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GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE

PART IV TYPES OF CONCRETE

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

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Indian Standard

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Indian Standard

GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE

PART IV TYPES OF CONCRETE

0. FOREWORD

0.1 This Indian Standard (Part IV) was adopted by the Indian Standards Institution on 25 February 1972, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 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 documents. It has, therefore, become necessary to standardize the various terms and definitions used in cement and concrete technology and thus avoid ambiguity in their interpretations. The Sectional Committee has, therefore decided to bring out a series of glossaries of terms relating to concrete and concrete materials.

0.3 For convenience of reference, this glossary of terms has been grouped into the following twelve parts:

Part I Concrete aggregates

Part II Materials (other than cement and aggregate)

Part III Concrete reinforcement

Part IV Types of concrete

Part V Formwork for concrete

Part VI Equipment, tools and plant

Part VII Mixing, laying, compacting, curing and other construction aspects

Part VIII Properties of concrete

Part IX Structural aspects

Part X Tests and testing apparatus

Part XI Prestressed concrete

Part XII Miscellaneous

0.3.1 In addition to the above, two separate standards have been brought out concerning terminology relating to hydraulic cement and pozzolanic materials. These standards are IS : 4845-1968* and IS : 4305-1967†.

0.4 In the formulation of this standard due weightage has been given to international co-ordination among the standard 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 2787-1956 Glossary of terms for concrete and reinforced concrete British Standards Institution.

BS 4340-1968 Glossary of formwork of terms. British Standards Institution.

ASTM Designation: C 125 Definitions of terms relating to concrete aggregate. American Society for Testing and Materials.

ACI No. SP-19 (1967) Cement and concrete terminology. American Concrete Institute.

ACI 617-1968 Recommended practice for concrete formwork American Concrete Institute.

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1. SCOPE

1.1 This standard (Part IV) covers definitions of terms relating to different types of cement concrete.

2. DEFINITIONS

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

2.1 Aerated Concrete — A lightweight product consisting of portland cement, cement-silica, cement-pozzolana, lime-pozzolana, or lime-silica pastes, or pastes containing blends of these ingredients and having a homogeneous void or cell structure, attained with gas-forming chemicals or foaming agents (for cellular concretes containing binder ingredients other than, or in addition to portland cement, autoclave curing is usually employed).

2.2 Air-Blown Mortar — Mortar or concrete conveyed through a hose and projected at high velocity on to a surface; also pneumatically applied mortar or concrete, sprayed mortar and gunned concrete (*see also* dry-mi

*Definitions and terminology relating to hydraulic cement.

†Glossary of terms relating to pozzolana.

shotcrete; gunite; and wet-mix shotcrete, pneumatically applied mortars).

2.3 Autoclaved — Steam curing of concrete products, sandlime brick, asbestos cement products, hydrous calcium silicate insulation products, or cement in an autoclave at maximum ambient temperatures generally between 170 and 215°C.

2.4 Boron Loaded Concrete — High-density concrete including a boron-containing admixture or aggregate, such as mineral colemanite, boron frits, or boron metal alloys to act as a neutron attenuator.

2.5 Build-Up — Gunning of shotcrete in successive layers to form a thicker mass.

2.6 Cast-in-Place — Mortar or concrete which is deposited in the place where it is required to harden as part of the structure, as opposed to pre-cast concrete.

2.7 Cast-in-Situ — *See* **2.6.**

2.8 Castable Refractory — A packaged, dry mixture of hydraulic cement, generally calcium-aluminate cement, and specially selected and proportioned refractory aggregates which, when mixed with water, will produce refractory concrete or mortar (*see also* **2.82**).

2.9 Cast Stone — Concrete or mortar cast into blocks or small slabs in special molds so as to resemble natural building stone.

2.10 Cellular Concrete — *See* **2.1.**

2.11 Cellular Construction — *See* **2.32.1.**

2.12 Central-Mixed Concrete — Concrete which is completely mixed in a stationary mixer from which it is transported to the delivery point.

2.13 Closed-Circuit Grouting — Injection of grout into a hole intersecting fissures or voids which are to be filled at such volume and pressure that grout input to the hole is greater than the grout take of the surrounding formation, excess grout being returned to the pumping plant for recirculation.

2.14 Colloidal Concrete — Concrete of which the aggregate is bound by colloidal grout.

2.15 Colloidal Grout — A grout which has artificially induced cohesiveness or ability to retain the dispersed solid particles in suspension.

2.16 Concrete, Aerated — Concrete made very light and cellular by the addition of a prepared foam or by generation of gas within the unhardened mixture.

