1.0 SCOPE

This specification covers the general requirements for all types of floor finishing in all type of building.

2.0 REFERENCES

Reference shall be made to the following Indian Standards for any further information etc. not covered in the specification. In case of any conflict/contradiction, provision of specification shall override.

IS: 4971	:	Recommendations for selection of Industrial floor finishes
IS: 2114	:	Code of practice for laying in situ terrazzo floor finish.
IS: 1237	:	Specification for Cement concrete flooring tiles.
IS: 777	:	Specification for glazed earthenware wall tiles.
IS: 2571	:	Code of practice for laying in situ cement concrete flooring.
IS: 4631	:	Code of practice for laying of epoxy resin floor toppings.
IS: 3462	:	Code of practice for unbacked flexible PVC flooring.
IS: 5318	:	Code of practice for laying of flexible PVC sheet and tile flooring.
IS: 3461	:	Specification for PVC asbestos floor tiles.
IS: 1443	:	Code of practice for laying and finishing of concrete flooring tiles.
IS: 5491	:	Code of practice for laying in situ granolithic concrete floor topping.
IS: 4441	:	Code of practice for use of silicate type Chemical resistant mortars.
IS: 4443	:	Code of practice for use of resin type chemical resistant mortar.
IS: 1196	:	Code of practice for laying Bitumen Mastic flooring.

3.0 CEMENT CONCRETE FLOORING

3.1 GENERAL

Cement concrete flooring shall in general conform to IS: 2571.Cement concrete flooring shall consist of a sub base (laid on the compacted earth or sand fill in case of ground floor only) a base course laid on the sub-base and then finishing layer of floor finishing. In case of ground floor, the filled and compacted bed on which the sub-base is to be laid, shall be as per structural drawings and specifications.

The bed for flooring shall be prepared either level or sloped as per drawings and as instructed by Engineer-in-charge.

3.2 WORKMANSHIP

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3.2.1 SUB-BASE

The sub-base which shall be laid on the prepared bed shall be of specified thickness and as per structural drawings and specifications.

The sub-base shall be of boulders/gravel/broken bricks/sand/cement concrete as per drawings. In case of upper floors, the structural RCC slab shall be treated as sub-base.

3.2.2 BASE COURSE

Base course shall be 25mm thick M-15 grade Concrete and shall generally conform to Civil structural specification.

The floor space on which base course is to be laid shall be divided into square/ rectangular or as per designed panels to prevent cracks in the floor finish. No dimension of the panels shall exceed 2m and length of the panel shall not exceed 1.5 times its breadth. Base course shall be laid on alternate panels. The borders of the panels shall have mitred joints at the corners of the room and intermediate joints shall be in straight line with panel joints.

The panels shall be bound by glass/PVC/stainless steel strips etc. as specified. These shall be fixed in position with their top at proper level, giving slope wherever required.

The flooring shall butt against masonry of wall which shall not be plastered. When the base course is to be laid on hardened base, the sub-base shall be roughened by steel wire brushing and cleaned. Before laying the base course, neat cement slurry @ 2.75 kg of cement per Sqm. of area shall be brushed into the prepared sub base surface.

Cement concrete shall be placed in position and beaten with trowel and finished smooth. Beating shall cease as soon as surface is found covered with cream of mortar. Necessary slope shall be provided.

3.2.3 FLOOR FINISHING

Finishing of the surface shall follow immediately after the completion of base course. The base course shall be free of excessive moisture before starting the floor finishing. Use of dry cement, cement sand mixture sprinkled on the surface to stiffen the concrete or absorb excessive moisture shall not be permitted.

While the concrete is still green, cement @ 2.75 kg per Sqm. of floor area shall be mixed with water to form a thick slurry and spread over the surface. It shall be pressed twice by

Means of iron floats, once when the slurry is applied and second time when the cement starts setting.

The junction of floor with wall plaster, cladding, skirting shall be rounded off uniformly upto a radius of 25mm unless otherwise mentioned.

3.2.4 CURING

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Each finished portion of floor, on completion shall be kept wet with ponding for a minimum period of 7 days.

4.0 CEMENT CONCRETE GRANOLITHIC FLOORING

Workmanship shall in general conform to IS: 5491.

4.2.1 SUB-BASE

The sub-base which shall be laid on the prepared bed shall be of specified thickness and as per structural drawings and specifications.

The sub-base shall be of boulders/gravel/broken bricks/sand/cement concrete as per drawings. In case of upper floors, the structural RCC slab shall be treated as sub-base.

4.2.2 BASE COURSE (UNDER LAYER)

Base course shall be M-15 grade Concrete and shall generally conform to Civil structural specification.

The floor space on which base course is to be laid shall be divided into square/ rectangular or as per designed panels to prevent cracks in the floor finish. No dimension of the panels shall exceed 2m and length of the panel shall not exceed 1.5 times its breadth. Base course shall be laid on alternate panels. The borders of the panels shall have mitred joints at the corners of the room and intermediate joints shall be in straight line with panel joints.

The panels shall be bound by glass/PVC/stainless steel strips etc. as specified. These shall be fixed in position with their top at proper level, giving slope wherever required.

The flooring shall butt against masonry of wall which shall not be plastered.

When the base course is to be laid on hardened base, the sub-base shall be roughened by steel wire brushing and cleaned. Before laying the base course, neat cement slurry @ 2.75 kg of cement per Sqm. of area shall be brushed into the prepared sub base surface.

Cement concrete shall be placed in position and beaten with trowel and finished smooth. Beating shall cease as soon as surface is found covered with cream of mortar. Necessary slope shall be provided.

Thickness of base course shall be as follows for different thickness of floorings:

a. 40mm thick flooring = 25mm thick

b. 50mm thick flooring = 35mm thick

4.2.3 WEARING TOP LAYER

The top layer shall be laid over first layer within 15 minutes of laying the first layer. The cement and aggregates for the top layer shall be mixed dry. After mixing, sufficient

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quantity of washed sand and water shall be added to make the mix plastic but not flowing. The top and bottom layer shall firmly grip together.

4.2.4 FLOOR FINISHING

Finishing of the surface shall follow immediately after the completion of base course. The base course shall be free of excessive moisture before starting the floor finishing. Use of dry cement, cement sand mixture sprinkled on the surface to stiffen the concrete or absorb excessive moisture shall not be permitted.

While the concrete is still green, cement @ 2.75 kg per Sqm. of floor area shall be mixed with water to form a thick slurry and spread over the surface. It shall be pressed twice by means of iron floats, once when the slurry is applied and second time when the cement starts setting.

The junction of floor with wall plaster, cladding, skirting shall be rounded off uniformly up to a radius of 25mm unless otherwise mentioned.

4.2.5 CURING

Each finished portion of floor, on completion shall be kept wet with ponding for a minimum period of 7 days.

5.0 HEAVY DUTY FLOORING

5.1 GENERAL

Heavy duty Flooring shall consist of a sub-base, a base course and a finishing layer of floor finish.

5.2 WORKMANSHIP

5.2.1 SUB-BASE

The sub-base which shall be laid on the prepared bed shall be of specified thickness and as per structural drawings and specifications.

The sub-base shall be of boulders/gravel/broken bricks/sand/cement concrete as per drawings. In case of upper floors, the structural RCC slab shall be treated as sub-base.

5.2.2 BASE COURSE

Base course shall consist of one layer of 35mm thick cement concrete (1 cement: 1.5 Coarse sand : 3.5 stone aggregates of 10mm to 6mm size by volume) laid on sub-base in panels in accordance with, clause no. 3.2.2.

5.2.3 FLOOR FINISH

Finishing layer shall be of cement, hardener and stone aggregate mix of 15mm thickness laid over the base course. Unless otherwise mentioned, one part of approved quality hardener and four parts of cement by weight shall be mixed dry. This dry

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mixture shall be mixed with stone grit of 6mm and down size in the ratio of 1 hardener and cement mixture: 2 stone grit by volume. Just enough water shall then be added to the mix.

The mixture so obtained shall then be laid on the base course within 2 to 4 hours of latter's laying. It shall be firmly pressed into bottom concrete so as to have a good bond with it. After the starting of initial setting, the surface shall be finished smooth and true with steel floats.

6.0 PRECAST HYDRAULICALLY PRESSED CEMENT TILES

6.1 MATERIALS

6.1.1 CEMENT CONCRETE TILES

Cement concrete tiles shall conform to IS: 1237 and shall be of approved shade, with 10 mm down size stone aggregates and using a 1:6 or as directed mixture of white and ordinary cement and shall be of 20mm thickness and approved shade.

6.1.2 PIGMENTS

Pigments to be admixed with mortar or for grouting the joints shall conform to Table -1 of IS: 2114.

6.1.3 CEMENT MORTAR

Cement mortar shall be in accordance with civil structural specification and following schedule

a. For flooring : 20mm thick, cement mortar (l cement : 6 coarse sand by volume)

b. For skirting/dado/riser : 12mm thick, cement mortar (1 cement:3 coarse sand by volume)

6.2 WORKMANSHIP

Workmanship shall in general conform to IS: 1443. The base on which tiles are to be laid shall be cleaned of all dust, dirt and properly wetted by applying neat cement slurry @ 2.75 kg. of cement per Sqm. of area without allowing water pools. Cement mortar of specified thickness shall then be spread over the base for two rows of tiles and 3-5 metres in length. The mortar shall be laid in slope as per requirements and thickness of mortar shall not be less than 10mm at any place. The top of the mortar shall be kept rough so that cement slurry can be absorbed. Laying shall be from centre & proceed outwards in two directions at 90°. Cut tiles of uniform sizes shall be laid along periphery, if necessary. Neat cement slurry @ 4.4 kg. of cement per Sqm. shall be spread over the mortar bed for laying 20 tiles at a time. The tiles shall then be fixed in this grout one after the other, each tile being gently tapped and properly bedded in line and level. The Joints shall not exceed 1.5mm in width. After the day's work, the excess

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cement slurry on top and the joints shall be cleaned with broom stick and washed before the slurry sets hard. Next day, the joints shall be filled with the cement grout to match the shade of the tile.

Tiles along the periphery shall be continued by average 12 mm under the wall plaster, skirting or dado.

For skirting/dado/risers on the brick masonry wall, the joints shall be raked out to a depth of at least 15mm while the masonry is being laid. In case of concrete work, the surface shall be hauled and roughened with wire brushes. The wall surface shall be uniformly and evenly covered with backing of cement mortar 1:3 (1 cement : 3 coarse sand by volume) of specified thickness. Before hardening of the cushioning mortar, back of each tile shall be covered with a neat layer of cement slurry @ 4.4 kg of cement per Sqm. and edges with white cement with or without pigment to match the shade of tiles and the tiles then shall be pressed on the backing and tapped.

The tiles shall be corrected to proper planes with joints truly vertical in required pattern and butt jointed. The fixing shall be done from bottom upward. The top of skirting and dado shall be truly horizontal.

6.3 CURING

The flooring shall be cured for 7 days by keeping it wet with ponding. Heavy traffic on the flooring shall be permitted only after 14 days.

6.4 GRINDING AND POLISHING

Grinding shall be commenced after 14 days when the tiles and the joints are properly set. Grinding shall be done by machines except for skirting and small areas. First grinding shall be done with carborundum stones of 48 to 60 grade grit fitted in the machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water baring all pin holes. It shall then be covered with a thin coat of grey/white cement mixed with pigments to match with colour of the flooring. This grout shall be kept moist for a week. Thereafter the second grinding shall be started with carborundum stone of 120 grit. Grinding and curing shall follow again. Final grinding shall be with carborundum of grade 220 to 350 grit using water in abundance. The floor shall be washed clean with water, oxalic acid powder shall then be dusted at 35 gm/sq. m. on the surface rubbed with machine fitted hessian bobs or rubbed hard with woollen rags. The floor shall then be washed clean and dried with a soft cloth or linen. If any tile is disturbed or damaged, it shall be refitted or replaced and properly jointed and polished.

7.0 CEMENT PLASTER SKIRTING

7.1 MATERIAL

Cement plaster skirting shall be laid with cement mortar (1 cement: 3 coarse sand by volume) as per clause no. 6.1.3 and shall be of specified thickness (6mm/12mm/18mm) as per item description.

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7.2 WORKMANSHIP

The surface on which the skirting is to be applied shall be prepared and skirting of specified thickness shall be laid. The junction between flooring and wall shall be rounded off to a radius of 25mm if not otherwise mentioned.

While the mortar is still green, cement @ 2.75kg per square metre shall be mixed with water to form thick slurry and applied over the mortar. It shall be pressed twice by means of iron floats, once when the slurry is applied and second time when the cement starts setting.

8.0 CAST-IN-SITU TERRAZZO FINISH

8.1 MATERIALS

8.1.1 BASE COURSE (UNDERLAYER)

Base Course for Cast-in-situ terrazzo flooring shall be 25mm thick cement concrete (1 cement: 2 coarse sand: 4 stone aggregate, 10mm nominal size by volume).

In case of vertical surfaces, the base course shall be 13mm thick cement mortar (1 cement: 3 coarse sand by volume)

8.1.2 AGGREGATES FOR TERRAZZO TOPPING

The aggregate to be used in topping shall be marble chips of plain White/Pink Makrana /Baroda green etc. all grade -1 as specified which shall be of 10mm nominal size. Marble powder to be used in terrazzo topping shall pass through IS Sieve Terrazzo. Marble chips shall be hard, sound, dense and homogenous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering. All proportions of materials used should be as directed by the Engg. - in - charge/ as specified.

8.1.3 PIGMENTS

Pigments to be used in terrazzo shall be of permanent colour and shall conform to IS: 2114, table-1.

8.2 WORKMANSHIP

Workmanship shall in general conform to IS: 2114. Terrazzo flooring shall be of specified thickness and shall be laid in two layers and in panels. Under layer or base course shall be of cement concrete laid over sub base and top layer shall be of terrazzo floor finish. Details of panels shall as per drawing. The thickness of Terrazzo finish shall be 15mm.

