PARTICULAR SPECIFICATIONS

FLOORING WORK

1.0 INDIAN STANDARDS

Work shall be carried out to Indian Standards and Code of Practices. In absence International Standards shall be followed. These shall be latest issue. List given hereunder is not to be considered as conclusive and is for reference and guidance only. Any discrepancies / conflict noticed shall be directed to the Engineer for his direction/approval. However as a general rule more stringent specification shall take precedence.

The Indian Standards with latest version to be followed are

(1) IS 269 Specification for ordinary and low heat portland cement.
(2) IS 383 Specification for Coarse and fine aggregates from natural sources for concrete.
(3) IS 455 Specification for Portland slag cement.
(4) IS 1130 Specification for marble (blocks, slab and tiles)
(5) IS 1237 Specification for cement concrete flooring tiles.
(6) IS 1443 Code of practice for laying and finishing of cement concrete flooring tiles.
(7) IS 2114 Code of practice for laying in situ terrazzo floor finish.
(8) IS 2571 Code of practice for laying in situ cement concrete flooring
(9) IS 4457 Specifications for ceramic unglazed vitreous acid resisting tile.
(10) IS 5491 Code of practice for laying in- situ granolithic concrete floor topping
(11) IS 14223 Specification for polished building stones part :1
(12) IS 13753 Dust pressed ceramic tiles with water absorption of E > 10% (Group B III)
(13) IS 13755 Dust pressed ceramic tiles with water absorption of 3% < E ≤ 6% (Group B IIa)

2.0 MATERIAL

2.1 Cement

2.1.1 Cement shall be ordinary Portland cement conforming to IS. Approved blended cement shall be used for internal plaster, masonry, flooring, waterproofing and plumbing works. For all RCC and PCC works, approved fly ash shall be used. For external plaster approved fly ash as per specification of item shall be used.

It shall be received in bags of 50 kg (or in bulk carriers in case of storage in silos) and each batch shall be accompanied with a test certificate of the factory. Also it shall be tested before use to ascertain its strength, setting time, etc. In case cement has been stored for over 6 months from date of manufacturer or for any reasons the stored cement shows signs of deterioration or contamination, it shall be tested as per the direction of the Engineer prior to use in the works.

2.2 Lime

2.2.1 Lime shall conform to IS 712. Field slaking shall be done as per IS 1635 code of practice for field slaking of lime and preparation of putty.

2.2.2 Lime shall be filled in bags and stored safely in weather-proof sheds. It shall not be stacked against the walls of the shed. It should be used fresh as soon as possible.

2.3 Water

2.3.1 Water used for mixing and curing shall be clean, reasonably clear and free from objectionable quantities of silt, oils, alkalis, acids, salts so as not to weaken mortar.
2.3.2 Water shall be tested in accordance with IS 3025. Maximum permissible limits of deleterious materials in water as given in IS 456.

2.4 Coloured cement may be either ready-mixed material or may be obtained by mixing pigments and cement at site. The pigments to be mixed with cement shall conform to Appendix "A" of IS 2114 code of practice for laying in-situ Terrazzo Floor Finish.

2.5 Sand shall conform to IS 1542 specification for sand for plaster. For white or coloured renderings, only quartz or silica sand shall be used. For textured finishes produced by treatment of freshly applied final or finishing coat with a tool coarser, particles used shall be screened through 3.35 mm IS sieve or 2.36 mm IS sieve. For torn texture a slightly larger portion of material coarser than 4.75 mm IS sieve shall be used.

2.6 Stone for sub base
Stone for soling shall be hard, sound, durable and free from defects like cavities, cracks, sand-holes, flaws, injurious veins, patches of loose or soft materials and weathered portions, etc.

2.7 Ceramic tiles
Ceramic tiles conforming to Indian or International standard shall be of specified size and make or equivalent. Tiles shall be free from cracks, grazes, spots, chipped edges and corners. Variation in size shall be limited to + 1.5 mm. Thickness shall be as specified in BOQ, but in no case shall they be less than 6 mm.

