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भाग 10 परीक्षण और परीक्षण उपकरण
(पहला पुनरीक्षण)

**Cement Concrete — Glossary of
Terms**
Part 10 Tests and Testing Apparatus
(*First Revision*)

ICS 01.040.91

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
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FOREWORD

This Indian Standard (Part 10) (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.

Cement concrete is one of the most versatile and extensively used building materials in all civil engineering constructions. There are a number of technical terms connected with the basic materials for concrete as well as the production and use of concrete which quite often require clarification to give precise meaning to the stipulations in the standard specifications, codes of practices and other technical standards. Based on this necessity and to standardize the various terms and definitions used in cement and concrete technology, this standard was published in 12 parts.

The other parts in the series are:

- Part 1 Concrete aggregates
- Part 2 Materials (other than cement and aggregate)
- Part 3 Concrete reinforcement
- Part 4 Types of concrete
- Part 5 Formwork for concrete
- Part 6 Equipment, tools and plant
- Part 7 Mixing, laying, compaction, curing and other construction aspects
- Part 8 Properties of concrete
- Part 9 Structural aspects
- Part 11 Prestressed concrete
- Part 12 Miscellaneous terms

In addition to the above, the terminology relating to hydraulic cement and pozzolanic materials are separately covered in IS 4845 and IS 4305.

This standard was first published in 1973. In this revision the necessary changes required have been incorporated in the light of experience gained in its use and also to bring it in line with the latest development on the subject.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following publications:

BS 6100-9 : 2007 'Building and civil engineering — Vocabulary — Part 9: Work with concrete and plaster', British Standards Institution

ASTM C125 : 2021 'Standard terminology relating to concrete and concrete aggregates', American Society for Testing and Materials (Revision 21A)

ACI CT-23 : 2023 'Concrete terminology', American Concrete Institute

ACI 617 : 1968 'Recommended practice for concrete formwork', American Concrete Institute

The composition of the Committee responsible for formulation of this standard is given in [Annex A](#).

(Continued on third cover)

*Indian Standard***CEMENT CONCRETE — GLOSSARY OF TERMS****PART 10 TESTS AND TESTING APPARATUS***(First Revision)***1 SCOPE**

This standard (Part 10) covers definitions of terms relating to tests and testing apparatus for cement concrete.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute 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 these standards:

<i>IS No.</i>	<i>Title</i>
IS 4031 (Part 4) : 1988	Methods of physical tests for hydraulic cement: Part 4 Determination of consistency of standard cement paste (<i>first revision</i>)
IS 4305 : 1967	Glossary of terms relating to pozzolana
IS 4845 : 1968	Definitions and terminology relating to hydraulic cement

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Absorbed Moisture — Moisture that has entered a solid material by absorption and has physical properties not substantially different from ordinary water at the same temperature and pressure.

3.2 Accidental Air — Air voids in concrete which are not purposely entrained.

3.3 Adsorbed Water — Water held on surfaces, of a material by electrochemical forces and having physical properties substantially different from those of absorbed water or chemically combined water at the same temperature and pressure.

3.4 Adsorption — Development at the surface of a liquid or solid of a higher concentration of a substance than exist in the bulk of the medium; especially formation of one or more layers of molecules of gases, of dissolved substances, or of liquids at the surface of a solid, such as cement, cement paste, or aggregate, or of air-entraining agents at the air-water interfaces; also the process by which a substance is adsorbed.

3.5 Air Content — The volume of air voids in cement paste, mortar, or concrete, exclusive of pore space fine aggregate particles, usually expressed as a percentage, of total volume of the paste, mortar, or concrete.

3.6 Air Meter — A device for measuring the air content of concrete and mortar.

3.7 Air Permeability Test — A procedure for measuring the fineness of powdered materials, such as Portland cement.

3.8 Air Void — A space in cement paste, mortar, or concrete filled with air; an entrapped air void is characteristically 1 mm or more in size and irregular in shape; an entrained air void is typically between 10 microns and 1 000 microns in diameter and spherical or nearly so.

