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**Designation: C 5 – 03**

## Standard Specification for Quicklime for Structural Purposes<sup>1</sup>

This standard is issued under the fixed designation C 5; 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 Department of Defense.*

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<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C-7 C07 on Lime and is the direct responsibility of Subcommittee C07.02 on Structural Lime. Current edition approved Nov. 30, 1979; May 10, 2003. Published January 1980; July 2003. Originally published as C 5 – 13 F; approved in 1913. Last previous edition approved in 1997 as C 5 – 579 (19974).

### 1. Scope

1.1 This specification covers all classes of quicklime such as crushed lime, granular lime, ground lime, lump lime, pebble lime, and pulverized lime, used for structural purposes.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 25 Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime<sup>2</sup>

C 50 Practice for Sampling, Inspection, Packing, and Marking of Lime and Limestone Products<sup>2</sup>

C 51 Terminology Relating to Lime and Limestone (As Used by the Industry)<sup>2</sup>

C 110 Test Methods for Physical Testing of Quicklime, Hydrated Lime, and Limestone<sup>2</sup>

C 1489 Specification of Lime Putty for Structural Purposes<sup>2</sup>

E 11 Specification for Wire-Cloth Sieves for Testing Purposes<sup>3</sup>

### 3. Terminology

3.1 *Definitions*—Unless otherwise specified, for definitions of terms used in this standard, refer to Terminology C 51.

### 4. Chemical Composition

4.1 The quicklime shall conform to the following requirements as to chemical composition, calculated on a nonvolatile basis:

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 14.02.

	Calcium Lime	Magnesium Lime
Calcium oxide, min, %	75	
Magnesium oxide, min, %		20
Calcium and magnesium oxide, min, %	95	95
Silica, alumina, and oxide of iron, max, %	5	5
Carbon dioxide, max, %:		
If sample is taken at place of manufacture	3	3
If sample is taken at any other place	10	10

## 5. Residue

5.1 The quicklime shall contain no more than 15 weight % of residue.

## 6. General Requirements

6.1 Quicklime shall be slaked and aged in accordance with the printed directions of the manufacturer. The resulting lime putty shall be stored until cool.

6.2 Lime putty prepared in accordance with Appendix X1.4.2 and adjusted must conform to standard consistency in accordance with Test Methods C 110, shall show no pops or pits when tested in accordance with Test Methods C 110.

6.3 Lime putty prepared as above shall have a plasticity figure the requirements of not less than 200. Specification C 1489.

## 7. Sampling, Inspection, etc.

7.1 The sampling, inspection, rejection, retesting, packaging, and marking shall be conducted in accordance with Methods C 50.

## 8. Test Methods

8.1 Conformance to chemical requirements shall be determined in accordance with Test Methods C 25.

8.2 Conformance to plasticity and residue requirements shall be determined in accordance with Test Methods C 110.

## 9. Keywords

9.1 building (structural); calcium oxide; dolomitic lime; high calcium lime; lime putty; magnesium oxide; plasticity; quicklime; residue; slaking

## APPENDIX

### (Nonmandatory Information)

#### X1. SLAKING AND PREPARATION OF LIME PUTTY

##### X1.1 Introduction

X1.1.1 Quicklime can never be used as such for structural purposes; it must always be slaked first. Since the method of slaking is an important factor in determining the quality of the finished product, the following directions for the preparation of lime putty are given, not as a part of the specification, but as information for the further protection of the purchaser.

X1.1.2 Different kinds of lime vary considerably in the way in which they behave with water. A little supervision over the operation of slaking will amply pay for itself by ensuring the production of the greatest possible quantity and the best possible quality of putty. To find out how to slake a new lot of lime, it is safest to try a little of it and see how it works. Since different lots of the same brand of lime vary somewhat, and since the weather conditions at the time have a decided influence, it is wise to try a sample from each lot used, whether familiar with the brand or not.

##### X1.2 Classification of Limes

X1.2.1 In a bucket, put two or three lumps of lime about the size of one's fist, or, in the case of granular lime, an equivalent amount. Add sufficient water to just barely cover the lime, and note how long it takes for slaking to begin. Slaking has begun when pieces split off from the lumps or when the lumps crumble. Water of the same temperature should be used for test and field practice.

X1.2.2 If slaking begins in less than 5 min, the lime is quick slaking; from 5 to 30 min, medium slaking; over 30 min, slow slaking.

##### X1.3 Directions for Slaking

X1.3.1 Slake quicklime in accordance with the printed directions of the manufacturer. When such directions are not provided, proceed as follows:

X1.3.2 For quick-slaking lime, always add the lime to the water, not the water to the lime. Have sufficient water at first to cover all the lime completely. Have a plentiful supply of water available for immediate use—a hose throwing a good stream, if possible. Watch the lime constantly. At the slightest appearance of escaping steam, hoe thoroughly and quickly, and add enough water to stop the steaming. Do not be afraid of using too much water with this kind of lime.

X1.3.3 For medium-slaking lime, add the water to the lime. Add enough water so that the lime is about half submerged. Hoe occasionally if steam starts to escape. Add a little water now and then if necessary to prevent the putty from becoming dry and crumbly. Be careful not to add any more water than required, and not too much at a time.

X1.3.4 For slow-slaking lime, add enough water to the lime to moisten it thoroughly. Let it stand until the reaction has started. Cautiously add more water, a little at a time, taking care that the mass is not cooled by the fresh water. Do not hoe until the slaking is practically complete. If the weather is very cold, it is preferable to use hot water, but if this is not available, the mortar box may be covered in some way to retain the heat.

#### **X1.4 Preparation of Putty for Use**

X1.4.1 After slaking, prepare putty for use as follows:

X1.4.2 *White Coat*— After slaking and aging finishing quicklime in accordance with the printed directions of the manufacturer, store the putty until cool. If no printed directions are provided by the manufacturer, prepare the putty for use as follows: After the action has ceased, run off the putty through a No. 10 (2.00-mm) sieve conforming to Specification E 11, and store for a minimum of 2 weeks.

X1.4.3 *Base Coats*— After the action has ceased, run off the putty through a No. 8 (2.36-mm) sieve conforming to Specification E 11. Add sand up to equal parts by weight, all of the hair or other fibers required, and store for a minimum of 2 weeks.

X1.4.4 *Masons' Mortar*— After the action has ceased, add part or all of the sand required, and store for a minimum of 24 h.

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