



Designation: C821 – 09

## Standard Specification for Lime for Use with Pozzolans<sup>1</sup>

This standard is issued under the fixed designation C821; 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.

### 1. Scope\*

1.1 This specification covers all types of commercial hydrated lime such as: high-calcium, magnesium, or dolomitic-hydrated lime. By-product limes and slaked quick limes in dry, wet, or slurried form are also included.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

C25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime

C50 Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products

C51 Terminology Relating to Lime and Limestone (as used by the Industry)

C204 Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus

C593 Specification for Fly Ash and Other Pozzolans for Use With Lime for Soil Stabilization

### 3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to Terminology C51.

3.2 *Definitions of Terms Specific to This Standard:*

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C07 on Lime and Limestone and is the direct responsibility of Subcommittee C07.02 on Specifications and Guidelines.

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<sup>2</sup> 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.

3.2.1 *chemical factor, n*—a numerical value of the active constituents in the hydrated lime that react chemically with a pozzolan. The value is based on the combined calcium oxide equivalents of free calcium oxide, calcium hydroxide, and magnesium oxide. Calcium carbonate and magnesium hydroxide are excluded, since these compounds have been found to be nonreactive.

3.2.2 *pozzolanic receptivity index, n*—a performance factor incorporating both chemical quality and fineness, determined by Eq 3.

### 4. Chemical and Physical Requirements

4.1 The lime shall conform to the requirements listed in Table 1, except as noted in Section 5.

### 5. Performance Requirements

5.1 If the chemical factor, Blaine fineness, or pozzolanic receptivity index is below the limits given in Table 1, the lime shall be required to meet the applicable performance requirements listed in Table 2. Where such lime complies with the limits listed in Table 2, it shall be considered acceptable for use with pozzolans. However, it may be necessary to increase the lime content in the lime-pozzolan mixtures in order to meet minimum design criteria.

### 6. Test Methods

6.1 *Chemical Factor:*

6.1.1 Determine calcium oxide (CaO), magnesium oxide (MgO), and carbon dioxide (CO<sub>2</sub>) contents in accordance with Test Methods C25. When the magnesium oxide content is greater than 5 %, determine the peak height of magnesium oxide and magnesium hydroxide using standard X-ray diffraction procedures and calculate the ratio ( $r$ ) of magnesium oxide to hydroxide using Eq 1. When the magnesium oxide is less than 5 %, the value of  $r$  shall be 0.30.

$$r = \frac{\text{cps MgO}}{\text{cps MgO} + 2.0 (\text{cps Mg}(\text{OH})_2)} \quad (1)$$

where:

cps = counts per second of principal peaks corresponding to an interplanar spacing for MgO of 2.106 Å and for Mg(OH)<sub>2</sub> of 2.365 Å.

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