

CHAPTER NO. 14

FLOORING AND DADOS

SPECIFICATION NO. 14.1—Flooring (General)

1. Unless otherwise specified, the base layer for all floors in contact with the ground shall consist of :—

Base.

(a) 4 inches (10 cms.) of sand layer or stone filling, and

(b) any one of the following layers :

(i) 4 inches (10cms.) of lime concrete, or

(ii) 4 inches (10cms.) of 1:8:16 mix cement concrete, or

(iii) flat single bricks or flat brick blocks having one inch wide joints filled with cement concrete 1:2:4 mix.

2. Cement concrete of mix 1:8:16 or lime concrete shall comply with specification no. 10.4 and no 10.2 for 'Cement Concrete' and 'Lime Concrete' respectively. The amount of water used while mixing shall be the minimum necessary to give sufficient plasticity for laying and compacting.

Materials.

Sand for base filling shall be clean and dry local sand, which is fit for use in cement concrete. Use of silt or very fine sand mixed with rubbish is prohibited. In order to keep out dampness and white ants, it is essential that sand for filling should be free from clay ; silt, sulphates and other harmful salts, dirt and organic impurities.

Second class bricks shall conform to specification no. 3.4

3. The earth filling shall be stopped at such a height as to allow of full thickness of sand, of cement concrete, and the correct thickness of surfacing. In areas, where the water-table is near the ground surface, a suitable treatment shall be provided to prevent the rise of moisture into the floor. This treatment shall be paid for separately.

Sand Filling.

4. A reference level mark shall be marked around on the walls 6 inches (15cms.) or so above the floor level with the help of a water-level. Water level consists of a can of water connected with a rubber tubing to a glass tube, which shows the level of water in the can. With the help of this level, truly horizontal lines can be marked with string and lime on the walls. These horizontal lines shall serve as a datum from which all levels for base layer and topping etc., shall be measured off.

Leveling.

SPECIFICATION NO. 14.1—Flooring (General)

Base concrete.

5. Base concrete shall be laid in accordance with the specification Nos. 10.4 and 10.2 for cement or lime concrete in one operation in a uniform layer 4 inches (10cms.) thick, absolutely true and parallel to what is required on the finished surface, and to the satisfaction of the Sub-Divisional-Officer.

Paving to bond with base concrete.

6. The finishing surface or paving shall not be laid before the base concrete has set for at least seven days. While the surface is still soft enough to receive and retain the impression, it should be brushed with a stiff-bristled broom. This is very necessary in order to remove laitance, scum and inadequately embedded coarse aggregate. In addition, the brushing scours and pits the surface so as to provide a mechanical bond for the topping. During the interval between the placing of the base and the finish, the base shall be thoroughly cured and protected from the deposition of grease, pitch paint, or any other foreign substance. Also immediately prior to the placing of the finishing topping, the base course shall be roughened with steel wire brushes without disturbing the concrete and wetted. It shall be ensured that the surface of the base course is absolutely free from surplus water, laitance and other foreign matter.

Brick or Brick block base.

7. In case of conglomerate floors, where so specified, in lieu of base concrete layer, flat Single bricks or flat brick-blocks $13\frac{1}{2}'' \times 18''$ or $18'' \times 18''$ (30 cm. \times 40 cm. or 40 cm. \times 40 cm.) having 1 inch (2.5 cm.) wide open joints around shall be laid on sand layer. The bricks used shall be clean second class bricks. The joints with a brick block shall be as thin as in ordinary brickwork and shall be grouted with 1:6 cement sand mortar. The bricks shall be wetted and one inch (2.5 cm.) joints filled with cement concrete 1:2:4 mix simultaneously with the concrete topping.

Laying of screed.

8. Where flooring has be laid over reinforced concrete slabs, as in case of multi-storeyed buildings, a layer of $1\frac{1}{2}''$ or 2 inch (38 mm. or 50mm.) thick cement concrete 1:8:16 screed shall be laid over the slab. At the time of laying the concrete slab, its surface shall be brushed with a stiff broom just before it hardens. The hardened slab shall be thoroughly cleaned wetted overnight, the surplus water removed and a grout 1 part cement : 1 part fine sand, brushed into the surfaces, keeping just ahead of the application of the screed bed. Screed battens, carefully levelled and trued, shall be fixed at proper height to suit the thickness of the screed bed. The mix shall be spread on the concrete slab, levelled with a wooden straight edge (with its two ends resting on screed battens) and well compacted. The levelling shall be done in such a manner that a slightly rough surface is left so as to form

SPECIFICATION NO. 14.1—Flooring General

a satisfactory key for the finishing coat. The finishing surface shall then be laid after preparing the surface in the manner laid down in para 5 *supra*.

9. The surface of the screed bed or base concrete shall be passed by the subordinate-in-charge before laying the wearing coat.

Surface to be passed.

10. The brickwork or masonry shall be kept down sufficiently under all archways, doors and fireplaces to admit of the depth of finishing surface being carried through. Joints must be given at this place, however, to avoid unsightly cracks due to any uneven settlement. The offsets in walls, pillars etc. shall be kept down sufficiently under to admit of the full depth of both the finishing surface and the base below it being carried through.

Flooring to continue under doorway and fireplace.

11. Unless otherwise specified, all floors shall be perfectly level, except bathroom and verandah floors, which shall have an outward slope of 1 in 60. The layers of sand and concrete shall be uniform in thickness and any slope required is to be obtained by making the outer walls lower than the inner ones by the necessary amounts.

Levels and Slopes.

12. The contractor shall provide and keep available wherever flooring work is proceeding, straight edges of a length not less than 8 ft. (2.5 metres) and with parallel sides, as well a 10 inch (25 cms.) spirit-level, for the purpose of testing the trueness of the floor being laid.

Straight edge and spirit level.

13. All work shall be measured net and paid for on the superficial area.

Measurement.

14. The rate for flooring may include the cost of finishing as well as base course. Alternatively these coats may be paid for separately.

Rate.

The through rate for base course includes the cost of sand and concrete and labour for placing them in position. The labour rate covers the labour charges only. For floors laid under archways, doors,—*vide* para 10 above, no payment is due for base course.

SPECIFICATION NO. 14.2—Conglomerate Flooring

General.

1. Unless otherwise specified, conglomerate flooring on the ground floor shall consist of a pavement 1 inch, $1\frac{1}{2}$ inch or 2 inch (25 mm, 38 mm. or 50 mm.) thickness of cement concrete topping laid over 4 inches (10 cms.) of base concrete and 4 inches (10 cms.) of sand. The sand layer and base concrete shall be laid as specified in specification No. 14.1. On subsequent floors, cement concrete topping shall be laid on screed bed, as specified in para 8 of specification No. 14.1.

Use of 1", $1\frac{1}{2}$ " and 2" Conglomerate.

2. One inch (25 mm.) conglomerate floor shall be used where heavy wear is not expected, such as in residences, office rooms and similar places.

Two inch (50 mm.) conglomerate flooring shall be used for schools, factories, corridors and in all similar situations, where heavy wear is expected.

In all other places, $1\frac{1}{2}$ inch (38 mm.) conglomerate flooring shall be used.

Materials.

3. The cement concrete shall comply with the specification No. 10.1 for 'Cement Concrete'. Where the conglomerate is equal to or less than 1-1/2 inch (38 mm.) thickness, the coarse aggregate shall be $\frac{3}{8}$ inch (10 mm.) nominal size. Where the conglomerate is thicker than $1\frac{1}{2}$ inch (38 mm.) the coarse aggregate shall be $\frac{1}{2}$ inch (15 mm.) nominal size.

Water Slump tests.

