DIVISION 9

FINISHES

BUILDING WORK

DIVISION 9

FINISHES

INDEX

SECTION 09220

PORTLAND CEMENT PLASTER

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required for Portland cement plaster system, including Metal furring and lathing, as shown on drawings and specified herein

1.02 RELATED WORK

A. Section 04200 - Masonry.

B. Section 03300 - Concrete.

1.03 REFERENCES

A. ASTM C91 - Standard Specification for Masonry Cement.

B. ASTM C150 - Standard Specification for Portland Cement.

C. ASTM C206 - Standard Specification for Finishing Hydrated Lime.

D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

E. ASTM C631 - Standard Specification for Bonding Compounds for Interior Plastering.

F. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters.

H. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster.

1.04 SUBMITTALS FOR REVIEW

A. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C926.

1.06 MOCK-UP

A. Provide mock-up of exterior and interior wall and ceiling system.

B. Construct mock-up, 2 m long by 1.5 m wide, illustrating surface finish.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Section 01601 - Control of Material: Environmental conditions affecting products on site.

B. Do not apply plaster when substrate or ambient air temperature is less than 10 degrees C nor more than 35 degrees C.

C. Maintain minimum ambient temperature of 10 degrees C during installation of plaster and until cured.

PART 2: PRODUCTS

2.01 PLASTER BASE MATERIALS

A. Cement: to ASTM C150, Type I Portland.

B. Lime: to ASTM C206, Type S and C207, Type S.

C. Aggregate: In accordance with ASTM C897.

D. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

E. Bonding Agent: in accordance with ASTM C631; type recommended for bonding plaster to concrete and concrete masonry surfaces.

F. Admixtures: use pasticiser to ASTM - C 494 or BS 4887 and water-retaiyning Agents with prior approval.

Man: FEP - MASTER BUILDERS

Ref: RHEOMIX - 720

Man: FOSROC

Ref: CEBEX 112

Or other approved and equal

G. Waterproofing Admixtures: shall be use for planter, water tank and external plaster

Man: FEP-MASTER BUILDERS
Ref: RHEOMIX - 141
Man: FOSROC
Ref: CONPLAST PROLAPIN 031
Or other approved and equal

2.02 PLASTER FINISH MATERIALS

A. Cement: As specified for plaster base coat, gray color.

B. Lime: As specified for plaster base coat.

C. Water: Clean, fresh, potable, and free of matter which can affect plaster.

2.03 FURRING AND LATHING

A. Metal Lath: to ASTM C847; flat diamond self furring mesh, of weight to suit application, backed with treated paper; galvanized.

B. Wire Mesh Reinforcement: 38 x 38 mm galvanized steel 24 gage 0.6 mm wire, woven mesh.

C. Casing Bead: Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, expanded metal flanges, with square edges; galvanized.

D. Corner Bead: Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, expanded metal flanges with radiused edge; galvanized.

E. Base Screed: Formed sheet steel, depth governed by plaster thickness, maximum possible lengths, expanded metal flanges, with beveled edge; galvanized.

F. Corner Mesh: Formed sheet steel, minimum 0.5 mm thick, expanded flanges shaped to permit complete embedding in plaster, minimum 50 mm size; galvanized.

G. Strip Mesh: Expanded metal lath, minimum 0.5 mm thick, 100 mm wide galvanized.

H. Control and Expansion Joint Accessories: Formed sheet steel accordion profile, 50 mm expanded metal flanges each side, galvanized.

I. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.

J. Fasteners: ASTM C1002, self drilling, self tapping screws.

2.05 CEMENT PLASTER MIXES

A. Mix and proportion cement plaster in accordance with ASTM C926, and as indicated.

B. Base Coat and Brown Coat: One part cement, minimum 3-1/2 and maximum 4 parts aggregate, and minimum 15 percent and maximum 25 percent hydrated lime.

C. Finish Coat: One part cement, minimum 4 and maximum 5 parts aggregate, and minimum 25 percent and maximum 50 percent lime.

D. Mix only as much plaster as can be used prior to initial set.

E. Add color pigments to finish coat in accordance with manufacturer's instructions.

F. Mix materials dry, to uniform color and consistency, before adding water.

G. Add admixtures to all coats as manufacturer's instructions.

H. Protect mixtures from freezing, frost, contamination, and excessive evaporation.

I. Do not retemper mixes after initial set has occurred.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verification of existing conditions before starting work.

B. Masonry: Verify joints are cut flush and surface is ready to receive work of this section. Verify no bituminous or water repellent coatings exist on masonry surface.

C. Concrete: Verify surfaces are flat, honeycomb are filled flush, and surfaces are ready to receive work of this section. Verify no bituminous, water repellent, or form release agents exist on concrete surface that are detrimental to plaster bond.

D. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.

E. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.02 PREPARATION

A. Dampen masonry surfaces to reduce excessive suction.

B. Clean concrete surfaces of foreign matter. Clean surfaces using acid solutions, solvents, or detergents. Wash surfaces with clean water.

C. Roughen smooth concrete surfaces and apply bonding agent in accordance with manufacturer's instructions.

3.03 INSTALLATION - LATHING MATERIALS

A. Apply metal lath taut, with long dimension perpendicular to supports.

B. Lap ends minimum 25 mm. Secure end laps with tie wire where they occur between supports.

C. Lap sides of diamond mesh lath minimum 38 mm.

D. Attach metal lath to concrete and masonry using wire hair pins, or loops. Ensure that anchors are securely attached to concrete and spaced at maximum 600 mm on center.

3.04 INSTALLATION - ACCESSORIES

A. Continuously reinforce internal angles with corner mesh, return metal 75mm from corner to form the angle reinforcement; fasten at perimeter edges only.

B. Place corner bead at external wall corners; fasten at outer edges of lath only.

C. Place strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

D. Place 100 mm wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

E. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

F. Install door and glazed frames plumb and level in opening. Secure rigidly in place.

G. Install metal access panels and rigidly secure in place.

H. Position to provide convenient access to concealed work requiring access.

3.05 CONTROL AND EXPANSION JOINTS

A. Locate interior control and expansion joints every 6 m. or as indicated.

B. After initial set, scribe contraction joints in exterior work every 1 m in each direction by cutting through 2/3 of the cement plaster depth, neatly, in straight lines.

C. Locate exterior control and expansion joints every 4m in each direction.

D. Establish control and expansion joints with double casing beads butted tight. Set both beads over 150 mm wide strip of polyethylene sheet for air seal continuity.

E. Coordinate joint placement with other related work.

3.06 PLASTERING

A. Apply plaster in accordance with ASTM C926.

B. Apply brown coat to a nominal thickness of 10 mm and a finish coat to a nominal thickness of 3 m over masonry, concrete and clay tile surfaces.

C. Apply base coat to a nominal thickness of 8 mm, brown coat to a nominal thickness of 9 mm, and a finish coat to a nominal thickness of 3mm over metal lath.

D. Moist cure base and brown coats. Apply brown coat immediately following initial set of scratch coat.

E. After curing, dampen previous coat prior to applying finish coat.

F. Apply finish coat and wood float or steel trowel as indicated to a consistent and smooth finish.

G. Avoid excessive working of surface. Delay troweling as long as possible to avoid drawing excess fines to surface.

H. Hand or Machine apply aggregate surfacing to full surface coverage.

I. Moist cure finish coat for minimum period of 48 hours.

3.07 ERECTION TOLERANCES

A. Maximum Variation from True Flatness: 3 mm in 3 m.

3.08 SCHEDULES

A. Interior Area: Two coat cement plaster, smooth wood float finish, excluding scratch coat.

B. Exterior Area: Three coat cement plaster, course float finish, excluding scratch coat.

C. Walls to receive ceramic tiles one coat cement plaster, rake float finish, excluding scratch coat.

D. Water tight and planters surfaces: Two coat cement plaster, smooth steel trowel finish, excluding scratch coat.

End of Section

SECTION 09300

CERAMIC TILE

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install ceramic tile on floors, base and walls using thinset applications method, including bath fitting as shown on the drawings and specified herein.