3.9 Ball Test — A test to determine the consistency of freshly mixed concrete by measuring the depth of penetration of a cylindrical metal weight with a hemispherical bottom.

3.10 Beam Test — A method of measuring the flexural strength (modulus of rupture) of concrete by testing a standard unreinforced beam.

3.11 Blaine Apparatus — Air-permeability apparatus for measuring the surface area of a finely ground cement, raw material, or other product.

3.12 Blaine Fineness — The fineness of powdered materials, such as cement and pozzolana, expressed as surface area usually in square centimeters per gram, determined by the Blaine apparatus.

To access Indian Standards click on the link below:

https://www.services.bis.gov.in/php/BIS_2.0/bisconnect/knowyourstandards/Indian_standards/isdetails/

3.13 Blaine Test — A method for determining the fineness of cement or other fine material on the basis of the permeability to air of a sample prepared under specified conditions.

3.14 Briquette — A moulded specimen of mortar with enlarged extremities and reduced centre having a cross section of definite area, used for measurement of tensile strength.

3.15 Calorimeter — An instrument for measuring heat exchange during a chemical reaction, such as the quantities of heat liberated by the combustion of a fuel or hydration of a cement.

3.16 Calorimetric Value — An indication of the amount of organic impurities present in fine aggregate.

3.17 Cap — A smooth, plane surface of suitable material bonded to the bearing surfaces of test specimens to ensure uniform distribution of load during strength testing.

3.18 Compacting Factor — The ratio obtained by dividing the observed weight of concrete which fills a container of standard size and shape when allowed to fall into it under standard conditions of test, by the weight of fully compacted concrete by a standard procedure of rodding (*see* IS 1199) which fills the same container.

3.19 Compression Test — Test made on a test specimen of mortar or concrete to determine the compressive strength.

3.20 Consistency — The relative mobility or ability of freshly mixed concrete or mortar to flow; the usual measurements are slump for concrete and flow for mortar, cement paste, or grout.

3.21 Consistency Factor — A measure of grout fluidity roughly analogous to viscosity, which describes the ease with which grout may be pumped into pores or fissures; usually a laboratory measurement in which consistency is reported in degrees of rotation of a torque viscometer in a specimen of grout.

3.22 Consistometer — An apparatus for measuring the consistency of cement paste, mortar, grout, or concrete.

3.23 Cored Beam — A beam whose cross section is partially hollow, or a beam from which cored samples of concrete have been taken.

3.24 Coring — The act of obtaining cores from concrete structures or rock foundations.

3.25 Cube Strength — The load per unit area at which a standard cube fails when tested in a specified manner.

3.26 Decant — To pour off a liquid without disturbing a sediment or precipitate.

3.27 Diametral Compression Test — *See* [3.71](#).

3.28 Differential Thermal Analysis (DTA) — Indication of thermal reaction by differential thermocouple recording of temperature changes in a sample under investigation compared with those of a thermally passive control sample, that is heated uniformly and simultaneously.

3.29 Dry-Volume Measurement — Measurement of the ingredients of grout, mortar, or concrete by their bulk-volume.

3.30 Dunagan Analysis — A method of separating the ingredients of freshly mixed concrete or mortar to determine the proportions of the mixture.

3.31 False Set — The rapid development of rigidity in a freshly mixed Portland cement paste, mortar, or concrete without the evolution of much heat, which rigidity can be dispelled and plasticity regained by further mixing without addition of water; premature stiffening, hesitation set, early stiffening, and rubber set are terms referring to the same phenomenon, but false set is the preferred designation.

3.32 Field-Cured Cylinders — Test cylinders cured as nearly as practicable in the same manner as the concrete in the structure to indicate when supporting forms may be removed, additional construction loads may be imposed or the structure may be placed in service.

