

East Central Railway

Office of the
General Manger (Engg)/Hajipur



PCE's CIRCULAR No- 22/2007/WORKS

Sub- KOTA STONE FLOORING

1. In absence of proper specification and acceptance criteria to ensure supply of good quality Kota Stone, the use of Kota Stone flooring had been banned completely vide this office letter No W-1/562/Rep & Maintenance/1692 dated 28.09.06. In supercession to the instruction issued earlier now it has been decided that Kota Stone flooring may be used wherever considered desirable keeping in view the financial implications following the Specification as described in following Para.

2. SPECIFICATION FOR KOTA STONE TILES/SLABS

2.1 Materials

Kota stone is fine grained naturally riven lime stone and is available in the form of tiles and slabs. The classification of the Kota stone tiles and slab are based upon size as mentioned below.

Item	Length (mm)	Width (mm)	Thickness (mm)
Slabs	700 to 2500	300 to 1000	20 to 150
Tiles	100 to 600	100 to 600	18 to 25

The tiles/slabs are to be cut into sizes as per requirement of the work. The tiles/slab shall be selected from stone of good quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. These shall be hand or machine cut to the requisite thickness. The tiles/slabs shall have the top (exposed) face polished before being brought to site.

2.2 Size and Thickness

- (i) The size of the Kota stone tiles/slabs shall not be less than 550 mm x 550 mm for platforms, concourse and other public areas whereas for buildings the minimum size will be 280 mm x 280 mm.
- (ii) The thickness of Kota stone for building floor shall be 20mm and for platform/concourse etc it shall be 25 mm.
- (iii) In staircase size of the slab should be so selected that there should not be any joint up to 1.20 m width, One joint up to 2.4 m width and 2 joints up to 3.6 m width of staircase.
- (iv) Tolerances allowed on size of the kota stone shall be as under:-
 - a) Length and width of tiles/slab = (+) /(-) 5 mm
 - b) Thickness = (+) / (-) 2 mm.

2.3 Acceptance Criteria

2.3.1 Before starting the work, the contractor shall get the samples of slabs/tiles approved by the AEN in

charge of the work. **The tiles/slab procured from the organized sector industries of Ramganj Mandi Area of Rajasthan shall only be used.** The physical properties of the Kota Stones shall conform to the following standard.

Properties	Test Methods	Acceptance Limit (Kota Blue)
Water Absorption (%)	ASTM C 97-02 or IS:1237-1980	< 1%
Hardness (Moh's Scale)	IS:13630(Part-13)	3 to 4
Minimum Compressive strength (In wet condition)	ASTM C 170-06 or IS:1237-1980	Parallel to rift- 70 N/mm ² Perpendicular to rift-126 N/mm ²
Modulus of Rupture (In wet condition)	ASTM C 99-87 or IS:1237-1980	28-39 N/mm ²
Abrasion Resistance	IS: 1237-1980	Average wear 2.2 mm to max wear on individual specimen 2.5 mm

For first 100 Nos Kota stone tiles/slab or less minimum one sample of the slab to be randomly selected and tested for physical properties in accordance with the test methods as detailed above. Further testing is required @ one sample for every additional 500 Nos or part there of. In no case the work of Kota stone flooring should commence without getting test report of the material and passing by the AEN in charge of the work.

2.3.2 While framing special condition and or specification to be included in the tender/contract agreement for such works, a Para with caption "**Sampling, Testing and Acceptance of Materials**" should invariably be included in which reference of relevant IS codes and other standard specifications should be made. All the field Supervisors and Officers associated with execution should also be well conversant with provisions of these codes and specifications and should check/test-check the works following the same.

2.4 Workmanship

2.4.1 Each slabs/tiles shall be cut to the required size and shape and fine chisel dressed at all the edges to full depth. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the tiles/slabs shall be true square and free from chippings giving a plane surface.