4. As little water shall be used in mixing the concrete as possible ; the slump shall not exceed $1\frac{1}{2}$ inch (38 mm.)

Dividing into panels.

5. Generally no dimension of a panel shall exceed 4 metres in case of floor finish laid monolithically with the base concrete and 2 metres in case of floor finish laid separately on a hardened base. Length of a panel shall not exceed $1\frac{1}{2}$ times its breadth. The floor will be divided into symmetrical panels by wooden or iron screeds. When secured in position, the tops of the screeds shall be fixed with reference to the horizontal lines fixed by the water level and shall mark the exact level of the finished floor surface.

Laying.

6. The concrete shall be mixed wet in as small quantities as required for the work. The concrete shall be placed into position, evenly levelled and a straight edge, resting on the screeds moved with a sawing motion, thus squeezing out the excess material and slightly compacting the same. The concrete shall then be consolidated fully with 'rhapies'. All laying and ramming shall positively be completed within 30 minutes of the wet mixing of the concrete.

SPECIFICATION NO. 14-2.—Conglomerate Flooring

7. Immediately after laying, only just sufficient trowelling to give a level surface shall be done. Excessive trowelling in the early stages should be avoided this tends to work a layer rich in cement to the surface. After the concrete has hardened sufficiently to prevent upward movement of fine particles, a reasonable number of passes of the trowel shall be given to improve the density of the finish. The time interval allowed between successive trowelling is very important. The final trowelling shall be given before the concrete has become too hard.

Finishing surfaces.

8. If the mixture feels sloppy when beating with the 'thapies' and 'creams' markedly on the top when the beating is finished, the concrete will be rejected as having been mixed with too much water. The whole batch including, such of it as has been laid in the floor, shall immediately be removed.

Concrete not to 'Cream.'

9. If so specified, or directed by the Executive Engineer, a floating coat of 1/16 inch (1-1/2 mm.) thick neat cement slurry shall be spread while the cement concrete is still green. On no account shall dry cement shall be sprinkled over concrete. The cement slurry shall be properly pressed twice by trowel, once when the slurry is applied and second time when cement starts to set.

Floating coat.

10. The surface, during the finishing, shall be frequently tested with a straight edge and spirit-level, and when finished shall present an absolutely true and smooth surface showing no undulations, tools, or other marks.

Test with straight edge.

11. On the second day, the screeds shall be removed carefully. The vertical side of the panels shall be examined and all honey-combing and voids, made good. To secure good joints, it is imperative that the sides of the panels are true and perfectly vertical. On the third day, the alternate panels shall be laid. While laying these, care shall be taken that the edges of the adjoining panels do not get smeared.

Joints.

12. Concrete in floors shall be left undisturbed for 24 hours after laying. During the process of laying as well as for a period of 14 days after, the floor shall be protected by suitable covering from the weather and extremes of temperature and kept wet for that period. Before the alternate panels are in position, the floor space shall be kept wet by damp gunny bags and later by ponding the water within earthen bunds.

Curing.

SPECIFICATION NO. 14-2.—Conglomerate Flooring**Adhesion.**

13. Lack of adhesion between the floor and the base, if any, shall be detected by tapping the surface with a hammer. Where such lack of adhesion is apparent, the concrete shall be cut and out and the base keyed sufficiently to allow sound renewal to be made.

Rate.

14. The through rates for conglomerate floor topping include the cost of cement concrete and labour charges for laying it in panels, finishing and curing. The labour rates include the labour charges for above operations, water charges and cost of form work. The rates exclude the cost of floating coat, which if got done shall be paid for separately. The rates, however, include the cost of removal of defects, if any, due to lack of adhesion etc,

SPECIFICATION NO. 14.3—Grey Polished Flooring

1. Grey polished flooring shall consist of the same specifications as for conglomerate flooring excepting that it shall be finished with $\frac{1}{2}$ inch (3 mm.) thick slurry of neat cement laying of which shall closely follow the laying of cement concrete. The surface shall be trowelled to an even smooth finish. The thickness of cement concrete layer shall be so adjusted that the required thickness of topping is obtained after grinding and polishing the neat cement surface.

General.

2. After a lapse of about 4 days the surface shall be ground and polished in the same manner as laid down in para 5 of specification no. 14.6 for "Terrazzo Flooring" excepting that no first cutting or grinding with carborundum brick of 60 grade is required to be done.

Finishing.

3. $\frac{3}{4}$ inch (19 mm.) grey polishing skirting or dado shall consist of $\frac{3}{4}$ inch (16 mm.) thick under layer of 1 : 3 cement sand plaster with $\frac{1}{4}$ inch (3mm.) thick top layer of neat cement rubbed and polished including rounding of junctions with floors. Cement sand plaster shall comply with specification no. 15.1 in all respects. Grinding and polishing shall be carried out in the same manner as specified above. All work in connection with the preparation and laying of grey polished skirting and dado shall be completed before the flooring is commenced.

Skirting or dado.

4. The through rates for grey polished topping or skirting or dado include the cost of cement concrete and neat cement slurry coat, and labour charges for laying it in panels polishing and curing.

Rate.

The labour rates include labour charges for the above operations, water charges and hire charges of grinding machine or cost of carborundum brick or polishing stone screed battens but does not include the cost of oxalic acid and floor polish.

The rates for skirting or dado include the cost of rounding of the junction of flooring and skirting or dado to a uniform radius as directed.

SPECIFICATION NO. 14.4—Brick or Tile Flooring

Type of floor.

1. This type of floor or pavement shall consist of a surfacing of either brick or tiles, laid flat or on edge, with the joints finished, cement pointed, where so specified.

Base.

2. Where so specified, the floor shall be laid on a foundation base concrete over sand as per specification no. 14.1. The thickness of base concrete shall be as specified. Any slope or camber, if specified, shall be given in the foundation.

Materials.

3. The bricks and brick tiles shall be first class, complying with specification nos. 3.4 and 3.6.

Cement sand mortar shall comply with specification no. 2.2.

Soaking.

4. The bricks or tiles shall be soaked in accordance with instructions in paragraph 3 of the specification no. 11.1 for 'brickwork'.

Pattern.

5. The laying shall be in plain, diagonal, herring bone or other pattern, as ordered. Where laid in plain courses, it shall be bonded to break joints at half the length of the brick or tile.

Surface.

6. The paving shall be cambered or sloped as indicated on the drawings or as ordered by the Executive Engineer. A true surface shall be provided and frequent tests to obtain this shall be made during laying by means of a straight edge at least six feet (2 metres) long. All joints shall be uniform, true, parallel and square, bricks being rubbed to ensure this, where necessary.

Edges with bull nosed Bricks.

7. No damaged bricks shall be used. Bats shall not be used except to close any line of bricks. Any overhanging edge of the paving, and edges along kerb and channel drains, shall be finished off by special bull-nosed bricks, unless otherwise, specified.

Laying.

8. All bricks shall be laid with bed and vertical joints quite full of 1:4 cement and mortar. Simple "lipping" at the edges shall not be permitted.

Where the floor is to be finished in cement sand mortar, the joints shall not exceed 3/32 inch (2 mm.) in thickness. The mortar in the joints shall be struck off flush with a trowel, no pointing being necessary; no mortar shall be allowed to spread over the edge of the bricks or tiles. The top surface shall be cleaned with wet gunny bags the same day.

Pointing.

9. If cement pointing has been specified, the joints shall not be less than 1/2 inch (6 mm.) thick. They will be flush pointed as per specification no. 15.8. after being raked out 1 inch (2.5 cm.) deep whilst the

SPECIFICATION NO. 14.4—Brick or Tile Flooring

mortar is still damp, and shall at once be filled with cement mortar composed of 1 part of cement and two parts of sand.