Top layer shall consist of mix of white cement, marble powder, marble chips, water and pigments. Cement and marble powder mix proportion shall be 3: 1 by weight. Cement, marble powder mix shall be mixed with marble chips in the proportion of 4:7 by volume. Quality and shade of chips and powder shall be as specified with a view to avoid variation in colour. Sufficient quantity of white cement shall be added in the

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cement mix to obtain the desired shade. Mixing shall be done in a trough or tub and complete quantities of white cement and pigment for a particular unit of job shall be dry mixed with aggregates. Water shall be added in small quantities to this dry mix to get a proper consistency. The mix shall be plastic but not so wet as to flow. The mix shall be used within 30 minutes of its preparation.

The base course/under layer shall be divided in panels with dividing strips (glass/PVC/stainless steel strips) upto the finished surface levels in accordance with clause no. 3.2.2. The sub-base shall be cleaned of all dust, dirt or any loose material. It shall then be wetted with water, mopped and smeared with neat cement slurry.

Terrazzo topping shall be laid while the under layer is still plastic but has hardened enough which is normally achieved between 18-24 hours after laying the under layer. A cement slurry @ 2.75Kg of cement per Sqm. of area pigmented with the same colour as the topping be brushed on the surface immediately before laying the topping. The terrazzo mix shall be laid to a uniform thickness and be compacted thoroughly by tamping or rolling and trowelled and brought true to required level by a straight edge and steel floats so that the maximum amount of marble chips come up and spreaded uniformly over the surface and no part of the surface is left without the chips.

8.3 CURING

The surface shall be left dry for air curing for a period of 12-18 hours. Thereafter water shall be allowed to stand overnight in pools for a period of minimum four days.

8.4 GRINDING AND FINISHING

Grinding and polishing shall be done with machines and shall start after 7 days of laying. First grinding shall be done with carborundum stone of 60 grit size. The surface shall than be washed clean and grouted with a grout of cement and/or colouring matter in same mix and proportion as the topping in order to fill any pin holes that appear. It shall then be allowed to dry for 24 hours and wet cured in the same manner as in clause no. 6.3. The second grinding shall be done with carborundum stone of 80 grit size. The surface shall then be prepared as after first grinding.

The third grinding shall be done with carborundum stone of 120 to 150 grit size. The surface shall then be prepared again as after first grinding.

The fourth grinding shall be done with carborundum stone of 320 to 400 grit size. The surface shall then be washed clean and rubbed hard with felt and slightly moistened oxalic acid powder @ 35 gms per square metre of floor surface. After the finishing works are over, the surface shall be washed with dilute oxalic add solution and dried. Floor polishing machine fitted with felt on hessian bobs shall then be run over it until the floor shines.

In case of polishing, wax polish shall be applied on the surface with the help of soft linen over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it. Clean saw dust shall be spread over the floor surface and polishing machine again operated to remove excess wax.

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Cast-in-situ Terrazzo in skirting, dado and risers shall be of specified thickness and of same shade as that of the flooring.

Underlayer for terrazzo on vertical surfaces shall be of stiff cement mortar 1:3 (1 cement: 3 coarse sand by volume) finished rough so as to give a good bond to the topping. Terrazzo topping shall be average 12mm thick and underlayer shall be 13 mm thick. Terrazzo topping shall be laid on the under layer in accordance with clause no. 8.2. Other details shall be same as for flooring excepting grinding which shall be manual and panels dividers are required

9.0 PRECAST HYDRAULICALLY PRESSED TERRAZZO TILES

9.1 MATERIALS

9.1.1 TERRAZZO TILES

Terrazzo tiles shall be of specified thickness and shade and shall generally conform in all respects to IS-1237. The tiles shall be made with 10mm down size stone aggregates, white & ordinary cement mix (1 white cement: 6 ordinary cement by volume) and pigments conforming to IS: 2114, Table -l.

9.1.2 PIGMENTS

Pigments to be admixed with mortar or for grouting the joints shall conform to Table -1 of IS: 2114.

9.1.3 CEMENT MORTAR

Cement mortar shall be in accordance with civil structural specification and following schedule

a. For flooring - 20mm thick cement mortar (1 cement: 4 coarse sand by volume).

b. For skirting/dado/riser - 12mm thick cement mortar (1 cement: 3 coarse sand by volume).

9.2 WORKMANSHIP

Workmanship shall in general conform to IS: 1443. The base on which tiles are to be laid shall be cleaned of all dust, dirt and properly wetted by applying neat cement slurry @ 2.75 kg. of cement per Sqm. of area without allowing water pools. Cement mortar of specified thickness shall then be spread over the base for two rows of tiles and 3-5 metres in length. The mortar shall be laid in slope as per requirements and thickness of mortar shall not be less than 10mm at any place. The top of the mortar shall be kept rough so that cement slurry can be absorbed. Laying shall be from centre & proceed outwards in two directions at 90°. Cut tiles of uniform sizes shall be laid along periphery, if necessary. Neat cement slurry @ 4.4 kg. of cement per Sqm. shall be spread over the mortar bed for laying 20 tiles at a time. The tiles shall then be fixed in this grout one after the other, each tile being gently tapped and properly bedded in line

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and level. The Joints shall not exceed 1.5mm in width. After the day's work, the excess cement slurry on top and the joints shall be cleaned with broom stick and washed before the slurry sets hard. Next day, the joints shall be filled with the cement grout to match the shade of the tile.

Tiles along the periphery shall be continued by average 12 mm under the wall plaster, skirting or dado.

For skirting/dado/risers on the brick masonry wall, the joints shall be raked out to a depth of at least 15mm while the masonry is being laid. In case of concrete work, the surface shall be hauled and roughened with wire brushes. The wall surface shall be uniformly and evenly covered with backing of cement mortar 1:3 (1 cement : 3 coarse sand by volume) of specified thickness. Before hardening of the cushioning mortar, back of each tile shall be covered with a neat layer of cement slurry @ 4.4 kg of cement per Sq.M. and edges with white cement with or without pigment to match the shade of tiles and the tiles then shall be pressed on the backing and tapped.

The tiles shall be corrected to proper planes with joints truly vertical in required pattern and butt jointed. The fixing shall be done from bottom upward. The top of skirting and dado shall be truly horizontal.

9.3 CURING

The flooring shall be cured for 7 days by keeping it wet with ponding. Heavy traffic on the flooring shall be permitted only after 14 days.

9.4 GRINDING AND POLISHING

Grinding shall be commenced after 14 days when the tiles and the joints are properly set. Grinding shall be done by machines except for skirting and small areas. First grinding shall be done with carborundum stones of 48 to 60 grade grit fitted in the machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water baring all pin holes. It shall then be covered with a thin coat of grey/white cement mixed with pigments to match with colour of the flooring. This grout shall be kept moist for a week. Thereafter the second grinding shall be started with carborundum stone of 120 grit. Grinding and curing shall follow again. Final grinding shall be with carborundum of grade 220 to 350 grit using water in abundance. The floor shall be washed clean with water, oxalic acid powder shall then be dusted at 35 gms/sq. m. on the surface rubbed with machine fitted hessian bobs or rubbed hard with woollen rags. The floor shall then be washed clean and dried with a soft cloth or linen. If any tile is disturbed or damaged, it shall be refitted or replaced and properly jointed and polished.

10.0 TILE WORK

10.1 MATERIALS

10.1.1 TILES

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Glazed (vitreous and ceramic tiles shall conform to IS: 777 and shall be of specified shade, size and of approved manufacturer. Ceramic tiles shall be matt finished and non slip type.

The size shall be as per following:

a. White/ coloured glazed vitreous tiles

200mm x 100mm x 6mm

200mm x 150mm x 6mm

200mm x 300mm x 6mm

300mm x 300mm x 8mm (± 5%)

b. Ceramic Tiles

300mm x 300mm x 8mm (± 5%)

200mm x 100mm x 6mm

10.1.2 PIGMENTS

Pigments to be admixed with mortar or for grouting the joints shall conform to Table -1 of IS: 2114.

10.1.3 CEMENT MORTAR

Cement mortar shall be in accordance with civil structural specification and following schedule

a. For flooring : 20mm thick, cement mortar(l cement : 6 coarse sand by volume)

b. For skirting/dado/riser : 12mm thick, cement mortar (1 cement:3 coarse sand by volume)

10.2 WORKMANSHIP

The tiles shall be laid over a coating of specified adhesive (as per approved manufacturer's specification) laid on base floor/wall plaster. The Joints of the tiles shall be flush pointed with cement paste (white cement and pigment conforming to IS:2114, Table-1) matching the shade of colours.

10.3 CURING

The flooring shall be cured for 7 days by keeping it wet with ponding. Heavy traffic on the flooring shall be permitted only after 14 days.

11.0 KOTA STONE FINISH

11.1 MATERIALS

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The Kota Stone slabs shall be of selected quality and shade, hard, sound, dense, homogenous in texture, free from cracks, decay, weathering and flakes. These shall be machine cut to the requisite size and thickness and chisel dressed. For flooring and skirting/dado/riser the thickness of the stone slabs shall be 25mm and 18mm respectively.

The slabs shall have the top (exposed) face polished before being brought to site. Before starting the work, the contractor shall get the samples of slabs approved by Engineer-in-charge.

11.2 WORKMANSHIP

11.2.1 DRESSING OF SLABS

Each slab shall be machine cut to the required size and shape and fine chisel dressed at all edges to full depth and machine rubbed to a smooth surface finish. All angles and edges of the slabs shall be true Square and free from chippings giving a plane and smooth surface.

11.2.2 PREPARATION OF SURFACE

Cement mortar in accordance with clause no. 6.1.3 of specified thickness and mix and shall be laid over the base after making it rough, cleaning thoroughly and applying neat cement slurry @ 2.75 kg of cement per Sqm. of area to receive the mortar.

The mortar shall be laid for fixing one slab at a time. Cement mortar shall be 15mm thick (1 cement: 4 coarse sand by volume) for flooring and 12mm thick (1 cement: 3 coarse sand by volume) for skirting/dado/riser.

11.2.3 LAYING

The slab shall be washed clean before laying. It shall be laid over cement mortar bedding on top, pressed, and tapped gently to bring it in level. It shall be then lifted and laid aside. Top surface of the mortar then shall be corrected by adding fresh mortar at hollows and depressions. The mortar then shall be allowed to harden and cement slurry of honey like consistency @ 4.4.kg of cement per Sq. M shall be spread over the mortar. The edges of the slabs shall be buttered with white cement with or without pigment grout to match the shade of the slabs. The slabs shall then be gently placed in position and tapped with wooden mallets till it is properly bedded in level. The joints shall be as fine as possible. Surplus cement on the surface of the slab shall be removed. The slabs in flooring shall continue for not less than 10 mm under the plaster/skirting. The finished surface shall be true to levels and slopes as instructed by the Engineer-in-Charge.

The slabs shall be laid in patterns as per drawings and size shall not be less than 310mm X 310mm which shall be uniform. Cut size may be used along periphery as required.

11.3 CURING

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The floor shall be cured for a minimum period of 7 days by wetting.

11.4 POLISHING AND FINISHING

Uneveness at the meeting edges of slabs shall be removed by fine chiselling. Polishing etc. shall be done in accordance with clause no. 6.4, except that cement slurry shall not be applied on the surface before each polishing.

12.0 MARBLE STONE FLOORING

12.1 MATERIALS

12.1.1 MARBLE SLABS

The Marble slabs shall be 20mm thick and grade -I Makrana White or Makrana plain Pink or Abu Green or Baroda Green as specified. The marble from which the slabs are made shall be of selected quality, hard, sound, dense, homogenous in texture, free from cracks, decay, weathering and flakes. The sample of Marble stone slabs shall be got approved from the Engineer-in-Charge.

The slabs shall be machine cut to the requisite dimensions.

12.1.2 PIGMENTS

Pigments to be admixed with mortar or for grouting the joints shall conform to Table -1 of IS: 2114.

12.1.3 CEMENT MORTAR

Cement mortar shall be in accordance with civil structural specification and following schedule

a.	For flooring	:	20mm thick, cement mortar(l cement : 6 coarse sand by volume)
b.	For skirting/dado/riser	:	12mm thick, cement mortar (1 cement:3 coarse sand by volume.

12.2 WORKMANSHIP

Same as clause no. 11.2 except that cement mortar shall be 20mm thick (1 cement: 6 coarse sand by volume) for flooring.

12.3 CURING

The floor shall be cured for a minimum period of 7 days by wetting.

12.4 POLISHING AND FINISHING

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Uneveness at the meeting edges of slabs shall be removed by fine chiselling. Polishing etc. shall be done in accordance with clause no. 6.4, except that cement slurry shall not be applied on the surface before each polishing.

13.0 P.V.C. FINISH

13.1 MATERIALS

13.1.1 P.V.C. ROLL/TILES

P.V.C. Roll/tile shall be 2mm thick homogenous, unbacked, flexible type of approved texture, colour and pattern, conforming to IS: 3462/3461.

13.1.2 ANTISTATIC PVC ROLL/TILE

Antistatic P.V.C, roll/tile shall conform to B.S.2050, Table-2 in addition to IS: 3462,

13.1.3 ADHESIVE

Adhesive shall be neoprene based rubber adhesive of approved make.

13.2 WORKMANSHIP

The base course shall be Cement Concrete flooring/Cement Concrete granolithic flooring for flooring and Cement plaster for skirting thoroughly dried and cleaned well before the laying of P.V.C. rolls/tiles.

P.V.C. rolls/tiles shall be brought to the temperature of the area in which it is to be laid and stacked suitably near the site for a period of about 24 hours.

The layout of P.V.C. flooring shall first be marked with guidelines on the base course to required pattern without adhesive. The adhesive then shall be applied by spatula to the base floor and back of the PVC roll/tile. PVC rolls shall be placed in position from one end onwards slowly without creation on any air pockets between roll and the base course. PVC rolls/tiles shall be placed only when the adhesive is set sufficiently for laying. When set sufficiently for laying, the adhesive will be sticky to the touch but shall not mark the fingers. After placing, the roll shall be pressed suitably with a wooden roller weighing about 5 kg. The joint between adjacent rolls shall be thin hairline type. For PVC tiles laying shall start from centre and proceed outwards in two right angle direction till the periphery of the room/area is reached. Fractional tiles of uniform cut sizes may be laid only along the peripheral border if so required owing to size of the room area.