3.33 Final Set — A degree of stiffening of a mixture of cement and water greater than initial set, generally stated as an empirical value indicating the time in hours and minutes required for a cement paste to stiffen sufficiently to resist to an established degree, the penetration of a weighted test needle; also applicable to concrete and mortar mixtures with use of suitable test procedures (*see* [3.42](#)).

3.34 Final Setting Time — The time required for a freshly mixed cement paste, mortar, or concrete to achieve final set.

3.35 Flame Photometer — An instrument used to determine elements (especially sodium and potassium in Portland cement) by the colour intensity of their unique flame spectra resulting from introducing a solution of a compound of the element

into a flame (also known as flame spectrophotometer).

3.36 Flash Set — The rapid development of rigidity in a freshly mixed Portland cement paste, mortar, or concrete, usually with the evolution of considerable heat, which rigidity cannot be dispelled, nor can the plasticity be regained by further mixing without addition of water; also referred to as quick set or grab set.

3.37 Flow

- a) Time dependent irrecoverable deformation; and
- b) A measure of the consistency of freshly mixed concrete, mortar, or cement paste in terms of the increase in diameter of a moulded truncated cone specimen after jiggling a specified number of times.

3.38 Flow Cone — A device for measurement of grout consistency in which a predetermined volume of grout is permitted to escape through a precisely sized orifice, the time of efflux (flow factor) being used as the indication of consistency; also, the mould used to prepare a specimen for the flow test.

3.39 Flow Table — A jiggling device used in making flow tests for consistency of cement paste, mortar, or concrete.

3.40 Gillmore Needle — A device used in determining time of setting of hydraulic cement.

3.41 Infrared Spectroscopy — The use of a spectrophotometer for determination of infrared absorption spectra (3.5 micron to 18 micron wave lengths) of materials, used for detection, determination, and identification especially of organic materials.

3.42 Initial Set — A degree of stiffening of a mixture of cement and water less than final set, generally stated as an empirical value indicating the time in hours and minutes required for cement paste to stiffen sufficiently to resist to an established degree, the penetration of a weighted test needle; also applicable to concrete or mortar with use of suitable test procedures.

3.43 Initial Setting Time — The time required for a freshly mixed cement paste, mortar or concrete to achieve initial set.

3.44 Kelly Ball — An apparatus used for indicating the consistency of fresh concrete, consisting of a cylinder with a hemispherically shaped bottom and handle and a stirrup to guide the handle and serve as

a reference for measuring depth of penetration (see 3.9).

3.45 Kelly Ball Test — See 3.9 and 3.44.

3.46 Liquid-Volume Measurement — Measurement of grout on the basis of the total volume of solid and liquid constituents.

3.47 Loss on Ignition — The percentage loss in weight of a sample of cement mortar or concrete ignited to constant weight at a specified temperature, usually 900 °C to 1 000 °C.

3.48 Moist Room — A room in which the atmosphere is maintained at a selected temperature (usually 23.0 °C ± 1.7 °C or 73.4 °F ± 3.0 °F) and a relative humidity of at least 98 percent, for the purpose of curing and storing cementitious test specimens.

3.49 Mould

- a) A device containing a cavity into which neat cement, mortar, or concrete test specimens are cast; and
- b) A form used in the fabrication of precast mortar or concrete units.

3.50 Neat Cement Paste — A mixture of hydraulic cement and water, both before and after setting and hardening.

3.51 Normal Consistency

- a) The degrees of wetness exhibited by a freshly mixed concrete, mortar, or neat cement grout when the workability of the mixture is considered acceptable for the purpose at hand; and
- b) The physical condition of neat cement paste, within a specified time after completion of mixing, as determined with the Vicat apparatus in accordance with the method specified in IS 4031 (Part 4).

3.52 Owendry — The condition resulting from having been dried to essentially constant weight, in an oven the temperature of which has been previously fixed, usually between 105 °C and 110 °C; also the process of producing this condition.

3.53 Penetration Resistance — The resistance, usually expressed in kg/mm² of mortar or cement paste to penetrate by a plunger or needle under standardized conditions.