2.17 Concrete, Dense — Concrete containing a minimum of voids.

2.18 Concrete, Dry-Packed — A concrete mixture sufficiently dry to be consolidated only by heavy ramming.

2.19 Concrete Fat — A concrete containing a large proportion of mortar.

2.20 Concrete, Foamed — *See* **2.16.**

2.21 Concrete Granolithic — Concrete suitable for use as a wearing surface finish to floors, made with specially selected aggregate of suitable hardness, surface texture, and particle shape.

2.22 Concrete, Heavy — Concrete of exceptionally high unit weight, usually obtained by use of heavyweight aggregates, used especially for radiation shielding.

2.23 Concrete, High-Density — Concrete of exceptionally high unit weight, usually obtained by use of heavyweight aggregates, used especially for radiation shielding (*see* **2.22**).

2.24 Concrete, Lightweight — Concrete of substantially lower unit weight than that made from gravel or crushed stone.

2.25 Concrete, Mass — Any volume of concrete cast-in-place (generally as a monolithic structure usually incorporating a high proportion of large coarse aggregate and a low cement content) and intended to resist applied loads by virtue of its mass; it is distinct from other types of concrete because its dimensions are of such magnitude as to require that measures be taken to cope with the generation of heat and attendant volume changes.

2.26 Concrete, No-fines — A concrete mixture containing little or no fine aggregate.

2.27 Concrete, No-Slump — Concrete with a slump of 25 mm or less.

2.28 Concrete, Normal Weight — Concrete having a unit weight of approximately 2 400 kg/m^3 made with aggregates of normal weight.

2.29 Concrete, Precast — Concrete cast elsewhere than its final position in the structure. Also known as grouted concrete (*see* **2.59**).

2.30 Concrete, Prepacked — Concrete produced by placing coarse aggregate in a form and later injecting a Portland cement-sand grout, usually with admixtures, to fill the voids.

2.31 Concrete, Preplaced-Aggregate — *See* **2.30.**

2.32 Concrete, Ready-Mixed — Concrete delivered at site or into the purchaser's vehicle in a plastic condition and requiring no further treatment before being placed in the position in which it is to set and harden.

2.32.1 *Centrally-Mixed Concrete* — Concrete produced by completely mixing cement, aggregates, and water at a stationary central mixing plant and delivered in containers fitted with agitating devices, except that when so agreed to between the purchaser and the manufacturer, the concrete may be transported without being agitated.

2.32.2 *Truck-Mixed Concrete* — Concrete produced by placing cement and aggregates in a truck-mixer at the batching plant, the addition of water and the mixing being carried out entirely in the truck-mixer either during the journey or on arrival at the site of delivery. No water shall be added to the aggregate and cement until the mixing of concrete commences.

2.33 Concrete, Refractory — Concrete having refractory properties, usually made with calcium-aluminate cement and refractory aggregate and suitable for use even at temperature above 1 000°C.

2.34 Concrete, Reinforced — Concrete containing reinforcement and designed on the assumption that the two materials act together in resisting forces.

2.35 Concrete, Spun — Concrete compacted by centrifugal action, for example, in the manufacture of pipes.

2.36 Concrete, Structural — Concrete used to carry structural load or to form an integral part of a structure; concrete of a quality specified for structural use; concrete used solely for protective cover, fill, or insulation is not considered structural concrete.

2.37 Concrete, Structural Lightweight — Structural concrete made with lightweight aggregate; the unit weight usually is in the range of 1 440 to 1 850 kg/m^3.

2.38 Concrete, Terrazzo — Marble-aggregate concrete that is cast-in-place or precast and ground smooth for decorative surfacing purposes on floors and walls.

2.39 Concrete, Transit-Mixed — Concrete, the mixing of which is wholly or principally accomplished in a truck mixer.

2.40 Concrete, Translucent — A combination of glass and concrete used together in precast or prestressed panels.

2.41 Concrete, Vacuum — Concrete from which water is extracted by a vacuum process before hardening occurs.

2.42 Concrete, Vibrated — Concrete compacted by vibration during and after placing.

2.43 Containment Grouting — Injection of grout, usually at relatively low pressure, around the periphery of an area which is subsequently to be

grouted at greater pressure; intended to confine subsequent grout injection within the perimeter.

2.44 Contraction-Joint Grouting — Injection of grout into contraction joints.

2.45 Control-Joint Grouting — *See* **2.44**.

2.46 Cyclopean Concrete — Mass concrete in which large stones, each of 50 kg or more, are placed and embedded in the concrete as it is deposited; the stones are called ' pudding stones ' or ' plums ', preferably not less than 15 cm apart and not closer than 20 cm to any exposed surface (*see also* **2.101**).

2.47 Dense Concrete — *See* **2.17**.

2.48 Dry-Mix Shotcrete — Pneumatically conveyed shotcrete in which most of the mixing water is added at the nozzle (*see also* **2.88**).