B. Tile and expansion joint pattern shall be as shown and as accepted.

1.02 RELATED WORK

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

1. Section 03350 - Concrete Finishes.
2. Section 07005 - Waterproofing and Dampproofing.
3. Section 07900 - Caulking.
4. Plumbing Work Sections.

1.03 REFERENCES

A. ANSI A108.1 - Installation of Ceramic Tile with Portland Cement Mortar.

B. ANSI A108.4 - Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive.

C. ANSI A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.

D. ANSI A108.10 - Installation of Grout in Tilework.

E. ANSI A118.1 - Dry-Set Portland Cement Mortar.

F. ANSI A118.6 - Ceramic Tile Grouts.

G. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.

H. ANSI A137.1 - Standard Specifications for Ceramic Tile.

I. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

J. ASTM C847 - Metal Lath.

1.04 SUBMITTALS

A. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.

B. Product Data: Provide instructions for using adhesives and grouts.

C. Samples: Mount tile & apply grout on two plywood panels, (800x600mm) in size illustrating pattern, color variations, and grout joint size variations.

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

1.05 MAINTENANCE DATA

A. Submit Maintenance Data Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI A137.1.

B. Conform to TCA Handbook, and ANSI A108.4.

C. Maintain one copy of each document on site.

1.07 QUALIFICATIONS

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

B. Installer: Company specializing in performing the work of this section with minimum three years experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Do not install adhesives in an unventilated environment.

1.10 EXTRA MATERIALS

A. Provide (3 sq m) of each size, color, and surface finish of tile specified, and representative trim, all properly packed in cartons, and clearly marked on the outside.

PART 2: PRODUCTS

2.01 CERAMIC MANUFACTURERS

A All ceramic tile shall be local made.

B For swimming pool ceramic and fihings and for pool surrounding area:

Man: Gail
Germany

2.02 CERAMIC TILE MATERIALS

A. Ceramic Floor Tile: to BS 1286, conforming to the following:

1.	Moisture Absorption	(5) percent.
2.	Size	as shown on Drawing.
3.	Edge	Square.
4.	Surface Finish	Slip resistant.
5.	Color	As selected.

B. Ceramic Wall Tile: to B 1281, conforming to the following:

1.	Moisture Absorption	(10) percent.
2.	Size as shown on Drawings.	
3.	Edge	Square.
4.	Surface Finish	Matte glazed and as indicated.
5.	Color	As selected.

2.03 BASE MATERIALS

A. Base: Match floor tile for moisture absorption, surface finish, and color:

1.	Length	Tile length.
2.	Height	(100 mm) and as stated on the drawing.
3.	Top Edge	Bull nosed .
4.	Internal Corner	Coved .
5.	External Corner	Bullnosed .

2.04 ADHESIVE MATERIALS

A. Type recommended by adhesive and tiling manufacturer's as suitable for type of tile and location in the works and to be approved.

2.05 GROUT MATERIALS

A. Grout: shall be waterproof, cement - based material, suitable for grouting ceramic wall and floor tile joints in interior and exterior installation, conform to BS5750: Part 2; colours as selected.

2.06 GROUT MIX

A. Mix and proportion pre-mix grout materials in accordance with manufacturer's instructions.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.02 PREPARATION

A. Protect surrounding work from damage or disfiguration.

B. Vacuum clean surfaces.

C. Seal substrate surface cracks with filler.

D. Apply sealer to substrate surfaces in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - THINNEST METHOD

A. Install adhesive tile, thresholds, stair treads, and grout in accordance with manufacturer's instructions.

B. Lay tile to pattern indicated.

C. Place edge strips at exposed tile edges.

D. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base and wall joints.

E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep expansion joints free of adhesive or grout.

H. Allow tile to set for a minimum of 48 hours prior to grouting.

I. Grout tile joints.

J. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

K. Form internal angles coved and external angles bullnosed.

L. Install ceramic accessories rigidly in prepared openings.

3.04 CLEANING

A. Clean tile and grout surfaces.

3.05 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished floor surface for 4 days after installation.

End of Section

SECTION 09410

TERRAZZO TILE

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, equipment and incidentals required to install terrazzo floor and base tiles including stairs and landings tile as shown and as specified herein.

B Tile and control (expansion) joint pattern shall be as shown and as accepted.

1.02 RELATED WORK

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

1. Section 03350 - Concrete Finishes.

2. Section 07005 - Waterproofing and Dampproofing.

3. Section 07900 - Caulking.

1.03 REFERENCES

A ASTM A185-Welded Steel Wire Fabric for Concrete Reinforcement.

B ASTM C33 - Concrete Aggregates.

C ASTM C150 - Portland Cement.

D ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

E ASTM D2103 - Polyethylene Film and Sheeting.

F. NTMA (National Terrazzo and Mosaic Association, Inc.) - Terrazzo Ideas and Design Guide.

1.04 SUBMITTALS

A Submit two copies of manufacturer's specifications and installation instructions for all materials required. Include certifications and other data as may be required to show compliance with these Specifications.

B Submit one sample panel of each tile type mounted on not less than 600 mm square plywood or hardboard backing and grouted as required. Engineer's review will be for color, pattern, and texture only. Resubmit as required until acceptance is obtained.

1.05 QUALITY ASSURANCE

A Installation Specifications shall conform to NTMA except as provided otherwise herein.

B Maintain one copy of document on site.

1.06 SAMPLE FLOOR AREA

A The Engineer will select one room or area which is scheduled to receive floor tile and designate it as the sample floor area. This area shall be finished and approved before authorization to proceed with work in other areas.

B The sample floor area shall, upon approval, be part of the finish work and shall become the standard of acceptance for floor finish on the remainder of the project.

1.07 ENVIRONMENTAL REQUIREMENTS

A Do not install terrazzo when temperature is below (10 degrees C) or above (40 degrees C).

B Maintain this temperature range 24 hours before, during, and 72 hours after installation of terrazzo.

1.08 COORDINATION

A. Coordinate the work with mechanical and electrical access cover placement in relation to terrazzo divider strips.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A Deliver materials and store on the site in original containers with seals unbroken and labels intact until time of use and handle all in accordance with manufacturer's directions. No tile shall be dropped during unloading or handling.

PART 2: PRODUCTS

2.01 MATERIALS

A Terrazzo tiles and fittings (normal type): shall be 250 x 250 x 25 mm for floor tiles, 30 mm thick for treads with non slip nosing, 20 mm thick for risers, 15 mm thick for skirtings, and shall be precast pressed tiles, with the wearing surfaces made of white Portland cement and local marble chippings of an approved quality and color. Tiles shall be Grade A, sound, square edged, and of even and uniform texture and color. Terrazzo tiles shall meet the prescribed laboratory tests.

B Terrazzo tiles with Marble pieces: shall as item A above but wearing surfaces made of white cement and local large marble pieces.

C Cement shall conform to ASTM C150, Type I.

D Colour Pigments for Topping: Non-fading mineral type.

E Terrazzo Sand shall conform to ASTM C33.

F Underbid: One part Portland cement to 4 parts sand by volume. Add water to produce low slump mix.

G Grout shall be Hydroment tile grout factory mixed with all required aggregate and pigment. The color shall be selected by the Engineer.

H Water shall be fresh, clean and potable, free from organic matter, acids and alkalis.

PART 3: EXECUTION

3.01 GENERAL

A Coordinate work with the work of other trades affected by tile work. Grounds, door bucks, electrical boxes, connections for plumbing and heating fixtures, and all fittings shall be in place and pipe chases and other openings shall be properly closed before any tile is installed.

B Inspect all surfaces to receive tile be assured that they are in proper condition for the work to be performed under this Section. Concrete to receive tile shall cured 28 days, minimum, before receiving tile. Notify the Engineer in writing of any condition requiring correction before any tile work is installed. Failure to make such a report shall be construed as acceptance of the conditions.

C Coordinate the work of this Section and that of the Section 07005 to insure that the required joints are caulked before grouting is performed.

3.02 CONTROL JOINTS

A Install control joints (tile expansion joints) in tile work at locations noted, at the intersection with walls and vertical obstructions, at other places where construction joints occur in concrete subfloor.

3.03 INSTALLATION - FLOOR TILE

A Set all tile in neat cement paste applied to a plastic setting bed. Thoroughly beat-in all tile while the mortar bed is still plastic. The beating shall fill the entire space between ribs of rib-backed tile with mortar. Provide control joints free of mortar where detailed and required.