2.4.2 Preparation of surface

(a) Sub-Base- In order to ensure stability of the floor structure a sub-base is required to be provided over well-compacted earth filling of plinths for Kota Stone floorings. For building floors, one layer of well burnt bricks over 100mm thick compacted sand layer is to be provided as sub base. In case of floorings of Platform/Concourse/Pathway etc sub base will consists of 75 mm thick stone ballast over one layer of well burnt brick over 100 mm thick compacted sand layer. **The required slope in floor topping to be given at the sub base stage itself.**

(b) Base Course- Kota Stone floorings when laid on ground floor, a base course of lean concrete mix

1:4:8 (Cement, Course Sand, Stone Aggregate 40mm nominal size) is to be provided between flooring and well compacted sub-base. The minimum thickness of Base-Course will be 100 mm for floors of buildings/ Platform/Concourse/Pathway etc.

(c) Cushioning Layer- In RCC Slab of upper floors in order to provide proper slope in floor topping a cushioning layer of minimum thickness of 40 mm of concrete mix 1:3:6 (Cement, Course Sand, Stone Aggregate 20 mm nominal size) is to be provided over slab.

2.4.3 Bedding

Bedding for the Kota stone slabs/tiles shall be of cement mortar 1:4 (1 Cement: 4 Coarse sand) of average thickness 20 mm. Minimum thickness at any place shall not be less than 10 mm.

2.4.4 Laying

Base Course/Cushioning layer shall be cleaned, wetted and mopped. Bedding Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, and tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar is then allowed to harden a bit. Over this surface, cement slurry of honey like consistency at 4.4Kg of cement per square meter is applied. The edges of the slabs already paved shall be buttered with grey cement; with admixture of pigment to match the shade of the slab. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. Surplus cement on the surface of the slab shall be removed. The slabs fixed in the floor adjoining the walls shall enter not less than 10mm under the plaster, skirting or dado. The junction between the wall and slabs shall be finished neatly. The finished surface shall be true to levels and slopes as instructed by the Engineer-in-Charge.

2.4.5 Curing

The floor shall be kept wet for a minimum of 7 days so that bedding and joints set properly.

2.4.6 Polishing and finishing

Unevenness at the meeting edges of slabs/tiles shall be removed by fine chiseling. Grinding shall normally be commenced after 14 days of laying the slabs. Except for skirting or small areas machine shall be used for the purpose. First grinding shall be done with carborandum stones of 120 grit fitted in the machine. Water shall be properly used during grinding. When the floor has been uniformly rubbed, it shall be cleaned with water. Final grinding shall be done when other works are finished. The machine shall be fitted with carborandum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 grams per square meter on the surface and the surface rubbed with machine fitted

with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed clean and dried with a soft cloth or linen. The finished floor shall not sound, hollow when tapped with a mallet. If any slab is disturbed or damaged, it shall be refitted or replaced, properly jointed and polished.

2.5 Kota stone in risers of steps, skirting and dado

- (i) Preparation of surface: - In case of brick masonry wall, the joints shall be raked out to a depth of a least 15mm while the masonry is being laid. In case of concrete wall, the surface shall be hacked and roughened with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work. The wall surface shall be cut uniformly to the requisite depth so that skirting face shall have the projection from the finished face of wall as shown in drawings or as required by the Engineer-in-Charge.
- (ii) Laying: the risers of steps and skirting shall be set in gray cement admixed with pigment to match the shade of the stone, as specified in the description of the item. The slab shall be so placed that the back surface is at a distance of 12mm from the wall, subject to a minimum of 10mm at any place. If necessary the slab shall be held in position with the help of M.S. hooks temporarily fixed in wall for the purpose at suitable intervals.
- (iii) Other Para as described above shall hold good.


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Chief Engineer/Works

Docket No- W-2/118/09/Works Policy/794

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Copy-

1. CAO/Con/N, CAO/Con/S/MHX for information Pl.
2. DRM/DNR, DHN, MGS, SPJ & SEE for information pl.
3. Sr.DEN/ (Co-ord)/DNR, DHN, MGS, SPJ & SEE for information and necessary action.
4. All HOD/Engg Deptt/ECR


Dy Chief Engineer/Works
For General Manager (Engg)