3.54 Permanent Set — Inelastic elongation or shortening.

3.55 Permeability to Water, Coefficient of — The rate of discharge of water under laminar flow conditions through a unit cross-sectional area of a porous medium under a unit hydraulic gradient and standard temperature conditions usually 20 °C.

3.56 Photometer — See [3.35](#).

3.57 Polarizing Microscope — A microscope equipped with elements permitting observations and determinations to be made using polarized light.

3.58 Proving Ring — A device for calibrating load indicators of testing machines, consisting of a calibrated elastic ring and a mechanism or device for indicating the magnitude of deformation under load.

3.59 Puddling

- a) Process of inducing compaction in mortar or concrete by use of a tamping rod; and
- b) Undesirable placement of shotcrete wherein air pressure is decreased and water content is increased.

3.60 Relative Humidity — The ratio of the quantity of water vapour actually present to amount present in a saturated atmosphere at a given temperature; expressed as a percentage.

3.61 Remoulding Test — A test to measure remouldability.

3.62 Schmidt Hammer (Trade Name) — A device for the non-destructive testing of hardened concrete based on the principle that the rebound of a steel hammer, after impact against the concrete, is proportional to the compressive strength of the concrete.

3.63 Screen (or Sieve) — A metallic plate or sheet, a woven wire cloth, or other similar device, with regularly spaced apertures of uniform size, mounted in a suitable frame or holder for use in separating material according to size; in mechanical analysis an apparatus with square openings is a sieve.

3.64 Screen Analysis — See [3.66](#).

3.65 Sieve — See [3.63](#).

3.66 Sieve Analysis — Determination of the proportions of particles lying within certain size ranges in a granular material by separation on sieves of different size openings.

3.67 Sieve Correction — Correction of a sieve analysis to adjust for deviation of sieve performance from that of standard calibrated sieves.

3.68 Slump Cone — A mould in the form of a truncated cone with a base diameter of 20 cm, top diameter 10 cm, and height 30 cm, used to fabricate a specimen of freshly mixed concrete for the slump test.

3.69 Slump Test — The procedure for measuring slump.

3.70 Spectrophotometer — Instrument for measuring intensity of radiant energy of desired frequencies absorbed by atoms or molecules; substances are analyzed by converting the absorbed energy to electrical signals, proportional to the intensity of radiation.

3.71 Splitting Tensile Test — A test for tensile strength in which a cylindrical specimen is loaded to failure in diametral compression.

3.72 Standard Curing — Exposure of test specimens to specified conditions of moisture or humidity and of temperature.

3.73 Test — A decisive trial, such as a controlled loading to failure of a specimen or a specified number of similar specimens.

3.74 Testing Machine — A device for applying test conditions and accurately measuring results.

3.75 Torque Viscometer — A viscometer used for measuring consistency of slurries in which rotation of a device suspended in a rotating cup is the measure of viscosity.

3.76 Turbidimeter — A device for measuring the particle size distribution of a finely divided material by taking successive measurements of the turbidity of a suspension in a fluid.

3.77 Turbidimeter Fineness — The fineness of a material, such as Portland cement, usually expressed as total surface area in square centimetres per gram, as determined with the turbidimeter.

3.78 Vee-bee Apparatus — A device for the measurement of the consistency of freshly mixed concrete; the measure of consistency is the time of vibration in seconds; required to transform the concrete sample from a truncated cone (remaining after removal of the slump cone) into a right cylinder; the time is assumed directly proportional to the energy used in compacting the sample.

3.79 Vicat Apparatus — A penetration device used in the testing of hydraulic cements and similar materials.

3.80 Vicat Needle — A weighed needle for determining setting time of hydraulic cements.

3.81 Viscometer — Instrument for determining viscosity of slurries including fresh concrete.

3.82 Wagner Fineness — The fineness of materials, such as Portland cement expressed as total surface

area in square centimeters per gram determined by the Wagner turbidimeter apparatus and procedure.

