



Designation: **C125—12 C125 – 12a**

## Standard Terminology Relating to Concrete and Concrete Aggregates<sup>1</sup>

This standard is issued under the fixed designation C125; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope\*

- 1.1 This standard is a compilation of definitions of terms as they are used in standards under the jurisdiction of Committee C09.
- 1.2 Other terminology under the jurisdiction of Committee C09 is included in two specialized standards. Terms relating to constituents of concrete aggregates are defined in Descriptive Nomenclature **C294**. Terms relating to constituents of aggregates for radiation-shielding concrete are defined in Descriptive Nomenclature **C638**.
- 1.3 Related terminology for hydraulic cement is included in Terminology **C219**. Additionally, the American Concrete Institute has an electronic document, *ACI Concrete Terminology*,<sup>2</sup> which is updated periodically. While this ACI Terminology is a useful resource, it shall not be referenced directly in ASTM standards because it is not a consensus document. The use of individual ACI or other definitions in ASTM standards shall be in accordance with *Form and Style*, Section E5.9, *Attributions*.
- 1.4 When a term is used in an ASTM standard for which Committee C09 is responsible, it is included herein only if used in more than one Committee C09 standard.

NOTE 1—The subcommittee responsible for this standard will review definitions on a five-year basis to determine if the definition is still appropriate as stated. Revisions will be made when determined necessary. The year shown in parentheses at the end of a definition indicates the year the definition or revision to the definition was approved. A letter R and a year indicate when the definition was reviewed. No date indicates the term has not yet been reviewed.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>3</sup>

- C94/C94M** Specification for Ready-Mixed Concrete
- C143/C143M** Test Method for Slump of Hydraulic-Cement Concrete
- C219** Terminology Relating to Hydraulic Cement
- C294** Descriptive Nomenclature for Constituents of Concrete Aggregates
- C403/C403M** Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
- C494/C494M** Specification for Chemical Admixtures for Concrete
- C511** Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
- C638** Descriptive Nomenclature of Constituents of Aggregates for Radiation-Shielding Concrete
- C939** Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
- C1074** Practice for Estimating Concrete Strength by the Maturity Method
- C1077** Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
- C1240** Specification for Silica Fume Used in Cementitious Mixtures
- C1437** Test Method for Flow of Hydraulic Cement Mortar
- C1610/C1610M** Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique
- C1611/C1611M** Test Method for Slump Flow of Self-Consolidating Concrete
- E135** Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.91 on Terminology.

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<sup>2</sup> Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, <http://www.terminology.concrete.org>.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

\*A Summary of Changes section appears at the end of this standard

### 3. Terms and Their Definitions

**absorption, *n***—the process by which a liquid is drawn into and tends to fill permeable pores in a porous solid body; also, the increase in mass of a porous solid body resulting from the penetration of a liquid into its permeable pores. (R 2008)

DISCUSSION—

In the case of concrete and concrete aggregates, unless otherwise stated, the liquid involved is water, the increase in mass is that which does not include water adhering to the outside surface, the increase in mass is expressed as a percentage of the dry mass of the body and the body is considered to be “dry” when it has been treated by an appropriate process to remove uncombined water, such as drying to constant mass at a temperature between 100 and 110°C.

**accreditation, *n***—*of testing agency*, a process by which an evaluation authority attests that a testing agency has demonstrated the competency to perform specific tasks in accordance with a standard. (2011)

**admixture, *n***—a material other than water, aggregates, hydraulic cementitious material, and fiber reinforcement that is used as an ingredient of a cementitious mixture to modify its freshly mixed, setting, or hardened properties and that is added to the batch before or during its mixing. (R 2008)

*accelerating admixture, *n**—admixture that accelerates the setting and early strength development of concrete. (C494/C494M)

*air-entraining admixture, *n**—admixture that causes the development of a system of microscopic air bubbles in concrete or mortar during mixing.

*chemical admixture, *n**—a nonpozzolanic admixture in the form of a liquid, suspension, or water-soluble solid.

*mineral admixture, *n**—deprecated term.

DISCUSSION—

This term has been used to refer to different types of water insoluble, finely divided materials such as pozzolanic materials, cementitious materials, and aggregate. These materials are not similar, and it is not useful to group them under a single term. The name of the specific material should be used, for example, use “pozzolan,” “slag cement,” or “finely divided aggregate,” as is appropriate.

