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*Indian Standard*

SPECIFICATION FOR  
APPARATUS FOR DETERMINING  
CONSTITUENTS OF FRESH CONCRETE

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**INDIAN STANDARDS INSTITUTION**

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NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR APPARATUS FOR DETERMINING CONSTITUENTS OF FRESH CONCRETE

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# *Indian Standard*

## SPECIFICATION FOR APPARATUS FOR DETERMINING CONSTITUENTS OF FRESH CONCRETE

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 21 February 1974, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** The Indian Standards Institution has already published a series of standards on methods of testing cement and concrete. It has been recognized that reliable and inter comparable test results can be obtained only with standard testing equipment capable of giving the desired level of accuracy. The Sectional Committee has, therefore, decided to bring out a series of specifications covering the requirements of equipment used for testing cement and concrete, to encourage its development and manufacture in the country.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard covers the requirements of apparatus for determining the proportions of cement, and fine and coarse aggregates of freshly mixed concrete where the nominal size of the largest aggregate does not exceed 40 mm.

### 2. WORKING PRINCIPLE

**2.1** The test consists essentially in weighing the sample of concrete in air and in water, and then thoroughly washing it through two sieves to separate coarse and fine aggregates and to remove cement. The clean

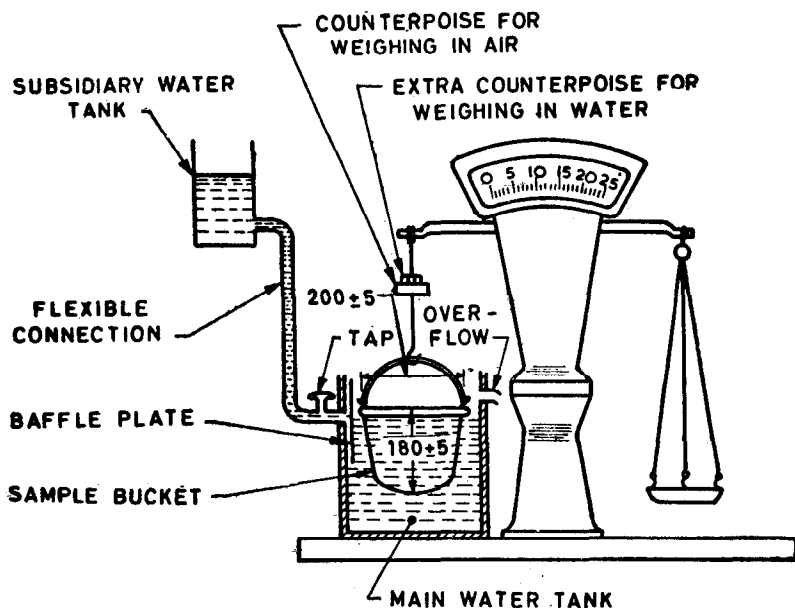
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\*Rules for rounding off numerical values ( revised ).

aggregates so recovered are then weighed in water and the mix proportions by weight are calculated from a knowledge of the specific gravities of the aggregates and cement.

### 3. DIMENSIONS

**3.1** Dimensions of different components of the apparatus for determining constituents of fresh concrete shall be as detailed in Fig. 1. Where tolerances are not specifically mentioned in the relevant clauses, dimensions shall be considered nominal.



All dimensions in millimetres.

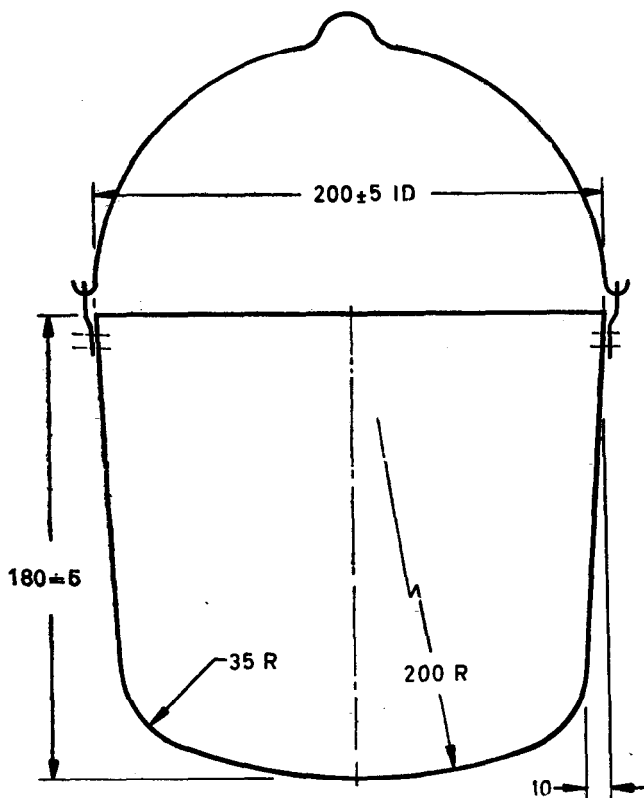
FIG. 1 5 kg SEMI-AUTOMATIC BALANCE READING TO 0.5 g

