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Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete¹

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1. Scope*

1.1 This specification covers the production, properties, packaging, and testing of packaged, dry, combined materials for concrete and mortars. The types of concrete and mortar covered are described in the following paragraphs in this section. Some of the mixtures covered by this specification may not be available in some areas.

1.1.1 *High-Early Strength Concrete*—For concrete building and repair jobs requiring a more rapid strength development such as required for the earlier removal of forms.

1.1.2 *Normal Strength Concrete*:

1.1.2.1 *Normal Weight Concrete*—For general concrete building and repair jobs where thicknesses exceed 50 mm [2 in.]. Typical uses include building or repairing sidewalks, patios, steps, footings, and for setting posts.

1.1.2.2 *Lightweight Concrete Using Normal Weight Sand*—For concrete building and repair jobs where lower concrete weights are desirable. These mixtures will produce concrete which is about 15 to 25 % lighter in weight than normal weight concrete.

1.1.2.3 *Lightweight Concrete*—For concrete building and repair jobs where the lightest concrete weight is desirable. These mixtures will produce concrete which is about 25 to 35 % lighter in weight than normal weight concrete.

1.1.3 *High-Strength Mortar*—For general concrete work requiring thicknesses of less than 50 mm [2 in.] or where a high-strength grout mixture is required. Typical uses include topping, patching, and stuccoing. Often referred to as *sand mix*.

1.1.4 *Mortars for Unit Masonry*—For laying brick, block, and stone, and for masonry repairs. The following three types of masonry mortar are covered:

1.1.4.1 *Type N*—For general masonry work requiring normal mortar properties.

1.1.4.2 *Type S*—For use where a higher strength masonry mortar is required.

1.1.4.3 *Type M*—For use where the highest strength masonry mortar is required.

1.2 The values stated in either SI or inch-pound units shall be regarded separately as standard. The values stated in each system are not exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.3 The following safety hazards caveat pertains only to the test method portion of this specification. *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*:²

C 33 Specification for Concrete Aggregates

C 39/C 39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C 91 Specification for Masonry Cement

C 109/C 109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

C 138/C 138M Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

C 143/C 143M Test Method for Slump of Hydraulic-Cement Concrete

C 144 Specification for Aggregate for Masonry Mortar

C 150 Specification for Portland Cement

C 173/C 173M Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 185 Test Method for Air Content of Hydraulic Cement Mortar

C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C 207 Specification for Hydrated Lime for Masonry Purposes

C 231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

¹ This specification is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.43 on Packaged Dry Combined Materials.

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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.

- C 260** Specification for Air-Entraining Admixtures for Concrete
- C 270** Specification for Mortar for Unit Masonry
- C 305** Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency
- C 330** Specification for Lightweight Aggregates for Structural Concrete
- C 494/C 494M** Specification for Chemical Admixtures for Concrete
- C 595** Specification for Blended Hydraulic Cements
- C 618** Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- C 702** Practice for Reducing Samples of Aggregate to Testing Size
- C 989** Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- C 1157** Performance Specification for Hydraulic Cement
- C 1240** Specification for Silica Fume Used in Cementitious Mixtures
- C 1329** Specification for Mortar Cement
- C 1437** Test Method for Flow of Hydraulic Cement Mortar
- C 1438** Specification for Latex and Powder Polymer Modifiers for Hydraulic Cement Concrete and Mortar
- C 1506** Test Method for Water Retention of Hydraulic Cement-Based Mortars and Plasters
- E 96/E 96M** Test Methods for Water Vapor Transmission of Materials

4.1.3 *Blended Cement*, shall conform to Specification **C 595** or Performance Specification **C 1157**.

4.1.4 *Chemical Admixtures*, shall conform to Specification **C 494/C 494M**.

4.1.5 *Flyash*, shall conform to Specification **C 618**.

4.1.6 *Ground Granulated Blast-Furnace Slag*, shall conform to Specification **C 989**.

4.1.7 *Hydrated Lime*, shall conform to Type S or Type SA of Specification **C 207**.

4.1.8 *Latex and Powder Polymer Modifiers*, shall conform to Specification **C 1438**.

NOTE 1—Type II latex polymers should not be used in applications that may be more than superficially wet in service.

4.1.9 *Masonry Cement*, shall conform to Specification **C 91**.

4.1.10 *Mortar Cement*, shall conform to Specification **C 1329**.

4.1.11 *Portland Cement*, shall conform to Type I, IA, II, IIA, III or IIIA of Specification **C 150**.

4.1.12 *Silica Fume*, shall conform to Specification **C 1240**.

5. Preparation of Aggregate

5.1 All aggregates shall be dried, without disintegration, to a moisture content of less than 0.1 mass %, computed on material dried substantially to constant mass % at 105 to 110 °C [221 to 230 °F].

6. Proportioning

6.1 The proportions of cementitious material and aggregate shall be such that the strength requirements will be met when an amount of mixing water is used that produces for concrete the slump specified in **12.2** and for mortar the flow specified in **14.2**.

7. Physical Properties

7.1 Packaged, dry, combined materials for concrete, high strength mortar, and mortar for use with unit masonry shall conform to the respective physical requirements as given in **Table 1** for the material specified when the prescribed amount of water is added.

3. Ordering Information

3.1 The purchaser shall specify the material desired as concrete, high strength mortar, or mortar for use with unit masonry, and the respective physical requirements as specified in **Table 1** shall govern.

4. Materials

4.1 Materials used as ingredients in packaged, dry, combined materials for mortar and concrete shall conform to at least one of the following requirements:

4.1.1 *Aggregates*, shall conform to Specification **C 33**, Specification **C 144**, or Specification **C 330**.

4.1.2 *Air-Entraining Admixtures*, shall conform to Specification **C 260**.

TABLE 1 Physical Requirements

Kind of Material	Compressive Strength, MPa [psi] min		
	3 days	7 days	28 days
<i>Concrete:</i>			
High-early strength	17.0 [2500]	24.0 [3500]	...
Normal strength:			
Normal weight	...	17.0 [2500]	24.0 [3500]
Lightweight using normal weight sand ^A	...	17.0 [2500]	24.0 [3500]
Lightweight	...	17.0 [2500]	24.0 [3500]
<i>Mortar:</i>			
High-strength mortar		20.0 [3000]	35.0 [5000]
Mortar for unit masonry:			
Type M	Shall comply with property requirements of Specification C 270 ^E		
Type S			
Type N			

^A Lightweight concrete using normal weight sand may contain some portion of lightweight fines.

^EThe performance requirements for 28-day compressive strength, water retention, and air content are those for mortars made from masonry cement unless otherwise specified. Manufacturers wishing to comply with the air content requirements for mortar-cement mortar or cement-lime mortar must specify the ingredients used and comply with the applicable portions of Specification **C 270**.