10. The work shall be protected during construction, from the effects of sun, frost, rain, and large variation in temperature and humidity and shall be kept wet for seven days after completion. If cement pointed, it shall be kept moist for at least 15 days after the pointing has been done.

11. Where so specified, as an alternative to laying procedure outlined in preceding para 8, bricks or tiles shall be laid flat to correct slope and level over a bed of $\frac{1}{2}$ inch (6 mm.) thick 1 : 6 cement sand mortar and grouted with a slurry composed of 1 : 4 cement sand mortar. The top surface shall be cleaned with wet gunny bags the same day. If the mortar on tiles or bricks has set, the surface shall be left clean after wire brushing.

12. The through rates include the provision of base course and pointing, where so specified. The labour rates include the cost of labour charges for all the operations and water charges.

Protection.

**Alternative Layer
with grouting.**

Rate.

SPECIFICATION NO. 14.5—Dry Brick Paving

- General.** 1. Dry brick paving shall be either flat bricks or bricks-on-edge laid on a base of mud mortar or brick ballast. In case of flat brick paving, the base shall be 1 inch (25 mm.) thick, while in case of brick-on-edge paving, it shall be 2 inches (50 mm.) thick.
- Materials.** 2. Bricks shall be first class and shall comply with specification no. 3.4. Mud mortar shall comply with specification no. 2.6. Brick ballast shall be of 1 $\frac{1}{2}$ inch (38 mm.) gauge and shall comply with specification no. 3.7.
- Preparing surface.** 3. The ground surface will be thoroughly watered, well-rammed and sloped longitudinally, and cambered to section, if, and as required, before the brick paving is laid.
- Laying Joints.** 4. The bricks will be laid dry flat or on edge, as specified on base layer specified in para 1, prepared to the slope and camber referred to above. The joints shall be as fine as possible, never exceeding $\frac{1}{4}$ inch (6 mm.) in thickness and shall be laid in proper straight lines longitudinally or patterned as ordered, in uniform parallel courses. After the laying has been approved, the joints shall be filled with sand. For this purpose, dry sand shall be spread and broomed into the joints so as to completely fill them.
- Finishing edges.** 5. The bricks shall be laid to a smooth flush surface without unevenness at the joints or the edges, and when required shall be chamfered to meet kerbs or drains. Kerbs will be finished with bull-nosed bricks.
- Rate.** 6. The through rates include all the work specified above as well as any preliminary light levelling or dressing of the ground required. These, however, do not include actual earthwork either in cutting or filling after finishing the work, the contractor shall sweep away all surplus sand and clear away debris and broken bricks. The labour rates include the cost of labour charges, cost of earth and water charges.

SPECIFICATION NO. 14.6—Terrazzo Flooring

1. Unless otherwise specified, terrazzo flooring shall consist of the same specifications as cokerate flooring,—*vide* specification no. 14.2 excepting that the topping shall consist of an underlayer of $1\frac{1}{2}$ inch (32 mm.) thick cement concrete 1 : 2 : 4 and a top layer of $\frac{1}{4}$ inch (6 mm.) thick of one part of cement and $1\frac{1}{2}$ parts of marble chippings by volume.

General.

Terrazzo topping and marble chippings shall be of the specified shade.

The floor both while laying the underlayer and later on the topping shall be divided into panels not exceeding 2 square metres so as to reduce the risk of cracking. The joints shall be so located that the longer dimension of any panel does not exceed 2 metres. The floor will be divided into symmetrical panels by wooden or iron screeds. When secured in position the top of the screed shall be fixed with reference to the horizontal lines fixed by the water level and shall mark the exact level of the finished floor surface. The flooring shall be divided into panels as specified in para 5 of specification no. 14.2.

2. The marble chips shall be $\frac{1}{8}$ inch (3 mm.) gauge or as specified by the engineer-in-charge. These shall conform to specification no. 3.49.

Materials.

Coloured cement shall conform to specification no. 3.14. If pigment has to be mixed with ordinary grey or white cement, it shall conform to specification no. 3.44.

The dividing strips, if used, may be of aluminium, brass, copper, zinc, ebonite, plastic or similar materials. They shall be of 1.5 mm. thick.

3. $1\frac{1}{2}$ inch (32 mm.) thick under-layer shall be laid in accordance with the the instructions laid down in specification no. 14.2, excepting that no trowelling of the surface is to be done. Dividing strips, where required, including any strips in a decorative design shall be bedded into the base concrete in case of ground floor or screed in subsequent floors. The top of the strips shall be kept at slightly higher level above the finished level of the floor, so that after grinding they are at the correct level.

Under layer.

4. The premixed cement and pigment shall be mixed dry with marble chips in the ratio of 1 cement and $1\frac{1}{2}$ marble chippings. The mixture shall be well turned over adding just enough water to obtain a fairly dry but workable mixture. The cement and marble mixture shall then be laid on the under-layer in a slightly more than $\frac{1}{4}$ inch (6 mm.) thickness so that after rubbing down, the finished face is not less than $\frac{1}{4}$ inch (6 mm.) in thickness. Laying of top layer shall closely follow laying of under layer, so that the two layers merge and firmly grip each

Top layer.

SPECIFICATION NO. 14.6—Terrazzo Flooring

other. The surface of the top layer shall be tamped and brought down to the required levels by using a straight edge. Between successive tappings, further quantities of cement marble mixture shall be spread, as required, and struck off with a straight edge to keep the surface to the required level and to have most of the finished surface composed of marble chips. Immediately after completing the tamping, the surface shall be floated and trowelled once or twice. No attempt shall be made to remove the trowel marks. Borders and decorative designs shall be laid before the main body of the flooring.

Finishing.

5. After a day or two when the terrazzo topping has hardened down to prevent dislodgement of marble chips, cutting or grinding shall be carried out till marble chips are evenly exposed. The cutting shall be done by hand or machine. The first cut shall be made with coarse carborundum brick of 60 grade and plenty of water. After the first cut, the surface shall be thoroughly washed to remove all grinding mud and covered with a grout of cement and colouring matter, in the original proportions, in order to fill the pin holes that appear after cutting. After the first cut, second and third cuttings shall be carried out, at intervals of about 4 days the grain of carborundum being finer in each case, that is, 80 and 120. Pin holes appearing after each cut shall be grouted as described for the first cut. The final cut or polish shall be carried out after an interval of 10 days of the third cut, with polishing stones or carborundum bricks of FF (finest) grade. After the final cut, oxalic acid shall be dusted over the surface at the rate of 2/3 pounds per 100 sq. ft. (0.03 kgs./mm.), sprinkled with water and rubbed hard with numdah blocks. The following day, the floor shall be wiped with a moist rag and dried with a soft cloth. The floor shall then be covered with oil free, dry saw dust which shall be removed after all construction work, such as painting, distempering etc. in the area has finished. Just before it is occupied, the surface shall be finally polished with a superior quality floor polish and rubbed with clean cotton waste. The rubbing must be continued until the floor ceases to be sticky.

Skirting or dado.

6. 3/4 inch (19 mm.) skirting or dado shall consist of 1/2 inch (12 mm.) thick under-layer of 1 : 3 cement sand plaster with a 1/4 inch (6 mm.) thick top layer of 1 part of cement with 1 1/2 parts of marble chips by volume. Cement sand plaster shall comply with specification no. 15.1 in all respects excepting that coarse sand shall be used. Finishing shall be carried out in the same manners as specified in para 5 *supra*.

Rate.