B Tile shall be laid out in grid pattern as shown on Drawings and shop drawings. Unless shown otherwise, floor tile pattern shall be centered in room with generally no tile cut smaller than half size and all cuts on the outer edge of the field. Floor tile shall be set with 2mm joints to receive grout.

C Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise specified or shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

D Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

E Provide openings for control joints where and as indicated and as specified above. If not indicate and detailed, comply with recommendations in TCA "Handbook for Ceramic Tile Installation" leaving joints ready for sealant specified.

F Grout tile joints using the approved prepared grout. Force a maximum amount of grout into the joints. Follow the grout manufacturer's directions explicitly. Tool joints flush for floor tile and to bottom of cushion edge for wall tile, all as accepted by the Engineer. Mortar shall not show through grouted joints. The finished grout shall be uniform in color, smooth and without voids, pinholes or low spots.

3.04 INSTALLATION - BASE

A Vertical Base Projecting From Wall: 9 mm minimum topping on underbed bonded to wall substrate, projecting 5 mm from finish wall surface, as detailed and shown on drawings.

3.05 APPLICATION - STAIRS

A Terrazzo Stairs and Landings: Minimum 16 mm topping on underbed bonded to treads and minimum 9 mm topping on underbed bonded to risers.

3.06 CURING

A Use curing method in accordance with NTMA instructions.

B Close area to allow undisturbed curing.

3.07 SURFACE FINISHING

A Brush apply terrazzo toping mix slurry to topping surface.

B Finish terrazzo in accordance with NTMA instructions.

C Produce terrazzo finish surface to match approved sample, with minimum 70 percent chip exposed.

D Grind terrazzo surface with power disc machine; successively sequence using coarse to fine grit abrasive, using a wet method.

E Apply grout mix to match matrix over ground surfaces to fill honeycomb exposed during grinding.

F After grout has sufficiently cured, grind, using a fine grit abrasive.

3.08 TOLERANCES

A Maximum Variation from Flat Surface: 2 mm in one m.

B Maximum variation from Level (Except Surfaces Sloping to Drain): 2mm

3.9 CLEANING AND PROTECTION

A Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

B Seal and polish surfaces in accordance with NTMA.

C Tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

D Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.

E Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed. Damp cure for 72 hours minimum.

F Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

End of Section

SECTION 09600

STONE FLOOR AND WALL TILING

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install Marble and Granite floor, base, wall, stairtread and riser finish using thinset as selected and shown on drawings and as specified herein .

B Tile and control (expansion) joint pattern shall be as shown and as accepted .

1.02 RELATED WORK

A. Section 03350 - Concrete Finishes .

B. Section 07900 - Caulking .

C. Plumbing Work Sections .

1.03 REFERENCES

A. ANSI A118.1 - Dry-Set Portland Cement Mortar.

B. ANSI A118.3 - Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.

C. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.

D. ASTM A185 - Welded Steel Wire, Fabric, Plain, for Concrete Reinforcement.

E. ASTM C33 - Concrete Aggregates.

F. ASTM C144 - Aggregate for Masonry Mortar.

G. ASTM C150 - Portland Cement.

H. ASTM C503 - Marble Dimension Stone (Exterior).

I. ASTM C568 - Limestone Dimension Stone.

J. ASTM C615 - Granite Building Stone.

K. ASTM C629 - Slate Dimension Stone.

L. ASTM C1142 - Ready-Mixed Mortar for Unit Masonry.

M. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

1.04 SUBMITTALS

A. Shop Drawings: Indicate stone layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, and setting details.

B. Submit stone supplier's installation instructions and field erection drawings.

C. Product Data: Provide instructions for using grout.

D. Samples: Mount stone and apply grout on two plywood panels, illustrating pattern, color variations, and grout joint size variations.

E. Submit sample of colored grout.

F. Submit stone samples for sealant compatibility testing.

1.05 MAINTENANCE DATA

A. Submit Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

B. Include list of liquids detrimental to appearance of stone finish.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with TCA Handbook for instructions applicable to mortar setting bed thinset bed and grouting.

B. Maintain one copy of document on site.

1.07 MOCKUP

A. Construct mockup, 2 m long by 1.5 m wide, with finish grout, and specified accessories.

B. Locate where directed.

PART 2: PRODUCTS

2.01 NATURAL STONE SLABS AND FITTINGS GENERALLY

A. To be first quality stone, each type obtained from one strata, from one quarry and delivered in one shipment.

B. Slabs are to be hard and free from cracks and other defects to surfaces and edges which may impair structural integrity, function or appearance and are to be cut square and true with clean edges and uniform in shape and thickness.

C. Length and width dimensions of individual slabs are to be within ± 1mm and thickness within 3mm from those shown on the Drawings.

D. Submit supplier's test results for each type of stone for the following tests, which must meet the following:

	Item	Marble	Granite
Weight per unit of volume	ton/m3	2.7	2.57
Absorption coefficient	Wt %	0.11	0.33
Compression breaking load	kg/cm2	1300	1800
Flexural Strength	kg/cm2	200	115
Thermal Expansion	mm/m°C	0.0063	0.0075

E. Marble and granite slabs and fittings: are to be in the quarry's longest lengths possible, commensurate position in the works. Saddles to door openings, stair treads and risers and window sills less than 2 meters are to be in one length.

2.02 MARBLE MATERIALS

A. Marble: ASTM C503; free of defects detrimental to appearance or durability:

1. Unit Size: as shown on drawings.

2. Thickness: as shown on drawings.

3. Surface Finish: Polished.

4. types: to be as shown on the drawings.

5. The selected marble slabs shall have sharp edges, correctly cut or rubbed to produce the required aesthelic finish.

6. Marble slabs and fittings for shoe Racks and benchs are to be as indicated and shown on the drawings.

2.03 ADHESIVE MATERIALS

A. Type recommended by adhesive and tiling manufacturer's as suitable for type of tile and location in the works and to be approved.

Man: Ardex Ltd.
Homefield Road, Haverhill,
Suffolk CBO 8QP
England
Tel.:(0440) 63939
Tlx.: 818814

Man: Building Adhesives Ltd - BAL .
Longton Road
Trentham
Stoke-on-Trent ST4 8JB.
England
Tel.:(0782) 659921
Fax: (0782) 643909

Man: Miclar Exports Ltd
3/10 Shoreditch High St.
London Ee1 6PE
England
Tel.:(01) 247 8838
Tlx.: 888898

Or other equal and approved

2.04 GROUT MATERIALS

A. Shall be factory mixed with all required aggregate and pigment, the colour shall be selected by the Engineer.

Man: Ardex Ltd.
Homefield Road, Haverhill,
Suffolk CBO 8QP
England
Tel.:(0440) 63939
Tlx.: (818814)

Man: Building Adhesives Ltd - BAL
Longton Road
Trentham
Stoke-on-Trent ST4 8JB.
Tel.:(0782) 659921
Tlx : 36574 Balad G

Man: Miclar Exports Ltd
3/10 Shoreditch High St.
London Ee1 6PE
England
Tel.:(01) 247 8838
Tlx.: 888898

Or other equal and approved

2.05 ACCESSORIES

A. Thresholds: Same stone type as flooring: finishes, colours and sizes as shown on drawings.

B. Sealant: shall be tow part polysulphide as specified in Section 07900.

C. Cleaner: Recommended by stone producer and grout manufacturer which will not harm stone, joint materials, or adjacent surfaces.

D. Sealer: Colorless, slip and stain resistant which will not detrimentally affect stone and adjacent work.

2.06 MORTAR AND GROUT MIX

A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions.

B Mix and proportion cementitious materials for site made mortarbed.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Control uniformity of mix and coloration.