*retarding admixture, *n**—admixture that retards the setting of concrete. (C494/C494M)

*water-reducing admixture, *n**—admixture that either increases the slump of freshly mixed mortar or concrete without increasing the water content or that maintains the slump with a reduced amount of water due to factors other than air entrainment.

*water-reducing admixture, high-range, *n**—a water-reducing admixture capable of producing at least 12 % reduction of water content when tested in accordance with Specification C494/C494M and meeting the other relevant requirements of Specification C494/C494M.

**aggregate, *n***—granular material, such as sand, gravel, crushed stone, or iron blast-furnace slag, used with a cementing medium to form hydraulic-cement concrete or mortar. (R 2008)

*coarse aggregate, *n**—(1) aggregate predominantly retained on the 4.75-mm (No. 4) sieve; or (2) that portion of an aggregate retained on the 4.75-mm (No. 4) sieve.

DISCUSSION—

The definitions are alternatives to be applied under differing circumstances. Definition (1) is applied to an entire aggregate either in a natural condition or after processing. Definition (2) is applied to a portion of an aggregate. Requirements for properties and grading should be stated in the specification.

*fine aggregate, *n**—(1) aggregate passing the 9.5-mm (3/8-in.) sieve and almost entirely passing the 4.75-mm (No. 4) sieve and predominantly retained on the 75- $\mu$ m (No. 200) sieve; or (2) that portion of an aggregate passing the 4.75-mm (No. 4) sieve and retained on the 75- $\mu$ m (No. 200) sieve.

DISCUSSION—

The definitions are alternatives to be applied under differing circumstances. Definition (1) is applied to an entire aggregate either in a natural condition or after processing. Definition (2) is applied to a portion of an aggregate. Requirements for properties and grading should be stated in the specifications.

*heavyweight aggregate, *n**—see *high-density aggregate*.

*high-density aggregate, *n**—aggregate with relative density greater than 3.3, such as: barite, magnetite, limonite, ilmenite, iron, or steel.

*lightweight aggregate, *n**—see *low-density aggregate*.

*low-density aggregate, n*—aggregate with bulk density less than 1120 kg/m<sup>3</sup> [70 lb/ft<sup>3</sup>], such as: pumice, scoria, volcanic cinders, tuff, and diatomite; expanded or sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, or slag; and end products of coal or coke combustion.

*normal-density aggregate, n*—aggregate that is neither high nor low density.

DISCUSSION—

This term refers to aggregate with relative density typically ranging between 2.4 and 3.0, or with bulk density typically ranging between 1120 kg/m<sup>3</sup> [70 lb/ft<sup>3</sup>] and 1920 kg/m<sup>3</sup> [120 lb/ft<sup>3</sup>].

*normalweight aggregate, n*—see *normal-density aggregate*.

**air content, n**—the volume of air voids in cement paste, mortar, or concrete, exclusive of pore space in aggregate particles, usually expressed as a percentage of total volume of the paste, mortar, or concrete. (R 2008)

*air-cooled blast-furnace slag*—see **blast-furnace slag, air-cooled**.

**air, entrained, n**—air voids, typically between 10 and 1000 μm (1 mm) in diameter and spherical or nearly so, that are incorporated intentionally into a cementitious mixture during mixing by use of an air entraining admixture. (2012)

DISCUSSION—

Entrained air is used primarily to increase the durability of cementitious mixtures exposed to cycles of freezing and thawing in wet environments. Entrained air may affect workability and strength of a hardened cementitious mixture.

**air, entrapped, n**—air voids, typically 1 mm or larger in size and mainly irregular in shape, that are incorporated unintentionally into a cementitious mixture during mixing and handling. (2012)

*air void*—see **void, air**.

**authority, evaluation, n**—an independent entity, apart from the testing agency being evaluated, that has the capability to provide an unbiased evaluation of the technical activities of concrete and concrete aggregates testing agencies. (2011)

DISCUSSION—

Two acceptable methods of evaluation are inspection and accreditation, and these services are offered by various evaluation authorities.

