भारतीय मानक
Indian Standard

IS 516 (Part 1/Sec 1) : 2021

दृढ़ीकृत कंक्रीट — परीक्षण पद्धतियाँ

भाग 1 दृढ़ीकृत कंक्रीट का सामर्थ्य ज्ञात करने के लिए परीक्षण

खण्ड 1 संपीड़न, फ्लेक्सुरल व खंडित तनन सामर्थ्य

(पहला पुनरीक्षण)

Hardened Concrete — Methods of Test

Part 1 Testing of Strength of Hardened Concrete

Section 1 Compressive, Flexural and Split Tensile Strength

(First Revision)

ICS 91.100.30

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FOREWORD

This Indian Standard (Part 1/Sec 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

Testing plays an important role in controlling the quality of cement concrete work. Systematic testing of raw materials, fresh concrete and hardened concrete, is an inseparable part of any quality control programme for concrete. This helps achieve a higher efficiency of the materials used and greater assurance of the performance of the concrete, in regard to workability, strength and durability. The test methods used should be simple, direct and convenient to apply. This standard was formulated with this objective in view.

This standard was first published in 1959. In this revision, it was decided to review and update the various existing test methods of concrete also taking into consideration the latest international practices and developments in this field in the country, and in addition to introduce certain new test methods, wherever required. In the process, the various existing test methods covered in IS 516 : 1959 'Method of tests for strength of concrete' have been revised taking into consideration primarily the corresponding ISO standards while also examining the other best practices world over and in the country. In addition, test methods for determination of additional properties have been included in areas such as permeability, initial surface absorption, corrosion of reinforcement, carbonation of concrete (field test) and, creep of concrete. Also, for better understanding and implementation, some of the other test methods which were spread over in number of other Indian standards have been brought together under the fold of IS 516 as its various parts, such as the splitting tensile strength, ultrasonic pulse velocity test, rebound hammer test, bond in reinforced concrete, and determination of water soluble and acid soluble chlorides. This is with a view to making the standard complete in all respects, and rendering it a comprehensive source of provisions for testing of concrete and reference in other Indian Standards.

In this revision, IS 516 has been split into 12 parts. The other parts in this series are:

Part 2 Determination of properties of hardened concrete other than strength

Part 3 Making, curing and determining compressive strength of accelerated cured concrete test specimens

Part 4 Sampling, preparing and testing of concrete cores

Part 5 Non-destructive testing of hardened concrete

Part 6 Determination of drying shrinkage and moisture movement of concrete samples

Part 7 Determination of creep of concrete cylinders in compression

Part 8 Determination of modulus of elasticity

Part 9 Determination of wear resistance

Part 10 Determination of bond in reinforced concrete

Part 11 Determination of Portland cement content of hardened hydraulic cement concrete

Part 12 Determination of water soluble and acid soluble chlorides in hardened mortar and concrete

This standard (Part 1/Section 1) gives the provisions for determining the compressive, flexural and split tensile strength of hardened concrete.

These test methods shall be applicable in place of the corresponding provisions given in IS 516 : 1959 'Method of tests for strength of concrete' and IS 5816 : 1999 'Methods of test for splitting tensile strength of concrete (*first revision*)'. IS 516 : 1959 shall be superseded after the publication of all the parts of the standard. IS 5816 : 1999 shall stand withdrawn after the publication of this standard.

(*Continued to third cover*)

Indian Standard

HARDENED CONCRETE — METHODS OF TEST

PART 1 TESTING OF STRENGTH OF HARDENED CONCRETE

Section 1 Compressive, Flexural and Split Tensile Strength

(First Revision)

1 SCOPE

This standard (Part 1/Section 1) covers procedures for testing compressive, flexural and split tensile strength of hardened concrete.

2 REFERENCES

The standards listed below contains provisions which through reference in this text, constitutes provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
516 (Part 4) : 2018	Hardened concrete — Methods of test: Part 4 Sampling, preparing and testing of concrete cores (*first revision*)
1199 (Part 5) : 2018	Fresh concrete — Methods of sampling, testing and analysis: Part 5 Making and curing of test specimens (*first revision*)
1500 (Part 1) : 2019/ ISO 6506-1 : 2014	Metallic materials — Brinell hardness test: Part 1 Test method (*fifth revision*)
1658 : 2006	Fibre hardboards — Specification (*third revision*)
14858 : 2000	Compression testing machine used for testing of concrete and mortar — Requirements
10086 : 1982	Specification for moulds for use in tests of cement and concrete

3 DETERMINATION OF COMPRESSIVE STRENGTH OF HARDENED CONCRETE

3.1 Test Specimens

The test specimen shall be a cube or a cylinder meeting the requirements of IS 1199 (Part 5) and IS 516 (Part 4) for concrete cores. Cylindrical specimens cast in the lab or cores extracted from the structures, shall be capped as per **6.6** of IS 1199 (Part 5). Damaged specimens shall not be tested. Specimens that are badly honeycombed shall not be regarded as being representative of the quality of concrete supplied. In general, standard cube and cylinder specimens shall not be tested if they are badly honeycombed as this is an indication of poor specimen making. When such specimens are tested, the test report shall include the fact that the specimen was honeycombed.

3.2 Apparatus

The test shall be carried out using a compression testing machine conforming to IS 14858. The test machine shall be in calibration at the time of test. The calibration shall be carried out at least once per year.

