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HINDUSTAN PETROLEUM CORPORATION LIMITED

GURU GOBIND SINGH REFINERY PRODUCTS EVACUATION PROJECT (GGSRPEP)

SPECIFICATIONS FOR FLOORING WORK

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1.0 SCOPE

This specification covers the requirement of providing labour, material, construction aids, workmanship etc. for providing and fixing flooring, skirting and dado work on floors and walls.

2.0 APPLICABLE CODES

Note: - Wherever reference is made to IS Codes, on any page of this Technical Specification (including annexures), applicable year of publication of IS Code is as stated below.

Following specifications will be considered as part of this specification:

IS 383-1999	: Coarse and fine aggregate from natural sources for concrete.
IS 1237-1980	: Cement concrete flooring tiles.
IS 1443-1972	: Code of practice for laying and finishing of cement concrete flooring tiles.
IS 2114 -1984	: Code of practice for laying in-situ terrazzo floor finish
IS 2571-1970	: Code of practice for laying insitu cement concrete flooring.
IS 2386-1963 (Part 1 - Part 8)	: Methods of test for aggregates for concrete.
IS 3461-1980	: Specification for PVC asbestos floor tiles.
IS 3462-1986	: Specification for unbacked flexible PVC flooring.
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 4457-1982	: Specification for ceramic unglazed vitreous acid-resistant Tiles.
IS 4631-1986	: Code of practice for laying epoxy resin floor toppings.
IS 4832	: Specification for Chemical Resistant Mortars.
Part-1: 1969	: Part-1 Silicated type.
Part-2: 1969	: Part-2 Resin type.
Part-3: 1968	: Part-3 Sulphur type
IS 4971	: Recommendations for selection of Industrial floor finishes.
IS 5318-1969	: Code of practice for laying of flexible PVC sheet and tile flooring.
IS 5491-1969	: Code of practice for laying in-situ granolithic concrete flooring topping.
IS 13712 -1993	: Ceramic tiles -definitions, classifications, characteristics and marking
IS 13630 : (Part	: Ceramic Tiles – Methods of test



1 to 13)-1993

- IS 13753 -1993 : Dust-pressed ceramic tiles with water absorption of E 10% (group B III)
- IS 13754 -1993 : Dust-pressed ceramic tiles with water absorption of 6% E 10% (group B IIb)
- IS 13755 -1993 : Dust-pressed ceramic tiles with water absorption of 3% E 6% (group B IIa)
- IS 13756 -1993 : Dust-pressed ceramic tiles with water absorption of E 3% (group B I)

3.0 PRIORITY OF REQUIREMENTS

In case of any variation and discrepancy in condition between the special conditions, this specification and codes, order of priority shall be as under:-

- (1) Special conditions
- (2) This specification
- (3) Codes

4.0 TYPES OF FLOORING

Various types of flooring and linings materials / systems are used for floor finishing over base floor, rigid / flexible viz. concrete, metal, stone, wood, etc., for different types of applications viz. Industrial, Non-industrial.

Although plain concrete Base floor as laid conforming to IS 2571 would be satisfactory for many purposes, Various types of floor hardening / topping / coating / lining are applied to improve physical, mechanical, and chemical properties of the base floor to desired extent.

5.0 INDUSTRIAL FLOORING

Generally in Industrial Flooring the purpose of flooring, is one or more combination of following requirements

- (a) For heavy duty floors, this is subject to heavy loads, severe abrasion and impact
- (b) For dust free and clean environment
- (c) For chemical and corrosion resistance

Further classification based on material / system used is stated in the subsequent paragraphs.

6.0 METALLIC FLOORING

For all Industrial plant floors subject to heavy loading, plants requiring dust proof and wear resistant floors, use of Metallic floor replaces the brittle, dusty granular properties of a plain cement floor with toughness, ductility and wear resistant properties of the Metallic surfaces.



6.1 Artificial Patent Stone (APS) Flooring

Artificial Patent Stone (APS) Flooring shall be laid in overall thickness of 40mm over sub base and shall conform to IS: 5491 in workmanship.

