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.

Designation: C1646/C1646M – 16

Standard Practice for Making and Curing Test Specimens for Evaluating Resistance of Coarse Aggregate to Freezing and Thawing in Air-Entrained Concrete[1]

This standard is issued under the fixed designation C1646/C1646M; 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.

1. Scope*

1.1 This practice covers procedures for making and curing test specimens for evaluating resistance of normal-weight coarse aggregates to freezing and thawing in air-entrained concrete in accordance with Test Method C666/C666M, Procedure A or B.

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

1.3 *This practice does not purport to address all 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.* (**Warning**—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged use.[2])

2. Referenced Documents

2.1 *ASTM Standards:*[3]

C33 Specification for Concrete Aggregates

C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C125 Terminology Relating to Concrete and Concrete Aggregates

C143/C143M Test Method for Slump of Hydraulic-Cement Concrete

C150 Specification for Portland Cement

C173/C173M Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C490 Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete

C494/C494M Specification for Chemical Admixtures for Concrete

C666/C666M Test Method for Resistance of Concrete to Rapid Freezing and Thawing

D75 Practice for Sampling Aggregates

2.2 *ACI Standard:*[4]

211.1 Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to Terminology C125.

4. Significance and Use

4.1 This practice provides standard requirements for proportioning concrete, and for preparing and conditioning test specimens suitable for evaluating the durability of coarse aggregate in air-entrained concrete subjected to freezing and thawing in accordance with Test Method C666/C666M.

4.2 Concrete having an adequate air-void system may not be resistant to freezing and thawing if it contains coarse aggregate that becomes critically saturated. An aggregate particle is considered to be critically saturated when there is insufficient unfilled pore space to accommodate the expansion of water that accompanies the freezing.

[1] This practice is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.67 on Resistance to the Environment.

Current edition approved June 1, 2016. Published June 2016. Originally approved in 2007. Last previous edition approved in 2008 as C1646/C1646M – 8a. DOI: 10.1520/C1646_C1646M-16.

[2] Section on Safety Precautions, Manual of Aggregate and Concrete Testing, *Annual Book of ASTM Standards*, Volume 04.02.

[3] 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.

[4] Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, http://www.aci-int.org.

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

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