3.3 Age at Test

Tests shall be made at recognized ages of the test specimens, the most usual being 7 and 28 days. Ages of 56 days, 90 days and one year are recommended if tests at greater ages are required. Where it may be necessary to obtain the early strengths, tests may be made at the ages of 24 h ± 30 min and 72 h ± 2 h. The ages shall be calculated from the time of the addition of water to the dry ingredients.

3.4 Number of Specimens

At least three specimens shall be tested at each selected age.

3.5 Procedure

3.5.1 *Preparation and Positioning of Specimens*

For specimens stored in water, excess moisture shall be wiped from the surface of the specimen before placing them in the testing machine. The dimensions of the specimens to the nearest 0.2 mm and their weight shall be noted before testing.

The time between the extraction of the specimen from the curing tank, and the testing, shall be as short as possible or not more than 2 h. During the time the specimen is outside the curing tank, it shall be protected from drying, may be by covering with wet cloth.

All testing machine bearing surfaces shall be wiped clean and any loose grit or other extraneous material removed from the surfaces of the specimen that will be in contact with the platens.

Do not use packing, other than auxiliary platens or spacing blocks, between the specimen and the platens of the testing machine. Cube specimens shall be compressed perpendicularly to the direction of casting. The specimen shall be centered on the lower platen to an accuracy of 1 percent of the designated size of cubic, or diameter of cylindrical specimens. Where physical means of ensuring centering are provided on the testing machine and they are in calibration, these shall be deemed to satisfy the requirements for accuracy of centering. If auxiliary platens are used, the top auxiliary platen shall be aligned with the top of the specimen. With two-column testing machines, cube specimens shall be placed with the trowelled surface facing a column.

3.5.2 *Loading*

The load shall be applied without shock and shall be increased continuously at a constant rate of 14 N/mm^2/min until no greater load can be sustained. The maximum load indicated shall be recorded.

3.5.3 *Assessment of Type of Failure*

For cube specimens, if the failure is satisfactory (*see* Fig. 1), this fact shall be recorded. If the failure pattern is unsatisfactory, this fact shall be recorded and the type of failure recorded using the pattern number in Fig. 2 closest to that observed.

For cylindrical specimens, if the failure is satisfactory (*see* Fig. 3), this fact shall be recorded. If the failure pattern is unsatisfactory, this fact shall be recorded and the type of failure recorded using the pattern letter in Fig. 4 closest to that observed.

3.6 Test Results

The compressive strength is given by the equation:

$$f_c = F/A_c$$

where

f_c = compressive strength, in MPa;

F = maximum load, in N; and

A_c = cross-sectional area, in mm^2, of the specimen on which the compressive force acts.

Average of three values shall be taken as the representative of the batch provided the individual variation is not more than ± 15 percent of the average. Otherwise repeat test shall be made, however if there is no further sample, then the average of two closest values may be taken as the average result.

The actual dimensions of test specimens shall conform to IS 10086. If the actual dimensions are within the tolerance limits as mentioned in IS 10086, the strength may be calculated on the basis of designated size. If the actual dimensions are outside this tolerance, the strength calculation shall be based on the actual dimensions of the test specimen, however, perpendicularity of the surface of specimens should be maintained as per IS 10086.

The compressive strength shall be expressed to the nearest 0.5 MPa.

3.7 Test Report

The following information shall be included in the report:

a) Details of the concrete like grade, mix details, etc, in case of cast specimens; and details of the structure, like structure type, origin member/structure, in case of cored specimen;

b) Type of specimen: cast (cube/cylinder) or drilled core;

c) Size of the specimen, and capping details, if applicable;

d) Identification mark;

e) Age of specimen;

f) Date of test;

g) Curing conditions;

h) Weight of specimen;

j) Dimension of specimen;

k) Maximum load;

m) Details of the machine used for testing (manual/automated, loading range, date of calibration, etc);

n) Compressive strength of specimen (to the nearest 0.5 MPa); and

p) Type of failure (satisfactory or unsatisfactory and, if unsatisfactory, the nearest type).