Base layer shall be 25mm thick in M15 grade concrete and wearing layer shall be 15mm thick in 1:3 (1 cement: 3 coarse sand by volume)

Base layer shall be laid over sub base in alternate panels in desired shape and pattern. Each panel shall not exceed 1.5m in width. Panel shall be bound by 3x30 PVC strip panel dividers, fixed in position with their top at proper level maintaining the required levels, slopes, linearity, etc. as required. Before laying the base course, neat cement slurry @ 2.75 kg of cement per sq. meter of area shall be applied by brush over the prepared sub base. The border of the panel shall have metered joints at the corner of the room and intermediate joints shall be in straight line with panel joints. 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.

Wearing layer shall be laid within 15 minutes of laying base layer. The cement and aggregates for the top layer shall be mixed dry. After mixing, sufficient 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. 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 Sq.M of floor area shall be mixed with water to form 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.

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

Skirting shall be 18 mm thick laid with cement mortar (1 cement: 3 coarse sand by volume). The surface on which the skirting is to be applied shall be prepared and skirting 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 meter 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. The skirting shall be cured for 7 days.

6.2 APS Flooring with Ironite Topping (Heavy Duty Flooring)

Heavy Duty Flooring shall be laid in overall thickness of 50mm over sub base and shall conform to IS: 5491 in workmanship.



Base layer shall be 35mm thick in cement concrete (1 cement: 1.5 coarse sand: 3.5 stone aggregates of 10mm to 6mm size by volume). Base layer shall be laid over sub base in alternate panels in desired shape and pattern. Each panel shall not exceed 1.5m in width. Panel shall be bound by 3x30 PVC strip panel dividers, fixed in position with their top at proper level maintaining the required levels, slopes, linearity, etc. as required. Before laying the base course, neat cement slurry @ 2.75 kg of cement per sq. meter of area shall be applied by brush over the prepared sub base. The border of the panel shall have metered joints at the corner of the room and intermediate joints shall be in straight line with panel joints. 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.

Wearing Top layer/ 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 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.

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

6.3 Readymade Brands

Various brands of metallic floor toppings are available from various manufacturers viz. Euco Plate and Diamond Plate from STP Ltd., Chapdur from Sica Qualcrete Ltd.

7.0 NON-METALLIC FLOORING

Epoxy resins on account of their qualities of adhesion and chemically resistant are used for non-metallic floor topping.

For industrial plant where floors requiring dust reduction and oil resistance, Non-Metallic flooring is recommended. Various brands of Epoxy floor hardeners are available for floor hardening while later is still "Green". Topping, Coating or Lining shall be applied as per the extent of requirements specified by Engineer-In-Charge.

Types and Applications of Epoxy Resin / Non - metallic flooring are stated below.

7.1 Trowel Type

This is usually heavily filled with sand or other suitable aggregate and the compound is applied by trowel. Such compounds are often referred to as mortars or screeds. Application of 5 mm to 6mm thick screed for monolithic, dust free, abrasion resistant, anti skid chemical resistant flooring is recommended to obtain satisfactory performance.



7.2 Flow Type

This is usually a solventless compound containing filler and pigment and the mixture when poured directly on to the surface will flow and level itself often with little assistance to form a smooth continuous coating. Applications of 150 to 300 micron thick coating for abrasion resistant and dust free flooring, and 1.5 mm to 2 mm thick self levelling floor topping for factory floors is recommended.

7.3 Terrazzo Floors

The Portland cement in the conventional terrazzo floors is replaced by epoxy resin binder. Such flooring formulations serve the dual purpose of providing a good appearance and chemical resistance. Minimum thickness recommended is 10 mm.

7.4 Non-skid Floors

This type of floor may be prepared by sprinkling a suitable grit on an epoxy floor topping when the later is still in a tacky state.