2.07 STONE FABRICATION

A. Form stone into panel sizes and thickness required.

B. Form stair treads and risers to configuration as detailed.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.02 PREPARATION

A. Vacuum clean substrate surfaces; damp clean stone.

B. Seal substrate surface cracks with filler.

C. Clean stone prior to installation, with edges and surfaces free of dirt or foreign material.

D. Do not use wire brushes or implements which mark or damage exposed surfaces.

3.03 INSTALLATION - THINSET METHOD

A. Install stone in accordance with stone fabricators and manufacturer's instructions.

B. Install stone, thresholds, stair treads, and grout in accordance with manufacturers instructions.

C. Lay stone units to pattern indicated. Do not interrupt tile pattern through openings.

D. Place thresholds at door frame openings, notching stone for door stop.

E. Cut and fit stone units tight to penetrations through unit. Ensure finish trim will cover cut edges. Form corners and bases neatly. Align floor and base joints.

F. Maintain uniform joint width subject to variance in tolerance allowed in stone unit size. Make joints watertight, without voids, cracks, excess mortar or excess grout.

G. Maintain joint width of 6 mm where abutting vertical surfaces or protrusions.

H. Sound test the units and after setting. Replace hollow sounding units.

I. Keep expansion and control joints free of mortar or grout. Apply sealant to joints.

J. Allow thinset materials to cure prior to grouting.

K. To accommodate joint grout, rake out joints 6 to 10 mm. Grout joints. Pack and work into voids. Neatly tool surface to a flush joint.

L. Apply sealant to junction of stone and dissimilar materials and junction of dissimilar planes.

M. Set stone in full mortar bed to support stone over full bearing surface. Accurately establish joint dimensions.

3.04 CLEANING

A. Clean stone and grout surfaces with cleaner; seal with sealer.

End of Section

SECTION 09901

SURFACE PREPARATION AND SHOP PRIME PAINTING

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all labor, materials, and equipment required for the surface preparation and application of shop primers on ferrous metals, excluding stainless steels, as specified herein.

1.02 RELATED WORK NOT INCLUDED

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

1. Section 09902 - Painting

1.03 SUBMITTALS

A Submit to the Engineer as provided in the Submittals section for shop drawings, manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thicknesses.

B Submit representative physical samples of the proposed primers, if required by the Engineer.

PART 2: PRODUCTS

2.01 MATERIALS

A Welding. All welded joints which will be fully or partially submerged shall be sealed watertight by continuous welds.

B Edge Grinding. Sharp corners of cut or sheared edges shall be ground to a radius as required to ensure satisfactory paint adherence.

C Surface Preparation. All ferrous metal surfaces, except motors, speed reducers, and stainless steel, shall be blast cleaned in conformance with the paint manufacturer's recommendations. All mill scale, rust, and contaminants shall be removed before shop primer is applied.

D Shop Painting. Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of the specified primer.

E Compatibility of Coating Systems. Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with their corresponding primers and finish coats specified in the Painting Section for use in the field and which are recommended for use together.

PART 3: EXECUTION

3.01 APPLICATION

A Surface Preparation and Priming

1. Non-submerged components scheduled for priming, as defined above, shall be sandblasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming. Submerged components scheduled for priming, as defined above, shall be blast clean in accordance with SSPC-SP-10, near white, immediately prior to priming.

2. Surfaces shall be dry and free of dust, oil, grease and other foreign material before priming.

3. Shop prime in accordance with manufacturer's recommendations.

End of Section

SECTION 09902

PAINTING

PART 1: GENERAL

1.01 SCOPE OF WORK

A Furnish all materials, labor, equipment and incidentals required to perform all the painting necessary to complete this contract in its entirety.

B It is the intent of these Specifications to paint all exposed structural and miscellaneous steel; steel doors and frames; door closers and surface sand/dust seals at painted doors; mechanical and electrical equipment, sluice gates, actuators, posts, conveying systems, pipe, fittings and valves; electrical conduit and appurtenances; exposed ventilating ducts, equipment and appurtenances; plaster walls and ceilings, concrete walls and ceilings, architectural wood and plywood components, all as specified in the attached painting schedules and all other work obviously required to be painted unless otherwise specified. Minor items not mentioned in the schedule of work shall be included in the work of this Section where they come within the general intent of the specifications as stated herein.

C "Paint" as used herein means all coating systems materials, including primers, emulsion, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

D The following items will not be painted:

1. Concrete (unless otherwise specified in the painting schedules), cementitious finish, stone and granite cladding and tile work.
2. Face brick.
3. Finish hardware unless specifically noted otherwise.
4. Non-ferrous metals and stainless steels, unless specifically noted otherwise.
5. Packing glands and other adjustable parts and nameplates of mechanical equipment.
6. Parts of buildings not exposed to sight, unless specifically noted otherwise.
7. Pre-Finished items.
8. Mechanical, electrical and instrumentation equipment which has been finished painted in the factory as specified.
9. Rubber and plastic materials.

1.02 RELATED WORK

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

1. Section 3300 - Concrete
2. Section 04200 - Masonry
3. Section 06400 - Architectural Wood Work
4. Section 09220 - Cement Plaster
5. Section 09901 - Surface Preparation and Shop Painting.

1.03 SUBMITTALS

A Product Data: Submit manufacturer's technical information including basic materials analysis and application instruction for each material proposed for use.

B Samples: prior to beginning work, Engineer will furnish colour chips for surfaces to be painted. Use representative colours when preparing samples for review. Submit samples for Engineer's review of colour and texture only. Provide a listing of material and application for each coat of each finish sample.

1. On 300 x 300 mm hardboard, provide 2 samples of each colour and material, with texture to simulate actual conditions. Resubmit samples as requested until acceptable sheen, colour and texture is achieved.
2. On actual wood surfaces, provide two 100 x 200 mm samples of natural and stained wood finish. Label and identify each as to location and application.
3. On concrete masonry, provide two 100 mm square samples of masonry for each type of finish and colour; define filler, prime and finish coats.
4. On actual wall surfaces and other interior and exterior building components, duplicate painted-finishes of prepared samples. Provide full-coat finish samples on at least 10 sq.m. of surface, as directed, until required sheen, colour and texture is obtained; simulate finished lighting conditions for review of in-place work.
    a. Final acceptance of colours will be from samples applied on the job.

1.04 DELIVERY AND STORAGE

A Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information.

1. Name or title of material.
2. Fed. Spec. or British Standard number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Colour name and number.

B Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean conditions, free of foreign materials and residue.

1. Protect from freezing where necessary, Keep storage areas heat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.07 JOB CONDITIONS

A Apply water-base paints only when temperature of surfaces to be painted and the surrounding air temperatures are between 10°C and 40°C, unless otherwise permitted by paint manufacturer's printed instructions.

B Apply solvent-thinned paints only when temperature of surfaces to be painted and the surrounding air temperatures are between 7°C and 40°C, unless otherwise permitted by paint manufacturer's printed instruction.

C Do not apply coatings in snow, rain, fog or mist; or when relative humidity exceeds 85% or to damp or wet surfaces; unless otherwise permitted by coating manufacturer's printed instructions.

1. Painting may be continued during inclement weather only if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2: PRODUCTS

2.01 MATERIALS

A All painting materials shall be delivered to the mixing room in unbroken packages, bearing the manufacturer's brand and name. They shall be used without adulteration and mixed, thinned, and applied in strict accordance with manufacturer's directions for the applicable materials and surface and with the Engineer's approval before using.

B Shop priming shall be done with primers that are guarantee by the manufacturer to be compatible with the finish paints to be used. Refer to the surface Preparation and shop Painting Section for special primers.

C All paint used shall be guaranteed by the paint manufacturer to be fumeproof and suitable for an atmosphere containing hydrogen sulfide.

D Materials shall be in full compliance with the requirements of pertinent codes and fire regulations. Proper containers outside of the buildings shall be provided and used for painting wastes, and no plumbing fixture shall be used for this purpose.

E Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint manufacturers. Use only materials displaying manufacturer's identification as a standard, best-grade product.

1. Proprietary names used to designate colours or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

2. Federal Specifications/British Standards establish minimum acceptable quality for paint materials. Provide a written certification from paint manufacturer that materials provided meet or exceed these minimums.

3. Manufacturer's products which comply with coating qualitative requirements of applicable federal specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Engineer. Furnish material data & manufacturer's certificate of performance to Engineer for proposed substitutions.

C Colour Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

1. Lead content in pigment, if any, is limited to contain not more than 0.06 % lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.

PART 3: EXECUTION

3.01 INSPECTION

A Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to applicator.

