INTERNATIONAL

Designation: ~~C125 – 19~~ C125 – 19a

Standard Terminology Relating to Concrete and Concrete Aggregates[1]

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 reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. 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. In the event of conflict between definitions in Terminology C125 and definitions in Terminology C219, definitions in Terminology C125 shall govern for Committee C09 standards.

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.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C94/C94M Specification for Ready-Mixed Concrete
C143/C143M Test Method for Slump of Hydraulic-Cement Concrete
C219 Terminology Relating to Hydraulic and Other Inorganic Cements
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
C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
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

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[1] 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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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at 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**

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

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. (R2008)

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.

acceptable range, *n*—the difference between the largest and smallest of three or more test determinations that is expected to be exceeded with a probability of about 5 % in the normal and correct operation of the test method. (2019)

DISCUSSION—

The acceptable range can be used as an index of precision for test methods that define a test result as the average of three or more test determinations.

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, 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. (R2015)

accelerating admixture,n—an admixture that increases the rate of reaction of cementitious materials thus reducing time of setting and increasing early strength development of a cementitious mixture. (2015)

air-entraining admixture,n—admixture that causes the development of a system of microscopic air bubbles in concrete or mortar during mixing. (R2008)

chemical admixture,n—an admixture in the form of a liquid, suspension, or water-soluble solid. (2014)

extended set-control admixture, n—an admixture that can predictably reduce the hydration rate of cement for applications requiring extended time of setting followed by normal strength development. (2019)

DISCUSSION—

Depending on dosage rate, this admixture can be used to manage the setting time of returned concrete, reduce the hydration of cement in wash water from concrete production, permit extended delivery times of ready mixed concrete, or function as an ordinary retarding admixture. Also referred to as a *hydration controlling admixture* or a *hydration stabilizing admixture*.

mineral admixture,n—deprecated term. (R2008)

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—an admixture that decreases the rate of reaction of cementitious materials thus increasing time of setting of a cementitious mixture. (2015)

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. (R2008)

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. (R2008)

age, equivalent, *n*—the number of days or hours of curing of a concrete mixture at a specified temperature required to produce a maturity equal to the maturity achieved by a given curing period at concrete temperatures different from the specified temperature. (2015)

DISCUSSION—

The specified temperature is taken typically as the temperature used for standard laboratory curing. For example, a concrete cured for three days at an elevated temperature may have an equivalent age of seven days of curing at the standard laboratory temperature.

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. (R2008)

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. (R2008)

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 (⅜-in.) sieve and almost entirely passing the 4.75-mm (No. 4) sieve and predominantly retained on the 75-μm (No. 200) sieve; or (*2*) that portion of an aggregate passing the 4.75-mm (No. 4) sieve and retained on the 75-μm (No. 200) sieve. (R2008)

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. (R2008)

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

low-density aggregate,n—aggregate with bulk density less than 1120 kg/m^3 [70 lb/ft^3], 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. (R2008)

normal-density aggregate,n—aggregate that is neither high nor low density. (R2008)

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^3 [70 lb/ft^3] and 1920 kg/m^3 [120 lb/ft^3].

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. (R2008)

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.

bias, *n*—the difference between the average value of a property obtained by a given test method and the accepted reference or true value of that property. (2019)

DISCUSSION—

Bias cannot be determined if an accepted reference material is not available or if the property value can be determined only by the given test method.

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. (R2008)

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. (R2008)

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. (R2011)

blast-furnace slag, granulated, *n*—the glassy, granular material formed when molten blast-furnace slag is rapidly chilled, as by immersion in water. (R2008)

bleeding, *n*—the autogenous flow of mixing water within, or its emergence from, a newly placed cementitious mixture caused by the settlement of the solid materials within the mass. (R2013)

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). (R2008)

DISCUSSION—

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

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. (R2015)

cement, slag, *n*—granulated blast-furnace slag that has been ground to cement fineness, with or without additions, and that is a hydraulic cement. (R2015)

