

# Simple Testing Of Admixtures And Surface Coating For Permeability To Water.

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This method of test describes the procedures for determining concrete permeability to water by capillary absorption method for comparison between controlled specimens and the specimens containing admixtures having surface coatings. This method gives the waterproofing efficiency of admixtures and coating, thus also of the greatest interest for durability of concrete offers protection to reinforcement from corrosion.

For all test specimens materials, proportions, workability, mixing, compaction, casting, curing, temperature and testing method should be kept identical for conclusive comparison between controlled and admixture/coated specimens.

## **Casting of Specimens**

10cm cubes of the following mix are to be cast by hand compaction filling the cubes in two layers each layer to be rammed 35 times by ramming rod 16mm dia 600mm in length one end bullet pointed. A set of 3 cubes shall be prepared with the recommended dosage of admixture. The other set of 3 cubes shall be made without any admixture (controlled cube). In case of surface coating is to be tested, then all the six cubes shall be made of the same mix.

## **Mix Proportions**

OP Cement 43 grade = 200 Kg/m<sup>3</sup>

Sand Zone II = 850Kg/m<sup>3</sup>

20-5mm aggregate = 1115lg/m<sup>3</sup>

Water= To give slump of 40<sup>+</sup>.5mm or compaction factor of about 0.90.

The above is a suggested mix of sand and aggregate having specific gravity of 2.6. Mixes may be designed as per local aggregates.

Cement:Aggregate ratio should be kept 1:9 to 1:10

Liquid admixtures usually reduce the water demand, but in very lean mixes there shall not be much reduction in mixing water.

The water of the liquid admixture should be accounted in the mixing water. A few trials of controlled concrete workability will be required for getting the exact quantity of mixing water for obtaining required workability. As far as possible this controlled concrete mixing water should not be exceeded with the admixture mix. The lean mix as recommended above will be desirable for this type of test.

### **Procedure of Testing**

After 24 hours of casting, all the cubes shall be demoulded and cured in clean water in the same curing tank for 28 days. After 28 days of curing all the cubes shall be dried in a ventilated oven at the temperature of 100°C to  $\pm 10^\circ\text{C}$  till constant weight. If surface coating is to be tested, then as per recommendations of the manufacturer three cubes to be surface coated at one face and upto the height of 5 cm on all the four faces. After coating and conditioning, these cubes along with the controlled cubes shall again be dried in the oven at a temperature of 50°C to  $\pm 2^\circ\text{C}$  till constant weight. Coated cubes faces should be kept upward while keeping them in oven, so that coating should not be damaged. The coating after its application should withstand without any physical and chemical change a temperature of 50°C, which is a temperature normally reached of concrete surfaces exposed to sun at most places of India during summer. A coating sensitive to this temperature should not be tested with this method.

All the six weighted cubes shall be placed in the same glazed or glass flat tray, so that the cubes are dipped up to a level of 1.2cm. The level of the water shall be maintained throughout the experiment by adding fresh water from time to time. Evaporation of water from exposed cubes surfaces and tray is prevented by covering the entire set up by polythene. Care should be taken that polythene should not disturb the set up. Determine the gain in weight of the cube at different intervals till the weight of cube become constant.

The permeability of each cube of a set shall be found by determining the coefficient of water absorption with the help of the formula:

$$A = M_w/t$$

Where A – Coefficient of water absorption.

$M_w$  – Amount of water absorbed per unit area.

T – Time in second for absorption

From the test results the effectiveness of admixtures and coating may be compared with controlled specimens. This method is simple for testing waterproofing admixtures and coating without any special equipment.

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