7. The through rates for terrazzo topping or skirting or dado include the cost of materials and labour charges for mixing the materials in specified proportions, laying them in position as underlayer and top

SPECIFICATION NO. 14.6—Terazzo Flooring

layer and finishing. The labour rates include the cost of labour charges for above operations, water charges and hire charges of grinding machine or cost of carborundum brick or polishing stone but do not include the cost of screed battens, oxalic acid and floor polish. The cost of metal strips is not included in the rates and shall be paid for separately, wherever these are ordered to be used.

The rates for skirting or dado include the cost of rounding off the junctions to a uniform radius as directed.

SPECIFICATION NO. 14.7—Precast Terrazzo Tile Flooring

General.

1. The precast terrazzo tile flooring shall consist of $\frac{3}{8}$ inch (20 mms.) thick precast terrazzo tiles laid on $\frac{3}{8}$ inch (20 mms.) thick mortar bed either over the usual base course of 4 inch (10 cms.) thick cement concrete 1 : 8 : 16 and 4 inch (10 cms.) sand or stone filling, in case of ground floors or over the reinforced concrete slabs in case of subsequent floors. The mortar bed shall be cement sand mortar of 1 : 6 proportion or preferably lime surkhi mortar 1 : 2 proportion. The base shall be laid as per specification no. 14.1.

Materials.

2. The precast terrazzo tiles shall conform to Indian Standard : 1237. They shall be manufactured from a mixture of cement, natural aggregates and colouring material (where required), by pressure process under a minimum pressure of 2000 lbs. per sq. inch (140 kg. per sq. cm.). These shall be of sizes and designs as specified or as approved by the Executive Engineer. The finished thickness of the tiles shall not be less than $\frac{3}{8}$ inch (20 mm.). The proportion of cement to aggregate in the backing of the tiles shall not be leaner than 1 : 3 by weight. The upper layer shall consist of marble chips and cement (with or without pigment) as specified. The finished thickness of the top layer shall be $\frac{3}{8}$ inch (10 mm.). Tolerances allowed on length and breadth shall be $\pm 1/24$ inch (1 mm.). The tolerances on thickness shall be $\pm \frac{1}{4}$ inch (5 mm.). The colour and texture of the wearing layer shall be uniform throughout its thickness. The wearing faces of the terrazzo tiles shall be mechanically ground and filled and shall be free from projections, depressions and cracks. All angles shall be right angles and all arrises shall be straight and true. The tiles shall satisfy the test laid down in the Indian Standard : 1237.

Pigments incorporated in the grout for filling the joints shall conform to the requirements of specification no. 3.43.

Cement sand mortar or lime surkhi mortar shall conform to specifications laid down in chapter no. 2. The amount of water added while mixing mortar shall be the minimum necessary to give sufficient plasticity for laying the mortar bed.

Preparation of base.

3. The base shall be cleaned of all dirt, scum or laitance and all loose material and then well-wetted down without forming any water pools on the surface. In the case of reinforced concrete floors, the top shall be left rough and the surface shall be scored with brush or broom stick while the concrete is green.

Spreading.

4. After the surface has been prepared, the mortar shall then be evenly and smoothly spread over the base or the slab by the use of screed battens. The thickness of the mortar bed shall be $\frac{3}{8}$ inch (20 mm.).

SPECIFICATION NO. 14.7—Precast Terrazzo Tile Flooring

The screeds, properly levelled, shall be fixed at the correct height to suit the thickness of the screed bed. The mortar shall be levelled with the screeding board in such a manner that a slightly rough surface is left to form a satisfactory key for the tiles. After the mortar bed has slightly hardened, the fixing of tiles shall begin.

5. Neat cement slurry of honey-like consistency shall be spread over the mortar bed; over such an area at a time as would accommodate about 20 tiles and the tiles after being soaked in water laid in the required pattern. The tiles shall be laid from the centre of the room outwards. The tile shall be gently tapped home with wooden mallet so that they get fully embedded and kept in proper level and slope. The joints shall be kept as close as possible and shall normally be 1/16 inch (1.5 mm.) wide. The joints shall run straight. After the tiles have been laid, the surplus cement slurry that may have come out of the joints shall be cleaned off with saw-dust.

Fixing.

6. The day after the tiles have been fixed, the joints shall be refilled with cement slurry of the same or the approximate shade as the colour of the tile. Before the joints are filled, they shall be cleaned with wire brush or with the point of a trowel and any loose cement dirt or dust in the joints shall be removed.

Joints.

7. The floor shall be kept wet or flooded with water and protected against damage due to traffic or any other cause for a minimum period of 7 days after the tiles are fixed.

Curing.

8. After the tiles are cured and have dried up, these shall be ground and polished in the same manner as laid down in para 5 of specification no. 14.6 for "Terrazzo Flooring" excepting that no first cutting is usually needed at site of work, having being already done at the factory.

Finishing.

9. The terrazzo tiles for skirting dado shall be of 1/2 inch (12 mm.) minimum thickness, with 1/4 inch (6 mm.) top layer of marble chips and cement. Before fixing tiles, the vertical surface shall be cleaned and thoroughly wetted. In case of masonry wall, the joints shall be raked out. In case of concrete, surface shall be hacked and wire brushed. A bed of 3/4 inch (10 mm.) thick cement sand mortar 1:3 mix shall then be laid. Before the plaster has hardened, the back of each tile shall be covered with a thin layer of neat cement slurry and the tile shall then be gently tapped against the wall with wooden mallet. The sides of the tiles shall be coated with grey or white cement slurry with or without pigment to match the shade of tiles and butt-jointed. The joints shall be as thin as possible.

Skirting dado.

SPECIFICATION NO. 14.7—Precast Terrazzo Tile Flooring

Rate. 10. The rates exclude the cost of base concrete and sand layer but include the cost of preparing the former for laying the mortar bed.

The through rates include the cost and laying of tiles on a mortar bed and slurry cost, and grouting of joints and all subsequent grinding, polishing, cleaning etc. The labour rates provide for labour charges for above operations as also the hire charges of grinding machines or the cost of carborundum brick or polishing stone, screed battens for mortar bed and water charges but exclude the cost of oxalic acid, and floor polish.

SPECIFICATION NO. 14.8.—White Glazed Tile Flooring

1. The white glazed tile flooring shall consist of $\frac{3}{8}$ inch (10 mm.) thick precast white glazed tiles laid on $\frac{1}{2}$ inch (12 mm.) thick mortar bed over the usual base course of 4 inches (10 cm.) cement concrete 1:8:16 and 4 inch (10 cm.) sand or stone filling, in case of ground floors or over the reinforced concrete slabs in case of subsequent floors. The mortar bed shall be of 1:3 cement sand mortar or preferably 1:2 lime surkhi mortar. The base course shall be laid as per specification no. 14.1.

General.

2. White glazed tiles shall conform to specification no. 3.47.

Materials.

The fittings for tiles such as cove-bases, angles, corners beadings, ridges shall conform to Indian Standard Specification.

Cement sand mortar or lime surkhi mortar shall conform to specifications laid down in Chapter No. 2. The amount of water added while mixing mortar shall be the minimum necessary to give sufficient plasticity for laying the mortar bed.

3. Tiles shall be fixed, jointed and cured in conformity with instructions in paras 3 to 7 of specification no. 14.7 for terrazzo tile flooring, excepting that the thickness and mix of the mortar bed shall be as specified above. Extra care shall, however, be taken in fixing the tiles to correct slope and level as any unevenness in surface cannot be removed later.

Laying.

4. All external and internal angles shall be of angle bead fittings of radius approved by the Engineer-in-charge and shall bond in with tiling on each side. The dado tile shall be finished with capping of design approved by the engineer-in-charge. The glazed tiles for skirting dado shall be of the same type and thickness as for flooring. They shall be laid as per instructions contained in para 9 of the specification no. 14.7 for 'terrazzo tile flooring.' The plaster bed shall, however, be $\frac{1}{2}$ inch (12 mm.) thick and shall be of 1:3 mix.