2.8 Stone for flooring
The Shahabad or other stone used shall be as approved by the Engineer and shall be hard, sound, free from cracks, cavities, holes, patches of injurious veins, weathered portions, flaws, etc. For fair representation, 4 Nos. of 300 X 300 mm sized pieces shall be submitted for approval. Material received shall conform to the said approval group of 4 stones and no other type shall be accepted. Colour, grain, vein, etc. must
conform to the approved sample only. Size and thickness shall be as specified. The stone may be ordered in various sizes to suit the pattern selected by the Architect/Engineer. Required pattern matching of stone shall be carried out by the contractor while cutting the stones.

3.0 **SUB-BASE**

Sub-base for all flooring shall be prepared and kept ready for further applications. All items shall be defined and detailed on the drawing. Measurements shall be as per the BOQ of these items.

Preparation of sub-base may be by doing excavation or back filling in plinth. Back filling shall be with the selected earth in layer of 150 mm to 200 mm maximum and well-compacted to achieve 95% compaction at optimum moisture content.

In case of excavation, the base shall be well-dressed to the desired level and inspected. All loose spots shall be excavated till the hard surface is reached and then filled as directed by the Engineer. Surface shall be watered with just sufficient water and rolled and compacted with vibratory compactor, mechanical plate compactor.

3.1 **Rubble soling**

Good quality 150 mm to 230 mm thick rubble soling shall be carried out depending upon the grade of soil. Rubble used shall be at least 100 mm for 150 mm thick soling and 150 mm for 230 mm thick soling. Stone shall be hand packed as close as possible and bedded firmly with the broadest face downwards and the greatest length across, voids filled with chips and small stones. These shall be hammered down to achieve packing and the complete filling of interstices. To achieve the desired levels and slopes, pegs at suitable intervals (about 12 m) shall be fixed. Soling shall be watered and again packed with sand or murrum to fill interstices created by watering. Then it shall be rolled with vibratory
compactor. Filling sand or murrum, watering and rolling shall continue till full compactness is achieved to satisfaction of the Engineer.

3.2 Metal packing

3.2.1 Coarse aggregate used for metal packing shall be crushed or broken stone, hard, durable and free from excess of flat, elongated, soft and disintegrated particles, dirt and other objectionable matter. Grading shall be as referred in IRC 19.

3.2.2 Prepared sub-base surface as detailed in clause 3.0 of this section shall be uniformly spread with well-graded metal. Templates shall be used for leveling. Leveling shall be true and checked with 3 m straight edge. Any raised areas or depressions of more than 12.5 mm shall be corrected. This shall be rolled with compactor as required or as asked by the Engineer for the intended purpose. Rolling shall continue till aggregate is thoroughly keyed and the creeping of the aggregate ahead of the roller is no longer visible. The rolled surface shall be checked and all irregularities corrected by loosening the surface, adding or removing necessary amounts of aggregate and recompacting until the complete area conforms to the required datum.

3.2.3 After the coarse aggregate has been thoroughly keyed and set by rolling, screening shall be carried out to fill the interstices. This shall be in 3 to 4 layers. Material shall be dry and no sprinkling of water shall be allowed.

3.3 Base floor

This shall be regular reinforced concrete floor or cement concrete floor of specified mix. Its thickness shall vary from 50 mm to 150 mm as the case may be. This may be nominally reinforced with reinforcement bar or mesh. It will be provided with 8 mm tor @ 300 mm c/c both ways.

4.0 FLOOR FINISHES

4.1 Ceramic / Marbonite tiles floor
4.1.1 Approved Ceramic / Marbonite tiles shall be laid on hard rough IPS (Screed) or water proof treated subbase ready to receive Ceramic / Marbonite tiles. Tiles shall be laid in accordance to IS specifications and instructions of manufacturer.