3.83 Wet Screening — Screening to remove from fresh concrete all aggregate particles larger than a certain size.

3.84 Wet Sieving — See [3.83](#).

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Cement and Concrete Sectional Committee, CED 02

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In Personal Capacity (<i>Grace Villa, Kadamankulam PO, Thiruvalla - 689583</i>)	SHRI JOSE KURIAN (Chairperson)
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Voluntary Organization in Interest of Consumer Education, New Delhi	SHRI M. A. U. KHAN DR RAJIV JHA (<i>Alternate</i>)
In Personal Capacity (<i>House No. 131 Sector 11D Faridabad - 121006</i>)	SHRI V. V. ARORA
In Personal Capacity [<i>B-806, Oberoi Exquisite, Oberoi Garden City, Goregaon (East), Mumbai - 400063</i>]	SHRI A. K. JAIN
In Personal Capacity (<i>36, Old Sneh Nagar, Wardha Road, Nagpur - 440015</i>)	SHRI L. K. JAIN
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In Personal Capacity (<i>Grace Villa, Kadamankulam PO, Thiruvalla - 689583</i>)	SHRI JOSE KURIAN (<i>Convener</i>)
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CSIR - Central Road Research Institute, New Delhi	SHRI SATISH PANDEY
CSIR - Structural Engineering Research Centre, Chennai	DR B. H. BHARAT KUMAR DR M. B. ANOOP (<i>Alternate</i>)
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Engineers India Limited, New Delhi	DR SUDIP PAUL MS MAITRAYEE MAZUMDER (<i>Alternate I</i>) MS AKANSHA SACHDEVA (<i>Alternate II</i>)
Hindustan Construction Company Limited, Mumbai	SHRI KHATAR BATCHA
Hindustan Consulting Associates Private Limited, New Delhi	SHRI SATISH KUMAR SHARMA
Indian Concrete Institute, Chennai	DR SAROJ MANDAL SHRI MANOJ KAWALKAR (<i>Alternate</i>)
Indian Institute of Technology Delhi, New Delhi	PROF B. BHATTACHARJEE DR SHASHANK BISHNOI (<i>Alternate</i>)
Indian Institute of Technology Hyderabad, Hyderabad	PROF K. V. L. SUBRAMANIAM
Indian Institute of Technology Madras, Chennai	PROF MANU SANTHANAM PROF RADHAKRISHNA G. PILLAI (<i>Alternate</i>)
Indian Society of Structural Engineers, Mumbai	SHRI UMESH JOSHI SHRI HEMANT S. VADALKAR (<i>Alternate</i>)
L&T Construction, Chennai	DR K. SIVAKUMAR SHRI S. MANOHAR (<i>Alternate</i>)

<i>Organization</i>	<i>Representation(s)</i>
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UltraTech Cement Limited, Mumbai	DR V. RAMACHANDRA DR AWADHESH K. SINGH (<i>Alternate</i>)
In Personal Capacity [<i>B-806, Oberoi Exquisite, Oberoi Garden City, Goregaon (East), Mumbai - 400063</i>]	SHRI A. K. JAIN
In Personal Capacity [<i>36, Old Sneh Nagar, Wardha Road, Nagpur - 440015</i>]	SHRI LALIT KUMAR JAIN
In Personal Capacity [<i>452, Sector 14, Sonipat - 131001</i>]	SHRI R. K. JAIN
In Personal Capacity [<i>Block M1 First Floor F1 VGN Minerya Gurusamy Road Nolambur, Chennai - 600095</i>]	DR C. RAJKUMAR

(Continued from second cover)

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Central : 601/A, Konnectus Tower -1, 6th Floor,
DMRC Building, Bhavbhuti Marg, New
Delhi 110002

Telephones

{ 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V,
Salt Lake, Kolkata, West Bengal 700091

{ 2367 0012
2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg,
Chandigarh 160019

{ 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113

{ 2254 1442
2254 1216

Western : 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri
(East), Mumbai 400093

{ 283 25838

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