**blast-furnace slag, n**—the nonmetallic product, consisting essentially of silicates and aluminosilicates of calcium and other bases, that is developed in a molten condition simultaneously with iron in a blast furnace. (R 2008)

**blast-furnace slag, air-cooled, n**—the material resulting from solidification of molten blast-furnace slag under atmospheric conditions; subsequent cooling may be accelerated by application of water to the solidified surface. (R 2008)

**blast-furnace slag, expanded, n**—the low density cellular material obtained by controlled processing of molten blast-furnace slag with water or water and other agents, such as steam or compressed air or both. (R 2011)

**blast-furnace slag, granulated, n**—the glassy, granular material formed when molten blast-furnace slag is rapidly chilled, as by immersion in water. (R 2008)

**bleeding, n**—the autogenous flow of mixing water within, or its emergence from, newly placed concrete or mortar caused by the settlement of the solid materials within the mass, also called water gain. (R 2008)

**bulk density, n—of aggregate**, the mass of a unit volume of bulk aggregate material (the unit volume includes the volume of the individual particles and the volume of the voids between the particles). (R 2008)

DISCUSSION—

This term replaces the deprecated term **unit weight**—*of aggregate*.

**bulk specific gravity, n**—the ratio of the mass of a volume of a material (including the permeable and impermeable voids in the material, but excluding the voids between particles of the material) at a stated temperature to the mass of an equal volume of distilled water at a stated temperature. (R 2008)

**bulk specific gravity (saturated surface dry), n**—the ratio of the mass of a volume of a material including the mass of water within the pores in the material (but excluding the voids between particles) at a stated temperature, to the mass of an equal volume of distilled water at a stated temperature. (R 2008)

**calcined**, *adj*—heated to a temperature less than the melting point so as to bring about a decomposition, phase transition, or removal of a volatile fraction of a solid material. (2012)

**calibration**, *n—of measuring instrument*, a process that, under specified conditions and following a standard procedure, establishes metrological traceability by determining: (1) the relationship between the quantity values provided by measurement standards or certified reference materials and the corresponding indications from a measuring instrument or system; and (2) the estimated uncertainty of measurements made subsequently with the instrument or system. (2011)

DISCUSSION—

Calibration takes into account systematic error (or bias) of the measuring instrument or system as well as random error that is associated with the use of the measurement instrument or system and error associated with the measurement standards or certified reference materials. Calibration should not be confused with an adjustment of a measuring instrument or with verification of a measuring instrument. Sometimes the first step alone is mistakenly called calibration, but performing only the first step is the process of **standardization**. In tests of concrete and concrete aggregates, standardization of measuring instruments or systems is often sufficient.

*cellular concrete*—see **concrete, cellular**.

**cement, hydraulic**, *n*—a cement that sets and hardens by chemical reaction with water and is capable of doing so under water. (R 2008)

**cement, slag**, *n*—granulated blast-furnace slag that has been ground to cement fineness, with or without additions, and that is a hydraulic cement.

**cementitious material** (*hydraulic*); (*hydraulic*), *n*—an inorganic material or a mixture of inorganic materials that sets and develops strength by chemical reaction with water by formation of hydrates and is capable of doing so under water. (R 2008)

**cementitious material, supplementary, (SCM)**, *n*—an inorganic material that contributes to the properties of a cementitious mixture through hydraulic or pozzolanic activity, or both. (2012)

DISCUSSION—

Some examples of supplementary cementitious materials are fly ash, silica fume, slag cement, rice husk ash, and natural pozzolans. In practice, these materials are used in combination with portland cement.

**cementitious mixture**, *n*—a mixture (mortar, concrete, or grout) containing hydraulic cement. (R 2008)

**certification**, *n—of technician*, a process by which an examiner determines and attests in writing that an individual has met established criteria and is qualified to perform specific test methods or practices. (2011)

**compound, curing**, *n*—a liquid that, when applied to the surface of newly-placed concrete, forms a membrane that impedes the evaporation of water and, in the case of white pigmented compounds, reflects heat. (2010)

**concrete**, *n*—a composite material that consists essentially of a binding medium within which are embedded particles or fragments of aggregate; in hydraulic-cement concrete, the binder is formed from a mixture of hydraulic cement and water. (R 2008)

