

IS 4031 (Part 14) : 1989

Indian Standard

HYDRAULIC CEMENT — METHODS OF PHYSICAL TESTS

PART 14 DETERMINATION OF FALSE SET

भारतीय मानक

जल दृढ़ी सीमेंट — भौतिक परीक्षणों की पद्धतियाँ

भाग 14 सीमेंट का आभासी जमाव

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 2

FOREWORD

This Indian Standard (Part 14) was adopted by the Bureau of Indian Standards on 25 August 1989, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

Hydraulic cements sometimes exhibit false set or premature stiffening on gauging with water. But further working with the trowel breaks up this set and the cement regains its plasticity and exhibits a normal setting time. False set is totally distinct from flash set. Criteria for accepting a set in cement as false set has been specified in different Indian Standards on hydraulic cement. The Cement and Concrete Sectional Committee, therefore, felt it necessary to lay down the procedure for determining false set of hydraulic cement. This test is required to be carried out only when a false set is suspected in cement.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

HYDRAULIC CEMENT — METHODS OF PHYSICAL TESTS

PART 14 DETERMINATION OF FALSE SET

1 SCOPE

1.1 This standard (Part 14) covers the procedure for determining false set of hydraulic cement.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
1433 : 1965	Specification for beam scales (revised)
3535 : 1986	Methods of sampling hydraulic cements (first revision)
5513 : 1976	Specification for Vicat apparatus (first revision)

3 SAMPLING AND SELECTION OF TEST SPECIMENS

3.1 The sample of the cement shall be taken according to the requirements of IS 3535 : 1986 and the relevant standard specification for the type of cement being tested. The representative sample of the cement selected as above shall be thoroughly mixed before testing.

4 TEMPERATURE AND HUMIDITY

4.1 The temperature of the moulding room, dry materials, appliances and water shall be maintained at $27 \pm 2^\circ\text{C}$. The relative humidity of the laboratory shall be 65 ± 5 percent.

5 APPARATUS

5.1 Vicat Apparatus

Vicat apparatus conforming to IS 5513 : 1976 shall be used.

5.2 Balance

The balance shall conform to Class B of IS 1433 : 1965.

NOTE — Self-indicating balance with equivalent accuracy may also be used.

5.3 Weights

The weights in use shall conform to the

requirements specified in *Weights and Measures Rules*.

5.4 Gauging Trowel

Gauging trowel shall have a steel blade 100 to 150 mm in length with straight edges and weighing 210 ± 10 g.

5.5 Graduated Glass Cylinders, 200 to 250 ml capacity.

5.6 Mixing Slab

Mixing slab shall be of non-absorbent material of suitable size.

6 PROCEDURE

6.1 Prepare a paste of weighed quantity of cement (500 g) with a weighed quantity (about 140 g) of potable or distilled water, taking care that the time of gauging is not less than three minutes nor more than four minutes and the gauging shall be completed before any sign of setting occurs. The gauging time shall be counted from the time of adding water to the dry cement until commencing to fill the Vicat mould. Fill the Vicat mould with this paste, the mould resting upon a non-porous plate. After completely filling the mould, smooth off the surface of the paste, making it level with the top of the mould. The mould may be slightly shaken to expel the air.

NOTE — Clean appliances shall be used for gauging.

6.1.1 In filling the mould, the operator's hands and the blade of the gauging trowel shall alone be used.

6.2 Place the test block confined in the mould, together with the non-porous resting plate, under the rod of Vicat apparatus bearing the plunger; lower the plunger gently to touch the surface of the test block, and quickly release, allowing it to sink into the paste. This operation of releasing the plunger shall be carried out exactly after 20 seconds of completion of mixing period.

6.3 Determination of Initial Penetration

Prepare trial pastes with varying percentages of water as described above until the amount of

IS 4031 (Part 14) : 1989

water necessary for making up the paste which will permit the Vicat plunger to penetrate to a point 28 to 36 mm from the top of the Vicat mould in 30 seconds of release of plunger is obtained.

6.4 Determination of Final Penetration

After completion of initial penetration reading, remove the plunger from the paste, clean it, and reset the mould and the plate in a new position. This operation should be performed with as little disturbance as possible to the paste confined in the Vicat mould. Bring the plunger again in contact with surface of the paste and release the plunger a second time, five minutes after completion of the mixing period and determine the final penetration after 30 seconds of release of plunger.

6.5 Determination of Remix Penetration

If the penetrations determined by the foregoing procedure show the cement to be stiffening rapidly, information as to the nature of stiffening shall be obtained by testing as given in 6.5.1 and 6.5.2.

6.5.1 After completing the measurement of the five minutes penetration, immediately return

the paste to the mixing slab and remix the contents for one minute.

6.5.2 Fill the mould and determine the penetration following the procedure specified in 6.3.

NOTES

1 If early development of stiffness can be dispelled and plasticity regained by further mixing without addition of water then it is termed as false set.

2 If early development of stiffness cannot be dispelled nor can the plasticity be regained by further mixing without addition of water then it is termed as flash set.

7 CALCULATION

7.1 Calculate the percent of final penetration as the ratio of final penetration to initial penetration as follows:

$$P = \frac{B}{A} \times 100$$

where

P = percent final penetration,

A = initial penetration in mm, and

B = final penetration in mm.

ANNEX A

COMPOSITION OF THE TECHNICAL COMMITTEE

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