Fittings.

5. The rates exclude the cost of base concrete and sand layer, but include the cost of preparing the former for laying the mortar bed.

Rate.

The through rates include the cost and laying of tiles and all fittings such as corners, angles ridges etc. on a mortar bed and slurry coat and grouting of joints and subsequent curing.

The labour rates provide for labour charges for the above operations and also water charges.

SPECIFICATION NO. 14.9—Marble Flooring

General.

1. The marble flooring shall consist of marble tiles laid on $\frac{1}{2}$ inch (12 mm.) thick mortar bed over the usual base course of 4 inches (10 cm.) base concrete 1:8:16 and 4 inches (10 cm.) sand or stone filling in case of ground floors or over the reinforced concrete slabs in case of subsequent floors. The mortar bed shall be of 1:3 cement sand mortar or preferably 1:2 lime surkhi mortar. The base shall be laid as per specification no. 14.1.

Materials.

2. The marble slabs shall be of the approved quality and source. They shall be of the size and pattern specified or shown on the drawings, which shall invariably be prepared before any work is done. The size of slabs shall not be less than 10 inch \times 10 inch (25 cm. \times 25 cm.). When marble is laid in a narrow strip, no piece shall be less than 18 inches (45 cm.) in length. All marble slabs used shall have a thickness of $\frac{3}{8}$ th of an inch to one inch (20 mm. to 25 mm.) and shall have a truly plain surface. The dimensions of marble slabs shall be slightly oversize to permit cutting to actual size of tiles at the site work. The marble from which slabs are made shall be of selected quality, dense and homogeneous, free from stains, cracks and flaws.

The contractor shall be responsible to see that the slabs are laid in accordance with the size and colour shown in the approved design. With certain marbles, where it is difficult to detect the colour until the floor is finally polished, all slabs not conforming to the continuity of the design after polishing shall be replaced by the contractor at his own cost.

Pigments incorporated in the grout for filling the joints shall conform to the requirements of specification no. 3.44.

Cement sand mortar or lime surkhi mortar shall conform to the specifications laid down in chapter no. 2. The amount of water added while mixing mortar shall be the minimum necessary to give sufficient plasticity for laying the mortar bed.

Laying.

3. The marble slabs shall be accurately sawn and rubbed so as to obtain truly sharpened straight edges and square angles. They shall then be laid in conformity with specifications contained in paras 3, 4, 5 and 6 of specification no. 14.7 for 'Terrazzo Tile Flooring'; with the exception that the mortar bed shall be $\frac{1}{2}$ inch (12 mm.) thick and shall consist of either 1:3 cement sand or 2:3 lime surkhi mortar. Also the joints shall not be more than $\frac{1}{32}$ inch ($\frac{3}{8}$ mm.) in thickness. Tiles projecting over the edges of verandahs or steps shall have their edges finished with a bullnosed ending.

SPECIFICATION NO. 14.9—Marble Flooring

4. During the progress of the work and for 10 days after laying, each section of the floor shall be kept flooded. Three clear days shall be allowed for setting before the pavement is walked over and no weight should be rested upon the surface until 7 clear days after laying is completed.

Curing.

5. When properly set, the floor shall be ground and polished in the same manner as laid down in para 5 of specification no. 14.6 for Terrazzo flooring, excepting that no first-cutting is usually needed, having being already done at the source. No mortar or stone of any sort will be allowed on the finished work.

Finishing.

6. The provisions of para 11 of specification no. 14.7 shall apply. Both the labour and through rates, however, include the cost of sawing the slabs and dressing their sides to correct size and square angle.

Rate.

MARBLE LINING

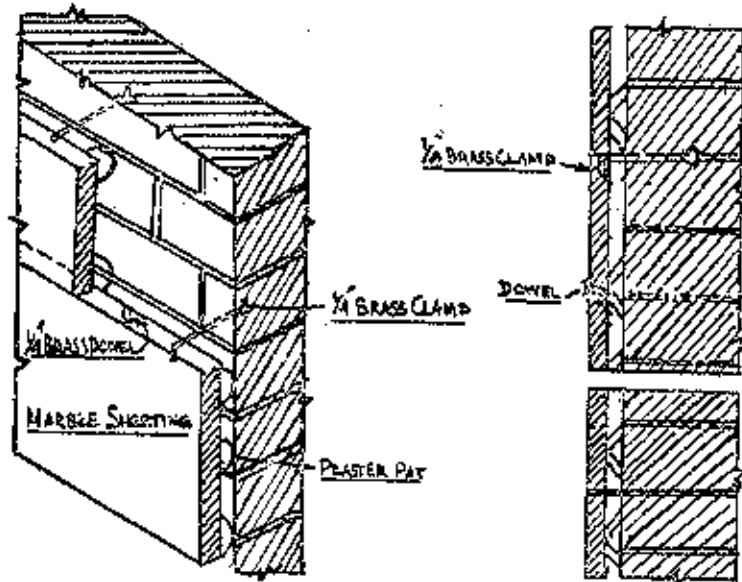
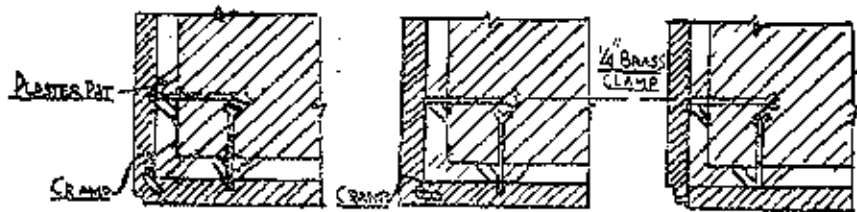


FIG 14.10 (a)

FIG 14.10 (b)



BIRDSMOUTH ANGLE JOINT

LAP JOINT

REBATED JOINT

FIG - 14.10 (c)

FIG 14.10 (d)

FIG 14.10 (e)

**SPECIFICATION NO. 14.10—Marble lining (Veneering) on Walls,
Pillars, Skirting, Dado, Risers of Steps**

1. Marble lining (veneer) on walls shall consist of fixing $\frac{3}{4}$ inch to 1 inch (20 to 25 mm.) thick marble slabs on masonry face with dowels and cramps on plaster of paris dabs. Marble lining on pillars, skirting, dado and risers of steps shall consist of fixing $\frac{3}{4}$ inch to 1 inch (20 to 25 mm.) thick marble slabs on masonry face on $\frac{1}{2}$ inch (13 mm.) thick 1:3 cement sand mortar bed or 2:3 lime surkhi mortar.

General

2. The materials shall conform to specification no. 14.9

Materials

3. Marble slabs shall be accurately sawn and rubbed so as to obtain truly sharp and straight edges and square angles. They shall be kept 1 inch (25mm.) from masonry face and shall be bedded on dabs of plaster of paris about 3 to 4 inches (7.5 to 10 cm.) in diameter laid in such a way that they are away from the joints. Marble slabs shall not be solidly bedded on the mortar, as they are liable to discoloration by the bedding mortar. The slabs of consecutive courses shall be fixed to each other with brass dowels $\frac{3}{8}$ inch (6mm.) diameter and $1\frac{1}{2}$ inch (38mm.) diameter long as shown in the Fig. Nos. 14.10 (a) and 14.10 (b).

