



Designation: **C1384—17 C1384 – 18**

## Standard Specification for Admixtures for Masonry Mortars<sup>1</sup>

This standard is issued under the fixed designation C1384; 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.

### 1. Scope\*

1.1 This specification pertains to admixtures for masonry mortars. Admixtures are substances other than Specification **C270** prescribed materials of water, aggregate, and cementitious materials that are used to improve one or more of the recognized desirable properties of conventional masonry mortar.

1.2 This specification does not cover coloring pigments.

NOTE 1—Information on coloring pigments can be found in Specification **E979C979/C979M**.

1.3 This specification does not cover additives that are added to the cementitious materials during the manufacture of the cementitious materials.

1.4 Acceptance of an admixture is based on its performance in an admixed mortar. Acceptance of the admixed masonry mortar is based on attainment of performance either equivalent to that required for conventional mortar or improved performance of one or more indicated properties, while maintaining required performance levels for other properties.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

NOTE 2—The testing laboratory performing the test methods referenced in this specification should be evaluated in accordance with Practice **C1093**.

1.6 *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>

**E91** Specification for Masonry Cement

**C144** Specification for Aggregate for Masonry Mortar

**E150** Specification for Portland Cement

**E207** Specification for Hydrated Lime for Masonry Purposes

**C270** Specification for Mortar for Unit Masonry

**C305** Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

**C403/C403M** Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance

**E595** Specification for Blended Hydraulic Cements

**C723** Practice for Chemical-Resistant Resin Grouts for Brick or Tile

**E778** Specification for Standard Sand

**C780** Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

**E979C979/C979M** Specification for Pigments for Integrally Colored Concrete

**C1072** Test Methods for Measurement of Masonry Flexural Bond Strength

**C1093** Practice for Accreditation of Testing Agencies for Masonry

**C1152/C1152M** Test Method for Acid-Soluble Chloride in Mortar and Concrete

**E1157** Performance Specification for Hydraulic Cement

**C1180** Terminology of Mortar and Grout for Unit Masonry

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee **C12** on Mortars and Grouts for Unit Masonry and is the direct responsibility of Subcommittee **C12.03** on Specifications for Mortars.

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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.

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

[C1218/C1218M Test Method for Water-Soluble Chloride in Mortar and Concrete](#)  
[C1329 Specification for Mortar Cement](#)  
[C1403 Test Method for Rate of Water Absorption of Masonry Mortars](#)  
[C1437 Test Method for Flow of Hydraulic Cement Mortar](#)

### 3. Terminology

3.1 Terminology defined in Terminology [C1180](#) shall apply for this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *admixed mortar, n*—masonry mortar that deviates from those combinations of materials recognized by Specification [C270](#) in that it also contains an admixture.

3.2.2 *admixture, n*—substance other than the Specification [C270](#) prescribed materials of water, aggregate, and cementitious materials that is added to a masonry mortar to modify one or more properties of the conventional masonry mortar.

3.2.3 *bond enhancer, n*—admixture used to increase the bond strength between the masonry mortar and the masonry unit.

3.2.4 *reference mortar, n*—mortar of the same composition as an admixed mortar except that the reference mortar does not include the admixture and may contain a different amount of water to obtain an equivalent flow or penetration as the admixed mortar.

3.2.5 *set accelerator, n*—admixture used to shorten the time of setting of a masonry mortar.

3.2.6 *set retarder, n*—admixture used to lengthen the time of setting of a masonry mortar.

3.2.7 *water repellent, n*—admixture used to decrease the rate of water absorption of the hardened masonry mortar.

3.2.8 *workability enhancer, n*—admixture used in a masonry mortar to increase the ease of being worked and used.

3.2.8.1 *Discussion*—

Workability is a combination of several properties, including: plasticity, consistency, cohesion, adhesion, water retentivity, setting characteristics, and its capacity to remain satisfactory under the influence of masonry unit suction and ambient environmental conditions. Many of these properties have defied exact laboratory measurement. The mason can best assess workability by observing the response of the mortar to the trowel and the masonry unit. For further discussion on workability, see the Appendix of Specification [C270](#).

### 4. Classification

4.1 Admixtures are classified by their effect on the performance characteristics of conventional masonry mortars. Admixed mortars are classified by their modified properties, as compared to a reference mortar. The following classifications are recognized:

4.1.1 Bond Enhancer.

4.1.2 Workability Enhancer.

4.1.3 Set Accelerator.

4.1.4 Set Retarder.

4.1.5 Water Repellent.

### 5. Materials

5.1 ~~*Cements—Cementitious Materials*~~—~~The cement used in the evaluation of the admixture—Cementitious materials shall conform to applicable requirements specified—those allowed in [5.1.1—5.1.5](#).~~ Specification [C270](#) for proportion specification mortars.

5.1.1 ~~*Cement, Portland*~~—When the admixture is evaluated in a mortar containing portland cement, the portland cement shall conform to the requirements for Type I, IA, H, HA, III, or IIIA of Specification [C150](#).