### 4. PARTS AND ACCESSORIES

**4.1** The apparatus shall consist of the parts given in 4.1.1 to 4.1.9.

**4.1.1 Balance** — The balance shall be a semi-automatic one capable of weighing up to 5 kg to an accuracy of 0.5 g. The balance shall be provided with two counterpoises to obtain equilibrium, one for when an empty bucket is being weighed in air and the other for when it is being weighed whilst immersed in water (Fig. 1).

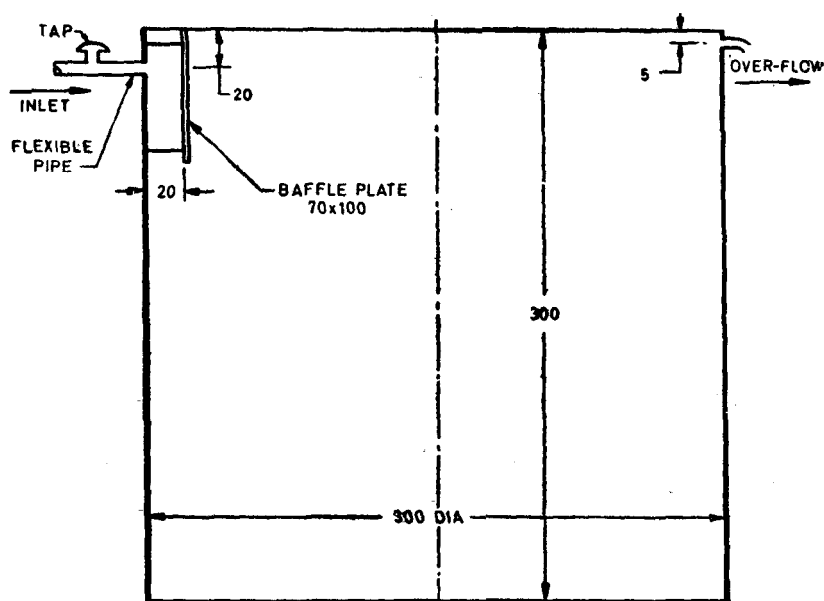
**4.1.2 Bucket Shaped Containers** — At least eight seamless bucket shaped containers of corrosion-resisting metal, such as, stainless steel, chromium or nickel plated steel sheet, 2.0 mm thick each  $200 \pm 5$  mm diameter (internal) on top and  $180 \pm 5$  mm deep having smooth sloping side and a rounded bottom to prevent the trapping of air when it is immersed, in accordance with Fig. 2. All these containers shall be of same weight in air correct to  $\pm 0.25$  g and each shall be clearly marked with the necessary correction figure to allow for the difference between its loss in weight when immersed in water and the weight of second counterpoise.



All dimensions in millimetres.

FIG. 2 BUCKET SHAPED CONTAINER

**4.1.3 Tank** — The tank shall be large enough to receive the bucket shaped container easily and made of corrosion resisting metal, such as stainless steel, chromium or nickel plated steel sheet 2.0 mm thick. The tank shall be approximately 300 mm internal diameter and 300 mm deep in accordance with Fig. 3. This shall have an overflow spout in such a position that the rim of a bucket hung from the balance is completely immersed when the tank is full. The spout shall preferably be at a distance of 5 mm from the top of the tank. The tank shall be connected by a tap and flexible pipe to a subsidiary tank, so that the water level in the main tank can be raised or lowered without disturbance by altering the level of the subsidiary tank. The tap shall be preferably at a distance of 20 mm from the top of the tank, so that in the lowest position of the subsidiary tank when the tap is open the level of water is below the lip of a bucket hanging on the balance. A baffle plate of corrosion resisting metal, such as stainless steel, chromium or nickel plated steel sheet (approximately 1.6 mm thick, 70 mm deep and 100 mm long) shall be provided inside the main tank opposite the inlet of the tap extending from the top of the tank to a position 50 mm below the centre of connection of the tap.



All dimensions in millimetres.

FIG. 3 MAIN TANK

**4.1.4 *Subsidiary Tank*** — The subsidiary tank shall be of suitable size and made of corrosion resisting metal, such as stainless steel, chromium or nickel plated steel sheet. The bottom of this tank shall be connected to the tap of the main tank by a flexible pipe. The position of the subsidiary tank shall be movable so that it can be lowered or raised from the position of the tap on the main tank as necessity arises.