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. (R2015)

cementitious material, supplementary, (SCM), *n*—an inorganic material that contributes to the properties of a cementitious mixture through hydraulic or pozzolanic activity, or both. (R2015)

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*—any mixture containing cementitious material and water. (2016)

Discussion—

Paste, grout, mortar, and concrete are examples of cementitious mixtures.

certification, *n—of technician*, a procedure to determine and attest in writing that an individual is qualified to perform specific test methods or practices. (R2015)

compound, curing, *n*—a liquid that, when applied to the surface of freshly-placed concrete, forms a membrane that impedes the evaporation of water. (2018)

Discussion—

White pigmented curing compounds reflect solar radiation and reduce surface heating.

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. (R2015)

concrete, cellular, *n*—a low-density cementitious mixture having a homogeneous void or cell structure attained using gas-forming chemicals or foaming agents. (2016)

concrete, fresh, *n*—concrete that possesses enough of its original workability so that it can be placed and consolidated by the intended methods. (2016)

concrete, hardened, *n*—concrete that has developed sufficient strength to serve some defined purpose or resist a stipulated loading without failure. (R2015)

concrete, pervious, *n*—hydraulic-cement concrete proportioned with sufficient, distributed, interconnected macroscopic voids that allow water to flow through the material under the action of gravity alone. (2015)

concrete, roller-compacted, RCC, *n*—concrete compacted while fresh by a roller, often a vibratory roller. (R2015)

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. (R2015)

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. (R2015)

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. (R2015)

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. (R2015)

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

density, *n*—mass per unit volume of a material (preferred over term **unit weight**). (2013)

DISCUSSION—

For materials with pores that can become filled with water, such as aggregate, different modifiers are applied to the term **density** depending on which portions of the material are included in defining the volume. The modifiers shown on the right are used:

Included in the Volume	Modifier
Solid portion of material	**absolute**
Solid portion of material plus impermeable pores	**apparent**
Solid portion of material plus permeable and impermeable pores	No modifier is used

For example, the term **apparent density** would be the mass of the solid material divided by the volume of solid material plus impermeable pores.

If permeable pores are included in the volume, a delimiting term (or an abbreviation) is used in parentheses to define the moisture condition of the permeable pores when mass is measured. These delimiting terms are *oven-dry (OD)* and *saturated-surface-dry (SSD)*. For example, the term **density** *(SSD)* would be the density of a porous material in its SSD condition. The delimiting term is not used with **absolute density** or **apparent density**, because permeable pores are not included in the defining volume.

density, relative, *n*—the ratio of the density of material at a stated temperature to the density of distilled water at that stated temperature; if a temperature is not stated, it is assumed to be 23°C [73.5°F]. (2013)

DISCUSSION—

As discussed for the term **density**, for a porous material (such as aggregate), different modifiers and delimiting terms are used for **relative density** depending on which density of the material is used in calculating the ratio. For example, **apparent relative density** refers to the ratio of **apparent density** to the density of water and **relative density** *(SSD)* refers to the ratio of **density** *(SSD)* to the density of water.

difference limit (*d2s* or *d2s%*), *n*—the difference between two test results that is expected to be exceeded with a probability of about 5 % in the normal and correct operation of the test method; used as an index of precision of the test method. (2019)

DISCUSSION—

The difference limit ***(d2s%)*** is used if the coefficient of variation is used as the statistic to define single-operator and multilaboratory precision. Refer to Practice C670 for additional discussion.

duration, impact, *n*—the time that the impactor used to generate stress waves is in contact with the test surface; also referred to as **contact time**. (2015)

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*)~~.~~)). (R2015)

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*. (R2015)

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. (R2015)

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.

factor, temperature-time, *n*—the maturity index computed as the area between the concrete temperature and the datum temperature from the plot of measured concrete temperature versus time, expressed in units of degree-days or degree-hours. (2015)

fibers, *n*—slender filaments, which may be discrete or in the form of bundles, networks, or strands of natural or manufactured materials that can be distributed uniformly throughout a fresh cementitious mixture. (2018)