



Designation: C51 – 21

## Standard Terminology Relating to Lime and Limestone (as Used by the Industry)<sup>1</sup>

This standard is issued under the fixed designation C51; 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 ( $\epsilon$ ) 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 terminology refers to the terms relating to lime and limestone products as used by the industry.

1.2 Where appropriate, the various terms defined below should be prefixed with one or other of the adjectives “high-calcium,” “magnesian,” or “dolomitic.” (Examples: dolomitic quicklime; high-calcium hydraulic hydrated lime; magnesian or dolomitic limestone.)

1.3 The composition of a limestone should be given in terms of a percentage of the carbonates present. In limestone of interest to the lime industry, it is usually assumed that the material consists almost entirely of carbonates. Where this assumption is not valid, the percentage of noncarbonate material should be determined, and the composition expressed in terms of the carbonate material present.

1.4 For specific application of lime or a limestone product, see the appropriate ASTM specification.

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:*<sup>2</sup>

[C125 Terminology Relating to Concrete and Concrete Aggregates](#)

[C207 Specification for Hydrated Lime for Masonry Purposes](#)

[C270 Specification for Mortar for Unit Masonry](#)

[C602 Specification for Agricultural Liming Materials](#)

[C1707 Specification for Pozzolanic Hydraulic Lime for Structural Purposes](#)

### 3. Terminology

**alkaline earth solutions (AES), *n***—an aqueous solution of the oxide or hydroxide of an element of group IIa in the periodic table, such as calcium or magnesium, which can be strongly alkaline.

**available lime index, *n***—those constituents of a lime which enter into a desired reaction under the conditions of a specific method or process.

**by-product lime, *n***—a variety of calcium or calcium/magnesium compounds, or both, that are usable for specific applications but generally do not meet one or more specifications required of primary lime products.

**DISCUSSION**—Examples include lime kiln dust and lime hydrator rejects. It is advised that the specific compositions, physical properties, performance characteristics, and anticipated variabilities of such materials be evaluated for the service intended.

**calcareous, *adj***—originating from predominately calcium carbonate or one of its derivative forms.

**calcia, *n***—the chemical compound calcium oxide (CaO).

**cement-lime mortar, *n***—cement-lime mortar primarily consists of hydraulic cement, hydrated lime or lime putty, mason’s sand and water.

**DISCUSSION**—These mortars can be specified by proportions or properties indicated in Specification [C270](#).

**dead burned dolomite, *n***—dolomitic limestone that has been heated with or without additives to a temperature sufficiently high and for a long enough time to decompose the carbonate structure so as to form calcium oxide and periclase in a matrix that provides resistance to subsequent hydration and recombination with carbon dioxide.

**dolomitic, *adj***—indicates the presence of 35 to 46 % magnesium carbonate (MgCO<sub>3</sub>) in the limestone from which the material was formed.

**dolomitic limestone, *n***—see **limestone**.

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee [C07](#) on Lime and Limestone and is the direct responsibility of Subcommittee [C07.08](#) on Editorial and Terminology

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<sup>2</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

**fluxing lime**, *n*—a term referring to quicklime used as an agent in the manufacture of steel or glass.

**fluxstone**, *n*—a term referring to limestone (high-calcium, magnesian, or dolomitic) used as an agent in the manufacture of iron and steel or glass.

**high-calcium**, *adj*—indicates the presence of 0 to 5 % magnesium carbonate ( $\text{MgCO}_3$ ) in the limestone from which the material was formed.

*high-calcium limestone*, *n*—see **limestone**.

**hydrated lime**, *n*—a dry powder obtained by treating quicklime with water enough to satisfy its chemical affinity for water under the conditions of its hydration.

DISCUSSION—Hydrated lime consists essentially of calcium hydroxide or a mixture of calcium hydroxide and magnesium hydroxide, or both (see *lime* Discussion).

**hydrated lime, di-hydrated or double**, *n*—dolomitic lime which has been hydrated under greater than atmospheric pressure and contains less than 8 % unhydrated oxides.

**hydrated lime, finishing**, *n*—hydrated lime suitable for use in the finish coat of plaster.

**hydrated lime, hydraulic**, *n*—the hydrated dry cementitious product obtained by calcining a limestone containing silica and alumina to a temperature short of incipient fusion so as to form sufficient free lime ( $\text{CaO}$ ) to permit hydration, and at the same time, leaving unhydrated sufficient calcium silicates to give a dry powder meeting hydraulic property requirements.