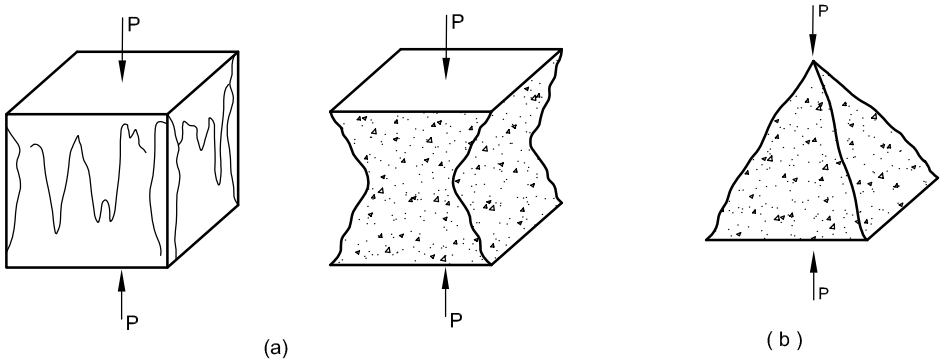
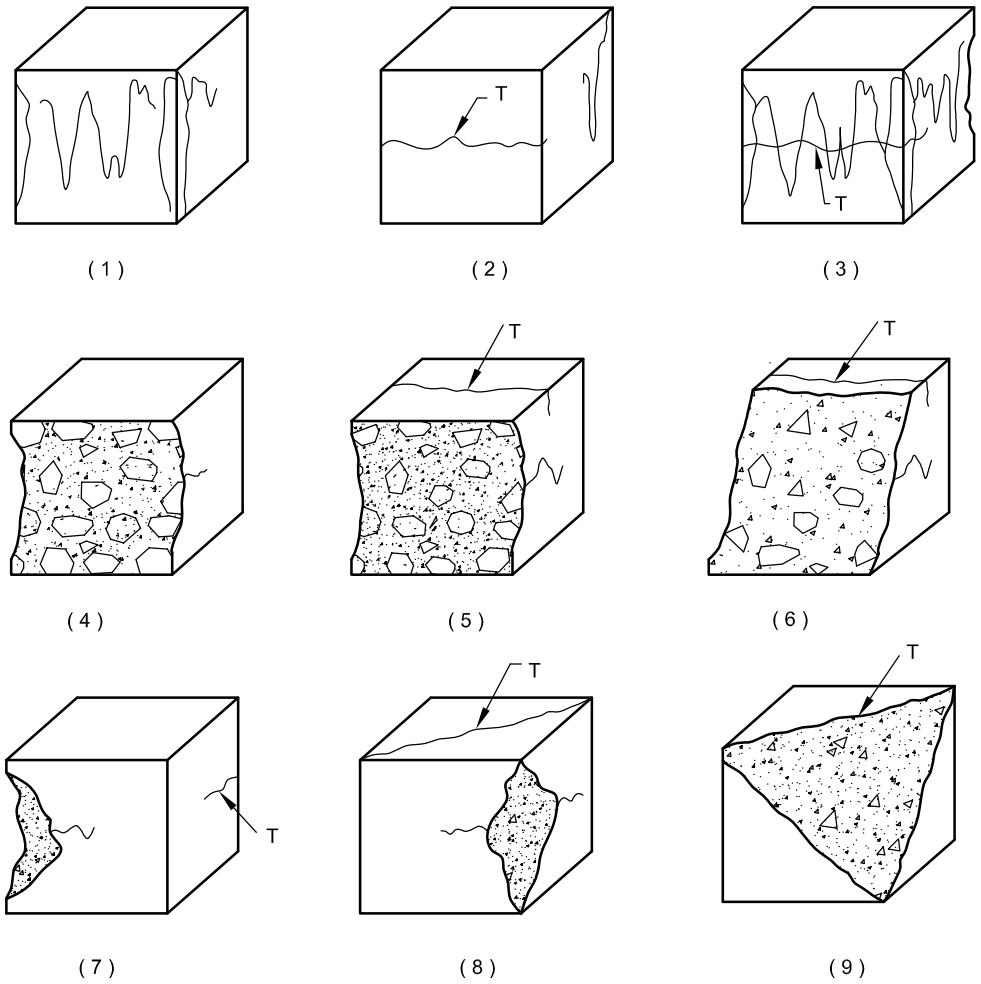