7.5 Materials

7.5.1 Epoxy Resin Blend

This shall be based on a liquid epoxy resin (which is usually a condensation product of Bisphenol) with or without constituents such as plasticizers, diluents and special pigments as may be necessary.

7.5.2 Hardener Blend

This shall contain a chemical, usually an amine, and amine - adduct or polyamide which will react with the epoxy resin at ambient temperatures to give a cured thermoset resin product. Hardeners based on amines and amine-adducts exhibit higher chemical resistance than polyamides but polyamide hardeners must be used where floors are exposed to frequent impact stress and fluctuations in temperature

7.5.3 Aggregates

Selected dry aggregates, such as quartz sand or calcined bauxite grit with graded particle size as recommended by the resin manufacturer shall be supplied as a separate component.

7.5.4 Coal Tar

Coal tar extenders are used to lower the cost and increase the flexibility of epoxy resin formulations. Besides, coal tar blending increases the resistance of water although the mechanical and chemical resistance properties are lowered.



Note: The resin, hardener and aggregate shall be mixed in the proportion as specified by the Engineer-In-Charge or Manufacturer's Specification and used as specified in this standard.

7.6 Surface Preparation

To ensure proper adhesion of the Epoxy resin mix, surface shall be cleaned, free from grease and oil, dry and rough.

All laitance shall be removed from concrete surface washing the floor with dilute Hydrochloric Acid. Sand blasting or hacking may be adopted for roughening the surface.

All cracks and broken areas on an existing concrete base shall be sealed / filled with fresh concrete before application of Epoxy resin topping.

Grease and oil shall be removed by washing the surface with solvents such as Acetone or a suitable detergent.

7.7 Laying

7.7.1 Mixing of Epoxy resin blend

The constituents required for a particular epoxy resin topping shall be mixed just before use, in correct proportion specified by the Manufacturer. The order of addition of the components shall be resin, hardener and aggregate (in dry condition) and duration of mixing shall be adequate to ensure thorough mixing.

7.7.2 Application

Application of blended epoxy resin topping shall be done uniformly over the prepared area to give the required thickness. The floor area may be divided in sections to get uniform thickness.

7.8 Manufacturers

For non-metallic flooring, chemical products from various manufacturers are available viz. FOSROC, SICA QUALCRETE MC-BAUCHEMIE, STP. LTD., CHEMBOND etc.

Note: Engineer-In-charge shall approve Product and Manufacturer prior to its use in the works

7.9 Other Types of Industrial Flooring

7.9.1 Acid Resistant Tiles / Bricks

Acid Resistant Tiles are used in flooring and lining to prevent corrosion of surface by acids and other chemicals as well as to resist abrasion on floors. These tiles are made up of materials like clay, feldspar, quartz, and talc and vitrified at high temperatures in ceramic kilns and kept unglazed to prevent slipperiness when laid on floor.

Chemical resistant mortars as per IS 4832 are used for laying these tiles. Laying and finishing procedure similar to the other glazed ceramic tiles described elsewhere.



7.9.2 FRP Grating / Plate Flooring

Fiber glass Reinforced polyester (FRP) Grating / Plate Flooring are available in standard size panels and are suitable for industrial flooring viz. Platform Staircase, Ramps, Catwalk, and Trench covers etc.

7.9.3 Manufacturers

1. CHEMGRATE CORP. of USA FRP Products under Brand names CHEMGRATE, CHEMPLATE, and CHEMTREAD etc.
2. INTERNATIONAL GRATING INC of USA FRP Products under Brand names KORDEK GRATING / PLATE etc.

8.0 NON INDUSTRIAL FLOORING

These are used for non-industrial purpose viz. commercial and residential flooring where light duty, dust free, clean environment and decorative purposes are governing criteria for choosing type of floor finishes. These are described below:

8.1 Plain Cement concrete / Mosaic / Terrazzo Flooring

8.1.1 In Situ Work

Methods commonly adopted for laying In-Situ Terrazzo Finish Surface shall be as per IS 2114.