**hydrated lime, masons**, *n*—hydrated lime suitable for use for masonry purposes.

**hydrated lime, mono-**, *n*—dolomitic lime which has been hydrated at atmospheric pressure and contains more than 8 % unhydrated oxides.

**hydrated lime, spray**, *n*—a hydrated lime of such fineness that at least 95 % of the particles will pass a 45  $\mu\text{m}$  (No. 325) sieve.

**lime**, *n*—a general term that describes material composed of calcium and magnesium oxides and hydroxides.

DISCUSSION—The chemical forms of calcium oxide ( $\text{CaO}$ ), calcium hydroxide ( $\text{Ca(OH)}_2$ ), magnesium oxide ( $\text{MgO}$ ), or magnesium hydroxide ( $\text{Mg(OH)}_2$ ) alone or in combination may be produced either primarily or as a by-product of materials other than limestone, for example,  $\text{Ca(OH)}_2$  formed by acetylene generation from calcium carbide ( $\text{CaC}_2$ ), water treatment sludges, and so forth.

**lime, air-slaked**, *n*—the product containing various proportions of the oxides, hydroxides, and carbonates of calcium and magnesium which results from the exposure of quicklime to the air in sufficient quantity to show physical signs of hydration (difficult to determine visually in pulverized quicklime).

**lime, building or construction**, *n*—a lime whose chemical and physical characteristics and method of processing make it suitable for the ordinary or special construction uses of the product.

**lime, chemical**, *n*—a quicklime or hydrated lime whose chemical and physical characteristics and method of processing make it suitable for one or more of the many and varied chemical and industrial uses of the product (see *lime* Discussion).

**lime, milk of or slurry**, *n*—a suspension of lime (hydrated or slaked quicklime) in water in such proportions as to resemble milk in appearance (see *lime* Discussion).

**lime mortar**, *n*—a lime putty mixed with an aggregate, suitable for masonry purposes.

**lime putty**, *n*—the product obtained by slaking quicklime with water according to the directions of the manufacturer or by mixing hydrated lime and water to a desired consistency.

**lime, refractory**, *n*—lime (usually dolomitic) that has been extremely hard burned so that it will possess little or no tendency for conversion of the oxides to hydroxides.

**limestone**, *n*—a sedimentary rock consisting primarily of calcium and magnesium carbonates.

DISCUSSION—Limestone may be classified as *dolomitic*, *magnesian*, or *high calcium*.

(1) *dolomitic*—limestone containing from 35 to 46 % magnesium carbonate ( $\text{MgCO}_3$ ).

(2) *magnesian*—limestone containing from 5 to 35 %  $\text{MgCO}_3$ .

(3) *high-calcium*—a limestone containing from 0 to 5 %  $\text{MgCO}_3$ .

**limestone, agricultural**, *n*—ground or pulverized limestone whose calcium and magnesium content is capable

DISCUSSION—Agricultural lime is a very powerful neutralizing agent. Agricultural limestone, often referred to as “aglime” is the predominate material for soil pH adjustment (see Specification C602).

**liming material**, *n*—a general term which includes the various chemical and physical forms of materials such as lime, limestone, mollusk shells, marl, byproduct lime, and slag whose calcium and magnesium compounds are capable of neutralizing acidity.

**magnesia**, *n*—the chemical compound magnesium oxide ( $\text{MgO}$ ).

**magnesian**, *adj*—indicates the presence of 5 to 35 % magnesium carbonate ( $\text{MgCO}_3$ ) in the limestone from which the material was formed.

*magnesian limestone*, *n*—see **limestone**.

**non-volatile**, *adj*—term used to denote the calculated chemical basis of a material in which the volatile fraction of that material is removed, relative to a specific temperature; for example, in lime and limestone, the loss on ignition is considered to be the volatile fraction.

**pH**, *n*—the negative logarithm of the hydrogen ion concentration, which can be greatly affected by temperature, particularly under alkaline conditions. It is therefore important to measure alkaline earth solutions (AES) at a specific recommended temperature of 25 °C.