PVC rolls in flooring shall he continued for 100mm high skirting without any joints and with 50mm radius rounded corner at the junction of skirting and flooring. Any excess adhesive squeezing out of the surface shall he wiped off immediately with a wet cloth. In case of such excess adhesive becoming hard, it shall be removed with a solution of one part of commercial Butyle Acetate and three parts of turpentine oil or any other solution as advised by the manufacturer of the roll.

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After a minimum period of 24 hours after laying the rolls/tiles, the finished floor shall be cleaned with a wet cloth soaked in warm soap solution of 2 spoons of soft soap powder in 5 litres of warm water or detergent as per approved manufacturers specifications

14.0 ACID RESISTANT TILES

14.1 MATERIAL

The tiles shall be vitrified ceramic tiles of approved size as per approved manufacturer's specification and shall be homogeneous. They shall have the following properties :-

S.No.	Property	Values	Norms
1	Water Absorptions	±0.5%	ASTM C 373
2	Scratch Resistance	≥ 6	ASTM C 373
3	Chemical Resistance	Unaffected	ASTM C 650
4	Abrasion Resistance	≥ 100	ASTM C 501
5	Breaking strength	1400 kg/sq.cm	ASTM C 648
6	Density	≥ 2.0 Gm/CC	

14.2 WORKMANSHIP

The base course shall be Cement Concrete flooring/Cement Concrete granolithic flooring for flooring and Cement plaster for skirting/dado and background surface shall be prepared as per clause no. 6.2 and IS:4443.

Tiles shall be fixed on the prepared surface over a bitumen priming layer, bitumen mastic layer and resin type chemical resistant mortar. The bitumen shall conform to IS:702 and laying of bitumen mastic shall conform to IS: 1196.

Joints shall be allowed to set for 24 hours. The floor shall then be washed as per manufacturer's specifications to totally remove all marks from tile surface.

15.0 EPOXY COATING

15.1 GENERAL

Epoxy floor coating shall be pigmented (approved shade) and consist of a solvent based, two pack system with epoxy resins and amine curing agents, chosen to withstand high degrees of chemical and abrasive action as per approved manufacturer's specification.

15.2 MATERIALS

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15.2.1 SCREED

The screed shall be provided in flooring and shall consist of a solvent free combination of epoxy resin, modified amine hardeners filled with specially graded and selected chemically inert aggregates of high strength. The system shall include an epoxy resin primer and screed which are both supplied in pre-weighed units ready for on-site mixing and application. The thickness of screed shall be minimum 3mm thick.

15.2.2 FINISHING COAT

An epoxy resin sealing coat in two coats @ 125 gms./sq.m. (minimum) per coat shall form the topping coat over the screed in case of flooring and over plastering in case of vertical surfaces.

15.3 WORKMANSHIP

15.3.1 PREPARATION OF SURFACE

The surface shall be sound, clean and dry in order to achieve maximum adhesion with the primer coating of epoxy resin as per approved manufacturer's specification.

15.3.2 LAYING

The primer shall be applied by brush and shall be allowed to become tacky. The screed shall be prepared as per manufacturers specification and laid in specified thickness evenly over the base floor by trowel. In case of flooring, the finished, cured screed shall have a slightly granular texture.

The epoxy resin topping shall be applied at least 24 hours after the laying of the screed. This topping shall be applied by brush or sprayed to a specified thickness in two coats with 3-5 hours interval between them. Care shall be taken to finish the topping perfectly smooth and devoid of any bubbles and unevenness. The newly laid floor shall be protected from dust or moisture and allowed to be used only after a minimum lapse of 48 hours.

16.0 MEASUREMENT AND RATE (THIS CLAUSE SHALL BE APPLICABLE FOR ITEM RATE TENDERS ONLY)

Measurement and rate for flooring for item rate tenders shall be in Sqm. in general unless otherwise mentioned.

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STANDARD SPECIFICATION
FOR
WOOD WORK

VCS-SS-CS-6041

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ABBREVIATION

m	Metre
mm	Millimetre
Cm	Centimetre
Sqm	Square Metre
Cum	Cubic Metre
Cm^2	Square Centimetre
Kg/m^2	Kilogram Per Square Metre
C/C	Center to Center
IS	Indian Standard

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1.0 SCOPE

This specification covers the general requirements for all types of wood work in doors, windows, ventilators, partitions, etc.

2.0 REFERENCES

Reference shall be made to the following Indian Standards for any further information etc. not covered in the specification. In case of any conflict/contradiction, provisions of specification shall override.

IS: 2202 Part-I	:	Specifications for wooden flush door shutters (solid core type) particle board and hard board face panels.
IS: 2202 Part-II	:	Specification for wooden flush door shutters (solid Core type) plywood face panels.
IS: 1003 Part-I	:	Specification for Timber paneled and glazed shutters –Door shutters.
IS: 3087	:	Specification for Wooden particle boards (Medium Density) for general purposes.
IS: 309	:	Specification for veneered particle boards.
IS: 848	:	Specification for synthetic resin adhesives for Plywood (phenolic and amino plastic)
IS: 205	:	Specification for nonferrous metal butt hinges.
IS: 2338	:	Code of practice for finishing of wood and wood Based materials. (Part I & II)
IS: 1341	:	Specification for steel butt hinges.
IS: 4021	:	Specification for timber door, window and ventilator frames.
IS: 303	:	Specification for plywood for general purposes.

3.0 MATERIAL

3.1 TIMBER

3.1.1 TEAKWOOD

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Teakwood shall be second class Indian Teakwood conforming to IS 4021 of good quality, well seasoned and free from defects such as cracks, dead knots, sapwood etc. No individual hard and sound knot shall be more than 15 sqcm. in size and the aggregate area of such knots shall not exceed 2% of the area of the piece. The timber shall be fairly close grained having not less than 2 growth rings per cm. width in cross section.

3.1.2 HARD WOOD

Hard wood shall be first class wood conforming to IS: 4021 of good quality, well seasoned and free from defects such as dead knots, cracks, sapwood etc. No individual hard and sound knot shall exceed 6 sq. Cm. in size with no dimension more than 50 mm and the aggregate area of such knots shall not be more than 1% of the area of the piece. There shall not be less than 5 growth rings per cm. Width in cross-sections.

3.1.3 MOISTURE CONTENT IN TIMBER

The maximum permissible percentage of moisture content for well seasoned timber shall be as per IS: 287.

3.1.4 WORKMANSHIP OF WOOD WORK

Workmanship for wood and joinery shall be as per IS: 1200 and IS: 4021.

3.1.5 PAINTING/POLISHING OF WOOD WORK

Painting/polishing of wood work shall be in accordance with specification No. VCS-SS-CS-6045

PARTICLE BOARD

Particle board shall conform to IS: 3097 and shall be three layer flat pressed teakwood based and of exterior grade (Grade-I), type-1, BWP type, bonded with phenol Formaldehyde Synthetic resin conforming to IS: 848.

3.2 MDF (MEDIUM DENSITY FIBRE) BOARD

Medium density fibre board shall conform to IS: 12406 Exterior grade (EGSB). It shall be dense, homogenous and manufactured from agro based lignocellulose fibres bonded with BWP type phenol formaldehyde synthetic resin conforming to IS: 848. It shall be categorized as class 1 for 'Surfaces of very low flame spread' as per IS: 1642.

3.3 BLOCK BOARD

Block board shall conform to IS: 2202 and shall be made of solid Core block board. 'T' type Teak wood beading of minimum 12mm thickness shall be fixed to the exposed edges of the boards.

3.4 VENEERS

Veneers shall conform to class-1 of IS: 303 and BS: 476 Part-7.

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3.5 FITTINGS & FIXTURES

3.5.1 HINGES

Hinges shall be of Extruded Aluminium Alloy and butt type conforming to IS: 205. Size of hinges shall be minimum 125mm long. Maximum spacing of hinges shall not exceed 600mm c/c

3.5.2 OVERHEAD HYDRAULIC DOOR CLOSER

Overhead hydraulic door closers shall be of heavy duty type and shall conform to IS: 3564.

3.5.3 FLOOR MOUNTED DOOR CLOSER

Floor mounted door closers shall be of heavy duty type and hydraulically operated and shall conform to IS: 6315.

3.5.4 MORTICE LOCK

Mortice locks shall be of chromium plated brass body and shall have 6 levers and pair of handles of pressure die cast zinc alloy (satin finished). Mortice locks shall conform to IS: 2209.

3.5.5 DOOR HANDLES

Door handles shall be of pressure die cast zinc alloy and shall be chromium plated.

3.5.6 ALDROP

Aldrop shall be of anodized Aluminium in bronze colour and shall be 300 mm long and 19.05mm dia.

3.5.7 TOWER BOLTS

Tower bolts shall conform to IS: 204 and shall be of anodized Aluminium in Bronze colour.

3.5.8 DOOR STOPPER

Door stoppers shall consist of heavy duty rubber shoes spring loaded type with zinc alloy pressure die cast chromium plated holders.

3.5.9 TOILET DOOR LATCH

Toilet Door latch shall be of Anodized Aluminium and shall be 75mm long with Vacant/occupied indicator.

3.5.10 COAT & HAT HOOK

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Coat & Hat hooks for Toilet doors shall be of chromium plated brass body.

3.6 GLAZING

Glass sheets for glazing shall be i) 4 mm thick plain glass (wt. 7.2 kg/m2) conforming IS: 2835, or ii) 5.5 mm thick toughened glass conforming to IS: 5437 as specified.

Glass sheets shall be free from flaws, scratches, cracks, bubbles etc.

4.0 WOODEN DOOR/WINDOW FRAME

Wooden Door/Window frame shall be made of specified wood and shall be in accordance with detailed drawings.

The wooden members of the frame shall be planed smooth and accurate to the full dimensions. Rebates, rounding, moulding etc. shall be done before the members are join into frames.

Joints in the frame work shall be perfect with square edges and shall be pinned with hard wood/bamboo pins of 10 to 15 mm dia.

Wood work shall be painted/polished or otherwise treated as specified. All exposed portions shall be coated with wood primer and concealed surface by bituminous paints as per specification No VCS-SS-CS-6045.

Before any surface treatment is applied, the wood work shall be got approved by the Engineer-in-charge. The frames shall be fixed to the masonry by 300mm x 25mm x 6mm MS hold fasts embedded in M-15 grade concrete block of 350mm x 100mm x 100mm in the hole of masonry. In case of concrete, frames shall be fixed by 96mm long, 12mm dia metallic dash fasteners.

5.0 DOOR SHUTTERS

Door shutters shall be complete with all operational fittings & fixtures like hinges, overhead hydraulic door closers, Tower bolts, Locking device, handles, door stopper etc.

5.1 BLOCK BOARD FLUSH SHUTTER

Block board flush shutter shall conform to IS: 2202. The shutter shall be 35mm thick and shall be made of solid core block board. *T* type Teak wood beading of minimum 12mm thickness fixed to the perimeter of the shutter. The shutter shall be faced on both sides with following finishes as specified and shall be factory made.

a. 3mm thick commercial type plywood conforming to IS:303, BS:476 part-7 finished with 2 coats of approved quality synthetic enamel paint over primer coat or

b. Approved quality 1mm thick teakwood veneering conforming to IS:303, BS:476, part 7 or

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c. 1mm thick approved quality lamination of approved shade.

The edges of the shutters shall either be painted with synthetic enamel paint or French polished.

5.2 PANEL DOOR SHUTTER

Panel door shutter shall be 35mm thick and shall consist of 100mm x 35mm teakwood stiles & top rail, 200mm x 35mm bottom rail and 150mm x 35mm lock rail and 12mm thick particle board infill panels. The infill panels shall be fixed with adhesive and moulded Teakwood headings (minimum 12.5mm x 12.5mm size).

The shutter shall be painted with 2 coats of approved shade synthetic enamel paint or polyurethane paint as specified over approved coat of primer.

5.3 GLAZED WOODEN DOOR SHUTTER

Glazed wooden door shutter shall be 38mm thick and shall consist of 100mm x 38mm Teakwood stiles and top rail, 200mm x 38mm bottom rail and 150mm x 38mm thick lock rail. 4mm thick plain glass or 5.5mm thick toughened glass panels shall be fixed in the stiles & rails with neoperene adhesive and 12.5mm x 12.5mm moulded Teakwood beading. All the wood work shall be painted with 2 coats of approved shade synthetic enamel paint or polyurethane paint as specified over a coat of primer.

5.4 FLYMESH DOOR SHUTTER

Fly mesh door shutter shall be 38mm thick and shall consist of 100mm x 38mm Teakwood stiles and top rail, 200mm x 38mm bottom rail and 150mm x 38mm thick lock rail and net of galvanised MS wire gauge of IS gauge designation 856 & dia 0.56mm fixed with 12.5mm x 12.5mm moulded Teakwood beading. The shutter including wire mesh shall be painted with 2 coats of approved shade synthetic enamel paint or polyurethane paint as specified over a coat of primer.

6.0 MEASUREMENT & RATE

This clause shall be applicable for item rate tenders only.

For item rate tenders wood work in door/window frames shall be measured in Cum. Door/window shutters shall be measured in Sqm. Hardwires and fittings like locks, tower bolts, door closer etc. shall be counted in numbers provided. Length and width shall be measured to the nearest 0.01 M. Area and volume shall be worked out to the nearest 0.01 Sqm. and 0.001 Cum.

Rate for item rate tenders shall include all materials, labour, erection, protective measures, transport, conveyance, storage and other incidental expenditures as required for completion of the items.

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STANDARD SPECIFICATION
FOR
PLASTERING AND POINTING

VCS-SS-CS-6043

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ABBREVIATION

m	Metre
mm	Millimetre
Cm	Centimetre
Kg	Kilogram
Sqm	Square Metre
RCC	Reinforced Cement Concrete
IS	Indian Standard

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1.0 SCOPE

This specification covers the general requirements for all types of plastering & pointing in all type of building.

2.0 REFERENCES

IS: 1542	Sand for plaster -Specification
IS: 460	Specification for test sieves
IS: 2645	Integral water proofing compounds for cement mortar and concrete –Specification
IS: 2386	Method of test for aggregates for concrete

3.0 MATERIALS

3.1 CEMENT

Cement shall conform to Specification No. VCS-SS-CS-6023.