**concrete, cellular**, *n*—a lightweight hydraulic-cement concrete having a homogeneous void or cell structure attained using gas-forming chemicals or foaming agents. (R 2008)

**concrete, fresh**, *n*—concrete which possesses enough of its original workability so that it can be placed and consolidated by the intended methods. (R 2008)

**concrete, hardened**, *n*—concrete that has developed sufficient strength to serve some defined purpose or resist a stipulated loading without failure. (R 2008)

**concrete, roller-compacted, RCC**, *n*—concrete compacted while fresh by a roller, often a vibratory roller. (R 2008)

**concrete, self-consolidating, SCC**, *n*—concrete that can flow around reinforcement and consolidate under its own weight without additional effort and without exceeding specified limits of segregation. (2010)

DISCUSSION—

Project specifications shall indicate the acceptable segregation based upon a specified test method. Test Method **C1610/C1610M** provides a procedure for determining the degree of aggregate segregation under static conditions and the Appendix of Test Method **C1611/C1611M** describes a non-mandatory technique for assessing the degree of segregation under flowing conditions.

**consistency**, *n—of a fresh cementitious mixture*, the relative mobility or ability to flow. (2010)

DISCUSSION—

This characteristic of fresh cementitious mixtures is difficult to quantify and empirical test methods have been adopted to provide indicators of consistency. For example, the slump test described in Test Method C143/C143M is used for concrete, the flow table method described in Test Method C1437 is used for mortar, and the flow cone method described in Test Method C939 is used for grout.

**consolidation**, *n*—of cementitious mixtures, the process of increasing the density of a fresh cementitious mixture in a form, mold, or container by reducing the volume of voids. (2009)

DISCUSSION—

Except for **self-consolidating concrete**, consolidation is accomplished by inputting mechanical energy, typically by rodding, tamping, tapping, vibration, or some combination of these actions. Specific apparatus and methods for consolidation are defined in the relevant C09 Standards.

*crushed gravel*—see **gravel, crushed**.

*crushed stone*—see **stone, crushed**.

**curing**, *n*—action taken to maintain moisture and temperature conditions in a freshly-placed cementitious mixture to allow hydraulic cement hydration and (if applicable) pozzolanic reactions to occur so that the potential properties of the mixture may develop. (2010)

*curing compound*—see **compound, curing**.

**density**, *n*—mass per unit volume (preferred over deprecated term **unit weight**). (R 2010)

**elongated piece** (*of aggregate*), *n*—a particle of aggregate for which the ratio of the length to width of its circumscribing rectangular prism is greater than a specified value (see also **flat piece** (*of aggregate*)). (R 2010)

**engineer, licensed professional**, *n*—an individual who is licensed to practice engineering as defined by the statutory requirements of the professional licensing laws of the governing jurisdiction; also referred to as *registered professional engineer*. (2011)

*entrained air*—see **air, entrapped**.

*entrapped air*—see **air, entrained**.

**examiner**, *n*—(1) an individual with the requisite technical qualifications to conduct and score impartially an examination of a person's ability to perform specific test methods or practices; (2) an individual designated by a certification body to conduct and score certification examinations. (2011)

DISCUSSION—

An individual who only supervises a multiple-choice type of written examination but does not evaluate the competence of the candidates to perform specific procedures is not considered an examiner. The examiner requires requisite technical qualifications to exercise judgment in scoring a candidate's ability to perform a specific procedure.

**fibers**, *n*—slender filaments, which may be discrete or in the form of bundles, networks, or strands of natural or manufactured materials, which can be distributed uniformly throughout a fresh cementitious mixture. (R 2010)

**fineness modulus**, *n*—of aggregate, a factor obtained by adding the percentages of material in the sample that is coarser than each of the following sieves (cumulative percentages retained), and dividing the sum by 100: 150- $\mu\text{m}$  (No. 100), 300- $\mu\text{m}$  (No. 50), 600- $\mu\text{m}$  (No. 30), 1.18-mm (No. 16), 2.36-mm (No. 8), 4.75-mm (No. 4), 9.5-mm ( $\frac{3}{8}$ -in.), 19.0-mm ( $\frac{3}{4}$ -in.), 37.5-mm (1½-in.), 75-mm (3-in.), 150-mm (6-in.). (R 2010)

