



Designation: D8370 – 22

Standard Test Method for Field Measurement of Electrochemical Impedance on Coatings and Linings¹

This standard is issued under the fixed designation D8370; 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 test method covers the procedure for field measurement of electrochemical impedance spectroscopy (EIS) for polymeric coatings over conductive substrates.

1.2 This test method covers the parameters for determining an adequate sample size.

1.3 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:²

D16 Terminology for Paint, Related Coatings, Materials, and Applications

D610 Practice for Evaluating Degree of Rusting on Painted Steel Surfaces

D660 Test Method for Evaluating Degree of Checking of Exterior Paints

D661 Test Method for Evaluating Degree of Cracking of Exterior Paints

D714 Test Method for Evaluating Degree of Blistering of Paints

G3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing

G106 Practice for Verification of Algorithm and Equipment for Electrochemical Impedance Measurements

G193 Terminology and Acronyms Relating to Corrosion

G215 Guide for Electrode Potential Measurement

2.2 ISO Standards:³

ISO 16773-1 Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens—Part 1: Terms and definitions

ISO 16773-2 Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens—Part 2: Collection of data

ISO 16773-3 Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens—Part 3: Processing and analysis of data from dummy cells

ISO 16773-4 Electrochemical impedance spectroscopy (EIS) on coated and uncoated metallic specimens—Part 4: Examples of spectra of polymer-coated and uncoated specimens

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminologies **G193** and **D16**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *test area, n*—total area of the coating surface within a pair of test cells.

3.2.2 *test location, n*—discrete physical location(s) selected on each structure for performing the electrochemical impedance spectroscopy (EIS) measurements.

4. Significance and Use

4.1 This test method is suitable for in-service condition assessment and quality control (QC) testing.

4.2 This technique is used to investigate a polymer barrier coating over a conductive substrate and is limited to exposed and accessible coating surfaces.

¹ This test method is under the jurisdiction of ASTM Committee **D01** on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee **D01.48** on Durability of Pipeline Coating and Linings.

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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.

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <https://www.iso.org>.