3.2 SAND

Sand for plaster and pointing shall consist of natural sand, crushed stone sand or crushed gravel sand or a combination of any of these and shall conform to IS: 1542. Sand shall be hard, durable, clean and free from adherent coatings and organic matter and shall not contain any appreciable amount of silt, day bails or pellets. Sand shall not contain harmful impurities such as iron pyrites, coal particles, lignite, mica shale etc in such form or in quantities as to affect adversely the hardening, strength or durability of the mortar.

The maximum quantities of clay, fine silt, fine dust and organic impurities in the sand shall not exceed the following limits:

a. Clay, fine silt and fine dust when determined in accordance with IS 2386 (Part 2).

In natural sand or crushed gravel sand & crushed stone sand

: Not more than 5% by mass

b. Organic impurities when determined in accordance with IS 2386 (Part 2):

: Colour of the liquid shall be lighter than that indicated by standard specified in IS 2386 (Part-2)

Grading of sand for use in Plaster shall conform to IS 1542 (as below)

IS sieve designation	Percentage passing
10mm	100

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4.75mm	95 to 100
2.36mm	95 to 100
1.18mm	90 to 100
600 micron	80 to 100
300 micron	20 to 65
150 micron	0 to 15

3.3 WATER

Water for plastering and pointing shall conform to VCS-SS-CS-6021

3.4 CEMENT MORTAR

Preparation of cement mortar shall conform to Specification No VCS-SS-CS-6021 and unless otherwise mentioned.

3.5 CEMENT MORTAR WITH WATERPROOFING COMPOUND

Waterproof compound shall conform to IS: 2645 of approved make. The compound shall be well mixed with dry cement in the proportion of 3% by weight or as recommended by manufacturer. Further procedures for preparation of cement mortar shall be as per clause No. 3.4

4.0 WORKMANSHIP

4.1 PREPARATION OF BACKGROUND SURFACE

The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surfaces shall be roughened by wire brushing or hacking for non-hard and hard surfaces respectively. Projections on surfaces shall be trimmed wherever necessary to get even surfaces. In case of brick/stone masonry, raking of joints shall be carried out wherever necessary. The masonry shall be allowed to dry out for sufficient period before carrying out the plaster work. The masonry shall not be soaked but only damped evenly thereafter before applying the plaster.

In case of concrete work, projecting blurs of mortar formed due to the gaps of joints in shuttering shall be removed. Such surface shall be scrubbed clean with wire brushes. The surface shall be pock marked with a pointed tool at spacing of not more than 50 mm centers, the pocks being made not less than 3 mm deep to ensure a proper key for the plaster. The surface shall be washed off and cleaned of all oil, grease etc. and well wetted before the plaster is applied.

4.2 SEQUENCE OF OPERATIONS

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For external plaster, the plastering operations shall be started from the top floor and carried downwards. For internal plaster, the plastering may be started wherever the building frame, roofing, and brick work are ready.

The surfaces to be plastered, shall first be prepared as described in "Preparation of background surface' in clause no 4.1

The first under layer shall then be applied to ceilings. After the ceiling plaster is complete and scaffolding for the same removed, plastering on wall shall be started.

After a suitable time interval as detailed under various types of plaster in subsequent para's, depending upon the type of mortar, the secondary layers if required shall be applied. After a further suitable time interval as detailed under various type of plaster in subsequent paras, the finishing coat shall be applied first to the ceiling and then to the walls.

Plastering of cornices, decorative features, etc. shall be completed before the finishing coat is applied. Unless otherwise specified corners and edges shall be rounded off to a radius of 25mm, such rounding off shall be complete along with the finishing coat to prevent any joint marks showing out later.

4.3 SCAFFOLDING/STAGING

Scaffolding/staging for plastering/pointing shall be as per "Technical Specification for Civil and Structural Work'.

4.4 DAMAGE RECTIFICATION

Any cracks, damages, any part of work which sound hollow when tapped or found damaged or defective otherwise shall be cut out in rectangular shape and redone as directed by Engineer-in-charge.

4.5 CHICKEN WIRE MESH

150mm wide, closely knit , 20 gauge chicken wire mesh stretched tight and fixed with G.I. "U" type nails shall be provided at all the brick/stone masonry and RCC joints.

5.0 PLAIN CEMENT PLASTER

5.1 PREPARATION OF MORTARS

The mortars of specified mix. shall be used as per the specifications of 'Cement Mortar' described in clause no. 3.4

5.2 APPLICATION OF PLASTER

5.2.1 ONE LAYER PLASTER WORK

To ensure even, specified thickness, plaster of 150 mm x 150 mm shall be first applied horizontally and vertically at not more than 2 meter interval over the entire surface to serve as gauges. The surface of these gauged areas shall be truly in the plane of the

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finished plaster surface. The mortar shall be brought to true surface by working with a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally the surface shall be finished off true with a trowel or wooden float to obtain a smooth texture. Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical/ horizontal and shall be carefully finished. Rounding or chamfering of corners, arises, junctions etc. shall be carried out with proper templates to the size required.

In suspending the work, the plaster shall be left, cut clean to line, both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped clean and wetted before plastering the adjoining area. Plastering work shall be closed on the border of the wall and nearer than 150 mm to any corners or arises and shall not be closed on the body of the features such as plaster bands, cornices nor at the corners or arises.

5.2.2 TWO LAYER PLASTER WORK

a. First or Under Layer

The first or under layer of the specified thickness shall be applied as described in clause no. 5.2.1. Before the first coat hardens, surface of it shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days depending upon weather conditions. The surface shall not be allowed to dry during this period.

b. Second or Finishing Layer

The second layer shall be complete to the specified thickness in the same manner as for first layer.

5.3 CURING

Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of 7 days. During this period the plaster shall be suitably protected from all damages at the contractor's expense by such means as approved by the Engineer-in-charge. The date of execution of plastering shall be marked on the plastering to ensure the proper duration of curing.

6.0 SAND FACE PLASTER

6.1 PREPARATION OF MORTAR

The mortar of specified mix shall be used as per the specifications of cement mortar described in clause no. 3.4.

6.1.1 APPLICATION OF PLASTER

Sand face plaster shall consist of 13 mm thick (1 cement: 4 coarse sand by volume) under layer and 7 mm thick (1 cement: 2 coarse sand, granule size 2 to 2.5mm by

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volume) top layer. Application of plaster shall be as described in "two coat plaster work' in clause no. 5.2.2.

The surface of the sand face plaster shall be finished rough with sponge or as directed by the Engineer-in-charge.

6.1.2 CURING

Curing shall be described in clause 5.3

7.0 EXPOSED AGGREGATE FINISH

7.1 PREPARATION OF MORTAR

The mortar of specified mix shall be used as per the specifications of cement mortar described in clause no. 3.4. White and coloured marble chips shall be of 6 mm to 12mm size out of Makrana/Ambaji, grade I or Dongri Chittor Brown/Rajnagar/Abu green grade-1 quality as specified. Marble dust shall be obtained from crushing hard marble stone.

7.1.1 APPLICATION OF PLASTER

Exposed aggregate finish plaster shall consist of 12mm thick plain cement plaster under layer (1 cement: 4 coarse sand by volume) finished rough and 20 mm thick top layer. Under layer shall be applied in accordance with "One layer plaster work' described in clause no. 5.2.1.

Top layer shall be 20 mm thick admixture of white cement and grey cement (mix. ratio 1:1 by volume) mixed with white/coloured marble chips/pebbles of 6mm to 9mm nominal size as per item description. Mix ratio shall be 1 cement: 1 marble chips/pebbles by volume. Marble dust @ 15% by volume shall be added to the admixture. The pebbles to be used shall be well washed and drained. The admixture shall be thrown wet on to the underlayer while it is still plastic using strong whipping motion at right angles to the face of the wall. One coat of neat cement slurry @ 2.75 kg cement per square metre of area shall be applied on to the underlayer to receive the top layer. The whole plastering shall be laid in panels of maximum 1.2 M x 1.2M or as per drawing with 12mm x 20mm grooves in between formed by holding removable wooden battons of 12mmx x 25mm size over the under layer.

Loose mortar etc. on the top surface shall be cleaned/removed by brushing/washing/spraying with water jet after initial setting of mortar.

7.1.2 CURING

Curing shall be as described in Clause no. 5.3

8.0 POINTING

Pointing shall be of the type specified such as flush, cut or weather struck, raised and cut etc.

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8.1 PREPARATION OF BASE SURFACE

The joints shall be raked to such a depth that the minimum depth of the new mortar measured from either the sunk surface of the finished pointing or from the edge of the brick shall be less than 20 mm.

8.1.1 MORTAR

Mortar shall be in accordance with the specifications of cement mortar described in clause no. 3.4

8.1.2 APPLICATION OF MORTAR AND FINISHING

The mortar shall be pressed into the raked out joints with a pointing trowel according to the type of pointing specified. The mortar shall be spread over the corner edges or surfaces of the masonry. The pointing shall then be finished with the pointed tool. The superfluous mortar shall be cut off from the edges.

8.1.3 FLUSH POINTING

The mortar shall be pressed into joints and shall be finished off flush and levelled. The edges shall be neatly trimmed with trowel and straight edges.

8.1.4 CUT OR WEATHER STRUCK POINTING

The mortar shall first be pressed into joints. The top of the horizontal joints shall then be neatly pressed back by about 15 mm with the pointing tool so that the joint is sloping from top to bottom. The vertical joint shall also be similarly pointed. The junctions of vertical joints with the horizontal joints shall be at true right angles in case of brick & coursed rubble masonry.

8.1.5 RAISED AND CUT POINTING

This type of pointing shall project from the wall facing with its edges cut parallel so as to have a uniformly raised band about 6 mm and width 10 mm more as directed. The pointing shall be finished to a smooth but hard surface.

8.1.6 CURING

Curing shall be as described in clause no. 5.3

9.0 MEASUREMENT & RATE

The description of each item, unless otherwise mentioned includes wherever necessary all material, conveyance and delivery, handling, loading/unloading, storing, fabrication, hoisting, all labour for finishing the work, preparation of background surface, staging/scaffolding, application, finishing, removal of staging/scaffolding, curing and other incidental charges. The rate for item rate tenders shall be for all heights and at all heights of work.

9.1 PLASTERING & POINTING

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Thickness of the plaster shall be the minimum thickness at any point on a surface and shall be exclusive of the key i.e. grooves or open joints in masonry. No extra payment shall be allowed for extra thickness of plaster done by contractor, drip moulds, rounding of edges etc.

For item rate tenders, all plastering/pointing shall be measured in square meters unless otherwise specified. Length, breadth and height shall be measured correct to 0.1 meters. Soffits of stairs shall be measured as plastering on ceiling. Ceiling with projected beams shall be measured over beams and plastered side of beam shall be measured and added on ceiling.

Deductions and additions shall be made in the following manner.

a. No deductions shall be made for ends of joists, beams, posts, openings not exceeding 0.5 Sq.m. area and no addition shall be made for reveals, jambs, soffets etc. of these openings mortar finish to plaster around ends of joists, beams, posts etc.

b. Deductions for openings exceeding 0.5 Sq.m but not exceeding 3 Sq.m each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings.

i. When both faces of wall are plastered with same type of plaster, deduction shall be made for one face only.

ii. When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deduction shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals in lesser, but no deduction shall be made on the other side. Where widths of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made.

iii. When only one face is plastered, full deduction shall be made from plaster if width of reveal on plastered side is lesser. But if widths of reveal on both sides are equal or more on uplastered side, no deduction shall be made.

c. In case of openings of area above 3 Sq.m each, deduction shall be made for openings but jambs, soffits, and sills shall be measured.

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Energising Quality

VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION
FOR
ROOF TREATMENT

VCS-SS-CS-6044

03	31.01.2022	NV	GDS	HK	GW
02	28.02.2020	NV	GDS	RKB	SK
01	16.10.2019	MA	MO	AD	SK
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REVISION RECORD						
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ABBREVIATION

m	Metre
mm	Millimetre
Kg/sqm	Kilogram Per Square Metre
gm/Sqm	Gram per Square Metre
Sqm	Square Metre
PCC	Plain Cement Concrete

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1.0 SCOPE

This specification covers the general requirements for all types of roof treatment in all type of building.

2.0 REFERENCES

As mentioned in the respective clauses.

3.0 POLYURETHANE (PU) WATERPROOF COATING

3.1 MATERIAL

PU waterproof coating shall consist of 2 pack clear/pigmented Aliphatic Polyurethane using Polyether Polyols (Polyster or Castor oil based Polyols are not acceptable) with Iso-cynorate for rendering flame resistant characteristic. The 2 pack system consisting of pigment and the solvent (Xylene/Toulene, no filter) shall be mixed in definite ratio by weight strictly as per approved Manufacturers specification for preparing the coating for application. The coating shall have physical features like high resistance to impact, abrasion and cracking, superior tensile strength (80 Kg/Sq.cm after 4 weeks at ambient temperature) and perfectly smooth, dust free glossy finish retained at least up to 3 years. It should also be resistant to acid, alkalies and have a very low water absorption rate (0.5 % maximum at ambient temperature after 7 days)

The packs shall not be older than 9 months after the date of manufacture and packing.

3.2 WORKMANSHIP

3.2.1 PREPARATION OF SURFACE

The roof surface shall be thoroughly cleaned with a wire brush and all foreign matter etc. shall be removed. Well defined cracks on the surface shall be cut to "V" section, cleaned and filled up with a paste of 2 component Polyurethane based crack filling compound and white cement in a ratio of 1:2.

3.2.2 PRIMER COAT

It shall consist of 2 packs Polyurethane. Primer coat shall be mixed in the ratio as per Manufacturer’s specification. A single coat of this primer shall be applied by brush over the prepared bed as an adhesion coat. The primer shall be allowed to dry for a minimum of 8 hours time before the successive finishing coats of PU are applied.

3.2.3 FINISHING COAT

The finishing coats shall consist of three successive pigmented sealing coats each of 2 packs Polyurethane mixed in the ratio as per Manufacturer's specification. Application shall be with brush to a smooth and even finish. The overall dry film thickness shall be 450 microns or minimum covering capacity shall be 160 gm/Sqm per coat. Each coat shall be allowed to dry for minimum 12 hours before applying next coat. Care shall be taken for quick application after mixing the 2 pack primer in view of short pot life of the

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mix and shall be fully consumed within the stipulated period as per Manufacturer's specification (maximum 60 minutes at 30 deg. C).