**4.1.5 *Sieve*** — Two nesting sieves 450 mm diameter; one IS Sieve 475-mm ( 100 mm in depth ) and other IS Sieve 150-microns ( 300 mm in depth ) supported in the sieve frame by an adequately rigid spider of non-corrodible material, such as brass in accordance with Fig. 4. The sieves shall conform to IS : 460-1962\*.

**4.1.6 *Funnel*** — A funnel approximately 500 mm in diameter at the top, 150 mm diameter at the bottom and 250 mm deep, made of 1.6 mm thick corrosion resistant metal sheet, such as, stainless steel, chromium or nickel plated steel on a sample bucket in accordance with Fig. 5 shall be provided to facilitate the washing of materials from the large sieves into the buckets without loss of any material.

**4.1.7 *Hose*** — A hose fitted with a nozzle giving a fairly fine strong spray of water shall be provided for washing of the cement from the aggregates over the surface of the sieves.

**4.1.8 *Stirring Rod*** — A mild steel stirring rod of 15 mm diameter and 300 mm long shall be provided.

**4.1.9 *Weight Box*** — A standard weight box of capacity 5 kg shall be provided.

## 5. MATERIALS

**5.1** The materials that shall be used for making the different items of the apparatus are given in Table 1.

## 6. MARKING

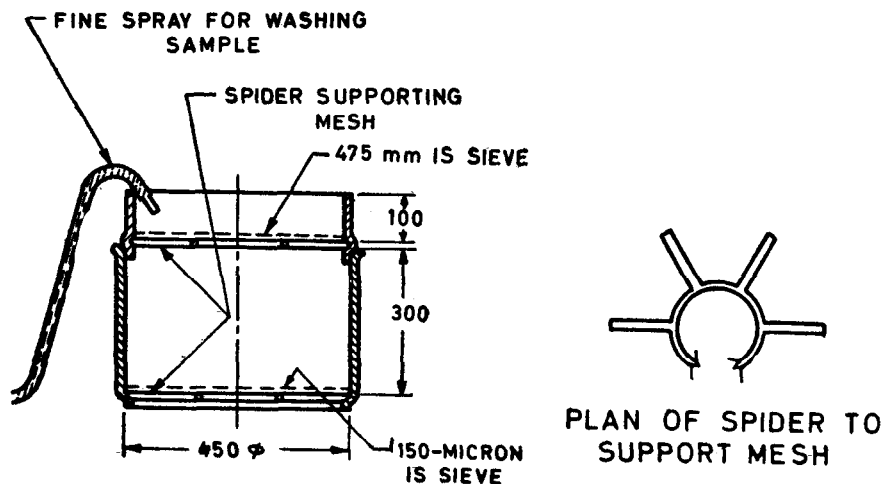
**6.1** The following information shall be clearly and indelibly marked on each component of the apparatus in a way that it does not interfere with the performance of the apparatus:

- a) Name of manufacturer or his registered trade-mark or both, and
- b) Date of manufacture.

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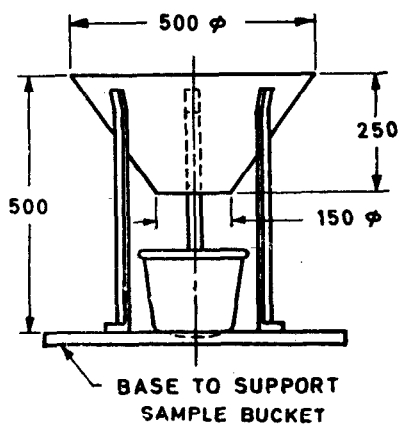
\*Specification for test sieves ( revised )





All dimensions in millimetres.

FIG. 4 NESTED SIEVES



All dimensions in millimetres.

FIG. 5 FUNNEL FOR TRANSFER OF MATERIAL

**6.1.1** The apparatus may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

**TABLE 1 MATERIALS FOR DIFFERENT ITEMS OF APPARATUS FOR DETERMINING CONSTITUENTS OF FRESH CONCRETE**

( Clause 5.1 )

SL No.	ITEM	MATERIAL	SPECIAL REQUIREMENT, IF ANY	RECOMMENDED INDIAN STANDARD, IF ANY
(1)	(2)	(3)	(4)	(5)
i)	Bucket including handle	Non-corrodible metal not attacked by cement, such as stainless steel, chromium or nickel plated steel	Smooth finish (inside and outside)	—
ii)	Tank	Non-corrodible metal not attacked by cement, such as stainless steel, chromium or nickel plated steel	Smooth internal finish	—
iii)	Spider	Brass	—	IS : 292-1961*
iv)	Stand for sample bucket	Cast iron	—	IS : 210-1970†

\*Specification for brass ingots and castings ( revised ).

†Specification for grey iron castings ( second revision ).

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