3.02 Installation

- A. Install fixtures, accessories and items in accordance with manufacturer's printed instructions.
- B. Install true, plumb and level, securely and rigidly anchored to substrate.
- C. Use tamper-proof security type fasteners.

END OF SECTION