8.1.2 Tiling Work

Terrazzo/Mosaic tiles shall be of approved colour and size and shall be 25 mm thick unless otherwise specified.

a) Tolerance

Tolerance on length or breadth shall be plus or minus one millimeter and on thickness plus 3 mm.

b) Wearing layer

Minimum wearing layer shall not be less than 5 mm for tiles. Color and texture of the wearing layer shall be uniform throughout its thickness.

c) Resistance to wear

When tested as per IS 1237, the thickness of wearing shall not be more than 3.5 mm for tiles.

The CONTRACTOR shall submit to the Engineer-In-Charge, samples of the tiles proposed to be used for the work and shall obtain his approval before placing the order.



The colour and quality of tiles used in work shall be similar to the sample approved. If after polishing it is revealed that the quality is not the same as per the sample, the work shall be rejected and shall be redone as instructed at the CONTRACTOR's cost.

For odd shaped size, the tiles shall be cut to the required size without damaging the tiles.

d) Laying of tiles

Surface Preparation:

The base courses either P.C.C. or R.C.C. slab shall be brushed with a stiff bristle broom removing all laitance. The brooming shall expose some of the aggregates and roughen the surface adequately to provide a mechanical bond for the topping. The base shall be cleared of any deposition i.e. grease, oil, paint etc. on its surface which will interfere with the bond and thoroughly cleaned of loose particles and dust with water by scrubbing with stiff brush. Foreign substance not removed by scrubbing shall be chipped off. After the base is chipped clean, it shall be saturated with water overnight. If specified, proprietary brand adhesive solution of approved make shall be applied as per manufacturer's specification to the old concrete surface so as to ensure proper bond between old concrete surface and new in-situ topping.

Bedding:

Levels of prepared surface to be checked and verified before starting any bedding work. Mortar pads shall be provided at suitable intervals to establish the level and slope for the tiling work. Minimum 20mm thick under bed of 1:6 cement_mortars spread uniform on the prepared concrete floor base and compacted to proper grade.

The method of laying the tiles shall be in accordance with IS 1443. Before the tiles are laid these shall be soaked in water for about 15 minutes and then allowed to dry out for the same time. Just prior to laying the tiles, cement slurry of the consistency of a thick paint at the rate of 4 kg per square meter shall be spread over a small area of mortar bed at a time and then the tiles shall be set on it in the desired pattern. Each tile shall be gently tapped with wooden mallet till it is properly bedded. As each tile is placed, its surface level shall be checked and any unevenness shall be corrected by rectifying the mortar bed. The tiles shall be laid with the side edges absolutely touching each other so that the joints shall be as fine and imperceptible as possible. After the entire floor of each room is completed, slurry of the same coloured cement as the colour of the tiles shall be spread over the surface and rubbed in so as to seal even the thinnest joints between the tiles and then make the surface impervious. Nobody shall be allowed to walk over the flooring during the first 24 hours. As soon as the cement slurry in the joints has hardened, the surface shall be kept continually wet for at least 7 days.

14 days after laying the tiles, the surface shall be ground smooth with an approved type of grinding machine, with carborundum stones of 48 to 60 grit. The floor shall be kept wet during the grinding process. Materials ground off shall be removed by squeezing and flushing with water.

Any air holes, pits or other blemishes observed in the surface shall then be filled with paste made of 1:2 cement and marble powder and water. After the



patch filler has hardened the floor shall be cured for another 7 days. The surface shall then receive the second and the final grinding with successive grades of carborundum stones of 120 and 220 to 350 grit respectively until a uniformly smooth and even surface is obtained. Finally it shall be thoroughly washed with soap water and mopped clean to the satisfaction of the Engineer-In-Charge.

e) Skirting

The skirting shall be of the same materials as that of the floor tiles and shall be of the exact size specified. It shall be fixed to the wall with cement mortar 1:4 bedding. Grinding and polishing shall be carried out by hand using carborundum of appropriate quality.

f) Applications

For Non plant building floorings.

g) Manufacturers

Various Manufacturers are available. viz. NITCO, KAJARIA , SPARTECH etc.