The PU coating shall be continued up the parapets/walls for a minimum of 150mm over the finished roof surface.It shall be continued into rain water pipes by atleast 100mm.The final coat of PU when tacky shall be sprinkled with 300 micron layer of clean sand. Plain cement concrete (1:2:4) of 25mm minimum thickness with 24 SWG chicken wire mesh shall be laid to slope in panels of maximum 1.2m x 1.2m size over this. The joints between panels shall be raked out neatly (after stipulated curing period) to a minimum 6mm X 6mm V groove and filled up with an approved quality elastomeric compound sealant. Drain outlet shall be provided for all spouts/rain eater pipes by suitable rounding, filling and sloping of PCC as per drawing. At the junction of the roof and parapet or any other vertical surfaces, a fillet of 75mm radius shall be formed in cement concrete (1:2:4).

4.0 MEASUREMENT & RATE

This clause shall be applicable for item rate tenders only

The finished work shall be measured in Sqm. of area for the purpose of payment in item rate.

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Energising Quality

VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION

FOR

WHITE WASHING, COLOUR WASHING, DISTEMPERING, PAINTING AND POLISHING

VCS-SS-CS-6045

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03	31.01.2022	NV	GDS	HK	GW	VCS QMS Integration

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ABBREVIATION

m	Metre
mm	Millimetre
Sqm	Square Metre
Kg	Kilogram
gm	Gram
IS	Indian Standard

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1.0 SCOPE

This specification covers the general requirements for all types of white washing, colour washing, distempering, painting and polishing.

2.0 REFERENCES

Reference shall be made to the following Indian Standards for further information etc. not covered in the specification. In case of conflict/contradictions provisions of the specification shall override.

IS: 6278	:	Code of practice for white washing and Colour washing.
IS: 2395	:	Code of practice for painting concrete, masonry and plaster Surfaces.
IS: 712	:	Specification for building limes.
IS: 55	:	Specification for Ultramarine blue for paints.
IS: 63	:	Specification for whiting for paint and putty.
IS: 427	:	Distemper, dry, Colour as required- Specification
IS: 428	:	Washable Distemper Specification
IS: 5411	:	Specification for plastic Emulsion paint for interior use.
IS: 2338	:	Code of practice for finishing of wood, and wood based Materials.
IS: 5410	:	Cement paint, Colour-Specifications
IS: 2524	:	Code of practice for painting nonferrous metals in buildings.
IS: 384	:	Brushes, paints and varnishes, flat-Specifications
IS: 486	:	Specification for Brushes, sash, tool, for paints and varnishes.
IS: 110	:	Ready mixed paint, brushing, grey filler enamels for use Over primers.
IS: 426	:	Paste filler for colour coats.
IS: 345	:	Wood filler, transparent liquid.
IS: 3585	:	Ready mixed paint, aluminium brushing priming water Resistant for wood work.

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IS: 426	:	Paste filler for colour coats.
IS: 106	:	Ready mixed paint, brushing, priming for enamels, for use on metals.

All materials required for the execution of painting work shall be obtained direct from approved manufacturers and shall be brought to the site in makers drums, bags etc. with seals unbroken.

In case of ready mixed paints, thinning if necessary, the brand of thinner shall be as per recommendations of the manufacturer.

Paint shall be applied by brushing or spraying. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer. During painting, every time after the paint has been worked out of the brush bristles, the bristles shall be opened up by striking the brush suitably.

Spray machine used may be of high pressure type or low pressure depending on the nature and location of work. After work, the brushes shall be completely cleaned of paint and shall be hung in a thinner if intended to be used afterwards. The spray guns shall be cleaned thoroughly after every break in work. The paint containers, when not used shall be kept close and free from air.

After the finishing of work, the adjacent surfaces not intended to be washed/ distempered/painted/polished shall be thoroughly cleaned of all paint patches and shall be finished in accordance with surface finishing of such surfaces.

3.0 WHITE WASHING

White washing in general shall conform to IS: 6278.

3.1 WORKMANSHIP

3.1.1 SCAFFOLDING

Wherever scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white/ colour washed. For white washing of ceiling, proper stage scaffolding shall be erected.

3.1.2 PREPARATION OF SURFACES

The surface shall be thoroughly cleaned of all dirt, dust, mortar dropping and other foreign matter before white wash is to be applied .Surfaces already white/colour washed shall be broomed down to remove all dust, dirt, loose scales of lime wash or other foreign matters.

All damaged portions of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the joints in masonry properly. Such portions shall be wetted and allowed to dry before any operation.

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All holes, cracks, patches etc. not exceeding 0.1 sq. m. in area shall be made good with material similar to that of the surface. Surfaces affected by efflorescence, moss, fungi, algae, lichen etc. shall be treated in accordance with IS: 2395.

3.1.3 PREPARATION OF WHITE WASH

The fat lime conforming to IS: 712 shall be slaked at site and shall be mixed and stirred with about 5 litres of water for 1 kg. of unslaked lime to make thin cream. This shall be allowed to stand for a period of 24 hours and then shall be screened through a clean coarse cloth. 4 kg of gum dissolved in hot water shall be added to each cubic metre of lime cream. Approved quality ultermarine blue conforming to IS 55 @ 3 gram per kg. of lime shall also be added to the solution. The whole solution shall be stirred thoroughly before use.

3.1.4 APPLICATION

White wash shall be applied with "MOONJ" brush to the specified number of coats .The operation for each coat shall consist of stroke of the brush from the top to down wards, another from the down to upwards over the first stroke, similarly one stroke horizontally from right and another stroke from the left. Each coat shall be allowed to dry before the next coat is applied. The white washing on ceiling should be done prior to that on walls.

3.1.5 PROTECTIVE MEASURES

Surfaces of doors, windows, floors etc. which are not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

4.0 COLOUR WASHING

4.1 WORKMANSHIP

4.1.1 SCAFFOLDING

Scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white/ colour washed. For white washing of ceiling, proper stage scaffolding shall be erected.

4.1.2 PREPARATION OF SURFACE

Surface shall be thoroughly cleaned of all dirt, dust, mortar dropping and other foreign matter before white wash is to be applied. Surfaces already white/colour washed shall be broomed down to remove all dust, dirt, loose scales of lime wash or other foreign matters.

All damaged portions of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the joints in masonry properly. Such portions shall be wetted and allowed to dry before any operation.

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All holes, crackes, patches etc. not exceeding 0.1 Sqm. in area shall be made good with material similar to that of the surface. Surfaces affected by efflorescence, moss, fungi, algae, lichen etc. shall be treated in accordance with IS: 2395.

4.1.3 PREPARATION OF COLOUR WASH

Sufficient quantity of colour wash enough for the complete job shall be prepared in one operation to avoid any difference in colour. The basic white wash solution shall be prepared in accordance with clause 3.1.3. Mineral colours of approved shade and quality not affected by lime shall be added to the white wash solution in proportions as directed by Engg.in-charge. Solid lumps etc. in the colour powder shall be ground to fine powder, sieved and mixed evenly and thoroughly to the white wash solution.

4.1.4 APPLICATION OF COLOUR WASH

Colour wash shall be applied with "MOONJ" brush to the specified number of coats. The operation for each coat shall consist of stroke of the brush from the top to down wards, another from the down to upwards over the first stroke, similarly one stroke horizontally from right and another stroke from the left. Each coat shall be allowed to dry before the next coat is applied. The white washing on ceiling should be done prior to that on walls.

4.1.5 PROTECTIVE MEASURE

Surfaces of doors, windows, floors etc. which are not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

5.0 DRY DISTEMPERING

5.1 WORKMANSHIP

5.1.1 SCAFFOLDING

Scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white/ colour washed. For white washing of ceiling, proper stage scaffolding shall be erected.

5.1.2 PREPARATION OF SURFACE

The surface shall be thoroughly brushed free from dust, dirt, grease, mortar droppings, other foreign matter and shall be made smooth by sand papering.

In case of distempering over existing distempered surface, the existing distempering shall be scrapped by steel scrappers leaving a clean surface.

All nails shall be removed. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of colour to be used. The surface then shall be rubbed down again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed.

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The surface affected by moss, fungus, algae, efforescense shall be treated in accordance with IS: 2395.

5.1.3 PRIMING COAT

A priming coat of whiting conforming to IS 63 shall be applied over the prepared surface. The priming coat shall be prepared by mixing 2.5 kg. of whiting and one litre of glue solution (prepared by mixing 250 gm. glue conforming to IS: 852 with boiling water) together and placing it in a covered vessel with enough water to cover the mixture which shall be left to cool until it becomes a jelly.

Priming coat shall be applied with "MOONJ" brush to the specified number of coats. The operation for each coat shall consist of stroke of the brush from the top to down wards, another from the down to upwards over the first stroke, similarly one stroke horizontally from right and another stroke from the left. Each coat shall be allowed to dry before the next coat is applied. The white washing on ceiling should be done prior to that on walls.

5.1.4 PREPARATION OF DISTEMPER

The dry distemper of approved shade and quality conforming to IS: 427 shall be stirred slowly in clean warm water using 0.6 liters of water per kg. of distemper. It shall be allowed to settle for at least 30 minutes before applying. The mixture shall be well stirred before and during use to maintain an even consistency.

5.1.5 APPLICATION OF DISTEMPER

After the priming coat has dried for at least 48 hours, the surface shall be lightly sand papered and dusted off avoiding rubbing off of the priming coat. Prepared distemper shall then be applied in minimum two coats with proper distemper brushes in horizontal strokes immediately followed by vertical ones which together shall constitute one coat. The subsequent coats shall be applied only after the previous coat has dried. The finished surface shall be even and uniform without patches, marks, distemper drops etc. The application of a coat in each room shall be finished in one operation. After each day's work, brushes shall be thoroughly washed in hot water and hung down to dry.

5.1.6 PROTECTIVE MEASURE

Surfaces of doors, windows, floors etc. which are not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

6.0 OIL BOUND DISTEMPERING

6.1 WORKMANSHIP

6.1.1 SCAFFOLDING

Same as in clause no. 5.1.1

6.1.2 PREPARATION OF SURFACE

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Preparation of surface shall in general be in accordance with clause no. 5.1.2 except that any uneveness shall be made good by applying putty made of plaster of paris mixed with water including filling up the undulation and then sand papering the same after it is dry.

6.1.3 PRIMER COAT

The primer coat shall be alkali resistant primer or distemper primer and shall be of the same manufacture as oil bound distemper.

If the wall surface plaster has not dried completely, alkali resistant primer otherwise distemper primer shall be applied. The mixture of alkali resistant primer shall be prepared as per approved manufacturer's instructions.

The application of primer coat shall be in accordance with 5.1.3

6.1.4 PREPARATION OF OIL BOUND DISTEMPER

The distemper shall conform to IS: 428 and shall be diluted with water or any other prescribed thinner recommended by the manufacturer.

6.1.5 APPLICATION OF DISTEMPER

After the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered and dusted off avoiding rubbing off of the primer coat. Minimum two coats of distemper shall be applied with brushes in horizontal strokes followed by immediate vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks drops etc. Application of a coat in each room shall be finished in one operation. 14 cm double bristled distemper brushes shall be used. After each days work brushes shall be thoroughly wahsed in hot water with soap solution and hung down to dry.

6.1.6 PROTECTIVE MEASURES

Same as in clause no. 5.1.6

7.0 WATERPROOF CEMENT PAINT

7.1 WORKMANSHIP

7.1.1 SCAFFOLDING

Same as in clause 5.1.1

7.1.2 PREPARATION OF SURFACE

Preparation of surface shall be in accordance with clause no. 5.1.2. The surface so prepared shall be thoroughly wetted with clean water before the paint is applied.

7.1.3 PREPARATION OF PAINT

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Waterproof cement paint of approved make shall be mixed with water and stirred to obtain a thick paste which shall then be diluted to brushable consistency. The proportion of mixture shall be as per manufacturer's recommendation. The paint shall be mixed in such quantity which can be used up within an hour of mixing to avoid setting and thickening of the paint.

7.1.4 APPLICATION OF PAINT

The surface shall be treated with minimum two coats of waterproof cement paint. No less than 24 hours shall be allowed between two coats and subsequent coats shall be applied only after the preceding coat has become hard to resist marking by subsequent brushing.

The finished surface shall be even and uniform in shade without patches, brush marks, paint drops etc. Cement paints shall be applied with a brush with relatively short stiff hog or fibre bristles.

7.1.5 CURING

Curing shall be started after the paint has hardened. Curing shall be done by sprinkling with water two or three times a day. This shall be done between coats and for at least two days following the final coat.

7.1.6 PROTECTIVE MEASURE

Same as in clause in 5.1.6

8.0 PLASTIC EMULSION PAINTING

8.1 WORKMANSHIP

8.1.1 SCAFFOLDING

Same as in clause 5.1.1

8.1.2 PREPARATION OF SURFACE

Same as in clause 6.1.2 under specification of oil bound distempering.

8.1.3 PREPARATION OF PAINT

Plastic emulsion paint shall conform to IS: 5411 (Part-1) and shall be of approved shade. Preparation of paint shall be as per manufacturer's instructions.

8.1.4 APPLICATION OF PAINT

The paint mix shall be continuously stirred while applying for maintaining uniform consistency. Number of coats shall be as specified. The painting shall be laid evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area with paint, brushing the surface hard at first, then brushing alternately in opposite direction 2 to 3 times and then finally brushing lightly in a

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direction at right angles to the same. In this process, no brush marks, no hair marks no clogging of paint puddles shall be permitted. The full process of crossing and laying off will constitute one coat. The paint shall be applied by means of brush or roller.

Before starting painting with plastic emulsion paint, the prepared surface shall be treated with two coats of primer consisting of cement, primer, whiting and plastic emulsion paint shall start only after the preceding coat has become sufficiently hard to resist brush marking. Subsequent coats of plastic emulsion paint shall also be started after the preceding coat is dried by evaporation of water content.

The surface on finishing shall present a flat, velvety smooth finish, even and uniform shade without patches, marks, paint drops etc.