2.49 Dry Pack — To forcibly ram a moist Portland-cement-aggregate mixture into a confined area; also the mixture so placed.

2.50 Dry-Packed Concrete — *See* **2.18**.

2.51 Dry-Tamp Process — The placing of concrete or mortar by hammering or ramming a relatively dry mix into place.

2.52 Expansive-Cement Concrete (Mortar or Grout) — A concrete (mortar or grout) made with expansive cement.

2.53 Fat Concrete — *See* **2.19**.

2.54 Flash Coat — A light coat of shotcrete used to cover minor blemished on a concrete surface.

2.55 Gas Concrete — Lightweight concrete produced by developing voids with gas generated within the unhardened mix (usually from the action of cement alkalies on aluminium powder used as an admixture).

2.56 Granolithic Concrete — *See* **2.21**.

2.57 Ground Wire — Small-gauge high-strength steel wire used to establish line and grade as in shotcrete work; also called alignment wire or screed wire.

2.58 Grout — Mixture of cementitious material and aggregate to which sufficent water is added to produce pouring concistency without segregation of the constituents, or mixtures of other compositions, such as containing PVC or epoxy resin or sodium silicate, but of similar consistency.

2.59 Grouted-Aggregate Concrete — Concrete which is formed by injecting grout into previously placed coarse aggregate (*see* **2.30**).

2.60 Gun Finish — Undisturbed final layer of shotcrete as applied from nozzle, without hand finishing.

2.61 Gunite (Trade Name) — Method of applying dry-mix shotcrete.

2.62 Gunning Pattern — Conical outline of material discharge steam in shotcrete operation.

2.63 Heat-Resistant Concrete — Any concrete which will not disintegrate when exposed to constant or cyclic heating at any temperature below which a ceramic bond is formed, that is, below about 1 000°C.

2.64 Heavy Concrete — *See* **2.22.**

2.65 Heavyweight Concrete — *See* **2.23.**

2.66 High-Density Concrete — *See* **2.23.**

2.67 High-Early-Strength Concrete — Concrete which, through the use of high-early-strength cement or admixtures, is capable of attaining specified strength at an earlier age than normal concrete.

2.68 Ilmenite — A mineral, iron titanate ($FeTiO_3$) which in pure or impure form is commonly used as aggregate in high density concrete.

2.69 Impending Slough — The consistency obtained with shotcrete containing the maximum amount of water that can be used without flow or sag after placement.

2.70 Insulating Concrete — Concrete having low thermal conductivity; used as thermal insulation.

2.71 Lean Concrete — Concrete of low cement content.

2.72 Lightweight Concrete — *See* **2.24.**

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

2.74 Mass Concrete — *See* **2.25.**

2.75 Monolithic Concrete — Concrete cast with no joints other than construction joints.

2.76 Nailable Concrete — Concrete, usually made with a suitable lightweight aggregate, with or without the addition of sawdust, into which nails can be driven.

2.77 Non-Air-Entrained Concrete — Concrete in which neither an air-entraining admixture nor air-entraining cement has been used.

2.78 Normal-Weight Concrete — *See* **2.28.**

2.79 No-Slump Concrete — *See* **2.27.**

2.80 Open-Circuit Grouting — A grouting system with no provision for recirculation of grout to the pump.

2.81 Oversanded — Containing more sand that would be necessary to produce adequate workability and a satisfactory condition for finishing.

2.82 Packaged Concrete, Mortar, Grout — Mixtures of dry ingredients in packages, requiring only the addition of water to produce concrete, mortar, or grout.

2.83 Packer — A device inserted into a hole in which grout is to be injected which acts to prevent return of the grout around the injection pipe; usually an expandable device actuated mechanically, hydraulically, or pneumatically.

2.84 Pass — Layer of shotcrete placed in one movement over the field of operation.

2.85 Pavement, Concrete — A layer of concrete over such areas as roads, sidewalks, airfields, canals, playgrounds, and those used for storage or parking.

2.86 Perimeter Grouting — Injection of grout, usually at relatively low pressure, around the periphery of an area which is subsequently to be grouted at greater pressure; intended to confine subsequent grout injection within the perimeter (*see* **2.43**).

2.87 Plain Concrete — Concrete with reinforcement; or concrete that does not conform to the definition of reinforced concrete.

2.88 Pneumatically Applied Mortar — Mortar or concrete conveyed through a hose and projected at high velocity on to a surface; also known as air-blown mortar; also pneumatically applied mortar or concrete, sprayed mortar and gunned concrete (*see also* **2.48**, **2.61**, **2.106** and **2.128**).

2.89 Pozzolanic Cement Concrete — Concrete having pozzolana partly substituted for its cement, the pozzolana content being not less than 10 percent of the combined weight of cement plus pozzolana.