Note: Sample and Manufacturers shall be approved by Engineer-In-charge prior to its use in the work.

8.2 Stone / Marble / Granite Flooring

Shahabad, Kota, Cuddapah, Stones are readily available in rough or smooth surfaces in tile or slab forms and are generally used for non-industrial and light industrial flooring purposes where rigid, non porous floor finish is required. Where decorative and easier to clean, longer lasting floor finish is required, marble and Granite may be used. Tiles or slabs of marble and granite may be fixed by cement mortar or chemical adhesive to the base floor.

8.2.1 APPLICATION

Stone flooring shall be laid in minimum 40mm overall thickness over sub base. For steps, joints in floor shall be permitted only when width / length is more than 0.6 / 2 meter. Thickness of the stone slabs shall be 25mm for floor and tread & 18mm for dado / skirting. Skirting shall normally be 125mm high unless specified otherwise.

PREPARATION OF BASE

The base courses either P.C.C. or R.C.C. slab shall be brushed with a stiff bristle broom removing all laitance. The brooming shall expose some of the aggregates and roughen the surface adequately to provide a mechanical bond for the topping. The base shall be cleared of any deposition i.e. grease, oil, paint etc. on its surface which will interfere with the bond and thoroughly



cleaned of loose particles and dust with water by scrubbing with stiff brush. Foreign substance not removed by scrubbing shall be chipped off. After the base is chipped clean, it shall be saturated with water overnight. If specified, proprietary brand adhesive solution of approved make shall be applied as per manufacturer's specification to the old concrete surface so as to ensure proper bond between old concrete surface and new in-situ topping.

LAYING

The mortar shall be 15mm thick in 1:6 (1Cement: 6 Coarse sand by volume) for flooring and 12mm thick in 1:3 (1 cement: 3 coarse sand by volume) for skirting. The mortar shall be laid for fixing one slab at a time. The slab shall be washed clean before laying. After laying once over cement mortar bedding, the slab shall be pressed, tapped gently to bring it in level, then lift & laid aside. Top surface of mortar then shall be corrected by adding fresh mortar at hollows & depressions. The mortar shall then be allowed to harden & cement slurry of honey likes consistency @ 4.4 Kg of cement per Sq. M. shall be spread over mortar. The slab edges shall be buttered with white cement (with necessary pigment) grout to match the shade of slabs. The slabs shall then be gently placed in position & tapped with wooden mallets till it is properly bedded in level.

The slabs in flooring shall continue for not less than 10mm under the plaster / skirting.

GRINDING & POLISHING

Grinding (with machine except for skirting & small areas) shall be commenced when the joints are properly set. First grinding shall be done with carborundum stones of 48 to 60 grade grit filled in machine. Water shall be properly used during grinding.

When 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 cement mixed with pigments to match with colour of the stone. This grout shall be kept moist for a weak. Thereafter the second grinding shall be started with Carborundum stone of 120grit. Grinding & 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 surface rubbed with machine fitted Hessian bobs or rubbed hard with woolen rags. The floor shall then be washed clean & dried with a soft cloth or linen.

If any stone slab is disturbed or damaged, it shall be refitted or replaced & properly jointed & polished.

8.3 Ceramic Tile Flooring



Ceramic tiles shall be of approved make, size and shade and shall conform to IS 13756. No cracked, chipped or wrapped tiles shall be used in the works. Surface of the tile can be smooth, profiled, wavy, decorated, glossy, matt, etc.

8.3.1 Surface Preparation

All masonry faces shall be cleaned thoroughly by removing dirt, loose mortar, efflorescence etc. The concrete surfaces shall be brushed to remove all laitance and roughened to provide a bond for the bedding.

8.3.2 Fixing tiles

The masonry and concrete faces shall be given a coat of cement plaster 12 mm thick (in proportion 1:4). The surface of the plaster shall be scarified with wire brush for getting a good bond between the tiles and the bedding.