**flat piece** (*of aggregate*), *n*—a particle of aggregate for which the ratio of the width to thickness of its circumscribing rectangular prism is greater than a specified value (see also **elongated piece** (*of aggregate*)). (R 2010)

**fly ash**, *n*—the finely divided residue that results from the combustion of ground or powdered coal and that is transported by flue gases from the combustion zone to the particle removal system. (R 2010)

**fog room**, *n*—a moist room in which the humidity is controlled by atomization of water. (see **moist room**) (2011)

*fresh concrete*—see **concrete, fresh**.

*granulated blast-furnace slag*—see **blast-furnace slag, granulated**.

**gravel**, *n*—coarse aggregate resulting from natural disintegration and abrasion of rock or processing of weakly bound conglomerate. (see **aggregate**) (2011)

**gravel, crushed**, *n*—the product resulting from the artificial crushing of gravel with substantially all fragments having at least one face resulting from fracture. (R 2010)

**grout**, *n*—a mixture of cementitious material and water, with or without aggregate or admixtures, that is used primarily to fill voids. (2011)

**grout (nonshrink), hydraulic-cement**, *n*—a hydraulic-cement grout that produces a volume that, when hardened under stipulated test conditions, is greater than or equal to the original installed volume, often used as a transfer medium between load-bearing members. (R 2010)

*hardened concrete*—see **concrete, hardened**.

**hardening**, *n*—gain of strength, and other properties, of a cementitious mixture as a result of hydration that occurs after final setting (for the definition of hydration, see Terminology C219). (2011)

*hydraulic cement*—see **cement, hydraulic**.

**inspection, laboratory**, *n*—a comprehensive evaluation of a testing agency that includes: (1) an examination of testing equipment for conformance to applicable tolerances; (2) an evaluation of the performance of test procedures for each standard submitted by the testing agency for review; (3) a review of the agency’s quality system based on criteria listed in Practice C1077; and (4) a summary report that lists deviations from the standards under review. (2011)

**laitance**, *n*—a layer of weak material derived from cementitious materials and aggregate fines carried to the surface of a cementitious mixture by bleeding. (2011)

**lime-saturated water**, *n*—*for curing test specimens*, water containing calcium hydroxide at saturation level and in contact with solid calcium hydroxide so that saturation is maintained. (R 2010)

*manufactured sand*—see **sand, manufactured**.

**material, certified reference**, *n*—a material, accompanied by a certificate, one or more of whose property values are certified by a procedure that establishes traceability to an accurate realization of the unit in which property values are expressed, and for which each certified property value is accompanied by an uncertainty at a stated level of confidence. (E135) (2011)

DISCUSSION—

The certificate provides traceable values and associated uncertainties of the properties of the material and must be retained with the material.

**material, consensus reference**, *n*—a material whose properties are based on average values obtained in an interlaboratory study or proficiency testing program that involves the use of standardized measurement systems. (2011)

DISCUSSION—

Consensus reference materials can be used internally by laboratories for periodic verification of measuring instruments or measurement processes.

**material, reference**, *n*—material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties. (VIM<sup>4</sup>) (2011)

**maturity**, *n*—the extent of the development of a property of a cementitious mixture. (R 2010)

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<sup>4</sup> International Vocabulary of Metrology—Basic and General Concepts and Associated Terms (VIM), 3<sup>rd</sup> Ed., 2008. Developed by Joint Committee for Guides in Metrology, [www.iso.org/sites/JCGM/JCGM-Introduction.htm](http://www.iso.org/sites/JCGM/JCGM-Introduction.htm).

DISCUSSION—

This term is usually used to describe the extent of relative strength development of concrete. However, the term can also be applied to the evolution of other properties which are dependent on the chemical reactions which occur in the cementitious materials. At any age, maturity is dependent on the curing history. (R 2010)

**maturity function**, *n*—a mathematical expression which uses the measured temperature history of a cementitious mixture during the curing period to calculate an index that is indicative of the maturity at the end of that period. (R 2010)

**maturity index**, *n*—an indicator of maturity which is calculated from the temperature history of the cementitious mixture by using a maturity function. (R 2010)