FIG. 1 SATISFACTORY FAILURE OF CUBE SPECIMENS



NOTE: T = TENSILE CRACK

FIG. 2 UNSATISFACTORY FAILURE OF CUBE SPECIMENS

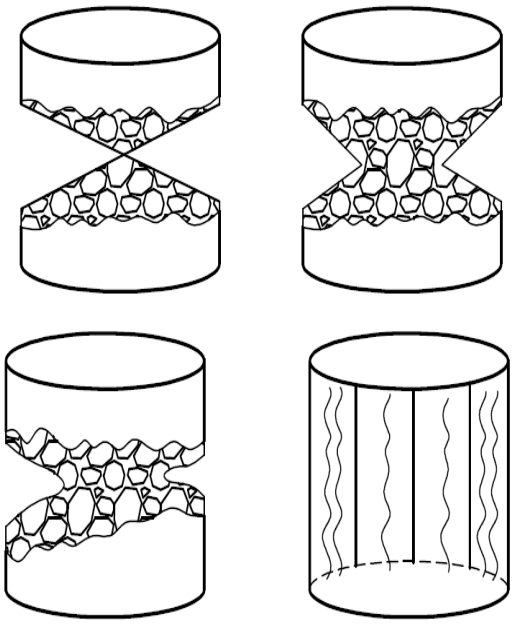


FIG. 3 SATISFACTORY FAILURE OF CYLINDRICAL SPECIMENS

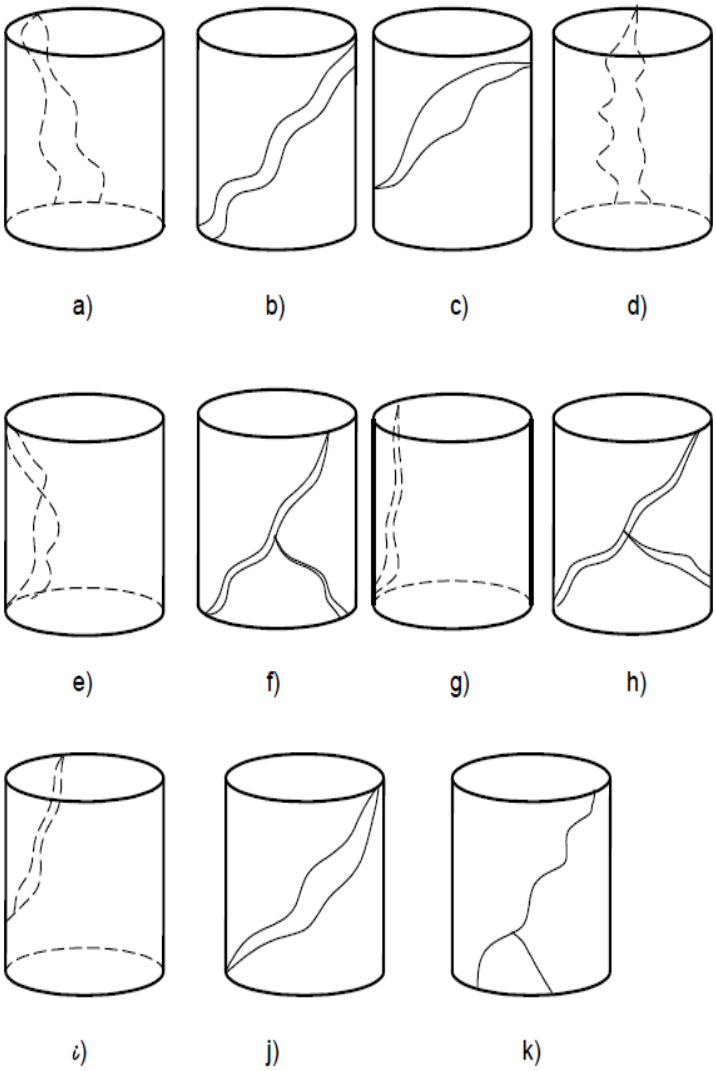


FIG. 4 UNSATISFACTORY FAILURE OF CYLINDRICAL SPECIMENS

4 DETERMINATION OF FLEXURAL STRENGTH

4.1 Test Specimens

The test specimen shall be a prism conforming to IS 1199 (Part 5). Sawn specimens of nominal width of 100 mm or 150 mm with a square cross-section and overall length of 500 mm and 700 mm may also be used.

4.2 Age at Test

Tests shall be made at recognized ages of the test specimens, the most usual being 7 and 28 days. Ages of 90 days and 1 year are recommended if tests at greater ages are required. Where it may be necessary to obtain the early strengths, tests may be made at the ages of 24 h ± 30 min and 72 h ± 2 h. The ages shall be calculated from the time of the addition of water to the dry ingredients.

4.3 Number of Specimens

At least three specimens shall be tested at each selected age.

4.4 Apparatus

4.4.1 *Testing Machine*

The testing machine may be of any reliable type of sufficient capacity for the tests and capable of applying the load at the rate specified. The permissible errors shall be not greater than ± 1 percent of the applied load. The bed of the testing machine shall be provided with two steel rollers, 38 mm in diameter, on which the specimen is to be supported, and these rollers shall

be so mounted that the distance from centre to centre is 600 mm for 150 mm specimens and 400 mm for 100 mm specimens. The load shall be applied through two similar rollers mounted at the third points of the supporting span, that is, spaced at 200 or 133 mm respectively centre-to-centre. The load shall be divided equally between the two loading rollers, and all rollers shall be mounted in such a manner that the load is applied axially and without subjecting the specimen to any torsional stresses or restraints. Each roller, except one of the lower ones shall be capable of rotating around its axis and of being inclined in a plane normal to the longitudinal axis of the test specimen.

4.4.2 *Force Application*

The device for applying loads shall consist of two upper rollers and two lower rollers (*see* Fig. 5).

The rollers shall be arranged as per **4.4.1.**

4.5 Procedures

4.5.1 *Preparation and Positioning of Specimens*

The specimen shall be examined and any abnormalities shall be reported.

For specimens stored in water, excess moisture shall be wiped from the surface of the specimen before placing in the testing machine.

The time between the extraction of the specimen from the curing tank until the test shall be as short as possible or not more than 2 h. During the time the specimen is outside the curing tank, it shall be protected from drying, like by covering with wet cloth. The test specimen shall be placed in the machine, correctly centred with the longitudinal axis of the specimen at right angles to the longitudinal axis of the upper and lower rollers. The reference direction of loading shall be perpendicular to the direction of casting of the specimen.

4.5.2 *Loading*

The bearing surfaces of the supporting and loading rollers shall be wiped clean, and any loose sand or other material removed from the surfaces of the specimen where they are to make contact with the rollers. The specimen shall then be placed in the machine in such a manner that the load shall be applied to the uppermost surface as cast in the mould.

The load shall not be applied until all loading and supporting rollers are resting evenly against the test specimen. The load shall be applied without shock and shall be increased continuously at a constant rate until no greater load can be sustained. The load shall increase at a rate 0.7 N/mm^2/min (rate of loading being 4 kN/min for 150 mm specimens and 1.8 kN/min for 100 mm specimens).