4.1.2 Tiles shall be fixed with approved tile adhesive.

4.1.3 Floor to receive tiles shall be wire brushed cleaned, wetted and mopped. Cement concrete screed of about 28 mm thickness shall be spread over the area uniformly and compacted with 2-3 metre straight edge to achieve dead uniform levels or slopes as required. Surface shall be allowed to harden for 7 days. Tiles shall be fixed by using tile adhesive (cement based) as specified by approved manufacturer about 3-6 mm on floor. Adhesive well combed and tile fixed with twist method to correct position. Tiles shall be positioned by tapping with wooden hammer and level checked with straight edge 2-3 metre long. Joints shall be as specified by tile manufacturer or as thin as possible. Points to be noted prior to start are as under -

1) Layout of the tiles is checked and approved by the Engineer.
2) End cut tiles are more than half.
3) Floor and wall tiles are in the same line.
4) Change of tiles is below the door shutter.
5) Dividing strip is provided if shown in drawing.
6) Cutouts of floor drains are in line with the tiles. Tiles around cutouts are greater than 50 mm or half the tile whichever is greater.
7) Joints shall be cleaned thoroughly and grouted with site made grout. White or colour grout shall be prepared by mixing quartz powder with colour pigments added to cement as per colour of tiles or as directed by the Engineer. Grout shall be a thick paste and tooled into joints and area of the tile cleaned with a damp cloth. Grouting shall be cured by wet curing for 7 days.
8) After 24 hours of grouting, tiles shall be cleaned with water and after 7 to 10 days or prior to handing over, tiles shall be washed with mild acid. Care shall be taken that grout does not develop any stain mark.

9) All expansion joints shall be carried out right through and finished by sealing with silicon sealant.

4.1.4 Item shall include for all material, labour, cutting, fixing, grouting, cleaning etc. complete to the satisfaction of the Engineer.

4.2 Ceramic / Marbonite tile (wall/dado)

4.2.1 Approved Ceramic / Marbonite tiles of size and shape shall be used.

4.2.2 Surface preparation shall be same as for plaster. Backing coat, plaster for dado and skirting shall be done as detailed in the plaster section. It shall be just finished to line and level + 2 mm when checked with 3 M Straight edge of aluminium box section.

4.2.3 Dado tiles shall be fixed as under -

It is preferred that tiles for dado shall be fixed with approved cement based adhesive. Brief method of working shall be as under.

1. Apply 3-6 mm thick adhesive over dry plastered surface and shall be levelled and combed with special combing trowel. Adhesive shall be applied to area just sufficient so that within 1 hour tiles shall be fixed.

2. The surface of the adhesive shall be allowed to weathered for a period about 5-10 minutes and ensured that it has become sticky.

3. Dry tiles shall be gently pressed by twisting / sliding action and levelled with wooden mallet and checked with straight edge of aluminium section.

4. Joints and surfaces shall be cleaned with wet cloth to remove grout coming out from joints.
4.2.4 Jointing

1) Joints shall be cleaned thoroughly and grouted with site made grout. White or colour grout shall be prepared with colour pigments added to quartz powder cement as per colour of tiles or as directed by the Engineer. Grout shall be a thick paste and tooled into joints and area of the tile cleaned with a damp cloth. Grouting shall be cured by wet curing for 7 days.

2) After 24 hours of grouting, tiles shall be cleaned with water and after 7 to 10 days or prior to handing over, tiles shall be washed with mild acid. Care shall be taken that grout does not develop any stain mark.

3) All expansion joints shall be carried out right through and finished by sealing with silicon sealant.

4.2.5 Item shall include material and labour required to complete the item as specified and approved by the Engineer. It shall include dividing strips, treating expansion joints, sealing corners and edges around fittings and fixtures, etc. all completed as approved by the Engineer.

4.3 Indian patent stone

4.3.1 Cement concrete floor flooring shall be plain cement concrete of M 20 grade of 40 to 75 mm thickness shall be laid in alternate panels. The concrete surface finish may be monolithically laid with structural slab or laid over hardened structural slab. For convenience and to protect final finish in the period of construction, laying of concrete over-hardened structural slab shall be preferred.