8.1.5 PRECAUTIONS

a. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush. Old brushes, if used shall be completely dried of turpentine/oil paints by washing in warm soap water.

b. No oil base putties shall be used in filling cracks/holes.

c. Washing of painted surface shall not be done within 3-4 weeks of application.

8.1.6 PROTECTIVE MEASURES

Same as in clause 5.1.6

9.0 ACRYLIC COPOLYMER AGGREGATE FINISH

9.1 MATERIAL

It shall be an acrylic based textured wall coating consisting of quartz and silica aggregate, inorganic pigments and other additives to form a crack free, flexible, tough, waterproof coating.

9.2 PREPARATION OF SURFACE

The surface to be coated shall be cleaned and all dirt, dust, grease and loose particles shall be removed. Any old textured surface shall be removed with removing agent as per manufacturer's instructions.

9.3 APPLICATION

Bonding agent and water shall be mixed first. Then the flakes/granules shall be added and mixed thoroughly and kneaded till no lumps are found. The dough shall be left for 20-30 minutes before starting application. The bonding agent, flakes/granules and water shall be mixed in different ratios for different finishes as per manufactuer's specifications.

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The first application shall be by steel trowel. It shall be smoothened, if the specified finish requires, by a plastic trowel.

10.0 PAINTING OF WOOD WORK

10.1 PREPARATION OF SURFACE

Preparation of wood surface shall conform to IS: 2338 (Part-1) in general. All woodwork shall be dry and free from any foreign matter. Nails shall be punched well below the surface. The surface shall be smoothened off with abrasive paper used across the grain prior to painting, with the grain prior to the staining. Any knots, resinous or bluish sap wood, cutting out of which is not justified shall be covered with red lead conforming to IS: 103.

Plywood and block board shall be treated in the same manner as for wood work.

Particle boards surface shall be filled with a thin brushable filler and finished as for solid wood.

10.2 PRIMING

Priming shall be in accordance with IS: 2338 (Part I and II). Dirt or any other extraneous material on the surface shall be removed and the priming shall be applied by brushing.

Priming shall be done on all exposed and unexposed surfaces. Unless specified otherwise all joinery work intended to be painted shall receive atleast 2 coats of primer. Type of primer shall be in accordance with Table-1 and Table-2 of IS: 2338 (Part-II).

10.3 STOPPING AND FILLING

Stopping and filling shall be done after priming. Stopping shall be made to the consistency of stiff paste and shall be used to fill holes and cracks. Filler shall be used to level up slight irregularities of the surface. Filler shall be applied with a putty knife and subsequently rubbed down to a level surface with abrasive paper.

The filler coat shall be allowed to fully flatten and harden before subsequent coat is applied.

10.4 APPLICATION OF UNDERCOAT

Under coat shall be applied after the surface has been primed, stopped and filled, and rubbed down to a smooth surface. Under coat may be brushed or sprayed. After drying the coat shall be carefully rubbed down and wiped clean before the next coat is applied.

The type of undercoat shall be depending upon the finishing and in accordance with Table 1 and Table-2 of IS: 2338 (Part II).

10.5 FINISHING

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The finishing paint shall be as specified and shall be applied either by the brush or by spraying.

Reference shall be made to the Table-1 and Table-2 of IS: 2338 (Part-II)

10.6 APPLICATION OF CLEAR FINISHES

For the application of clear finishes, the following procedures shall generally be adopted in accordance with IS: 2338 (Part-I).

a. Filling

b. Staining

c. Sealing

d. Finishing

10.6.1 FILLING

Fillers shall be applied to prevent the excessive penetration of the finish to the surface for obtaining a smooth finish. Fillers shall be conforming to IS: 345.

Fillers shall be heavily applied to the wood surface by hand, using hessian or jute rag across the grain. It shall be rubbed when still wet to get better penetration. After 5-10 minutes it shall be wiped off by hand across the grain followed by a light wipe with the grain. The filled surface shall be dried preferably over night and smoothened with abrasive paper.

10.6.2 STAINING

10.6.2.1 Spirit Stains

Spirit stains are solutions of spirit soluble dyes in Industrial methylated spirit.

10.6.2.2 Oil Stains

Oil stains are solutions of oil soluble dyes in linseed oil, but, usually consist of insoluble, semi-transparent pigments ground in linseed oil and thinned with turpentine or other solvent.

10.6.2.3 Preparation of Wood for Staining

Surface intended for staining shall be kept scrupulously clean and free from greasy finger marks. It shall be prepared by careful smoothing with fine abrasive paper used in the direction of the grain. Small cracks/nail holes shall be stopped with plastic wood/fine plaster of paris. The stopping shall be rubbed down with fine abrasive paper when hard and touched with a thinned knotting before staining. In case of oil staining stopping shall be done after staining using tinted putty or wood filler.

10.6.2.4 Application of Stains

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Stains shall be applied by brushing and wiping or by spraying. The stain shall be so thinned that it can be applied fairly, liberally without over staining and over lapping.

10.6.3 SEALING

A suitable sealer shall be applied on the filled and sanded surface to prevent absorption by the wood of the succeeding coats of finish and to seal stain and filler and thus preclude their bleeding into the finish coat.

Sealer may be sprayed on taking care not to flood the surface and it shall be allowed to dry hard. When fully dry the surface shall be sanded taking care not to cut through at corners and edges. Dust shall be blown off and surface wiped with a clean rag.

10.6.4 FINISHING

The stained surface shall be varnished, wax-polished or french polished as required after it is dried.

10.6.4.1. Varnishing

Varnishing of wood and wood based material shall be in accordance with IS: 2338 (Part-I).Surfaces to be Varnished shall be prepared to produce a smooth, dry and matt surface and all dust and dirt shall be removed from the surface.

The Varnish shall be applied liberally with a brush and spread evenly over a portion of the surface with short light strokes to avoid frothing. It shall be allowed to flow out while the next section is being laid in. Excess Varnish shall be scraped out of the brush and then the first section be crossed, re- crossed and laid off lightly. The Varnish, once it has begun to set, shall not be retouched. In case of any mistake, the Varnish shall be removed and the work shall be started afresh.

Where two coats of varnish are applied, the first coat shall be a hard drying under coating or flatting varnish which shall be allowed to dry hard and then be flatted down before applying the finishing coat. Sufficient time shall be allowed in between two coats.

When flat varnishing is used for finishing, a preparatory coat of hard drying undercoating of flatting varnish shall first be applied and shall be allowed to harden thoroughly. It shall then be lightly rubbed down before the flat varnish is applied. On larger areas, the flat varnish shall be applied rapidly, and the edges of each patch applied shall not be allowed to set, but shall be followed up whilst in free working conditions.

10.6.4.2 French Polish

French polish shall conform to IS: 348. Suitable pigments shall be added to get the required colour. The surface to be French polished shall be rubbed down to

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smoothness with sand paper and shall be well dusted. Pores in the surface shall be filled up with fillers.

A pad of woollen cloth covered by a fine cloth shall be used to apply the finish. The pad shall be moistened with polish and rubbed hard on the surface in a series of overlapping circles applying the polish sparingly but unifomly over the entire area to give an even surface. A trace of linseed oil may be used on the face of the pad for the purpose. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cloth, slightly damped with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture and high gloss.

11.0 PAINTING OF STEEL AND OTHER METAL SURFACE

11.1 GENERAL

Reference shall be made to IS :2524 and IS: 1447.

11.2 PREPARATION OF SURFACE

The surface, before painting, shall be cleaned of all rust, scale, dirt and other foreign matter with wire brushes, steel wool, scrappers, sand paper etc. The surface shall then be wiped finally with mineral turpentine which shall then be removed of grease etc. The surface then shall be allowed to dry.

In case of GI surface, surface so prepared shall be treated with Mordant solution (5 litre for about 100 Sqm.) by rubbing the solution generously with brush. After about half an hour, the surface if required shall be retouched and washed down thoroughly with clean cold water and allowed to dry.

11.3 APPLICATION OF PRIMING AND PAINTS

Approved quality primer and paint in specified numbers of coats shall be applied as per manufacturer's recommendations either by brushing or spraying. Each subsequent coat shall be applied only after the preceding coat has dried.

12.0 MEASUREMENT AND RATE

This clause shall be applicable for item rate tenders only.

For item rate tenders, all work shall be measured in areas. Areas shall be worked out to the nearest 0.01 sq. m and all dimensions to the nearest 0.01 metre.

Deductions shall be made in accordance with Specification no. VCS-SS-CS-6043.

For item rate tenders, rate shall include the cost of all materials, labour, scaffolding, protective measures etc. and all works involved in specification. The rate shall also include, if not mentioned otherwise, conveyance, delivery, handling, unloading, storing etc.

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VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION

FOR

FALSE CEILING, FALSE FLOORING, UNDERDECK INSULATION & PARTITIONING

VCS-SS-CS-6047

03	31.01.2022	NV	GDS	HK	GW
02	28.02.2020	NV	GDS	RKB	SK
01	16.10.2019	MA	MO	AD	SK
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ABBREVIATION

m	Metre
mm	Millimetre
Sqm	Square Metre
IS	Indian Standard
BS	British Standard
C/C	Center to Center
Kg/m^2	Kilogram Per Square Metre
M.S.	Mild Steel
PVC	Poly Vinyl Chloride

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1.0 SCOPE

This specification covers the general requirements for all types of false ceiling, false flooring, underdeck insulation & partitioning in all type of building.

2.0 REFERENCES

IS: 3087	Particle Board of wood and other Lignocellulosic materials medium density for general purpose -Specification
IS: 1642	Code of practice for fire safety of building (General)
IS: 2095	Gypsum plaster Boards - Specifications
IS: 12406	Medium density fibre boards for general purpose
IS: 848	Synthetic Rasin adhesive for plywood
BS: 476	Fire test on Building and structural materials
BS: 4370	Method of test for rigid cellular materials

3.0 FALSE CEILING GRID SYSTEMS

3.1 GALVANISED STEEL GRID SYSTEM

Galvanized Steel grid system shall be erected for the purpose of supporting Mineral fibre false ceiling tiles.

3.1.1 MATERIAL

a. Main Runner

Main runner shall be of hot dipped galvanized steel and T' shaped of 24 mm x 38mm size and 0.33mm thickness with double rotary stitching with backed polyester coating (min 25 micron) on the cap of flange.

b. Cross Runner

Cross runner shall be of hot dipped galvanized steel and 'T' shaped of 24 mm x 30mm size,0.25mm thickness, 1200mm long and 24 mm x 25mm size , 0.25mm thickness,600mm long with double rotary stitching with backed polyester coating (min 25 micron) on the cap of flange.

c. Perimeter Section

Material shall be same as runners. Sections shall be 22mm x 22mm size of 0.45mm thickness. Exposed areas of all the metallic members shall be powder coated (25micron).

3.1.2 ERECTION

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Main Runners shall be placed at the spacing of max. 1200 mm c/c. Cross runners shall be fixed @ max. 600 mm c/c to obtain a grid of 600mm x 600mm.

The grid shall be suspended by means of 4mm dia MS wire,6mm thick MS cleat of 25mm x 25mm section, dash fasteners and level adjustors.

The overall grid system shall be rigid by self locking joints, in accordance with false ceiling patterns, perfectly levelled and aligned at desirable height as per drawings.

3.2 ALUMINIUM GRID SYSTEM

Aluminum grid system for supporting false ceiling tiles shall be of approved make and shall be perfectly leveled, aligned at desired height and in accordance with the false ceiling pattern as per drawings.

3.2.1 MATERIAL

a. Main Runner

Main Runners shall be of extruded anodized (25 micron) aluminum Tee Sections of 25 mm x 35 mm size (approved make), 2.5mm thick.

b. Cross Runner

Cross Runners shall be of extruded anodized (25 micron) aluminum Tee Sections of 25 mm x 25 mm size (approved make), 2.5mm thick.

c. Perimeter Section

Perimeter sections shall be of extruded anodized (25 micron) aluminum angle Sections of required size.

3.2.2 ERECTION

The grid system shall be assembled by interlocking the main and cross runners @ 600 mm max. both ways by means of Aluminum angle cleats. The main runners shall be suspended from the ceiling by means of 3 mm thick MS flat clamp fixed to main runners @ 1200 mm max. and fixed to 6 mm dia MS hook which again is fixed to the ceiling. 3 mm thick MS flat clamp shall be connected to main runner with 25 mm long MS clamp with leveling nut and @ 1200 mm maximum. The MS hooks shall be suspended from the ceiling by means of slotting in 25 mm x 25mm x 3 thick MS angle, fixed to the stab by 12 mm dia Dash fasteners @ 1200 mm c/c.

The overall grid system shall be rigid, in accordance with false ceiling pattern, perfectly leveled and aligned at desirable height.

3.3 GI GRID SYSTEM

3.3.1 MATERIAL AND WORKMANSHIP

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a. Wall Channels

Wall channels shall be made of 0.5 mm thick GI of size 27 mm, one flange 20 mm and the other 30 mm. Wall channels shall be fixed to peripheral walls by rawl plugs/dash fasteners @ 450 mm c/c.

b. Intermediate Channels (main runners)

GI intermediate channels shall be 0.9 mm thick, of size 45 mm and with two flanges of 15 mm each. The intermediate channels shall be suspended from the ceiling @ 1200 mm with 25 mm x 0.5 mm GI hanger bolted to the channel and fixed to the ceiling (by means of bolting to GI cleat fixed to the ceiling with dash fasteners).

c. Ceiling Sections (Cross runners)

GI channel shaped ceiling sections shall be 0.5 mm thick having a knurled Web of 51.1 mm and two flanges of 26 mm each with lips of 10.5 mm. The ceiling sections shall be fixed to the intermediate channels in perpendicular direction at 450 mm C/C with the help of connecting clips.

GI grid system for supporting false ceiling tiles shall be perfectly leveled, aligned at desired height in accordance with false ceiling pattern.

4.0 FALSE CEILING TILES

The tiles shall be placed in position over the supporting grid system by means of hold down clips at four corners of each tiles and one in Centre of each side. The finished false ceiling shall be perfectly leveled and aligned, at desired height as per drawings.

Necessary Electrical & AC and other fixtures shall be provided as per drawing and in coordination with relevant construction activities.