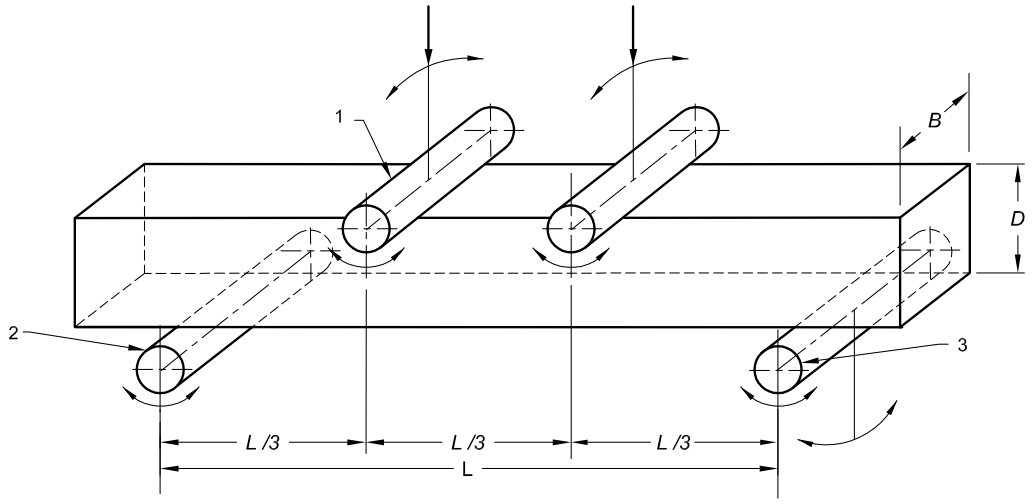
The maximum load indicated shall be recorded.

4.5.3 *Assessment of Type of Fracture*

The fractured specimen shall be examined and the appearance of the concrete and type of fracture shall be recorded (*see* Fig. 6).

4.6 Test Results

The flexural strength of the specimen shall be expressed as modulus of rupture, F_b and shall be calculated to the nearest 0.05 MPa as follows in case of failure Type A (*see* Fig. 6A):



L = 400 mm FOR 100x 100 x 500 mm SPECIMEN, OR
600 mm FOR 150x 150 x 700 mm SPECIMEN

KEY:
1. LOADING ROLLER (CAPABLE OF ROTATION AND BEING INCLINED)
2. SUPPORTING ROLLER
3. SUPPORTING ROLLER (CAPABLE OF ROTATION AND BEING INCLINED)

FIG. 5 TEST SETUP

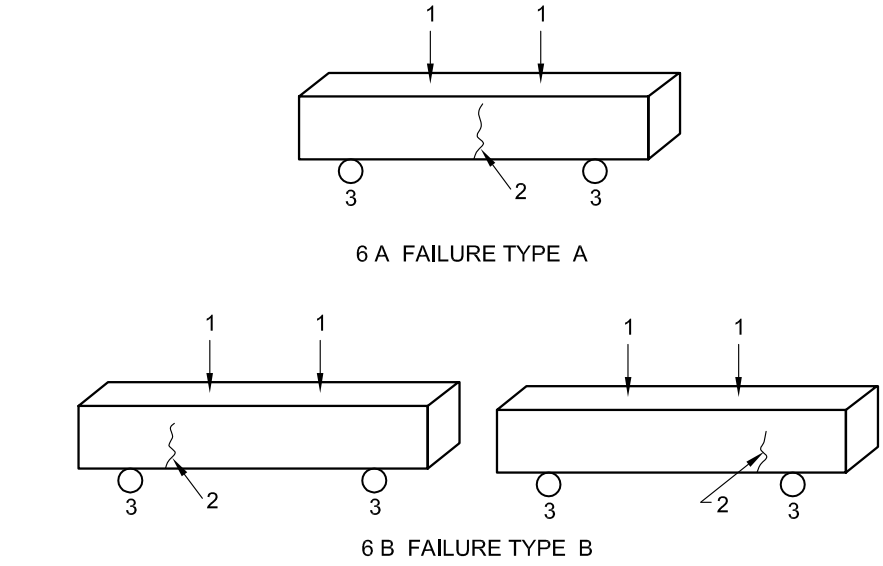


FIG. 6 TYPES OF FAILURE PATTERN

$$F_b = (P \times L)/B \times D^2$$

in which '*a*' is greater than 200 mm for 150 mm specimen, or greater than 133 mm for 100 mm specimen, or

in case of failure Type B (*see* Fig. 6B), modulus of rupture F_b shall be calculated to the nearest 0.05 MPa by the following formula:

$$F_b = (3P \times a)/B \times D^2$$

in which '*a*' is less than 200 mm but greater than 170 mm for 150 mm specimen or less than 133 mm but greater than 110 mm for 100 mm specimen,

where

F_b = flexural strength, in MPa;

P = maximum load, in N;

a = the distance between the line of fracture and the nearer support, measured on the centre line of the tensile side of the specimen, in mm;

B, D are the lateral dimensions (breadth and height) of the specimen, mm; and

L = length of span on which the specimen is supported, expressed in mm.

If 'a' is less than 170 mm for 150 mm or less than 110 mm for a 100 mm specimen, the results of the test shall be discarded.

The flexural strength shall be expressed to the nearest 0.05 MPa.

4.7 Test Report

The following information shall be included in the report:

a) Size of specimen;
b) Identification mark;
c) Age of specimen;
d) Date of test;
e) Details of concrete mix such as grade, cement content, curing condition, etc;
f) Weight of specimen;
g) Maximum load;
h) Type of fracture and flexural strength of specimen (to the nearest 0.05 MPa);
j) In case of failure Type B, value of '*a*'.