The tiles shall be soaked in clean water for about half an hour before using. After soaking, tiles shall be removed from water and stacked on clean surface. The back of the tile shall be buttered with 1:2 plastic cement mortar to a thickness slightly in excess of the finished thickness required and the tile pressed to the wall and tapped back in position. Alternatively a rich fatty mortar shall be applied on the bedding and the tile pressed into it, care being taken to ensure that the keys of the tiles are buttered up with mortar.

It shall be ensured that the back of the tile is solid over the whole area. Joints shall be uniform, even, straight and as thin as possible in any case not more than 3.0 mm. Surfaces of tiles having been fixed, the joints shall be cleaned of gray cement and refilled with cement paste of the same shade as that of the tiles. The tiled surface shall be left wet for a period of 7 days.

Glazed rounded corner convex or concave shall be provided where specified and no extra cost will be paid for the same.

After the completion of the work the surface shall be cleaned of all stains etc.

Alternatively tiles may be fixed with Tile Adhesive chemicals of which, various proprietary brands are available. In such case soaking of tile with water before using shall not be done. Manufacturer's specification shall be used for Tile adhesive fixing.

8.3.3 Applications

Generally used for walls and floors of toilets and kitchens etc., where constant risk of spoiling interior finish due to water, is there. Also it can be used elsewhere for decorative surface and clean environment.

8.3.4 Manufacturers

Ceramic Tiles shall be of approved manufacturers such as HR JOHNSON, HINDUSTAN SANITARYWARE, NITKO, KAJARIA or equivalent.



Note: Sample and Manufacturers shall be approved by Engineer-In-charge prior to its use in the work.

8.4 PVC Flooring

PVC Flooring provides dust-free, noise absorbing, resilient, non-porous, decorative surface. The two types of PVC Flooring are as follows:

- (a) Flexible PVC Flooring
- (b) Rigid PVC Flooring

Flexible PVC Flooring is available in sheet form is suitable for lighter traffic. Flexible PVC flooring are not suitable for areas exposed to continuous sun light and rain. Flexible PVC Flooring is liable to be damaged by burning cigarette stumps. Thickness of sheet shall be 2mm unless specified otherwise.

Rigid PVC flooring is available in standard tile sizes such as 300 mm x 300 mm and comparatively more suitable for heavy traffic and rigid floors. Thickness of tile shall be 2mm unless specified otherwise.

The size, type and shade of the tiles shall be as specified and/or as directed by the Engineer-In-Charge and conforming to IS 3461/ IS 3462. PVC Flooring shall be anti-static type.

8.4.1 Adhesive

The adhesive shall be of the type and make recommended by the manufacturer of P. V. C. tiles. Preparation and laying shall be done as per IS 5318.

8.4.2 Surface Preparation

For concrete base floor, surface shall be scraped free of all foreign material and swept clean. Surface shall be kept wet for 24 hours by sprinkling water and then screed topping (1:3 cement mortar) of 3 mm thickness shall be provided over the concrete to get required even and levelled surface. Before laying is undertaken, it shall be ensured that the prepared surface is even and perfectly dry.

8.4.3 Laying

The adhesive shall be spread evenly on the base and on the back of the tiles as prescribed by the manufacturer. Time shall be allowed, for the solvent in the adhesive to evaporate. The tiles shall then be pressed firmly into contact with the surface and smoothed down with a suitable tool. Weights shall be used to avoid tendency of curling. Immediately after, the tiles shall be rolled with 5 kg wooden roller to get the tiles bonded down properly. The tiles shall be laid with butt joints throughout and the joints shall be very fine. After laying, any adhesive sticking to the surface of the tiles shall be removed immediately and shall not be allowed to harden. After a week of laying the surface shall be cleaned with mild soap and wet cloth.

8.4.4 Manufacturers



1. PVC flexible flooring sheets under brand name Wonder Floors by Premier Vinyl Flooring, "Armstrong" or equivalent.
2. PVC flooring Tiles under brand name Marblex by Bhor Industries, "Armstrong" or equivalent.