4.3.2 a) Hardened structural slab shall be thoroughly wire-brushed, hacked with mechanical scabler to remove all scum, laitance of cement mortar and allowed to expose coarse aggregate. Surface shall be wetted and cleaned thoroughly.

b) Concrete shall be laid in panels. Panels shall be such as to minimise shrinkage and curling. Their length to breadth ratio
shall be 1.5:1. It is advisable to keep the maximum length of each panel as 2.0 m.

Panels shall be formed by providing shuttering of timber or steel angles to dead accurate level. They shall be rigid and watertight.

c) In case dividing strips are to be provided, the same shall be fixed to dead accurate level and concrete poured into them (not required to be in alternate bays).

4.3.3 a) The concrete mix used shall be as stiff as possible. When mix is held in hand it shall form a ball but when released will crumble by itself.

b) All excess water from the surface shall be mopped up keeping surface just wet.

c) Thick cement paste/slurry shall be brushed into the surface just prior to laying of the concrete. It must be noted that slurry shall not be brushed over area where concrete laying is likely to be delayed.

d) Concrete laid shall be vibrated and rammed as required. It shall be leveled with 3 m straight edge.

e) Surface shall be well troweled and rubbed smooth to the satisfaction of the Engineer. False square of size 300 x 300 mm, shall be marked on the smooth surface.

f) No additional dry cement or cement mortar shall be sprinkled on the stiffened concrete surface to achieve smoothness.

g) Concrete shall be kept moist for 14 days.

h) Edges of panels shall be well-compacted to minimize lifting and curling.

4.3.4 IPS-laid monolithic with structural concrete shall be carried out as under
a) Floor concrete slab shall be allowed to stiffen enough but still be in a plastic stage.

b) Mix shall be laid in position and well-compacted with wooden float and leveled with 3 m straight edge.

c) After the surface has become slightly hard, steel troweling shall be carried out to achieve a smooth, leveled surface.

d) No additional dry cement or cement mortar shall be sprinkled on the stiffened concrete surface at any stage.

e) The concrete shall be wet cured for 14 days.

5.0 SKIRTING / DADO / STEPS/RISERS / CLADDING ON WALLS, COLUMNS

5.1 Material for skirting, dado, steps, risers shall be as specified in Architectural drawings.

5.1.1 Surface preparation shall be same as for flooring for each type. Backing coat, plaster for dado and skirting shall be done as detailed in the plaster section. It shall be combed for creating a key and better adhesion with skirting material.

In case of steps, bedding shall be laid exactly as flooring and all operations described therein shall be carried out.

5.1.2 External and Internal facings shall be fixed with adequate provision for expansion and construction joints.

The contractor shall supply and fix all necessary supports, anchor slots, anchor cramps and dowels required for the satisfactory completion of all vertical granite or any other stone cladding work. Fastner/clamps etc. will be made from suitable non-ferrous metal. They shall be in such shape and dimension that they are adequate to carry the loads to be imposed upon them.

Fixing of wall cladding with stone shall be done through experienced masons only.
Application of backing coat in CM 1:4 of required thickness (minimum 12mm thick), fixing the stone to the surface by using paste of approved chemical adhesive of minimum 3mm thickness, including drilling holes, making notches etc. for securely fixing the stone with cramp/pins/clamps of stainless steel and of minimum size of 20mm wide X 1.5mm to 2.0mm thickness of suitable length and anchor fasteners of 3.4 to 3.5 mm diameter and 35mm long, making grooves of minimum size 3mm wide X 1 to 2mm deep on backside of cladding stone, making chamfers of suitable length in stone, cleaning, polishing, using required double legged scaffolding in single / multiple staging and also including providing of temporary support to the cladding and removing the same after the stone is firmly adhered, etc. complete to the satisfaction of the Engineer.

All stones shall be fixed to wall in perfect plumb and level as per design. To keep the stone in position use of gypsum shall be done and all back cavity after fixing of clamps, dowels etc. shall be grouted with non shrinking grout. Height of cladding shall be raised in a day which is self supporting.