5 DETERMINATION OF SPLITTING TENSILE STRENGTH

5.1 Specimens

The specimen shall be a cube or cylinder meeting the requirements of IS 1199 (Part 5). Damaged or badly honeycombed specimens shall not be tested.

5.2 Apparatus

5.2.1 *Testing Machine*

The test shall be carried out using a compression testing machine conforming to IS 14858.

The test machine shall be in calibration at the time of test. The calibration shall be carried out at least once per year.

5.2.2 *Jigs*

Jig shown in Fig. 7 may be used for splitting cylindrical and cubic specimens. Curved steel loading pieces may be used in place of conventional plane platens when tests are carried out on cubical specimen. Alternatively a jig shown in Fig. 8 may be used for cubic specimen.

5.2.3 Two packing strips of tempered hardboard of nominal thickness 4 mm conforming to IS 1658 having following dimensions of the test specimen shall be used for each specimen and shall be discarded after each such test:

a) Width 15 ± 2 mm,
b) Nominal thickness 4 ± 1 mm, and
c) Length greater than the length of the line of content of the test specimen.

5.2.4 *Steel Loading Strips*

A steel loading plate having minimum hardness value, when tested in accordance with IS 1500 (Part 1) shall be used between the platen of the machine and the hardboard packing strip. The piece shall not be shorter than the specimen. For cylindrical specimens it shall be of rectangular cross-section and for cubic specimens, it shall be a section of a cylinder, with a radius of 75 mm, so that the load is applied along a line on the surface of the specimen.

5.3 Age at Test

Tests shall be made at the recognized ages of the test specimens, the most usual being 7 and 28 days. Tests at any other age at which the tensile strength is desired may be made, if so required. The ages shall be calculated from the time of the addition of water to the dry ingredients. The age at test shall be reported along with the results.

5.4 Number of Specimens

At least three specimens shall be tested for each age of tests.

5.5 Procedure

5.5.1 Specimens when received dry shall be kept in water for 48 h before they are taken for testing. Unless other conditions are required for specific laboratory investigation specimens shall be tested immediately on removal from the water whilst they are still wet. Surface water and grit shall be wiped off the specimens and any projecting fins removed from the surfaces which are to be in contact with the packing strips.

5.5.2 *Marking*

Central lines shall be drawn on the two opposite faces of the cube using any suitable procedure and device that will ensure that they are in the same axial plane (*see* Fig. 9).

5.5.3 *Placing of the Specimen in the Testing Machine*

The bearing surfaces of the testing machine and of the loading strips shall be wiped clean.

5.5.4 *Positioning*

The test specimen shall be placed in the centering jig with packing strip and/or loading pieces carefully positioning along the top and bottom of the plane of loading of the specimen. The jig shall then be placed in the machine so that the specimen is located centrally. In the case of cubic specimens, the load shall be applied on the moulded faces in such a way that the fracture plane will cross the trowelled surface. For cylindrical specimen it shall be ensured that the upper platen is parallel with the lower platen.

5.5.5 *Rate of Loading*

The load shall be applied without shock and increased continuously at a nominal rate within the range 1.2 N/mm^2/min to 2.4 N/mm^2/min. Maintain the rate, once adjusted, until failure. The maximum load applied shall then be recorded. The appearance of concrete and any unusual features in the type of failure shall also be noted.

The rate of increase of load may be calculated from the formula:

$$(1.2 \text{ to } 2.4) \times \pi/2 \times l \times d \text{ N/min}$$

5.6 Calculation

5.6.1 The measured splitting tensile strength f_c, of the specimen shall be calculated to the nearest 0.05 N/mm^2 using the following formula:

a) *For cylinders,*

$$f_c = \frac{2P}{\pi l d}$$

b) *For cubes,*

$$f_c = \frac{P}{2l^2}$$

where

P = maximum load applied to specimen, in N;
l = length of cylinder/side of the cube, in mm; and
d = cross sectional dimension of cylindrical specimen, in mm.

5.7 Examination of Specimen

The fractured specimen shall be examined and the appearance of the concrete and type of fracture, if unusual, shall be recorded. An example of unusual type of fracture is when the plane of fracture is not vertical.

