

Concrete Pavement

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only after ensuring availability of the equipments at site for uniform blending through a specific mechanized facility with automated process control like batch mix plants conforming to IS 4925 and IS: 4926. Site mixing will not be allowed otherwise.

- 4) Mix design will be done as per IRC:44. The OPC content shall not be less than 310 kg/cum (against 360 kg/cum), in case of blending at site. The curing period may be suitably enhanced (by about 2 days).
- 5) The Portland Pozzolana Cement produced in factory shall not have fly ash content more than 25 per cent. The Portland Puzzling Cement produced in factory with fly ash content more than 25 per cent shall not be used. Certificate from the manufacturer to this effect shall be procured before use.

If the soil around has soluble salts like sulphates in excess of 0.5 per cent, the cement used shall be sulphate resistant and shall conform to IS :12330.

Guidance may be taken from IRC: 44 for ascertaining the compressive/flexural strength of cement concrete required to match with the prescribed design strength of concrete. Cement to be used may preferably be obtained in bulk form. If cement in paper bags are proposed to be used, there shall be bag-splitters with the facility to separate pieces of paper bags and dispose them of suitably. No paper pieces shall enter the concrete mix. Bulk cement shall be stored in accordance with Clause 1014. The cement shall be subjected to acceptance test just prior to its use.

602.2.3 Chemical Admixtures : Admixtures conforming to IS: 9103 and IS:6925 shall be permitted to improve workability of the concrete or extension of setting time, on satisfactory evidence that they will not have any adverse effect on the properties of concrete with respect to strength, volume change, durability and have no deleterious effect on steel bars. The particulars of the admixture and the quantity to be used, must be furnished to the Engineer in advance to obtain his approval before use. Satisfactory performance of the admixtures should be proved both on the laboratory concrete trial mixes and in the trial length paving. If air entraining admixtures is used, the total quantity of air in air-entrained concrete as a percentage of the volume of the mix shall be 5 ± 1.5 per cent for 31.5 mm nominal size aggregate.

602.2.3.1 Fibres :

Fibres may be used subject to the provision in the design/approval by the Engineer to reduce the shrinkage cracking and post-cracking. The fibres may be steel fibre as per IRC:SP:46 or polymeric Synthetic Fibres within the following range of specifications:

- Effective Diametre 10 micron – 1.0 mm
- Length 6-48 mm
- Specific gravity more than 1.0
- Suggested Dosage 0.6-2.0 kg/cum (0.2 -0.6 % by cement weight of cement in
 - o mix). Usage will be regulated as stipulated in IRC:44/
 - o IS:456 or any other specialist literature.
- Water absorption less than 0.45 percent
- Melting point of this fibre shall not be less than 160°C.
- The aspect ratio generally varies from 200-2000.
- These synthetic fibers will have good alkali and UV light resistance.

When fibers are used, the tolerance of slump may be ± 15 mm for slump of less than 50 mm and ± 25 mm for a slump greater than 50 mm but less than 100 mm.

602.2.4 Aggregates

602.2.4.1 Aggregates for pavement concrete shall be natural material complying with IS : 383 but with a Los Angeles Abrasion Test result not more than 35 per cent. The limits of deleterious materials shall not exceed the requirements set out in IS : 383.

The aggregates shall be free from chert, flint, chalcedony or other silica in a form that can react with the alkalis in the cement. In addition, the total chlorides content expressed as chloride ion content shall not exceed 0.06 per cent by weight and the total sulphate content expressed as sulphuric anhydride (SO₃) shall not exceed 0.25 per cent by weight. In case the Engineer considers that the aggregates are not free from dirt, the same may be washed and drained for at least 72 hours before batching, as directed by the Engineer. The deleterious substances shall not be more than the limits given in Table 600-2.

602.2.4.2 Coarse aggregate : Coarse aggregate shall consist of clean, hard, strong, dense, non-porous and durable pieces of crushed stone or crushed gravel and shall be devoid of pieces of disintegrated stone, soft, flaky, elongated, very angular or splintery pieces. The maximum size of coarse aggregate shall not exceed 31.5 mm for pavement concrete. Continuously graded aggregates shall be used as per Table 600-I, No aggregate which has water absorption more than 2 per cent shall be used in the concrete mix. The aggregates shall be tested for soundness in accordance with IS: 2386 (Part-5). After 5 cycles of testing the loss shall not be more than 12 per cent if sodium sulphate solution is

To improve the ductility and fatigue resistance of high performance/high strength concrete, polymeric fibres may be added in the concrete 0.2-0.4% by weight of cement and/or steel fibres as per IRC:SP:46. Polymeric fibres shall have water absorption properties of concrete (i.e. reduction in the strength not more than 5%). Entrapped air content in the concrete shall not be more than 3%, except where freezing and thawing is taking place.

604.2.8 Fibres :

Fibres may be used subject to the provisions in the design/approval by the Engineer to reduce the shrinkage cracking and post-cracking. The fibres may be steel fibre as per IRC:SP:46 or polymeric Synthetic Fibres within the following range of specifications:

- Effective Diameter 10 micron – 1.0 mm
- Length 6-48 mm
- Specific gravity more than 1.0
- Suggested Dosage 0.600-2.0 kg/cum (0.2 -0.6 % by cement weight in mix). Usage will be regulated as stipulated in IRC:44/ IS:456 or in any other specialist literature.
- Water absorption less than 0.45%
- Melting point of this fibre shall not be less than 160°C.
- The aspect ratio generally varies from 200-2000.
- These synthetic fibers will have good alkali and UV light resistance.

When fibers are used, the tolerance of slump may be ± 15 mm for slump of less than 50 mm and ± 25 mm for a slump greater than 50 mm but less than 100 mm.

604.2.9. Storage of materials: All materials shall be stored in accordance with the provisions of Clause 1014 of the Specifications and other relevant IS Specifications. All efforts must be made to store the materials in proper places so as to prevent their deterioration or contamination by foreign matter and to ensure their satisfactory quality and fitness for the work. The platform where aggregates are stock piled shall be on a levelled platform elevated from the ground atleast by 150 mm. This platform will be a pucca paved platform, preferably brick paved. The area shall have slope and drain to drain off rain water. The storage space must also permit easy inspection, removal and storage of the materials. Aggregates of different sizes shall be stored in partitioned stack-yards. All such materials even though stored in approved godowns must be subjected to acceptance test as per Clause 903 of these Specifications immediately prior to their use.