B Starting of painting work will be construed as applicator's acceptance of surfaces within any particular area.

C Do not apply paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.02 SURFACE PREPARATION

A General: Perform preparation & cleaning procedures in compliance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Engineer in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

2. Remove ironmongery, ironmongery accessories, machined surfaces, plates, lighting fixtures and similar items in place and not to be finish painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items & adjacent surfaces.

   Following completion of painting of each space or area, reinstall removed items.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil & grease prior to mechanical cleaning. Program cleaning and application so that contaminants from cleaning process will not fall on wet, newly-painted surfaces.

B Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening if required to remove glass.

1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed instruction.

2. Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize aside, and allow to dry before painting.

C Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits & sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler.

1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

2. When transparent finish is required, use clear varnish for backpriming.

3. Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

4. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

D Ferrous Metals: clean ferrous surfaces, which are not galvanised or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

1. Touch-up shop applied prime coats wherever damaged or bare, where required by other sections of these specifications.

2. Clean and touch-up with same type shop primer.

E Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.03 MATERIALS PREPARATION

A General: Mix and prepare painting materials in accordance with manufacturer's directions.

B Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C Stir materials before application to produce a mixture of uniform density, and as required during application. Do not stir film into material. Remove film and, if necessary, strain material before using.

3.04 APPLICATION

A General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint, surface treatments, and finishes, are indicated in "schedules' on the Drawings.
2. Provide finish coats which are compatible with prime paints used.
3. Apply additional coats when undercoats or other conditions show through final coat of paint, until paint film is of uniform finish, colour and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently -fixed equipment or furniture with prime coat only before final installation of equipment.

5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

6. Paint backsides of access panels, removable or hinged covers to match exposed surfaces.

7. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

B Scheduling Painting Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surfaces deterioration.

1. Allow sufficient time between successive coatings to permit proper drying Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum coating thickness: Apply materials at not less than manufacturer's recommended rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended y coating manufacturer.

D Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.

E Mechanical items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.
2. Heat exchangers.
3. Tanks.
4. Ductwork, insulation.
5. Motor, mechanical equipment, and supports.
6. Accessory items.

F. Electrical items to be painted include, but are not limited to, the following:

1. Conduit and fittings.

2. Switchgear.

G Prime Coats:

1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

H Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfection.

I Pigmented (opaque) Finished: completely cover to provide and opaque, smooth surface of uniform finish, colour, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

J Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, colour irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

K Completed Work: Match approved samples for colour, texture and coverage. Remove, refinish, or repaint work not in compliance with specific requirements.

3.05 FILED QUALITY CONTROL

A The right is reserved by the Engineer to invoke following material testing procedure at any time, and any number of times during period of field painting.

1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site swill be taken, identified and sealed, and certified in presence of Contractor.

2. Testing laboratory will perform appropriate tests for any or all of following characteristics:

Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, colour retention, alkali resistance, and quantitative materials analysis.

B If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint form previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

3.06 CLEAN-UP AND PROTECTION

A Clean-Up: During progress of work, remove from site discarded materials, rubbish, cans and rags at end of each work day.

1. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

B Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing, and repainting, as directed by Architect.

1. Provide "Wet Paint" Signs in Arabic/English and labourers native languages as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

2. At completion of work by other trades, touch-up and restore all damaged or defaced painted surfaces.

3.07 EXTERIOR PAINT SCHEDULE

A General: Provide the following paint systems for the various substrates, as indicated.

B Concrete, Stucco and Masonry (Other than concrete masonry units):

1. Lusterless (Flat) Acrylic Finish: 3 coats with total dry film thickness not less than 90 microns.

   a. First and Second Coats : Acrylic Emulsion (FS TT-P-19).

2. Heavy-Duty Textured Coating: One coat with total dry film thickness not less than 375 microns.

   a. First Coat: Heavy-duty, Textured Coating (FS TT-C-555, Type II).

C Concrete Masonry Units:

1. Lusterless (Flat) Acrylic Finish : 3 coat over filler coat with total dry film thickness not less than 90 microns, excluding filler coat.

   a. Filler Coat: Solvent Thinned block Filler for Porous Surfaces (FS TT-F-1098).

   b. First and Second Finish Coats : Acrylic Emulsion (FS TT-P-19).

2. Heavy-Duty Textured Coating: 2 coats with total dry film thickness not less than 650 microns.

a. First and Second Coats: Heavy-duty, Textured Coating (FS TT-C-555, Type II).

3.08 INTERIOR PAINT SCHEDULE

A General: Provide the following paint systems for the various substrates, as indicated.

B Concrete:

1. Lusterless (Flat) Emulsion Finish: 3 finish coated over filled surface.

a. Filler Coat: Solvent-Thinned Block Filler (FS TT-F-1098). Apply filler coat at a rate to ensure complete coverage with pored filled.

b. First, Second and third Finish Coats: Interior Latex Emulsion (FS TT-P-29).

End of Section

DIVISION 14

CONVEYING SYSTEM

BUILDING WORK

DIVISION 14

CONVEYING SYSTEM

INDEX

DIVISION 14 CONVEYING SYSTEM

SECTION 14 – 1 LIFTS

14-1 General Conditions

14-1-1 General

a. The characterization of the project as presented below is general and refers to the principal equipment which is essential for execution of works, but does not cover all the items related to detailed planning and assembly and coordination works, which shall be the responsibility of the contractor.

b. In any case where an item or part is described in the singular, it shall also refer to several items or parts, as required for faultless of the work by the contractor, and no request for supplementary payment for the aforesaied shall be allowed.

14-1-2 Plans

The contractor shall submit detailed working plans for approval by the Engineer.

These plans shall include all the various parts and equipment, with the exact dimensions required for construction purposes. After they are checked and approved by the Engineer, these plans will be returned to the contractor to be used by him as a reference for execution.
No work or part thereot shall be executed and /or no parts shall be ordered or fabricated prior to receipt of the approved plans. If the plans are not approved , the contractor shall resubmit them, at his own expense, with all modifications requested by the Engineer. All submissions shall be made with four
copies of each plan.

In addition to the plans and details, the contractor shall submit all the following material:

- Technical data, name of manufacturer and country of manufacture of all mechanical and electrical parts.
- Assembly plans as made.
- Control plans and electrical plants diagram, as made.
- Electrical wiring plans, as made.
- Name of electrical and mechanical parts and their functions as shown on the plans.
- List of recommended spare parts, with their catalog numbers.
- Detailed maintenance instructions.
- Instructions for use of lift in normal operation and in emergency.

All the above material shall be deliverd to the Inspector in an orderly fashion and in three copies. Furthermore, the contractor undertakes to submit to the Inspector at his request all plans and diagrams required for choosing the shape of the doors and door frames, colors and buttons, etc., all without special payment.

14-1-3 Dimensions

The contractor shall determine the dimensions of the building at the site,as they are in reality, and he shall not take them off the plans.

14-1-4 Work Progress Report

The contractor shall give the Inspector information on the progress of the entire project, without special requests.

14-1-5 Insurance

The contractor shall bear full liability, and shall undertake to compensate the Engineer for any damages caused to him. Or in the event that the Engineer shall be liable for a penalty under the law, as a result of defective materials used by him or by the fault, and /or negligence, and/or neglect of his employees, and/or sub-contractors. Furthermore, the contractor undertakes to arrange insurance for the duration of the entire period of his assembly work and the service period provided by him to cover all damages, and with respect to any personal injury. The contractor undertakes to submit a copy of the policy to the Engineer.

14-1-6 Warranty and Service

The commeencement of the warranty period shall be determined from the date of commencement of daily use of the lift and not from the date of acceptacnce of the lift by the Engineer. The warranty period is for **12 months** from the aforesaid date. The Engineer shall at the contractor's request give notice of the date of commencement of use of the lift, i.e. the commencement of the warranty.

All parts devices and materials supplied by the contractor shall be new and highly sophisticated. The contractor is liable for the faultless operation of the lift and all its parts and equipment. A warranty of **five years** shall be given on electrical motors and steel cables.