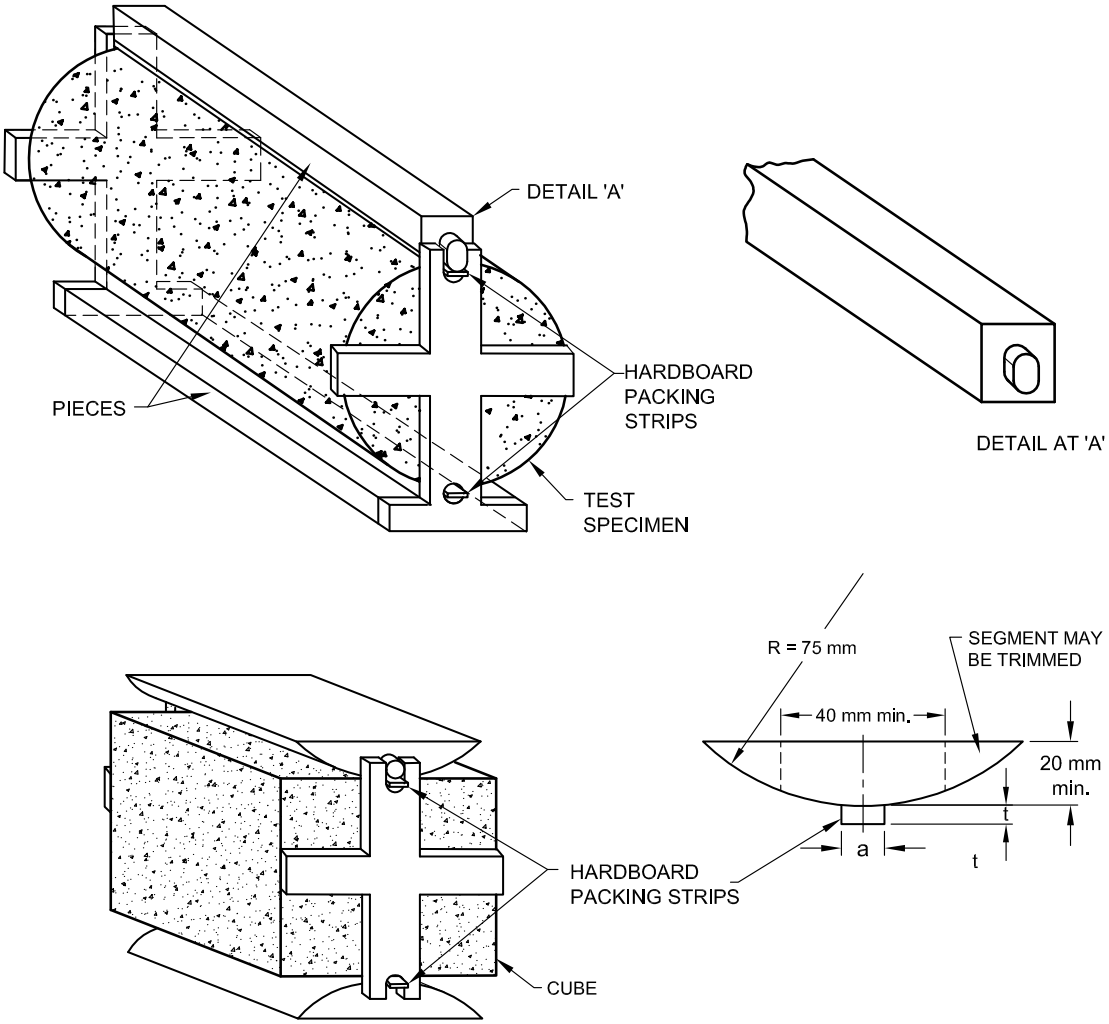


FIG. 7 JIG FOR SPLITTING CYLINDER AND CUBE

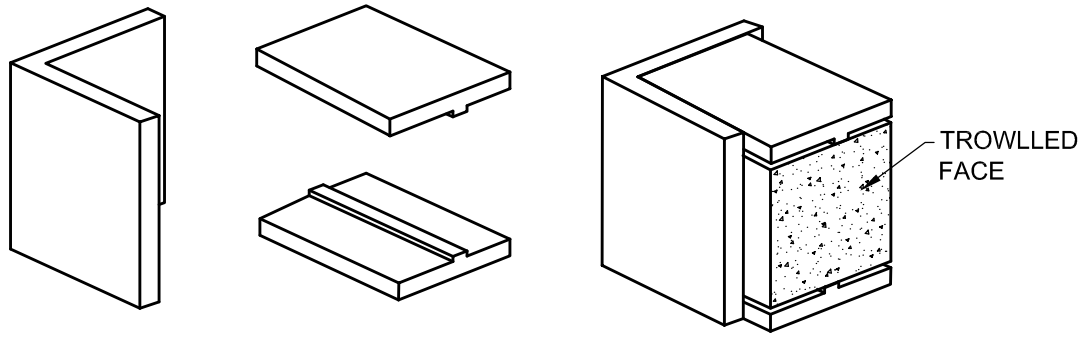


FIG. 8 ALTERNATE APPARATUS FOR SPLITTING CUBES

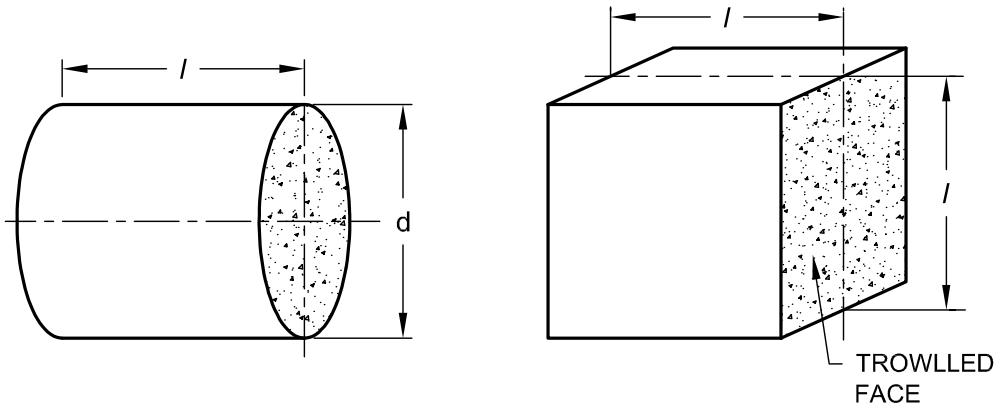


FIG. 9 PLANE OF LOADING

5.8 Report

The following information shall be included in the report on each specimen:

a) Date of test.