2.90 Prepacked Concrete — *See* **2.31**.

2.91 Preplaced-Aggregate Concrete — *See* **2.31**.

2.92 Preshrunk Concrete

a) Concrete which has been mixed for a short period in a stationary mixer before being transferred to a transit mixed.

b) Grout, mortar, or concrete that has been mixed 1 to 3 h before placing to reduce shrinkage during hardening.

.93 Puddling

a) Process of inducing compaction in mortar or concrete by use of a tamping rod.

b) Undesirable placement of shotcrete wherein air pressure is decreased and water content is increased.

.94 Pumped Concrete — Concrete which is transported through hose or ipe by means of a pump.

.95 Ready-Mixed Concrete — Concrete manufactured for delivery to a urchaser in a plastic and unhardened state (*see also* **2.12**, **2.107** nd **2.117**).

.96 Rebound — Sand and cement or wet shotcrete which bounces away :om a surface against which shotcrete is being projected.

.97 Refractory Concrete — *See* **2.33**.

.98 Refractory Insulating Concrete — Refractory concrete having ɔw thermal conductivity.

.99 Reinforced Concrete — *See* **2.34**.

.100 Rich Concrete — Concrete of high cement content.

.101 Rubble Concrete

a) Concrete similar to cyclopean concrete except that small stones (such as one man can handle) are used.

b) Concrete made with rubble from demolished structures (*see also* **2.46**).

.102 Rustic or Washed Finish — A type of terrazzo toping in which he matrix is recessed by washing prior to setting so as to expose the chips vithout destroying the bond between chip and matrix; a retarder is sometimes applied to the surface to facilitate this operation.

.103 Sagging — Subsidence of material from the gunned surface of a loping or vertical concrete structural member or from the gunned surface ɔf an overhead horizontal shotcrete structural member (*see also* **2.108**).

.104 Sawdust Concrete — Concrete in which the aggregate consists nainly of sawdust from wood.

.105 Shooting — Placing of shotcrete.

.106 Shotcrete — *See* **2.88**.

2.107 Shrink-Mixed Concrete — Ready-mixed concrete mixed partially in a stationary mixer and then mixed in a truck mixer (*see also* **2.92**).

2.108 Sloughing — Subsidence of material from a vertical surface of newly gunned shotcrete generally due to the use of an excessive amount of mixing water (*see also* **2.103**).

2.109 Slugging — Pulsating and intermittent flow of shotcrete material due to improper use of delivery equipment and materials.

2.110 Sounding Well — A vertical conduit in the mass of coarse aggregate for preplaced aggregate concrete, provided with continuous or closely spaced openings to permit entrance of grout; the grout level is determined by means of a float on a measured line.

2.111 Sprayed Mortar — Mortar or concrete conveyed through a hose and projected at high velocity onto a surface; also known as air-blown mortar; also pneumatically applied mortar or concrete, sprayed mortar and gunned concrete (*see also* **2.48, 2.61** and **2.129**).

2.112 Spun Concrete — *See* **2.35.**

2.113 Structural Concrete — *See* **2.36.**

2.114 Structural Light Weight Concrete — *See* **2.37.**

2.115 Terrazzo Concrete — *See* **2.38.**

2.116 Tesserae — Small pieces of marble tile or glass used in mosaics.

2.117 Time of Haul — In production of ready-mixed concrete, the period from first contact between mixing water and cement until completion of discharge of the freshly mixed concrete.

2.118 Transit-Mixed Concrete — *See* **2.39.**

2.119 Translucent Concrete — *See* **2.40.**

2.120 Tremie Concrete — Concrete placed by means of a tremie.

2.121 Tremie Seal — Concrete placed under water by means of a tremie in a cofferdam or caisson so that it can be dewatered after the concrete hardens.

2.122 Truck-Mixed Concrete — *See* **2.39.**

2.123 Undersanded — With respect to concrete, containing an insufficient proportion of fine aggregate to produce optimum properties in the fresh mixture, especially workability and finishing characteristics.

2.124 Unreinforced Concrete — *See* **2.87.**

2.125 Vacuum Concrete — Concrete from which water is extracted by a vacuum process before hardening occurs.

2.126 Venetian — A type of terrazzo topping in which large chips are incorporated.

2.127 Vermiculite Concrete — Concrete in which the aggregate consists of exfoliated vermiculite.

2.128 Vibrated Concrete — Concrete compacted by vibration during and/or after placing.

2.129 Wet-Mix Shotcrete — Shotcrete wherein all ingredients, including mixing water, are mixed in the equipment before introduction into the delivery hose; it may be pneumatically conveyed or moved by displacement.

(*Continued from page* 2)

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Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402 Fax :+ 91 011 3234062, 3239399, 3239382
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Central Laboratory :	***Telephone***
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