5.1.2 ~~*Cement, Blended Hydraulic*~~—When the admixture is evaluated in a mortar containing blended hydraulic cement, the blended hydraulic cement shall conform to the requirements for Type IS, IS-A, IP, IP-A, I(PM) or I(PM)-A of Specification [C595](#).

5.1.3 ~~*Cement, Hydraulic*~~—When the admixture is evaluated in a mortar containing a hydraulic cement, the hydraulic cement shall conform to the requirements for Type GU, HE, MS, HS, MH, or LH of Specification [C1157](#).

5.1.4 ~~*Cement, Masonry*~~—When the admixture is evaluated in a mortar containing a masonry cement, the masonry cement shall conform to the requirements of Specification [C91](#).

5.1.5 ~~*Cement, Mortar*~~—When the admixture is evaluated in a mortar containing a mortar cement, the mortar cement shall conform to the requirements of Specification [C1329](#).

5.2 ~~*Lime*~~—When the admixture is evaluated in a cement-lime mortar, the hydrated lime shall conform to Specification [C207](#).

5.2 ~~*Sand*~~—The fine aggregate used in the tests will vary dependent on the test procedure. shall conform to the requirements of Specification [C144](#). The sand used in preparing the mortars for all tests shall be from the same delivery.

5.3.1 Sands used for soluble chloride, flexural bond strength and rate of water absorption tests shall be a blend of equal parts by weight of graded standard sand and standard 20-30 sand conforming with Specification **C778**.

5.3.2 Sands used for compressive strength, water retention, determination of air content of plastic mortar, board life, and time of setting tests shall conform to the requirements of Specification **C144**.

## 6. Chemical Composition

6.1 The admixture shall not react adversely with embedded or attached materials common to masonry.

NOTE 3—Currently, there is no standard test method for determining the corrosion potential of masonry mortars toward embedded and attached materials. Nonetheless, the admixture shall not be offered for sale if the manufacturer has evidence that the admixture does react adversely with embedded or attached materials common to masonry.

6.2 At the maximum recommended dosage, the mortar admixture shall add not more than 65 ppm (0.0065 %) water-soluble chloride, or 90 ppm (0.0090 %) acid-soluble chloride to the mortar’s overall chloride content as determined by testing of the reference and admixed mortars in accordance with **9.1.1**.

## 7. Physical Properties

7.1 All modified masonry mortars shall comply with the property specification requirements of Specification **C270**. In addition, the admixed mortars shall conform to all of the specific classification requirements in **Table 1** for which the admixture is obtaining qualification. Unless more specimens are required by a specific test method, a minimum of three specimens shall be tested and the results averaged. These result averages shall meet the requirements of this section.

7.2 Admixture compliance tests shall be the responsibility of the manufacturer of the admixture. These compliance tests shall be completed within the past five (5) years and prior to any admixture composition change.

## 8. Mortar Types and Proportions

8.1 Design the reference mortar to be a specific type of cement/lime, mortar cement, or masonry cement mortar in conformance with the proportion specification of Specification **C270** except that the aggregate ratio shall be fixed at three times the sum of the separate volumes of cementitious materials. In addition, the aggregate shall meet the requirements in **5.35.2**.

**TABLE 1 Physical Requirements<sup>A</sup>**

	Bond Enhancer	Workability Enhancer	Set Accelerator	Set Retarder	Water Repellent
Compressive strength, min % of reference:					
7 day	80	80	80	70	80
28 day	80	80	80	80	80
Water retention, min % of reference:	report	100	report	report	report
Air content of plastic mortar, %	report	report	report	report	report
Board life, min % of reference	report	120	report	120	report
Time of setting <sup>B</sup> , allowable deviation from reference, h: min:					
Initial: at least	...	...	1:00 earlier	1:00 <sup>C</sup> later	...
not more than	1:00 earlier nor 1:30 later	1:00 earlier nor 3:30 later	3:30 earlier	8:00 <sup>C</sup> later	1:00 earlier nor 1:30 later
Final: at least	...	...	1:00 earlier	...	...
not more than	1:00 earlier nor 1:30 later	1:00 earlier nor 3:30 later	...	8:00 <sup>C</sup> later	1:00 earlier nor 1:30 later
Flexural bond strength, min % of reference	110	...	...	...	...
Rate of water absorption max % of reference 24 h; 28 days	...	...	...	...	50

<sup>A</sup> The values in the table include allowance for normal variation in test results. In addition to meeting the requirements in this table, all admixed mortars must meet the property requirements of Specification **C270**.

<sup>B</sup> All time of setting tests shall be performed at 23 ± 3°C (73.4 ± 5.4°F), except those for set accelerators, which shall be performed at 5 ± 2°C (41 ± 3.6°F) as specified in **9.1.5**.

<sup>C</sup> The manufacturer’s maximum recommended dosage rate shall be used when testing the initial and final set times for a set retarder.