The contractor shall service the lift and all parts thereof during the warranty period and shall maintain it at all times in good and clean condition. The contractor shall rectify any defect occurirng during the warranty period immediately and at his own expense, within a maximum of 24 hours from notice thereof. Checking of the plans and acceptance of the lift by the Inspector and/or its representative does not exempt the contractor from his warranty .
Upon conclusion of the warranty, the lift shall be re-accepted and the contractor must repair defects and replace defective parts, the lift shall be re-accepted and the contractor must repair defects and replace defective parts, etc. and rectify all faults discovered after use. Parts, which were replaced during the warranty period, shall be given a further **warranty of 12 months.** The aforesaid warranty of the contractor shall not apply to damage resulting from force major, misuse and electrical defects.

During the aforesaid warranty period, the contractor shall execute the service of the lift. The Engineer shall make a separate payment for the aforesaid service. Furthermore, other than defects, which the contractor is obliged to repair as aforesaid, the contractor shall at least once monthly inspect, lubricate and execute all works associated with service. A service log shall be placed in the plant room, in which all faults, works and their times shall be recorded.

The technicians who carry out the repair or service shall sign the log.

The aforesaid records shall be checked by the Engineer or its representative once every three months and shall be approved by them. The contractor hereby undertakes to keep further declares that the aforesaid spare parts are at his disposal at the time of submission of the bid.

a. After six months from commencement of the lift operation date, and its delivery to the inspector for regular operation. The contractor undertakes to maintain the lift with minimum faults, so that the maximum number of faults which suspend the operation of the lift, shall not exceed six faults/ annum. For such 'purpose, whoever maintains the lift shall conduct a fault log which shall give precise details of the nature of the faults, alongside which the contractor's service technician shall insert the cause of the fault and the steps taken to repair it. The six-fault annum as aforesaid shall not include faults arising from the following causes:

    1. Misuse by the users.
    2. Faults caused by dirt.
    3. Faults caused by irregular power supply.
    4. Faults caused by defects in the building, such as water leaks.
    5. Faults caused by wear and tear, such burnt out light bulbs.
    6. Faults in the lift caused by users.
    7. One repeated fault for which no solution was yet found.
    8. Repairs made during a night shift.
    9. Faults during emergencies.

b. From the list of faults in the log, the consultant shall decide which are relevant to suspension of operation of the lift and arise from the provision of defective service and/or equipment and/or assembly and/or operation.

c. The srvice contract shall be for full sevice, including spare parts, for a period of at least five years or with an undertaking by the contractor to replace or repair spare parts as necessary.

d. The date determined for commencement of recording of faults is six months from the date of delivery of the lift to the Engineer.

14-1-7 Painting

All metal parts shall be chemically cleaned or sandblasted and shall be painted with an undercoat and two top coats, as specified by the Engineer.

14-1-8 Signs

The contractor shall supply all signs required in the plant room, car and panels (including warning signs and instructions for use). All signs shall be as specified by the Engineer and the text/numbers shall appear in **English and/or Arabic** as will, as requested.

14-1-9 Assembly and Delivery of Lifts

Experts and persons shall assemble the lift with extensive experience in the assembly of lifts. During the assembly, a foreman who is responsible for the work shall be present at the site.

The contractor shall supply all auxiliary materials, labor and hoists required carrying out the assembly. Furthermore, the contractor shall drill and fill all the holes required for assembly of the lift. The contractor shall further carry out all portage words related to the assembly.

Upon completion of the assembly of the lifts and all related equipment, the contractor shall order an inspection by the local Electric Authority and by a lift inspector qualified by the Electric Authority and by a lift inspector. The Engineer shall be as specified by the Inspector. The cost of repeated inspections caused by the contractor should also be at his expense. Following the aforesaid inspections, the contractor shall, without additional payment, repair and modify parts of the plant, if demanded by the Local Electric Authority the qualified lift inspector or the engineer.

The Inspector shall instruct the representatives of the Inspector in the use of the lifts under normal and emergency conditions.

14-1-10 Quality of Work

The contractor undertakes to execute the work at a high professional standard and in accordance with existing or customary standards. He shall employ at the site skilled workers of the highest caliber in the number required by him to complete the lifts on time, in order to prevent delays in completion of the building. The Inspector is entitled to demand the removal, from the site of the workers who in his opinion are unsuitable in terms of skill or for personal reasons.

14-1-11 Damage to Building

The contractor shall be liable for any damage caused to the building, lift machinery or persons, if caused directly or indirectly by him or by his employees. The contractor shall compensate all damaged parties or damages as aforesaid in entirety. The contractor shall not drill holes in the structure, pillars, walls and/or ceiling without the approval of the Engineer.

14-1-12 Execution of Additional or Partial Works

If the contractor shall be required to execute works not included in the Bill of Quantities, the price of the work shall be fixed by the Engineer as estimated by him, on the basis of the labor and materials applied in the execution of those parts. Furthermore, the Inspector may order all the specified works or some of them only, at the price specified in the Bill of Quantities.

14-1-13 Sub – Contractors

The contractor shall submit for approval by the Engineer or his representative, the engineer, his intention to award any part of the project to a sub-contractor. The Engineer is entitled to approve or disqualify any such sub-contractor, if in the Engineer's opinion, he is unable to execute the work. The Engineer is further entitled to terminate the work of any sub-contractor if in his opinion the subcontractor is not executing the work in accordance with the requirements.

14-1-14 Guarantees

The contractor shall be required to give suitable guarantees for the quality of the equipment and operation of the lift, as specified by the Engineer.

14-1-15 Delivery Deadline

The deadline for delivery and operation of the lift shall be **12 months** from the date of the order, provided that lift shaft and plant room shall be at the disposal of the contractor five months prior to the end of the aforesaid period. In the event that the delivery of the shaft and accordingly, but the period of assembly and operation of the lift shall remain five months as above, from the date on which the shaft and plant room were placed at the disposal of the contractor.

14-1-16 Conditions of Service after Warranty Period

The Engineer and the contractor shall sign a standard service contract. In consideration for the sum specified in the Bill of Quantities, the contractor shall supply all services specified in the standard service contract. In addition to the works specified in the aforesaid contract, the contractor undertakes to execute during normal working hours all repairs or service for no extra payment.

If parts or materials shall be required for the purpose of executing the aforesaid repairs, the Engineer shall pay only for such parts or materials the price, which does not exceed the normal market price.

The contractor's employees shall obtain the signature of the Inspector's representative at the site upon a suitable confirmation, which verifies that the materials or parts were actually supplied. Without the signature of the Inspector's representative the Inspector shall not be obliged to pay any account.
For work outside normal working hours, the contractor may request payment in the sum. Which shall be determined in advance. For such working hours, the signature of the Engineer's representative at the site shall be obtained. Without the signature of the Inspector's representative, the Inspector shall not be obliged to pay any account.

The above obligations do not apply to repairs and modifications demanded by competent authorities. For such repairs and modifications, the Engineer shall pay for both the parts and the labor. In any event, the price shall be fixed in advance prior to commencement of the work.

14-2 Technical Specification for traction geared motors lifts

14-2-1 General specifications

The lifts to be supplied have to be original lifts totally manufactured by one of the following approved manufacturers, or equal to them. In case other manufacturers are proposed, detailed catalogues and specifications shall submitted with bid to enable comparison and analysis.
No local cabins, doors, controllers and other parts are acceptable

Approved makers:	Original Otis /France
	Original Mitsubishi/Japan
	Original Gold Star/Korea
	Jordan Lifts Co.

Passenger's lifts For Raghadan Bus Terminal (Gam Tower)

Basic Specifications		
Number of lifts		One (1) Full Collective Selective.
Type		Passenger Lifts.
Load (kg)		640Kg.
Drive		VVVF-Variable Voltage Variable Frequency.
Speed (m/s)		1.60 m/sec.
Control		Computer operated with master & slave to keep monitoring & full feed back (Matching installed BMS.)
No: of floors		5.
No. of entrances		5 all in line.
Rise		28 m approx.
Floor Designation		0,1,2,3,4F
Power supply		400 V, 3-phase, 50 Hz.
Machine room location		Above Hoist way.
Hoistway		
Construction		Concrete.
Clear dimensions		W.2300 mm X D. 1900 mm.
Pit Depth		1800 mm.
Overhead		3800 mm.
Car		
Inside dimensions		W. 1400 mm x D. 1200 mm x H. 2300 mm.
Enclosures	Ceiling	- Stainless Steel.
	Floor	- Covered with Rubber.
		- Handrail on three sides.
Fittings		- Kick plate. - Mirror Electric fan. - Balustrade on roof
Car Panels		Stainless Steel
Car Façade		Stainless Steel
Car Door	Type	Automatic Central Opening.
	Size	W. 1100 mm X H. 2100 mm.
	Finish	Stainless steel hairline finishes
Entrance Protection		- InfraRed Curtain Device on full car door height Mechanical Door Protection.