Lining on walls

**SPECIFICATION NO. 14.11.—Rough Red Sand
Stone Flooring**

General

1. The rough red sand stone flooring shall consist of $1\frac{1}{2}$ inch (38mm.) thick rough red sand stone slabs set in 1:5 cement sand mortar on a base of 4 inches (10 cms.) of base concrete over 4 inches (10 cms.) of sand or stone filling, as specified in specification no. 14.1 in case of ground floors or over the reinforced concrete slabs in case of subsequent floors.

Materials

2. The stone slabs shall be of approved source and shall be hard, even, sound and durable, rectangular in shape and of specified size. The slabs shall be without soft veins, cracks or flaws and shall have uniform colour. The slabs shall have a minimum thickness of $1\frac{1}{2}$ inches (38 mm.) . They shall be of uniform size and shape and shall be self-faced on the upper surface. The end faces may, however, be left quarry-scabbled and the dimensions shall be slightly oversize to permit cutting to actual size of slabs at site of work.

Cement sand mortar shall conform to specification no. 2.2.

Preparation of surface

3. The base shall be cleaned of all dirt, scum or laitance and all loose material; and then well-wetted down without forming any water pools on the surface.

Setting

4. At site of work, all slabs shall be accurately two-line dressed on edges truly square to at least half their depth. Slabs projecting over the edges of verandahs or steps shall have their outer edges finished with a bull-nosed moulding. The slabs shall be laid as indicated on the plan or as directed by the engineer-in-charge. They shall break joint in adjacent courses by not less than 8 inches (20 cms.). Each slab shall be soaked in water for at least one hour before being laid. It shall be laid in 1:5 cement sand mortar and gently tapped down with a wooden mallet, so that no hollows are left beneath it. The joints shall not exceed $\frac{1}{2}$ inch (6 mm.) in thickness and shall be levelled with a trowel, after being filled solidly with mortar for their full depth. If pointing is ordered to be done separately, the joints shall be raked out at least $\frac{3}{8}$ inch (10 mms.) deep. No mortar shall be allowed to spread over the edges of the slabs. No patching up on the edges shall be permitted and slabs with chipped or badly dressed edges shall be replaced by the contractor. The finished surface shall be perfectly true, level projected or slopped as shown on the plans or as directed by the Executive Engineer.

Curing

5. The pavement shall be kept well watered during progress of the work and for seven days after completion.

**SPECIFICATION NO. 14.11—Rough Red Sand
Stone Flooring**

6. The through rate includes the cost of sand stone pavement after preparing the base, dressing of stone sides to correct size, jointing and curing, but excludes the cost of base course layer and pointing, if required to be done. The labour rates provide for labour charges for the above operations and water charges.

Rate

SPECIFICATION NO. 14.12—Kotah Stone Flooring

- General** 1. Kotah stone tile flooring shall consist of $1\frac{1}{4}$ to $1\frac{1}{2}$ inch (35 to 40 mm.) thick Kotah stone tiles laid in $\frac{1}{2}$ inch (12mm.) thick 1:3 cement sand mortar bed over the usual base course or screed bed laid according to specification no. 14.1 in case of ground or subsequent floors respectively.
- Materials** 2. Kotah stone tiles shall be made from Kotah stone, which shall be of selected quality, dense and homogeneous, free from stains, cracks and flaws. The tiles shall be machine or hand cut to the specified thickness. The dimensions of tiles shall be slightly oversize to permit cutting to actual size of tiles at site of work. The top surface shall be level and smooth. The size of the tiles shall not be less than 10 inches \times 10 inches (25 cm. \times 25 cm.)
- Laying** 3. The provisions of para 3 of specification no. 14.9 for marble flooring shall apply.
- Carriag** 4. The provisions of para 4 of specification no. 14.9 shall apply.
- Finishing** 5. The provisions of para 5 of specification no. 14.9 shall apply.
- Rate** 6. The provisions of para 6 of specification no. 14.9 shall apply.

SPECIFICATION NO. 14.13—Rough Kotah Stone Flooring

- | | |
|---|--------------------------------------|
| <p>1. Rough Kotah Stone flooring shall consist of 1½ inch to 2 inch (45 mm. to 50 mm.) thick slabs over ½ inch (20 mm.) thick base of 1:3 mix cement sand mortar.</p> | <p>General</p> |
| <p>2. The rough Kotah stone slabs shall be made from Kotah stone, which shall be selected quality, dense and homogeneous, free from stains, cracks and flaws. The slabs shall be rectangular in shape and of the specified size and thickness. The dimensions of tiles shall be slightly over-size to permit cutting to actual size of slabs at site of work. The upper surface shall be self-faced, but the end faces may, however, be left quarry-scabbled.</p> | <p>Materials</p> |
| <p>3. The base shall be cleaned of all dirt, scum or laitance or all loose material and then well-wetted down without forming any water pools on the surface.</p> | <p>Preparation of surface</p> |
| <p>4. The provision of para 4 of specification no. 14.11 on 'Rough Red stone Flooring' shall apply excepting that the mortar base shall be ½ inch (20 mm.) thick and shall be of 1:3 cement sand mortar. Also the joints shall be filled with neat cement slurry of the same or approximately same colour of the tile.</p> | <p>Setting</p> |
| <p>5. The provisions of para 5 of specification no. 14.11 for 'Rough Red Stone Flooring' shall apply.</p> | <p>Curing</p> |
| <p>6. The provisions of para 6 of specification no. 14.11 for 'Rough Red Stone Flooring' shall apply.</p> | <p>Rate</p> |

**SPECIFICATION NO. 14.14—Kotah Stone Lining (Veneering)
on Walls, Pillars, Skirting, Dado, Risers of Steps**

General

1. Kotah stone skirting, dado, riser of steps walls, and pillars shall be $\frac{3}{4}$ inch (20 mm.). In other respects, the Specification No. 14.10 on marble lining on walls, pillars, skirting dado, risers of steps shall apply excepting that the Kotah Stone slabs in case of walls shall also be solidly bedded in 1:3 cement sand mortar on the masonry face, like skirting, dado, etc. No dowels or cramps are to be provided in fixing Kotah Stone lining unless specifically ordered in which case these will be paid for over and above the rate. The slabs shall in turn be fixed in position to the masonry by brass cramps $\frac{1}{2}$ inch (6 mm.) diameter and 12 inches (30 cm.) long. These cramps shall be bent and embedded by $\frac{3}{4}$ inch (20 mm.) into the marble slabs and the other end shall be forked and embedded in the masonry. Each slab shall be carefully plumbed and levelled.

**Skirting dado
pillars, etc**

2. After the marble slabs have been sawn and rubbed, as specified in para 2 above, they shall be fixed in position in the same manner as specified for precast terrazzo tiles skirting and dado—*vide* para 9 of Specification No. 14.7 with the exception that the mortar bed shall be $\frac{1}{2}$ inch (13 mm.) thick and shall consist of either 1:3 cement sand or 2:3 lime surkhi mortar.

Joints

3. The joints shall be fine and shall not be greater than $\frac{1}{8}$ inch (3mm.) in thickness. Joints shall either be filled with white cement or with plaster of paris. In case of coloured marble, necessary pigment shall be added to white cement or plaster of paris to match with the colour of the marble.

The angle joints, where the slabs are returned about an angle, shall either be mitred birds-mouth angle joints, or rebated lap joints, as shown in Fig. no. 14.10 (c), (d), (e). Simple lap joints as shown in Fig. no. 14.10(d) shall be avoided, as they do not present a good appearance.

Curing

4. During the progress of the work and for 10 days after laying, each section of the lining shall be kept moist. No weight should be rested upon the surface until 7 clear days after laying is completed.