4.1 MINERAL FIBRE TILES

Mineral fibre false ceiling tiles shall be with durable tegular edging having NRC value of min. 0.50,Light reflectance value of min. 80%,K value of 0.052 to 0.057 w/m deg. C and fire performance conforming to class I as per BS : 476.The tiles shall be of 600 mm x 600 m x 15 mm size. The tiles shall have fissured or granulated texture on the front side as specified. Back side shall be provided with protective coating.

4.2 PARTICLE BOARD TILES

Particle board tiles shall be made of teakwood particle board conforming to IS: 3087 (3 layer flat pressed particle board bonded with BWP type phenol Formaldehyde Synthetic resin and as per IS: 848, categorized as class- I for ' Surface of very low flame spread ' as per IS: 1642, treated with antifungus chemicals)

The tiles shall either be painted or laminated as specified. Lamination shall be 0.5 mm thick and of approved quality, shade and texture fixed by hot press method and shall conform to BS 476, Part -7. The tiles shall be painted at the bottom surface (Facing the floor) with two coats of approved colour acrylic emulsion paint (of approved make)

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after sanding off the surface with 120 grit sand paper and applying particle board primer. The other surfaces shall be painted with 2 coats of linseed oil varnish.

Tile sizes shall be 600mm x 600 mm x 12 mm and all four edges of the tiles shall be painted with a coat of approved quality primer.

4.3 GYPSUM BOARD TILES

Gypsum board shall conform to IS: 2095.The Gypsum boards used for false ceiling shall have following properties.

a.	Thermal Conductivity	-	0. 16W/mk
b.	Thermal Resistance.		
i.	For 9.5 mm thick board	-	0.06Sq.MK/W
ii.	For 12.5 mm thick board	-	0.08Sq.MK/W
iii.	For 15 mm thick board	-	0.09 Sq.MK/W
c.	Fire Propagation		
i.	Fire Propagation		
	Index of performance	-	Not exceeding 12 and a sub index not exceeding 6 (when each side is tested separately to BS 476, Part -6)
ii.	Surface spread of flame	-	Class 1 (both sides) as per test to BS 476 Part -7).

Gypsum boards shall be of specified thickness and of specified finish (painted with Plastic Emulsion paint/ Laminated with 0.5mm thick lamination). The Gypsum board shall be screw fixed to the underside of false ceiling grid system with 12.5mm dia dry wall screw @ 230 mm C/C by drilling machine, Joints in the board shall be finished flush with fillers, finisher and primer as per manufacturer's recommendation to give a seamless finish.

5.0 UNDERDECK INSULATION

5.1 MATERIAL

Underdeck insulation shall be of phenolic foam rigid slab of 25mm thickness and approx. 1000mm x 500mm size as specified and shall conform to IS: 13204. It shall have density of 32 kg / M3 and K Value 0.016 KCal/hr M°C as per BS 4370, Part 2. The insulation shall be classified as ' Non Combustible ' as per BS 476, part 5 and ' Class I' for surface spread of flame as per BS 476, part 7. It shall be prelaminated on both sides with kraft paper.

5.2 WORKMANSHIP

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The entire soffit of slab and beams shall be thoroughly cleaned. Bituminous primer or zinc chromate primer shall be applied evenly @ 0.5 kg/m2 over the entire surface. Hot bitumen or CPRX adhesive shall then be applied on the insulation panel @ 1.5 kg/m2. The panels shall be pressed in position and further secured by dash fasteners.

The underdeck insulation shall be fixed only after all fixtures like hooks, clamps, cleats etc. for light fixtures, ducts etc. have been fixed in the ceiling.

6.0 CAVITY (FALSE) FLOORING (WITH METAL TRAY)

6.1 MATERIAL

a. Pedestal base plate

Pedestal base plate shall be made of galvanized Mild steel and shall be of 100 mm x 100 mm size and 3mm thick. It shall have stiffening folds as per drawing.

b. Pedestal stud

Pedestal stud of 19 mm I.D. and 3 mm thickness shall be made of galvanized mild steel seamless pipe.

c. Top -head attachments

Top head attachments shall be made of pressure die cast aluminum alloy disc of 2.5 mm thickness, having channel shaped projections in all 4 directions and 4 pin heads on top as per drawing to receive panels. A fully threaded bright red of 19 mm I.D. shall be fitted to underside of top head and inserted into base pipe stud.

d. Channel stringers

Channel stringers shall be galvanized, machine cut, cold rolled mild steel channels of size 18.5 mm x 18.5 mm and 2.5 mm thickness.

e. MDF board floor panels

Floor panels shall be of dense, homogeneous, medium density fibre boards manufactured from agrobased lignocellulosic fibres conforming to IS-12406, exterior grade bonded with synthetic resin conforming IS: 848, BWP type and categorized as class-I for 'Surfaces of very low flame spread' as per IS-1642. It shall be of 18 mm thickness and of size 610 mm x 610 mm in general.

The floor panels shall be fixed with screws onto MS bottom tray of 1.2 mm thickness die formed to shape as per drawing.

The floor panels shall be finished on top with antistatic type PVC tiles or laminate as specified and along four sides with hard PVC lipping as per drawing.

6.2 WORKMANSHIP

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False flooring pattern shall be as per approved drawing. Pedestal base plates shall be fixed to the base floor by dash fasteners as per the grid.

The pedestal stud locations shall ensure the grid work as per flooring pattern which in general shall be of 610 mm x 610 mm dimension. The length of the pedestal studs shall be such that clear cavity between false flooring and base flooring is of desired depth.

The threaded bright rod with the top head attachments shall be inserted into the studs and shall be adjusted to obtain proper level of the finished floor panels by means of the adjustment nuts.

Stringer channels then shall be fitted onto the top heads in position to form the supporting grid work for the floor panels checking the level once again by adjusting the nut position if necessary. Now the check nut shall be finally tightened to secure the final level. Floor panels as specified shall be placed over the stringer channels and top head disc in such a manner that the holes in MS tray fit into the pin heads on discs.

Each floor panel shall be marked with positional numbering on the underneath. The finished floor panels shall be perfectly leveled, aligned without any gaps in between the panels.

Each individual panel shall be removable for the purpose of maintenance of the cavity.

Necessary cut-outs shall be made in the panels for cable routing, control panel fixation etc. as per dwg.

Necessary ramps, slopes, steps etc. shall be also provided for as per dwg.

Around a control panel/rack, the residual space left out shall be filled up with cut panels of uniform size as required to fully close the gap between the adjacent full panel and the control panel base channel. In this case the part floor panel shall extend up to the full width of the base channel and the cut size shall be determined accordingly. An additional row of jack pedestals shall be provided along the cut out on which the edge of the floor panel shall rest and over which the base channel of control panel shall be placed. It shall not directly rest on the jack head pedestal or grid channels.

The cavity between false flooring and base floor shall be properly cleaned and made dust free. The floor shall be finally coated with polyurethane based coating. The finished false flooring shall be able to serve for a distributed load of 1250 kg/m2.

7.0 CAVITY (FALSE) FLOORING (WITH PARTICLE BOARD)

7.1 MATERIAL

a. Pedestal base plate

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Pedestal base plate shall be made of galvanized Mild steel and shall be of 100 mm x l00 mm size and 8mm thick.

b. Pedestal stud

Pedestal stud of 30 mm dia shall be made of galvanized mild steel seamless pipe. The stud shall have threading at top and bottom for attaching the top head attachment and fixing to base plate.

c. Top-head attachments

Top head attachments shall be made of pressure die cast aluminum alloy of shape and thickness as per drawing. The top head attachment shall be provided with check nuts at bottom portion for attaching the top head threading in the stud allowing for adjustment upto 25mm up & down.

d. Channel stringers

Channel stringers shall be galvanized, machine cut, cold rolled mild steel channels of size 40 mm x 40 mm and 3.15 mm thickness.

e. Particle board floor panels

Floor panels shall be of unveneered, 3 layer flat pressed, teakwood particle board conforming to IS: 3087 bonded with BWP type phenol formaldehyde synthetic resin conforming IS: 848 and categorized as class-I for 'Surfaces of very low flame spread' as per IS: 1642. It shall be of 35 mm thickness and of size 610 mm x 610 mm in general.

The floor panels shall be finished on the underneath side with 0.05mm thick Aluminum foil turned up and extended by minimum 12mm along the perimeter.

The floor panels shall be finished on top with antistatic type PVC tiles or high pressure laminate as specified and along four sides with hard PVC lapping as per drawing.

12mm x 12mm x 75mm long, 2mm thick Aluminum channel cleats shall be provided on middle of four sides of the panels for lateral stability.

7.2 WORKMANSHIP

False flooring pattern shall be as per approved drawing. Pedestal base plates shall be fixed to the base floor by 6mm dia, 40mm long dash fasteners as per the grid.

The pedestal stud locations shall ensure the grid work as per flooring pattern which in general shall be of 610 mm x 610 mm dimension. The length of the pedestal studs shall be such that clear cavity between false flooring and base flooring is of desired depth.

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The top head attachments shall be inserted into the studs and shall be adjusted to obtain proper level of the finished floor panels by means of the adjustment nuts.

Stringer channels then shall be fitted onto the top heads in position to form the supporting grid work for the floor panels checking the level once again by adjusting the nut position if necessary. Now the check nut shall be finally tightened to secure the final level. Floor panels as specified shall be placed over the stringer channels.

Each floor panel shall be marked with positional numbering on the underneath. The finished floor panels shall be perfectly leveled, aligned without any gaps in between the panels.

Each individual panel shall be removable for the purpose of maintenance of the cavity.

Necessary cut-outs shall be made in the panels for cable routing, control panel fixation etc. as per drawing.

Necessary ramps, slopes, steps etc. shall be also provided for as per drawing. Around a control panel/rack, the residual space left out shall be filled up with cut panels of uniform size as required to fully close the gap between the adjacent full panel and the control panel base channel. In this case the part floor panel shall extend upto the full width of the base channel and the cut size shall be determined accordingly. An additional row of jack pedestals shall be provided along the cut out on which the edge of the floor panel shall rest and over which the base channel of control panel shall be placed. It shall not directly rest on the jack head pedestal or grid channels.

The cavity between false flooring and base floor shall be properly cleaned and made dust free. The floor shall be finally coated with polyurethane based coating. The finished false flooring shall be able to serve for a distributed load of 1250 kg/Sqm.

8.0 PARTITIONING & PANELLING

8.1 MS FRAME

MS frame for Partitioning & Paneling shall consist of horizontal & vertical members of 18SWG 52mm X 38mm MS sections. The members shall be welded to each other at maximum 600mm c/c both ways. The frame shall be fixed to the floor/ceiling/wall with GI roullete plug, screw and washers & 300mm maximum c/c. The members shall be provided with one coat of red oxide zinc chromate primer.

The frame-work arrangement shall be in accordance with the pattern for partition including doors/windows etc.

8.2 GYPSUM BOARD FOR PARTITIONING & PANELLING

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Gypsum boards for partitioning & paneling shall be 12.5mm thick and same as specified in clause no. 3.3

Number of Gypsum board layers (single skin or double skin) shall be as specified and with finishing (painting or lamination) as specified.

Frame work along the edges shall be concealed with partition/panel boards. Necessary cutouts for electrical, AC, return air etc. and other fixtures shall be provided in the boards. Glazing if any shall be fixed with putty and wooden headings.

8.3 LAMINATED PARTICLE BOARD FOR PARTITIONING & PANELLING

Particle board for partitioning/paneling shall be 12mm thick and shall be same as in clause no. 3.2.

Number of Particle board layers (single skin or double skin) shall be as specified and with finishing (painting or lamination) as specified.

Frame work along the edges shall be concealed with partition/panel boards. Necessary cutouts for electrical, AC, return air etc. and other fixtures shall be provided in the boards. Glazing if any shall be fixed with putty and wooden beadings.

9.0 MEASUREMENT AND RATES

This clause shall be applicable for item rate tenders only.

For item rate tenders, False ceiling/flooring, Insulation, Partition, Paneling shall be measured in Sqm. correct up to two places of decimal. Dimensions shall be measured correct upto 0.01m.

No deduction shall be done for cut outs for fixtures, cables etc. up to 0.18 Sq.m in area. No extra shall be paid for providing such cutouts.

Rate for item rate tenders shall include all materials, labour, transport, conveyance, erection, storage, other incidental expenditures involved in carrying out the items.

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STANDARD SPECIFICATION
FOR
ACID PROOF TILE LINING

VCS-SS-CS-6048

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ABBREVIATION

m	Metre
mm	Millimetre
Sqm	Square Metre
IS	Indian Standard
BIS	Bureau of Indian Standards
ASTM	American Society for Testing And Materials

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1.0 SCOPE

This specification covers the requirement of material and laying of Acid Proof tile lining for flooring on acid storage areas.

2.0 REFERENCES

IS: 4832 (Part-I)	:	Specification for Chemical resistant mortar silicate type
IS: 4832 (Part-II)	:	Specification for Chemical resistant mortar Resin type
IS: 4860	:	Specification for Acid resistant bricks
IS:9510	:	Specification for Bitumen, Mastic Acid Resisting Grade
ASTM D41-94	:	Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and waterproofing

Note: - Latest edition of IS shall be followed.

3.0 MATERIAL

3.1 ACID PROOF TILES

The Tiles shall conform to IS: 4860 - Class I quality. All tiles shall be dense, homogeneous and manufactured out of special raw material which shall have low lime, flint, sand and iron contents. These shall be specially fired and vitrified at high temperature to have qualities of low absorption. The size of the tiles shall normally be 230mm x 115mm or as per IS: 4860. The thickness shall be as specified in the item.

3.2 ACID PROOF MORTAR

3.2.1 SILICATE MORTAR

It shall consist of selected potassium silicate solution and inert filter powder. Both mixed well to enable to set at ambient temperature. The mortar shall conform to IS: 4832 (Part - I). The mixing proportion and other instructions for use shall be as specified standard manufacturers."Cement Proctor S.W.K" manufactured by Corromondal Prodorite or equivalent may be used. This type of Mortar is resistant to most acids except hydro-fluoric acid and concentrated ortho-phosphoric acid; they are not resistant to alkalis of any concentration or to boiling water or stream.