Joints and surfaces shall be cleaned thoroughly by using coir stringer wire brush. Then joints shall be grouted with approved ready made grout or matching colour grout as directed. Surfaces shall be allowed to cure for 7 days.

Not withstanding the above stipulation, the contractor shall be entirely responsible for the sufficiency of fixings.

All anchors and other fixing shall be concealed when the work is completed.

Great care shall be taken to protect delivered and laid marble and other stones from dripping and staining during the course of work.

5.1.3 Skirting or dado tiles shall be fixed as under -

1) Sufficiently hardened backing/undercoat must be damp.
2) Tiles shall be buttered with grey/white or pigmented cement paste including tile adhesive if required on the back side as directed.

3) Tiles shall be fixed on the undercoat and tamped with wooden mallet or rubber mallet to achieve full adhesion to the undercoat. Edges shall be tamped to secure line and level.

4) Care shall be taken to achieve pattern of laying with respect to floor or ceiling.

5) Tiles shall be mopped with wet cloth to remove grout coming out from joints.

5.1.4 Polishing and cleaning shall be as described in type of tile referred above, except that the operation shall be manual.

5.1.5 Item shall include material and labour required to complete the item as specified and approved by the Engineer. It shall include dividing strips, treating expansion joints, sealing corners and edges around fittings and fixtures, etc. all completed as approved by the Engineer.

6.0 SANDWICHEO CUDDAPPAH PLATFORM WITH GRANITE TOP

6.1 Machine cut cuddappah stone slabs used shall be of 40 mm thickness, colour shall be uniform and the slabs free from all defects.

6.2 Slabs shall be either machine cut at factory in required sizes or cut by m/c at site. In all cases no damaged stone shall be used in the work.

6.3 Vertical stones and stones of shelf shall be machine polished on both sides while the top slab shall be polished on one side i.e. underside, while top surface shall be kept rough for better adhesion with granite top.

6.4 All edges shall be sharp, perfectly rectangular and the exposed edges shall be pencil rounded and machine polished.
6.5 Assembly of toilet counter shall be done as per detail given by Architect or Engineer complete to all details and dimensions.

6.6 Vertical pieces shall be in perfect plumb on all sides while horizontal slab shall be in perfect level.

6.7 All joints and in fill layer shall be filled with cement sand mortar of mix 1:4 (1 cement : 4 sand) and properly cured.

6.8 Granite top used shall be of approved quality and shade. Thickness shall be about 20 mm and all slabs shall be machine cut.

6.9 All slabs preferable shall be from same mines and granite blocks / rocks to ensure uniformity of colour and quality.

6.10 Cutting and polishing shall be by machine only either at factory. No damaged piece shall be used.

6.11 All edges shall be sharp, perfectly rectangular and the exposed edges shall be pencil rounded and polished.

6.12 Granite top shall be laid over cement mortar bed of about 20 mm thickness of mix cement mortar 1:4 (1 cement : 4 sand). Prior to laying of mortar bed the top of cuddappah stone base shall be scrapped clean and washed thoroughly.

6.13 Mortar bed shall be layed and neat cement slurry with cement paste shall be spread over the mortar bed and clear granite slab shall be laid and fixed to perfect level over it.

6.14 Joints shall be as thin as possible and limited to 1-2 mm maximum. The joints shall be wiped off for excess cement slurry and cleaned prior to grouting with matching coloured cement grout.

6.15 Granite facia patti shall be fixed by using anchor fasteners and epoxy based adhesives of approved type by the Engineer.

6.16 Work shall be protected and cured for atleast 7 days. The timber props on braces shall be left in place as per instruction / recommendations of adhesive manufacturer.
6.17 The sink of specified size and make shall be fixed by cutting of cuddappah stone base and the joints on top with granite shall be filled with silicon sealant of approved make and colour.

6.18 Measurements shall be either in numbers, running meters or square meters as mentioned in BOQ.

6.19 Rate shall include all materials, wastage, labour, grout, sealant, adhesives, anchors, protection, curing etc. complete. Sink shall be either part of item or not as per BOQ.

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