



Designation: C 215 – ~~97~~^{ε1} 02

Standard Test Method for Fundamental Transverse, Longitudinal, and Torsional Resonant Frequencies of Concrete Specimens¹

This standard is issued under the fixed designation C 215; 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.

^{ε1} NOTE—The values for “cylinder” and “prism” in 9.1 were editorially corrected in April 1999.

¹ This test method is under the jurisdiction of ASTM Committee C-9 C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.64 on Nondestructive and In-Place Testing.

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1. Scope *

1.1 This test method covers measurement of the fundamental transverse, longitudinal, and torsional resonant frequencies of concrete prisms and cylinders for the purpose of calculating dynamic Young’s modulus of elasticity, the dynamic modulus of rigidity (sometimes designated as “the modulus of elasticity in shear”), and dynamic Poisson’s ratio.

1.2 Values in SI units are the 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:*

C 31/C 31M Practice for Making and Curing Concrete Test Specimens in the Field²

C 42/C 42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete²

~~C 192 Practice for Making 125 Terminology Relating to Concrete and Curing Concrete Test Specimens in the Laboratory Aggregates²~~

C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory²

C 469 Test Method for Static Modulus Elasticity and Poisson’s Ratio of Concrete in Compression²

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials²

E 1316 Terminology for Nondestructive Examinations³

3. Terminology

3.1 *Definitions*—Refer to Terminology C 125 and the section related to ultrasonic examination in Terminology E 1316 for definitions of terms used in this test method.

4. Summary of Test Method

34.1 The fundamental resonant frequencies are determined using one of two alternative procedures: (1) the forced resonance method or (2) the impact resonance method. ~~The same~~ Regardless of which testing procedure is selected, the same procedure is to be used for all specimens of an associated series.

34.2 In the forced resonance method, a supported specimen is forced to vibrate by an electro-mechanical driving unit. The specimen response is monitored by a lightweight pickup unit on the specimen. The driving frequency is varied until the measured specimen response reaches a maximum amplitude. The value of the frequency causing maximum response is the resonant frequency of the specimen. The fundamental frequencies for the three different modes of vibration are obtained by proper location of the driver and the pickup unit.

² Annual Book of ASTM Standards, Vol 04.02.

³ Annual Book of ASTM Standards, Vol 03.03.

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