Passenger's lifts For Raghadan Bus Terminal (Shopping Center)

Basic Specifications	
Number of lifts	One(1) Full Collective Selective.
Type	Passenger Lifts.
Load (kg)	1350Kg.
Drive	VVVF-Variable Voltage Variable Frequency.
Speed (m/s)	1.60 m/sec.
Control	Computer operated with master & slave to keep monitoring & full feed back (Matching installed BMS.)
No: of floors	3.
No. of entrances	3 all in line.
Rise	16 m approx.
Floor Designation	0,1,2,
Power supply	400 V, 3-phase, 50 Hz.
Machine room location	Above Hoist way.
Hoistway	
Construction	Concrete.
Clear dimensions	W.3400 mm X D. 1850 mm.
Pit Depth	1800 mm.
Overhead	3800 mm.
Car	
Inside dimensions	W. 2800 mm x D. 1300 mm x H. 2300 mm.
Enclosures Ceiling	- Stainless Steel.
Floor	- Covered with Rubber.
	- Handrail on three sides.
Fittings	
	- Kick plate.
	- Mirror
	Electric fan.
	- Balustrade on roof
Car Panels	Stainless Steel
Car Façade	Stainless Steel
Car Door Type	Automatic Central Opening.
Size	W. 1100 mm X H. 2100 mm.
Finish	Stainless steel hairline finishes
Entrance Protection	- InfraRed Curtain Device on full car door height.
	- Mechanical Door Protection.

Passenger's lifts: For Raghadan Bus Terminal (Management Tower)

Basic Specifications	
Number of lifts	One (1) Full Collective Selective.
Type	Passenger Lifts.
Load (kg)	640Kg.
Drive	VVVF-Variable Voltage Variable Frequency.
Speed (m/s)	1.60 m/sec.
Control	Computer operated with master & slave to keep monitoring & full feed back (Matching installed BMS.)
No: of floors	4.
No. of entrances	4 all in line.
Rise	22 m approx.
Floor Designation	1,2,3,4
Power supply	400 V, 3-phase, 50 Hz.
Machine room location	Above Hoist way.
Hoistway	
Construction	Concrete.
Clear dimensions	W.2300 mm X D. 1900 mm.
Pit Depth	1800 mm.
Overhead	3800 mm.
Car	
Inside dimensions	W. 1400 mm x D. 200 mm x H. 2300 mm.
Enclosures Ceiling	- Stainless Steel.
Floor	- Covered with Rubber.
Fittings	- Handrail on three sides. - Kick plate. - Mirror Electric fan. - Balustrade on roof
Car Panels	Stainless Steel
Car Façade	Stainless Steel
Car Door Type	Automatic Central Opening.
Size	W. 1100 mm X H. 2100 mm.
Finish	Stainless steel hairline finishes
Entrance Protection	- InfraRed Curtain Device on full car door height. - Mechanical Door Protection.

General For All Lifts

Car Operating Panel	- (N) Push Buttons with Braille numbers for the visually impaired - Alarm Button - Automatic Fan. - Door Open. Door Close Buttons. - Position Indicator. - Direction Arrows. - Emergency Car Light. - Emergency Fireman Service Key. - Overload Signal acoustic and luminous. - Car TellTale Lights. - Intercommunication Unit. - Priority Key Switch (VP) - Voice Synthesizer.
Landing doors type Clear opening	Automatic Center Opening. W: 1100 mm x H.2100 mm. Stainless Steel Finish.
Landing fixtures	- All to be Vandal Resistant - Hall Position Indicator & Lantern with digital display at all floors. - Electronic Hall Buttons with illumination
Electrical Equipment & Features	- Emergency Final Limit Switch. - Top of Car Inspection Button. - Phase Protection Device. - Safety Circuits. - Traveling Cable. - Necessary Wiring and Tubing. - Over Load Device. - Emergency Power Operation. - Emergency Fire Operation. - Electrical Recall Operation. - Anti Nuisance Device. - Automatic Car Return Device. - Door Time Protection. - Nudging Feature. - Load by-pass.
Mechanical Equipment	- Progressive Safety Gear. - Speed Govrnor. - Counterweight Armature and Fillers. - Car & C.W> Guide Rails with Fastenings. - Steel Wire Ropes. - Oil Buffers under Car & Counterweight.

14-2 Cabin

14-2 Cabin Specifications:

14-2-1 Car Operating Panel:

The panel shall be made of stainless steel sheeting. The individual modular units remounted within a stainless steel panel and are designed for ease of operation by the handicapped. The panel shall contain the following features:

1. A bank of illuminated buttons corresponding to landing levels served
2. Alarm button
3. Stop button
4. Door open button
5. Door close button
6. Switch for Ventilation fan.
7. Car in use
8. Lights Key switch.
9. Overload indicator, acoustic and luminous
10. Inter phone system to connect with the reception
11. Battery alarm operated bell operating buttons
12. A car direction indicator
13. Cabling for paging & music system

14-2-2 Car finishes:

Side Panels	Matt stainless steel with mirrors on back sides, factory built
Ceiling	Lit stainless steel diffusers under fluorescent lighting and fan.
Flooring	Luck Strong.
Car Return	Stainless steel finish
Door Panels	Stainless steel finish
Hand rail	Approved metallic shape on three sides

14-2-3 Car Roof

A special service panel for operation by services personnel.

14-2-4 Additional Features Included in price

Emergency car light (1X18 w) min.	(ECL)
Emergency light battery (Ni-Cadmium) unit with charger	(EBU)
Car direction indicator	(CD1)
Car position indicator	(CP1)
Hall position indicator on main floors	(HP1)
Hall position indicator on all floors	(HP1-3)
-Cabin ventilation fan	(Fan)
Phase failure	(J)
Full load device	(FLD)
Overload device	(OLD)
Light ray device	(ISC-1)
Gong to notify arrival to floor	(GNS)
Braille sign for blind persons	
False Call Canceling	(FCC)

Car re-opening by hall button
Nurse key switch.
Fire man switch

14-3 Machine:

The machine shall be of the worm geared traction type particularly designed for lift service. The phosphor-bronze worm wheel and cast iron traction sheaves are mounted on a common shaft. For quietness of operation the Electro-mechanical brake is operated from a dc. Supply.

14-3-1 Motor:

The motor shall be particularly designed for lift service with high starting torque.

14-3-2 Motion Control

14-3-2-1 Controller

The controller shall be vertical, steel, and cubicle type, with hinged doors, sufficiently ventilated, with easy access to all housed components.
All power contractors shall be electro-magnetically operated with carbon to copper contacts to prevent fusing. Control circuits shall have silver contacts.
All components of the controller shall have class B insulation.
The controller shall provide protection against the following:

1. No-Volt and sustained under-voltage
2. Phase reversal
3. Overload
4. Failure of any phase

The controller shall cut off the power supply, apply the break and bring the car to rest in ground floor/or to the nearest floor as directions, then open the door. If any of the above failures occurs.

14-3-2-2 Stopping accuracy

The lift manufacturer shall guarantee a stopping accuracy of no less than +/-5 mm

The mechanical break shall not be operative before the car has been electrically stopped and at speed zero.

14-4 Car

14-4-1 Car frame

A Car frame fabricated from treated for formed steel members shall be provided with adequate bracing to support the platform and car enclosure.

14-4-2 Safety pear and Speed governor

The safety gear shall be of the progressive type and shall be mounted on the members of the frame and shall be operated by an over speed governor, in the event of over speeding in the upward or downward directions. Guide shoes shall be mounted on top and bottom of the car frame to engage the guide rails and ensures smooth car operation.