3.2.2 RESIN MORTAR

The furane and phenolic mortar for jointing consist of inert powder synthetic resin syrup. No water shall be used during mixing. This mortar shall conform to IS: 4832 (Part - II). The mixing proportion and other instructions shall be as specified by standard manufacturers. "Furacin" and "Phencil" manufactured by Corromondal Prodorite or equivalent may be used. This type of Mortar has a good resistance to non-oxidizing mineral acids, and poor resistance to oxidizing mineral acids. They are fairly resistant to inorganic alkalis and water.

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3.3 BITUMEN PRIMER

A bitumen primer is an asphalt based material thinned with petroleum solvent (conforming to ASTM D-41) should be applied over the surface. Primers from standard manufacturers only shall be used.

3.4 BITUMEN MASTIC

The bitumen mastic shall consist of a mixture of asphalt cement mineral filler, and mineral aggregate, which are acid alkali proof. The composition, preparation and properties of the bitumen mastic shall be as per IS: 9510 for resisting acid. The bitumen mastic shall be insoluble in Benzol and the matter soluble in diluted hydrochloric acid should not be more than five percent. "Prodorphalte" by Coromandal Prodorite or equivalent may be used.

4.0 LAYING

4.1 SURFACE PREPARATION

a. All damaged or questionable areas should be chipped out and replaced.

b. Adequate floor slope for good drainage is important.

c. Low spot should be avoided because finished floor will follow contour or sub floor.

d. Concrete should be dry, clean and well cured before application of membrane is started.

4.2 PRIMER APPLICATION

A bitumen primer should be applied over the prepared surface. It should be allowed to dry before applying the membrane material.

4.3 MEMBRANE APPLICATION

Bitumen mastic is used to build up the membrane. It is heated to 120-205°C and applied to the primed surfaces. Multiple coat application should be made to thickness requirements. The thickness of the mastic layer shall be to suit the acid concentration and expected load or as specified by the Engineer-in-charge. Each coat should be inspected for blisters and pinholes. If present, they should be broken and before applying subsequent coats. Bitumen mastic should not be used as the membrane material where solvents are involved.

4.4 REINFORCEMENT APPLICATION

Bitumen coated glass cloth can be used for membrane reinforcements at the corners, edges, walls, etc. depending on the requirements.

4.5 APPLICATION OF MORTAR AND BRICKS

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There are two ways of lining Acid resisting linings:

4.5.1 WHEN BEDDING AND JOINTING MATERIAL ARE THE SAME.

A thin layer of about 3mm suitable resinous mortar is spread on the back of the acid proof tiles and the tiles are pressed down on the bed. Suitable joint thickness of about 3mm should be maintained. Jointing is done with suitable resin mortar.

4.5.2 WHEN BEDDING AND JOINTING MATERIAL ARE DIFFERENT

A thin layer of about 6mm suitable silicate type mortar is spread on the back of the acid proof tiles and the tiles are pressed down on the bed. Proper joint thickness of about 3mm should be maintained and filled up with suitable resin type mortar. In case of pointing the joint thickness should be 6mm and depth of the pointing should be 19mm.

In this case, joints with silicate mortar should be acid cured with 20 to 25 percent hydrochloric acid or with 30 to 40 percent sulphuric acid before applying the resin type mortar. After acid curing, the free acid in the joints shall be cleaned with water and sufficient time should be allowed for thorough drying. After curing resin mortar is used for filling up the joints.

5.0 GUARANTEE

The Vendor shall give material and performance guarantee for a period of minimum one year from the date of commissioning of the plant.

6.0 PAYMENT

This clause shall apply to item rate tender only.

6.1 Payment shall be on square meter basis of area covered.

6.2 The payment clause(s) as described in the clause no. 6.1 shall not be referred / applicable for LSTK Jobs.

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1.0 LIST OF VENDORS

Unless otherwise specifically mentioned in the Schedule of Items, Contractor has to use materials as listed below, of only these brand names/Company's names, which are mentioned in the approved list for civil, structural, architectural, water supply and sanitary items thereon.

SL No.	Items/Name of Products	Makes / Brands / Manufacturers
1.	Reinforcement Steel	TATA,SAIL,RINL,IISCO,RATHI, JINDAL
2.	Cement	Ambuja, ACC,JK,Grasim,Ultratech,Birla,L&T,Cement Corporation of India, Maihar
3.	Chemical for Antitermite treatment	DE- NOCIL Bombay, Pest Control of India, Trishul
4.	Flush doors	Archidply Merino flush doors Greenply Century Plyboards (i) Limited
5.	PVC Panel Door	Rajshri Plastiwood Limited, Sintex, Plasopan
6.	Al Section for Al Door/ Window/ Partitions	Hindalco, Bhoruka, Jindal
7.	Aluminium Door/ Window/ Glazing Fabricated and Anodized	M/s Ahlcon M/s Alumilite Pvt Ltd, M/s Ajit India Pvt Ltd, M/s Argent Industries
8.	Aluminium door and windows Fittings	Godrej & Boyce Everite Agencies (P) Ltd Golden Industries
9.	Automatic Glass Door	Ditec (Gandhi), FAAC, Ozone
10.	Aluminium Grill	Alu Grill, Arihant Aluminium Corporation, Decogrille
11.	Door Closer	Everite, Golden, Gandhi, Godrej, Dorma
12.	Builders Hardware	M/s Golden Industries Pvt. Ltd., Everite, M/s Godrej, Dorma
13.	Plywood for general purpose	Merino Plywood, Archid Ply, Century Ply, Green Ply
14.	Pre laminated Particle board	Century, Greenlam, Archid ply, Merino
15.	Laminated Sheets	Merino, Greenlam, Century
16.	Modular Partitions	Godrej, Blowplast
17.	Partitions of Composite sandwich panel of FR	Aerocon, Everest

	boards.	

18.	False Ceiling (Calcium Silicate Board)	Aerolite, Ramco Hilux, Everest
19.	False Ceiling (POP/ Gypsum Board)	Gypboard, Saint Gobain, USG Boral
20.	Glazed Ceramic Tiles, Non-Skid (Floor/Wall), (1st quality only)	Kajaria, Somany, NITCO, Johnson (Marbonite), Orient, Asian, RAK
21.	Vitrified/ Designer Vitrified Tiles (1st quality only)	Kajaria, Somany, NITCO, Johnson (Marbonite), Orient, Asian, RAK
22.	PVC Tiles/Flooring (IS 3461) (1st quality only)	Armstrong, Wonder floor, Bhor Industries
23.	Designer Paver Tiles/ Interlocking tiles ISI marked/ Grass-jointed Tiles (1st quality only)	Pavit, Ultra, Hindustan, Eurocon, Vyara, Unistone, Konkrete
24.	Vitrified Clay Tile	Unistone, Eurocon, Dazzle
25.	Wall care Putty for Base preparation (1st quality only)	Birla Wall care putty, Berger, Jenson & Nicholson, JK White
26.	White Cement (1st quality only)	Birla, JK
27.	Cement based Paints (1st quality only)	Super Snowcem, Duracem, Super Acrocem.
28.	Dry Distemper / Oil bound Distemper (1st quality only)	Goodlass Nerolac Paint, Shalimar Paint, Jenson & Nicholson, Asian Paint, Berger. ICI Dulux
29.	Acrylic Washable Distemper (1st quality only)	Asian, Berger, ICI Dulux, Jenson & Nicholson, Nerolac, Shalimar
30.	Plastic Emulsion Paint (1st quality only)	Asian, Berger, ICI, Nerolac, Jenson & Nicholson, Nerolac, Shalimar
31.	Exterior Acrylic Emulsion (1st quality only)	ICI (Weathercoat), Excel (Nerolac), Apex (Asian), Berger, Jenson & Nicholson

32.	Synthetic Enamel Paint (1st quality only)	ICI Paint, Asian Paint (Apcolite), Berger Paints. Goodlass Nerolac Paints (Nerolac)
33.	Textured Paint / Wall Tile	Unitile, Heritage, Spectrum, Iokos, Acropaints, Asian

	(1st quality only)	
34.	Integral water proofing compound	STP, Pidilite, Fosroc, CICO, Sika, Chryso
35.	Water proofing for cementitions surface IS-2645	Acrocrete & Acrocote, CICO, Fosroc, STP, Sika, Chryso
36.	Bituminous Product	M/s Faridabad Spinning & Woolen Mills Pvt Ltd, 837, SP Mukherjee Marg Delhi, M/s STP Ltd (Formerly Shalimar Tar Products) M/s Bitufelt Pvt Ltd 123/377 Fazalm Ganj Kanpur 208012, Texas, Texas India Ltd, Multiplas, IWL Chennai
37.	Hardeners	Ironite, Ferrok, Hardonate
38.	Construction Chemicals	Choksey, CICO, Forsroc, Sika, STP Limited, Chryso
39.	Non Metalic Surface Hardners	CICO, Fosroc, STP, Sika
40.	Corrugated, Semi Corrugated & AC Sheets (IS-459-1970,IS-2098)	M/s Everest Bldg Products Ltd Jata Sankar Bosa Marg Muland (west) Bombay 400080, M/s Ramco AC Sheets “SWASTIK”, M/s Eternit Everest Ltd, UP Asbestos Ltd
41.	Sheet Glass /Structural Glazing	Saint Gobain, Modi, AIS, Asahi
42.	Stainless Steel Cladding	Jindal, Koncept Steel Pvft. Ltd., Alps
43.	Punch Tape Concertina Coil	Global Technocrat, S.G.Engineers Delhi
44.	Punch Tape In Plastic Spool	Global Technocrat, S.G.Engineers Delhi
45.	Stainless Steel Railing	Jindal, Koncept, Indiana, Kich, Ozone
46.	FRP/ HDPE Garbage Bins	Sintex, Swift, Nutech, Sheetal
47.	Thermoplastic Road	Shalimark (STP)

	Marking Paint	
48.	Bollard	STP, Ace Polymers, FAAC, Pioneer Swift
49.	Cateye	TATA, STP, Pioneer Swift, Unicorp
50.	Readymade Speed Breaker	STP, Ace Popymers, Pioneer Swift
51.	Sanitary ware	Kohler, HSW, Jaquar, Cera, Parryware
52.	WC seat cover ISI	Kohler, HSW, Jaquar, Cera, Parryware
	Marked	

53.	PVC Flushing Cistern IS: 774-1984 (ISI Certified)	Kohler, HSW, Jaquar, Cera, Parryware
54.	Faucets & Taps, Stop Valves & Pillar Taps, Surgical basin mixer, Shower rose and other CP fittings	Kohler, HSW, Jaquar, Cera, Parryware
55.	Kitchen Stainless Steel Sink	Diamond, Nirali, Neel Kanth, Jayna
56.	Looking Mirror	Saint Gobain, Modi, AIS, Asahi
57.	Float Valve	Leader, Bombay Metal & Alloy Co, Bombay superflow.
58.	SGSW Pipes (IS-651) ISI Marked	Perfect Agra, Devraj Ind Gaziabad, Buran, RK, Prince, Supreme pipe and Fittings, M/s Perfect Jabalpur
59.	CI (Centrifugally Cast) Pipes for sewage disposal ISI marked	NICCO, SRIF, A-1 Singhal Casting Co Agra, Jindal Saw, Kesoram, NECO, SKF/ CIF and any other brand having ISI marking
60.	PVC rain water/sewage pipes (IS-4985)	Reliance, Finolex, Supreme, Kisan, Prince
61.	HDPE Water storage tanks (Rotational Moulded)	Sintex, Swift, Nutech, Sheetal
62.	AAC Blocks	Biltech, Ecolite, Birla Aerocon
63.	Cast Iron Pipes and Fittings	Hindustan Engineering Products Company Calcutta, S..L.C., Standard approved manufacturers of any other brand of fittings having ISI marking,RIF,BIS
64.	RCC Pipes	Indian Hume Pipe Company, Delhi / Allahabad / Chandigarh / Lucknow; Hindustan Pressure Pipes, Kolhapur; Dhere Concrete Products, Pune or any other approved manufacturer conforming B.I.S.

		Standard
65.	Brass Fittings	Leader Engineering Works, Jalandhar; L & K Mathura; Luster Sanitary, Jalandhar; Annapurna Metal Works, Calcutta; Neta Metal Works, Jalandhar; Honey Industrial Corporation, Bombay.
66.	C.P. Fittings	Ego Metal Works, Ballabhgarh; Jaquar Industries, Delhi; Soma Plumbing Fixtures Limited, Calcutta; Gem Sanitary Appliances Pvt. Ltd.,Delhi; Essco Sanitations, Delhi; Bilmet, Bombay.
67.	Stone Ware (Salt-Glazed) Pipes	Hind Ceramics Limited, Orissa; Ceramic Industries Limited, Sambalpur; Shrikamakshi Agencies,

		Madras; Binary Udyog Pvt. Limited, Howrah; Tirumati Moulds Limited, Nagpur; Kiran Potteries, Hyderabad; Perfect Sanitary Pipes, Bharatpur.
68.	Asbestos Cement Pipes and Fittings	Ganga Asbestos Limited, U.P.; Hyderabad Asbestos Cement Products Limited; J.K. Super Pipe Industries, Nanded; Konark Cement and Asbestos Limited, Orissa; Maharashtra Asbestos Limited, Bombay; Poddar Industrial Corporation, Patna; Sarbamangala Mfg. Company, Calcutta
69.	HDPE pipes and fittings	ORI-PLAST,HASTI
70.	False flooring	Unitile, Unifloor, Hewetson
71.	Eye wash	Tobit Engineers, Euronics
72.	Structural Steel	SAIL / RINL / IISCO / TATA / ESSAR / JSPL / ISPAT / JSW
73.	Sheeting	Tata Blue Scope, JSW Steel Ltd., Interarch, Lloyd Insulation, Multicolor
74.	Electrodes	ESAB, Advani, D&H India, Ador, Maruti MW Wiretec
75.	Paint	Akzo-Nobel, Asian Paint, Kansai Nerolac Paints, Berger Paints, ICI Paint (Deluxe), Shalimar Paint (Superlac)

MATERIALS NOT SPECIFIED

Any materials not fully specified in these specification and which may be offered for use in the works shall be subject to approval of Engineer, without which it shall not be used anywhere in the construction works.