

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4031-14 (1989): Methods of physical test for hydraulic cement, Part 14: Determination of false set [CED 2: Civil Engineering]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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

(First Reprint JANUARY 1993)

UDC 666·94·015·57 : 666·9·015·59

© BIS 1990

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

February 1990

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 (<i>revised</i>)
3535 : 1986	Methods of sampling hydraulic cements (<i>first revision</i>)
5513 : 1976	Specification for Vicat apparatus (<i>first revision</i>)

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

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

Cement and Concrete Sectional Committee, BDC 2

Chairman

DR H. C. VISVESVARAYA

Member

SHRI K. P. BANERJEE
SHRI HARISH N. MALANI (Alternate)
SHRI S. K. BANERJEE
CHIEF ENGINEER (BD)
SHRI J. C. BASUR (Alternate)
CHIEF ENGINEER (DESIGNS)
SUPERINTENDING ENGINEER (S & S)
CHIEF ENGINEER (RESEARCH-CUM-DIRECTOR)
RESEARCH OFFICER (CONCRETE TECHNOLOGY) (Alternate)
DIRECTOR
JOINT DIRECTOR (Alternate)
DIRECTOR
CHIEF RESEARCH OFFICER (Alternate)
DIRECTOR (C & MDD-II)
DEPUTY DIRECTOR (C & MDD-II) (Alternate)
SHRI V. K. GHANESKAR

SHRI S. GOPINATH
SHRI A. K. GUPTA
SHRI J. SEN GUPTA
SHRI P. J. JAGUS
DR A. K. CHATTERJEE (Alternate)
JOINT DIRECTOR STANDARDS (B & S)/CB-I

JOINT DIRECTOR STANDARDS (B & S)/CB-II
SHRI N. G. JOSHI

Representing

National Council for Cement and Building Materials,
New Delhi

Larsen and Toubro Limited, Bombay

National Test House, Calcutta
Bhakra Beas Management Board, Nangal Township

Central Public Works Department, New Delhi

Irrigation Department, Government of Punjab
A. P. Engineering Research Laboratories, Hyderabad

Central Soil and Materials Research Station, New Delhi

Central Water Commission, New Delhi

Structural Engineering Research Centre (CSIR),
Ghaziabad
India Cements Limited, Madras
Hyderabad Industries Limited, Hyderabad
National Buildings Organization, New Delhi
Associated Cement Companies Ltd, Bombay

Research, Designs and Standards Organization (Ministry
of Railways), Lucknow

Indian Hume Pipes Company Limited, Bombay

Members

SHRI R. L. KAPOOR

SHRI R. K. SAXENA (*Alternate*)

SHRI G. K. MAJUMDAR

SHRI P. N. MEHTA

SHRI S. K. MATHUR (*Alternate*)

DR A. K. MULLICK

SHRI NIRMAL SINGH

SHRI S. S. MIGLANI (*Alternate*)

SHRI S. N. PAL

SHRI BIMAN DASGUPTA (*Alternate*)

SHRI R. C. PARATE

LT-COL R. K. SINGH (*Alternate*)

SHRI H. S. PABRICHA

SHRI Y. R. PHULL

SHRI M. R. CHATTERJEE (*Alternate*)

DR MOHAN RAI

DR S. S. REHSI (*Alternate*)

SHRI A. V. RAMANA

DR K. C. NARANG (*Alternate*)

SHRI T. N. SUBHA RAO

SHRI S. A. REDDI (*Alternate*)

DR M. RAMAIAH

DR A. G. MADHAVA RAO (*Alternate*)

SHRI G. RAMDAS

SHRI A. U. RIJHSINGHANI

SHRI C. S. SHARMA (*Alternate*)

SECRETARY

SHRI K. R. SAXENA (*Alternate*)

SUPERINTENDING ENGINEER (DESIGNS)

EXECUTIVE ENGINEER (SMD DIVISION) (*Alternate*)

SHRI L. SWAROOP

SHRI H. BHATTACHARYA (*Alternate*)

SHRI S. K. GUHA THAKURTA

SHRI S. P. SANKARNARAYANAN (*Alternate*)

DR H. C. VISVESVARAYA

SHRI D. C. CHATURVEDI (*Alternate*)

SHRI G. RAMAN,

Director (Civ Engg)

Representing

Roads Wing (Ministry of Transport), Department of Surface Transport, New Delhi

Hospital Services Consultancy Corporation (India) Ltd, New Delhi

Geological Survey of India, Calcutta

National Council for Cement and Building Materials, New Delhi

Development Commissioner for Cement Industry, (Ministry of Industry)

M. N. Dastur and Company Private Limited, Calcutta

Engineer-in-Chief's Branch, Army Headquarters

Hindustan Prefab Limited, New Delhi

Indian Roads Congress, New Delhi; and Central Road Research Institute (CSIR), New Delhi