They safety ear and governor shall comply with their requirements of BS5655.
A switch on the safety gear shall open the motor control and brake control circuits before the latter is applied. Breaking or slackening of the governor rope shall cause the lift to stop

14-4-3 Platform

The car platform shall be of all-steel construction.

14-4-4 Car Ceiling

The car ceiling shall be coated with (light) gray vinyl. Direct lighting shall be provided through a protruding translucent plastic diffuser

14-4-5 Flooring

The floor shall be constructed of steel platform al least 4mm thick supported on a suitable steel frame, covered in hard wearing flame resistant PVC material and plywood finish

14-4-6 Car doors

The car shall be provided with a (central opening) of two speed type horizontal sliding door the door shall be hung on shelve hangers with a steel track and quieted at the bottom by non metallic shoes sliding in a threshold groove. The side surface of the door shall be of the same material as the car façade. The ear side surface of the door shall be finished in stainless steel.

Door Operation

Door on the car and at each hoist way landing shall be power operated by means of a quality operator mounted on top of the car. The door operator shall be powered by a variable speed DC motor and shall have positive control over door movement for smooth operation.

A safety shoe shall be furnished at the edge of the car door to cause instant reopening should contact be made with an obstruction during the closing cycle.

Door operation shall be automatic at each landing with door opening initiated as the car arrives at the landing.

A car door (electric) contact shall prevent starting the lift away from the landing unless the car door is in the closed position.

The time interval for which the lift doors remain open when a car stops at a landing shall be independently adjustable for response to car calls and response to hall calls.
The maximum time to completely open and to completely close the doors shall be 8 seconds.

The manufacturer shall guarantee a complete door time adjustable between 5 to 10 seconds.
The maximum door noise measured one meter form the landing entrance shall be 35dbA.

14-4-8 Full Selective Collective Microprocessor Control For All Cars

The lifts shall have full collective selective automatic operation whereby all lifts operate from a single line of push button at the landings, with up and down buttons at the intermediate landing call, and that car shall be the car nearest to the call and set for the direction of travel for which the call has been registered.
A group controller for **two/ three cabinets** will be installed.

The system shall also enables the passengers arriving late, to reopen the closing door by pressing the hall button.

14-4-9 LANDINGS

Landing Entrances

Automatic Sliding Doors

Complete center opening two speed sheet steel entrances shall be installed at each entrance.

The sheets shall be covered with stainless steel.

A small decorative frame, finished in stainless steel, shall be provided.

A total frame as approved by the Architect shall be designed and approved for lift entrances at the landing (prime coat).

14-4-10 Landing Fixtures

Hall Button Fixtures

At each terminal landing, a push-button fixture shall be provided and at each intermediate landing, a button fixture shall be provided containing "up" and "Down" push buttons.

When a call is registered by momentary pressure on a landing button, that button shall become illuminated and remain illuminated until the car is answered.

Hall Position Indicator

A digital hall position indicator shall be installed at all landings

Hall Lantern

A Separate hall lantern shall be provided at all landings When a car is stopping at a landing the lantern indicating the direction in which the ear is traveling shall become illuminated prior to arrival or the car.

A gong shall sound to announce the arrival of the car The gong shall sound once for the "UP" direction and twice for the "Down" direction.

14-4-11 Fireman's Control

A fireman switch shall be provided at ground floor level, to enable the fireman to cut out all landing call button, bring the lifts to ground floor, and ensure that the lifts can only be operated from inside the car.

The switch shall be enclosed suitable flush mounted box access to which shall be obtained by breaking small glass panel on the front of the box Upon the switch being reset after use, the lifts shall return to their normal operation. The front cover of the box shall be clearly labeled:

"FIREMAN'S CONTROL"

The fire control in the lift controller shall also operate from fire alarm in the building

14-4-12 Falsc Call Canceling

All calls will be automatically canceled to avoid unnecessary stops by registration of nuisance call cars the number of car calls registered does not correlate with the carload.

14-4-13 Passenger Sensing Doors

An ultra sensitive sensor mounted above the car entrance monitors passengers boarding or exiting to control door opening / closing time suitably.

14-4-14 Safety Door Edge

Each leading edge of the door panels shall be equipped with a safety edge, to re-open the closing door when any passenger or object touches any of the edges.

14-4-15 Overload Non Start

When a carload exceeds a predetermined weight the lift shall stop operation with the doors opened at the door, and alarm shall be actuated (buzzer and light).

The alarm stops when enough passengers have left the car 10 reduce load.

14-4-16 Automatic Bypass

If a car becomes near full capacity, the lift will automatically bypass all the calls along the service direction, responding to the car calls only,

14-4-17 Non-Service of Specified Floor

A key switch located inside the slide cover of the car operating panel can be activated to suspend lift service to specified floor(s), thus conforming to the current change of tenets in the building.

14-4-18 Car light and Fan Shut off

To save energy, car lighting and ventilation fan shall turned off automatically if there is no call registered within a pre-determined period at time.

14-5 HOIST WAY EQUIPMENT

14-5 Cuide Rails

14-5-1 Cuide Rails

Planed steel tees shall be provided as guides for the car (and counterweight). The stem section of all guides shall be tongued and grooved provide match joints. The guide rails shall securely fastened to the building structure.

14-5-2 Counterweight

A structural fabricated steel frame with cast iron filler weights shall be furnished to provide proper counterbalance for smooth operation. The weight of the counter weight shall be equal to () % of the lift capacity plus the car weight
The counterweight frame shall be equipped with a mechanical safety device For the lifts with rear doors the counter weights shall be on the side, the manufacturer shall try to maintain the maximum load capacity and size for these two lifts.

14-5-3 Ropes

The hoist ropes shall be of traction steel of suitable size (special for lifts) construction and number to insure the proper operation of the lifts and give satisfactory wearing qualities. The supplier shall submit sample for approval with test certificate.

Compensating Ropes (chains) shall be provided to compensate for the weight of the hoist ropes

The ropes shall be designed with a minimum safety factor of 12 or as specified from manufacture.

Ropes suspension shall be provided with rubber or spring elements for car and counterweight.

14-5-4 Buffers

Suitable oil type buffers shall be provided for car and counterweight.

14-5-5 Electric Wiring

All necessary insulated wiring and conduit of tubing, together with necessary fittings, metal boxes, troughs and ducts, will be provided, except as specified as work by others.

14-5-6 Earthling

A) All conduit trunking and cable sheets shall be included and connected solidly or by suitable flexible metallic conduit and cable glands to all switch gear, conduit boxes, motors and all other electrical apparatus supplied, fixed by the Contractor.

B) An earth terminal with is provided in the isolator switch in the machine room, to which an earth conductor should be connected by the lift Contractor for the lift installation. All conduits

14-5-7 Radio Interference Suppression

The Contractor shall include in his lift specs, for interference suppression capacitors in the V.V.V system.

Interference suppression components shall not be used in any part of the electrical circuits where their failure might cause an UN-safe condition.

14-5-8 Silence Operation

A Precautions shall be taken by the Contractor to ensure quietness of the lift installation, specially the motors, brakes, controllers reduction gear, terminal floor switched, solenoid operated ramps car gate-lock ramps, and gates to ensure that any vibration generated by the lift equipment is not transmitted to the building structure.

14-5-9 Tools in the Machine Rooms

A) The Contractor shall provide and fix in each machine room, at an agreed position, a shelf on which shall be placed the traction shelve clamp and spanner and grease gun, and one liter pot of grease.

B) The machine room and reception must be provided with a supervisory board showing each imposition in/out of service signal. Landing calls situation.

14-5-10 Testing & Acceptance

A) The Contractor shall ensure that all equipment has been tested at the manufacture's works before delivery and installation on site.

B) Site test shall be made in the presence of the Engineers, for satisfactory performance of the complete installation and for compliance with the specified requirements and guarantee any metal stained or any damage done in testing shall be made good at the Contractor's expense.

14-5-11 Operation from diesel generator (emergency power supply)

Pre-arrangement for operation of lifts from emergency power supply (stand-by generator) shall be provided

One in use lift to be connected automatically to this emergency power supply by the lift supplier. Others will supply Cables and automatic transfer

14-6 For Dimension

Use standard BS 5655 Part 5 1989

End of Section