Finishing

5. The marble lining or dado etc., shall be rubbed and polished as per Specification No. 14.9 on Marble Flooring.

Rate

6. The through rates cover the cost of all materials including sawing the slabs, dressing their sides to correct size and square angles, laying of slabs on a mortar bed and slurry coat or on plaster of paris debas, cost of dowels and cramps where necessary, grouting of joints and subsequent grinding, polishing, curing, cleaning, etc.

**SPECIFICATION NO. 14.14—Kotah Stone Lining (Veneering)
on Walls, Pillars, Skirting, Dado, Risers of Steps**

The labour rates provide for labour charges for the above operations, as also the hire charges of grinding machines or the cost of carborandum bricks or polishing stone, screed battens for mortar bed, and water charges, but exclude the cost of oxalic acid and floor polish.

SPECIFICATION NO. 14.15—Wooden Board and Strip Flooring

Definition

1. Board flooring is defined as flooring having wooden planks of nominal width greater than 4 inches (10 cms.), while strip flooring consists of planks of nominal 4 inches (10 cms.) and less in width usually tongued and grooved.

**Floor Bearers :
ground floors**

2. In the case of ground floors, floor joists (bridging joists) will rest on pillars, dwarf walls, rails or beams as may be necessary.

The plinth under the flooring shall be excavated to the depth directed by the Executive Engineer, and dressed level and rammed. If directed, a layer of base concrete will be laid as specified in specification No. 14.1; otherwise dwarf walls or pillars will be built on a cement or lime concrete foundation. The dimensions and spacing shall be as indicated in the drawings or as otherwise directed by the Executive Engineer. The masonry or base concrete must be perfectly dry before joists are fixed.

**Floor bearers :
suspended
floors**

3. In the case of upper floors the bridging joists will rest on wall plates, beams, rails or on other joists as shown on the drawings, or as otherwise directed by the Executive Engineer.

**Floor bearers :
Materials and
Fixing**

4. The timber for the floor joists shall be of the kind specified and shall be in accordance with the general specifications for woodwork. The full number of joists for each continuous floor shall be laid and dressed to one level and tested before flooring is commenced.

Preservatives

5. All joists, wall plates, bearers, and the underside of planing shall be given two coats of hot wood preservative such as creosote or coal tar, as ordered by the Executive Engineer. The rate does not include this work, which shall be paid for separately according to the rates for painting with these materials.

**Boarding materials
and size**

6. The boarding for the floor need not be planed on the underside in the case of ground floors and suspended floors to be celled. Unless otherwise specified or shown in the drawings, in the case of deodar, kail or chir wood, the boards or strips shall be 1½ inch (38mm.) thick, not more than 6 inches (15 cms.) wide and not more than 10 ft. (3 metres) in length. In the case of teak, they shall be 1 inch or 1½ inches (25 or 38 mms.) thick as specified, 4 inches (10 cms.) wide and of as great a length as possible. No board or strip shall be less than 6 feet (2 metres) long, the ends being truly squared up after and split portion has been sawn off. All boards and strips shall be uniform and parallel in width and of the same thickness.

SPECIFICATION NO. 14.15—Wooden Board and Strip Flooring

The timber for boarding and strips shall comply with specification No. 3.15 for timber and also para 1 of specification No. 17.1 for 'Woodwork General'. The maximum permissible limit of moisture content in timber shall be 10 per cent.

7. The planks shall be planed true on one side (on both sides for unceiled upper floors), the edges to be planed, rebated or tongued and grooved as specified or as directed by the Executive Engineer. In the absence of instructions, the side joints shall be tongued and grooved and the end joints shall be concealed for teak floors and rebated for other floors. The various type of joints are illustrated in figure no. 14.15(a).

Joints

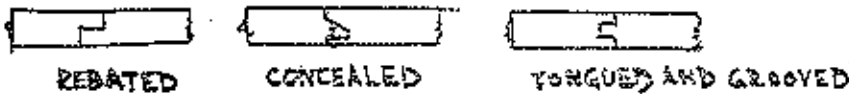


FIG. 14.15 (a) TYPES OF WOODEN FLOORING JOINTS.

8. The outer line of boarding shall be accurately fixed parallel with, and close to the wall. Each subsequent line shall have the side joints carefully jointed up and shall then be cramped into position by floor cramps, and nailed or screwed as specified so that the heads shall be sunk below the finished surface of the floor, or otherwise fixed with concealed joints. The cramps shall not be removed until the nails or screws have been fixed. The ends of planks shall rest on the centre of a joist and the ends of no two adjacent planks shall be on the same joist. Where a wooden floor butts against a paved or conglomerate floor, the joint shall be covered by a brass strip which shall be screwed to wooden floor and will have its top flush with the top surface.

Planking method of laying.

9. The nails or screws shall comply with specification No. 3.42 and shall be in length at least twice the thickness of the plank, two being used at each and one at every intermediate joint alternately on opposite sides of the plank. All screws must be oiled before insertion.

Nails and screws.

10. After the floor has been laid, it shall be planed in both directions and made perfectly smooth. All depressions in the wood nail holes and all small defects of every kind, where permitted by the Executive Engineer to remain in the work, shall be filled with plastic wood filler complying with Indian Standard 42.

Planing.

SPECIFICATION NO. 14.15—Wooden Board and Strip Flooring**Finishing.**

11. The flooring shall be waxed or stained and varnished if required, after sand papering the surface.

Rate.

12. The through rates for teak wood flooring are for the floor boarding or strips laid and fixed in position and planed in both directions. These also include the provisions of brass screws in the case of teak floors where concealed fixing is not employed. These do not include any sand papering, oiling, waxing, staining or varnishing. The rates do not include joists, wall plates, bearers, beams, rolled steel joists, rails or concrete or masonry pillars. The labour rates include the labour charges for above operations, sawing charges and carriage to and from the saw mill.

SPECIFICATION NO. 14.16 —Parquet Flooring

1. Wooden block (parquet) flooring shall consist of shisham wooden blocks laid on hot bituminous adhesive over $\frac{1}{2}$ inch (13mm.) thick 1:4 cement sand screed bed, top surface being rubbed smooth and wax polished to a fine finish. The screed bed shall be laid on the base concrete prepared according to specification No. 14.1 or on reinforced concrete slab floor. For good results, it is important that dry conditions should prevail in the building before wooden block floor is laid, otherwise blocks will absorb moisture and expand.

General.

2. Shisham wood used for wooden blocks shall be of the best quality, well seasoned and shall comply with specification No. 3.15 and para 1 of specification No. 17.1 of "Woodwork General" for timber in all respects. The maximum permissible limit of moisture content in timber shall be 10 per cent.

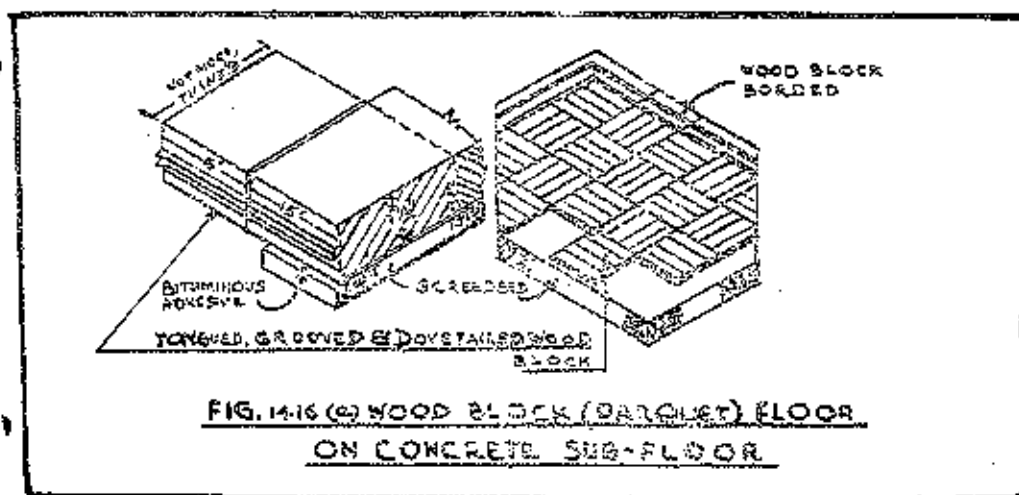
The adhesive used for fixing wooden block shall be straight run bitumen R--90 grade and shall comply with specification No. 3.41.