Central Road Research Institute (CSIR), New Delhi

Central Building Research Institute (CSIR), Roorkee

Dalmia Cement (Bharat) Limited, New Delhi

Gammon India Limited, Bombay

Structural Engineering Research Centre (CSIR), Madras

Directorate General of Supplies and Disposals, New Delhi

Cement Corporation of India, New Delhi

Central Board of Irrigation and Power, New Delhi

Public Works Department, Government of Tamil Nadu

Orissa Cement Limited, New Delhi

Gannon Dunkerley & Company Ltd, Bombay

Institution of Engineers (India), Calcutta

Director General, BIS (*Ex-officio Member*)*Secretary*

SHRI N. C. BANDYOPADHYAY

Joint Director (Civ Engg), BIS

Cement, Pozzolana and Cement Additives Subcommittee, BDC 2 : 1*Convener*

DR H. C. VISVESVARAYA

National Council for Cement and Building Materials, New Delhi

Members

DR A. K. MULLICK

DR (SHRIMATI) S. LAXMI } (*Alternates to Dr H. C. Visvesvaraya*)

SHRI S. K. BANERJEE

SHRI N. G. BASAK

SHRI T. MADNESHWAR (*Alternate*)

SHRI SOMNATH BANERJEE

CHIEF ENGINEER (RESEARCH-CUM-DIRECTOR)

RESEARCH OFFICER (CT) (*Alternate*)

SHRI N. B. DESAI

SHRI J. K. PATEL (*Alternate*)

DIRECTOR

RESEARCH OFFICER (*Alternate*)

DIRECTOR (C & MDD II)

DEPUTY DIRECTOR (C & MDD II) (*Alternate*)

SHRI R. K. GATTANI

SHRI R. K. VAISHNAVI (*Alternate*)

SHRI J. SEN GUPTA

SHRI P. J. JAGUS

DR A. K. CHATTERJEE (*Alternate*)

JOINT DIRECTOR, STANDARDS (B & S)/CB-I

JOINT DIRECTOR, STANDARDS (B & S)/CB-II (*Alternate*)

National Test House, Calcutta

Directorate General of Technical Development, New Delhi

Cement Manufacturers Association, Bombay

Irrigation Department, Government of Punjab

Gujarat Engineering Research Institute, Vadodara

Maharashtra Engineering Research Institute, Nasik

Central Water Commission, New Delhi

Shree Digvijay Cement Company Ltd, Bombay

National Buildings Organization, New Delhi

Associated Cement Companies Ltd, Bombay

Research, Designs and Standards Organization, Lucknow

IS 4031 (Part 14) : 1989

Members

SHRI R. L. KAPOOR

SHRI R. K. DATTA (*Alternate*)
SHRI W. N. KARODE
SHRI R. KUNJITHAPATTAM
SHRI G. K. MAJUMDAR

SHRI K. P. MOHIDEEN
SHRI NIRMAL SINGH

SHRI S. S. MIGLANI (*Alternate*)
SHRI Y. R. PHULL
SHRI M. R. CHATTERJEE (*Alternate*)
SHRI A. V. RAMANA
DR K. C. NARANG (*Alternate*)
COL V. K. RAO
SHRI N. S. GALANDE (*Alternate*)
SHRI S. A. REDDI
DR S. S. REHSI
DR IRSHAD MASOOD (*Alternate*)
SHRI A. U. RIJHSINGHANI
SHRI M. P. SINGH
SUPERINTENDING ENGINEER (D)
SENIOR DEPUTY CHIEF ENGINEER (GENERAL) (*Alternate*)
SHRI L. SWAROOP
SHRI H. BHATTACHARYA (*Alternate*)
SHRI V. M. WAD

Representing

Roads Wing (Ministry of Transport), Department of
Surface Transport, New Delhi

Hindustan Construction Company Ltd, Bombay
Chettinad Cement Corporation Ltd, Paliyur, Tamil Nadu
Hospital Services Consulting Corporation (India) Ltd,
New Delhi
Central Warehousing Corporation, New Delhi
Development Commissioner for Cement Industry (Ministry
of Industry)

Central Road Research Institute (CSIR), New Delhi

Dalmia Cement (Bharat) Ltd, New Delhi

Engineer-in-Chief's Branch, Army Headquarters

Gammon India Ltd, Bombay
Central Building Research Institute (CSIR), Roorkee

Cement Corporation of India Ltd, New Delhi
Federation of Mini Cement Plants, New Delhi
Public Works Department, Government of Tamil Nadu

Orissa Cement Ltd, New Delhi

Bhilai Steel Plant, Bhilai

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard 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 BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Revision of Indian Standards

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. BDC 2 (4620)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 311 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 86 62
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	6 32 92 95

Branches : AHMADABAD, BANGALORE, BHOPAL, BHUBANESHWAR, COIMBATORE,
FARIDABAD, GHAZIABAD, GUWAHATI, HYDERABAD, JAIPUR, KANPUR,
PATNA, THIRUVANANTHAPURAM.

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JUNE 2013
TO
IS 4031 (Part 14) : 1989 HYDRAULIC CEMENT —
METHODS OF PHYSICAL TESTS

PART 14 DETERMINATION OF FALSE SET

(Page 1, *clause 4.1, line 4*) — Substitute ‘not less than 65 percent’ for ‘ 65 ± 5 percent’.

(CED 2)

Reprography Unit, BIS, New Delhi, India