



Standard Test Method for Determining the Effects of Chemical Admixtures on the Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments¹

This standard is issued under the fixed designation G 109; 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 (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—Paragraph 1.2 was corrected editorially in August 2000.

1. Scope

1.1 This test method describes a procedure for determining the effects of chemical admixtures on the corrosion of metals in concrete. This test method can be used to evaluate materials intended to inhibit chloride-induced corrosion of steel in concrete. It can also be used to evaluate the corrosivity of admixtures in a chloride environment.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units in parentheses are provided for information only.

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:

- A 615/A 615M Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement²
- C 33 Specification for Concrete Aggregates³
- C 143/C 143M Test Method for Slump of Hydraulic Cement Concrete³
- C 150 Specification for Portland Cement⁴
- C 173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method³
- C 192/C 192M Practice for Making and Curing Concrete Test Specimens in the Laboratory³
- C 231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method³
- C 511 Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes⁴

C 876 Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete³

C 881 Specification for Epoxy-Resin-Base Bonding Systems for Concrete³

C 1152/C 1152M Test Method for Acid-Soluble Chloride in Mortar and Concrete³

D 448 Classification for Sizes of Aggregate for Road and Bridge Construction⁵

D 632 Specification for Sodium Chloride⁵

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁶

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁶

G 3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing⁷

G 15 Terminology Relating to Corrosion and Corrosion Testing⁷

G 33 Practice for Recording Data from Atmospheric Corrosion Tests of Metallic-Coated Steel Specimens⁷

G 46 Guide for Examination and Evaluation of Pitting Corrosion⁷

2.2 NACE Standards:

SSPC SP 5 (NACE No. 1) White Metal Blast Cleaning⁸

3. Significance and Use

3.1 This test method provides a reliable means for predicting the inhibiting or corrosive properties of admixtures to be used in concrete.

3.2 This test method is useful for development studies of corrosion inhibitors to be used in concrete.

3.3 This test method has been used elsewhere with good agreement between corrosion as measured by this test method and corrosion damage on the embedded steel.^{9,10,11,12} This test

¹ This test method is under the jurisdiction of ASTM Committee G-1 on Corrosion, Deterioration, and Degradation of Materials and is the direct responsibility of Subcommittee G01.14 on Corrosion of Reinforcing Steel.

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² Annual Book of ASTM Standards, Vol 01.04.

³ Annual Book of ASTM Standards, Vol 04.02.

⁴ Annual Book of ASTM Standards, Vol 04.01.

⁵ Annual Book of ASTM Standards, Vol 04.03.

⁶ Annual Book of ASTM Standards, Vol 14.02.

⁷ Annual Book of ASTM Standards, Vol 03.02.

⁸ Available from Structural Steel Painting Council, Pittsburgh, PA.

⁹ Berke, N. S., Shen, D. F., and Sundberg, K. M., "Comparison of the Polarization Resistance Technique to the Macrocell Corrosion Technique," *Corrosion Rates of Steel in Concrete*, ASTM STP 1065, N. S. Berke, V. Chaker, and D. Whitney, editors, ASTM, August 1990, pp. 38–51.