b) Identification mark, shape and size of the specimen, in mm.

c) Age of specimen.

d) Splitting tensile strength to the nearest 0.05 N/mm^2.

e) Fracture pattern, in line with Fig. 9.

f) Weight of specimen.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Cement and Concrete Sectional Committee, CED 02

Organization	*Representative(s)*
In Personal Capacity (*Grace Villa, Kadamankulam P.O., Thiruvalla* 689583)	Shri Jose Kurian (***Chairman***)
ACC Ltd, Mumbai	Shri Rajesh J. Modi Dr Manish V. Karandikar (*Alternate*)
Ambuja Cements Limited, Ahmedabad	Shri Umesh P. Soni Shri Sukuru Ramarao (*Alternate*)
Atomic Energy Regulatory Board, Mumbai	Shri L. R. Bishnoi Shri Sourav Acharya (*Alternate*)
Builders' Association of India, Mumbai	Shri Sushanta Kumar Basu Shri D. R. Sekor (*Alternate*)
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Cement Manufacturers' Association, Noida	Dr V. Ramachandra Ms Shashwati Ghosh (*Alternate*)
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Central Water Commission, New Delhi	Director (CMDD) (N&W) Deputy Director (CMDD) (NW&S) (*Alternate*)
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Construction Chemicals Manufacturers' Association, Mumbai	Shri Samir Surlaker Shri Nilotpol Kar (*Alternate*)
CSIR – Central Building Research Institute, Roorkee	Shri S. K. Singh Shri Subhash Gurram (*Alternate*)
CSIR – Central Road Research Institute, New Delhi	Dr Rakesh Kumar Dr V. V. L. Kanta Rao (*Alternate*)
CSIR – Structural Engineering Research Centre, Chennai	Dr K. Ramanjaneyulu Dr P. Srinivasan (*Alternate*)
Delhi Development Authority, New Delhi	Shri Laxman Singh Shri Vijay Shankar (*Alternate*)
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Engineers India Limited, New Delhi	Shri Rajanji Srivastava Shri Anurag Sinha (*Alternate*)
Gammon Engineers & Contractors Pvt Ltd, Mumbai	Shri Shriram B. Kulkarni Shri Rahul Biradar (*Alternate*)
Hindustan Construction Company Limited, Mumbai	Shri Satish Kumar Sharma Shri Mukesh Valecha (*Alternate*)

Organization	*Representative(s)*
Housing and Urban Development Corporation Limited, New Delhi	Representative
Indian Association of Structural Engineers, New Delhi	Shri Mahesh Tandon Shri Ganesh Juneja (*Alternate*)
Indian Concrete Institute, Chennai	Shri Vivek Naik Secretary General (*Alternate*)
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Indian Institute of Technology Roorkee, Roorkee	Dr V. K. Gupta Dr Bhupinder Singh (*Alternate*)
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Ministry of Road Transport and Highways, New Delhi	Shri Y. Bala Krishna Shri Sanjeev Kumar (*Alternate*)
National Council for Cement and Building Materials, Ballabgarh	Shri V. V. Arora Dr S. K. Chaturvedi (*Alternate*)
National Test House, Kolkata	Shri D. V. S. Prasad Dr Somit Neogi (*Alternate*)
Nuclear Power Corporation of India Ltd, Mumbai	Shri Arvind Shrivastava Shri Raghupati Roy (*Alternate*)
Nuvoco Vistas Corporation Limited, Mumbai	Shri Pranav Desai Shri Ravindra Khamparia (*Alternate*)
Public Works Department, Govt of Tamil Nadu, Chennai	Superintending Engineer Executive Engineer (*Alternate*)
The India Cements Limited, Chennai	Representative
The Indian Hume Pipe Company Limited, Mumbai	Shri P. R. Bhat Shri S. J. Shah (*Alternate*)
The Institution of Engineers (India), Kolkata	Dr H. C. Visvesvaraya Shri S. H. Jain (*Alternate*)
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Ultra Tech Cement Ltd, Mumbai	Shri Surya Valluri Dr M. R. Kalgal (*Alternate*)
Voluntary Organization in Interest of Consumer Education, New Delhi	Shri M. A. U. Khan Shri B. Mukhopadhyay (*Alternate*)
In personal capacity [*B-803, Oberoi Exquisite, Oberoi Garden City, Goregaon (East), Mumbai*]	Shri A. K. Jain
In personal capacity (*36, Old Sneh Nagar, Wardha Road, Nagpur*)	Shri L. K. Jain

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Panel for Revision of Indian Standards on Test Methods for Concrete, CED 2:2/P7

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(*Continued from second cover*)

This revision has been taken up to incorporate the modifications found necessary in the light of experience gained in its use and also to bring it in line with the latest development on the subject nationally as well as internationally. Significant modifications in this revision include,

a) all the provisions relating to compression testing of cubical and cylindrical specimens have been brought under this standard. The capping details of cylindrical specimens have been elaborated.

b) arrangement of loading of flexural test specimens has been simplified. A new figure has been included indicating the failure types clearly.

c) the formula for split tensile strength for cubical specimens has been included.

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

In reporting the result of a test or analysis made in accordance with this standard, if the final value observed or calculated, is to be rounded off, it shall be done 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 specified value in this standard.

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Amendments Issued Since Publication

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