

## CRD-C 61-89A

## TEST METHOD FOR DETERMINING THE RESISTANCE OF FRESHLY MIXED CONCRETE TO WASHING OUT IN WATER

**1. Scope**

1.1 This test method covers a procedure for measuring the amount of cement paste that washes out of a sample of confined freshly mixed concrete upon contact with water.

**2. Applicable Documents**2.1 *ASTM Standards:*

C 143 Method for Slump of Hydraulic Cement Concrete (CRD-C 5)

C 172 Method of Sampling Freshly Mixed Concrete (CRD-C 4)

C 231 Method for Air Content of Freshly Mixed Concrete by the Pressure Method (CRD-C 41)

2.2 Handbook for Concrete and Cement Items  
CRD-C 32 Test Method for Flow Under Water of Hydraulic-Cement Concrete

**3. Apparatus**

3.1 Washout tube - A cylindrical clear plastic tube (Fig. 1) of the following dimensions:

Inside diameter = 190 mm  $\pm$  2 mm  
Outside diameter = 200 mm  $\pm$  2 mm  
Height = 2,000 mm  $\pm$  2 mm

3.2 Receiving Container - A cylindrical receiving container with cover, shown in the tube in Fig. 1, both made out of perforated sheet steel having a nominal thickness of 1.4 mm. The perforations shall be circular and shall have a nominal diameter of 3 mm and a nominal distance between the centers of adjacent perforations of 5 mm. The diameter shall be 130 mm  $\pm$  2 mm and the height should be 120 mm  $\pm$  2 mm.

3.3 Rope - A rope with a length of about 2-1/2m attached to the receiving container.

3.4 Scale - A scale allowing determination of the mass of the sample with a precision of 0.05 percent of the mass of the sample.

3.5 Rod - A 10-mm (3/8-in.) diameter round, straight steel rod with at least the tamping end rounded to a hemispherical tip of the same diameter as the rod, approximately 300 mm (12-in.) long.

**4. Sample**

4.1 Obtain a representative sample of concrete in accordance with Method C 172. If the concrete contains coarse aggregate particles that would be retained on a 37.5-mm (1-1/2-in.) sieve, wet sieve a representative sample over a 37.5-mm (1-1/2-in.) sieve to yield somewhat more than enough to fill the receiving container to the desired level. The wet sieving procedure is described in Method C 172.

**5. Procedure**

5.1 Level the washout tube base and fill the tube with water to a height of 1,700  $\pm$  5 mm.

5.2 Determine the mass of the receiving container and cover. Put a sample of fresh concrete, having a mass slightly in excess of 2,000 g, into the receiving container.

5.3 Rod the sample 10 times with a 10-mm diameter rod. Tap the side of the container with the rod 10 to 15 times. Clean the extruded concrete from the outside of the container. Determine and record the mass of the concrete as  $M_1$ ,  $M_1$  shall be 2,000  $\pm$  20 g.

5.4 Attach the rope to the receiving container. Put the receiving container holding the sample with its cover in place into the washout tube and lower until the bottom of the container is in contact with the water.

5.5 Let the receiving container fall freely through the water to the bottom of the tube. After waiting 15 sec, bring the receiving container up in 5  $\pm$  1 sec. Let the receiving container drain for 2 min, tilting slightly to allow water to run off the top of the sample. Determine the mass of the concrete remaining in the receiving container and record as  $M_2$ . The loss in mass of the concrete in the receiving container is equal to  $M_1 - M_2$ .

5.6 Perform the sequence three times on the same sample, determining  $M_2$  each time. The  $M_2$  after the final sequence is the cumulative loss in mass.

**6. Calculations**

6.1 Washout, or loss of mass of the sample, expressed as a percentage of the initial mass of the sample is given by the following formula:

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$$D = \frac{M_i - M_f}{M_i} \times 100$$

where:

D = washout, %

$M_i$  = mass of sample before initial test

$M_f$  = mass of sample after each test

**7. Report**

The report shall include the following:

7.1.1 Values of D after each drop, expressed as  $D_1$ ,  $D_2$ , and  $D_3$  i.e., the percentage of the original mass of the sample lost after each of the three drops.

7.1.2. The mixture proportions of the concrete and other information necessary to describe the properties of the freshly mixed concrete when tested.

**8. Precision and Bias**

8.1 Precision - The precision of this test method has not been determined.

8.2 Bias - The bias of this test method cannot be determined since no standard reference material is available.

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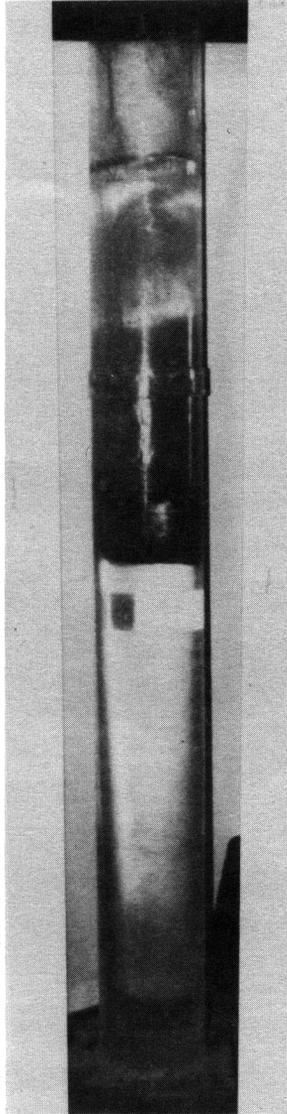


Figure 1. Washout apparatus