The primer used shall be straight run bitumen of R--90 grade thinned to brushing consistency with creosote oil, which shall comply with specification No. 3.41.

The mortar for screed shall be 1 : 4 cement sand mortar, comply with specification No. 3.41.

3. Shisham wood strips shall be $1\frac{1}{2}$ inch (38 cm.) thick of width not more than $3\frac{1}{2}$ inch (10 cm.). The length of the strips shall neither be less than 6 inch (15 cms.) nor more than 15 inches (40 cms.). The wooden strips shall be cut to sizes and assembled with tongued

Wooden blocks.



SPECIFICATION NO. 14.16—Parquet Flooring

and grooved joints into blocks so as to give the specified pattern, normally basket-weave, shown in fig. 14.16 (a). The blocks shall again have tongued and grooved joints, so that they interlock with each other when laid. The long bottom edge of each strip shall have a chamfer or groove to take up surplus adhesive and to provide a good key for the bituminous adhesive. The strips shall be free from torn grain, chipped grain, tool marks and other defects.

Preparation of surface.

4. The screed bed shall be laid in accordance with specification No. 14.1 using as dry a mix as possible. Care shall be taken to obtain a flat surface and to ensure that it is kept free from cement and plaster droppings. Sufficient time shall be allowed for proper curing. Before wooden blocks are laid, the surface shall be perfectly dry and dust-free, and shall be passed by the engineer-in-charge.

Laying.

5. A coat of primer shall be brushed on the screed. The under side of each individual block already assembled shall then be dipped in the bituminous adhesive heated to the correct specified temperature and the block then placed directly into position without undue sliding. The block shall not be dipped too deeply into the adhesive otherwise the excess adhesive will adhere, which will be extruded through the joints when the block is pressed into position. The wooden blocks shall be placed according to the standard patterns such as basket-weave or herring-bone etc., as specified or ordered by the Executive Engineer. While placing the blocks in position, thin string shall be tied to ensure the placing of blocks in proper line and at proper finished level. Expansion joints $\frac{3}{4}$ inch to 1 inch (20 to 25 mm.) width shall be formed between the floor and the adjacent walls and filled with bitumen or cork. The expansion joint may be marked by the skirting along the walls.

Finishing.

6. After completion of laying, the surface shall be planed in both directions and shall be rubbed down with sand paper to remove all irregularities, using a coarse grade and finishing with a fine grade until the surface is flush, clean and smooth. The flooring shall then be wax-polished to a fine finish in accordance with specification No. 16.7.

Rate.

7. The through rate for wooden blocks (parquet) flooring in the Common Schedule includes the cost and laying of screed bed, primer, bituminous adhesive and wooden blocks and waxing. The rate excludes for cost of expansion joint, which shall be paid for separately. The labour rate includes the cost of labour charges for the above operations, cost of fuel wood for heating adhesive and sawing charges including carriage to and from the saw mill.

SPECIFICATION NO. 14.16—Parquet Flooring

8. In high class parquet flooring, the hardwood strips are not placed directly over the base concrete but are glued with synthetic resin adhesive or with cold-setting case in glue on to a timber base supported on wooden joists. The hardwood strips are quite thin being normally $\frac{1}{4}$ inch (6 mm.) in thickness. The strips of various sizes and shapes are assembled in a various decorative patterns. A variety of designs is obtained by use of various species of wood, care being taken in the choice of woods to ensure the use of those having similar wearing quality.

High class
parquet flooring.

SPECIFICATION NO. 14.17—Linoleum Flooring

General.

1. Linoleum used shall be of a thickness adequate for the condition of surface. The following thicknesses for linoleum are generally recommended:—

Situation	Thickness
(i) For public buildings, cinemas, restaurants, and the like.	6.0 to 6.7 mm.
(ii) For offices, shops and the like, depending upon the intensity of traffic.	3.2 to 4.5 mm.
(ii) For houses .	3.2 mm.
(iv) For houses, in lightly used areas, depending on the use.	Less than 3.2 mm.

Linoleum, if kept wet, expands, mildews and eventually rots. It should, therefore, not be used in bathrooms, kitchens, laundries, etc.

Linoleum shall be laid either loose or stuck down to the sub-floor by means of a suitable adhesive.

Materials.

2. Linoleum shall comply with specification no. 3.45 in all respects and shall be of specified thickness.

The adhesive used in laying linoleum floors shall be of an approved type. The adhesive may be vegetable and casein glues, lignin paste, gum spirit adhesive, bitumen rubber emulsion or bitumen rubber solution. The relative merits governing the use of each type are contained in Indian Standard: 1198, which may be referred to for guidance.

Plywood shall comply with specification no. 3.16.

Preparation of base.

3. It is extremely important that the base over which linoleum floor is to be laid should be absolutely dry and level. The base shall be thoroughly clean, free from dust and dirt, chemicals, oil paints or grease. When the linoleum is to be laid on an existing floor, it shall, if damp be adequately damp-proofed. When an entire new floor is to be laid, a one inch (25 mm.) thick screed of 1:3 cement sand mortar shall be applied over the base concrete or reinforced concrete slab. The screed shall be so finished with a steel trowel as to produce a smooth surface.

In case of timber floors, all nail heads shall be punched down, irregularities planed off and holes filled with plastic wood or similar filler. To prevent dry rot, the timber floors shall be well-ventilated.

SPECIFICATION NO.14.17---Linoleum Flooring

The movement of timber floors may tear stuck down linoleum. The best method of preventing this is to nail sheets of plywood to the boards and to stick the linoleum to them.

4. The linoleum shall be laid dry or fixed to the floor by means of a suitable adhesive, as specified. Linoleum shall be kept at a temperature not less than 20° centigrade for at least 48 hours before it is unrolled. It shall be laid out flat for several days before it is cut to size. When two widths of linoleum meet, they shall be left with one overlapping the other until expansion has stopped and then cut to fit.

Fixing.

When linoleum is to be stuck down, there is no need to wait for expansion to occur because the adhesive restrains movement. It shall be closely cut to size and fitted loose on the floor. Half of the sheet is turned back into the centre and the adhesive is spread on that half floor. When laid directly on concrete, the back of the linoleum shall also be primed with adhesive. When the adhesive has become tacky, the linoleum shall be rolled on the floor, working from the centre to the walls. The material shall then be firmly pressed down by roller. A 1½ cwt. (70 kg.) roller is a convenient tool for this operation. If any section of linoleum tends to rise, it shall be weighted down with sand bags until the adhesive has gripped.

5. Any adhesive contaminating the face of the floor shall be removed as soon as possible, and in any case within the setting time. When the floor has been securely fixed, it shall be cleaned with soap and warm water and then waxed.

Cleaning.

6. The through rate in the Schedule provides for the cost of laying of plain coloured 3.20 mm. gauge linoleum laid dry. The cost of any pretreatment of the base and cost of adhesive if used shall be paid extra. If linoleum of exact size is required, extra, rate, as provided in the Schedule shall be paid. The labour rate provides for the labour charges for cutting and laying the linoleum.

Rate.