



Standard Guide for Electrochemical Noise Measurement¹

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1. Scope

1.1 This guide covers the procedure for conducting online corrosion monitoring of metals by the use of the electrochemical noise technique. Within the limitations described, this technique can be used to detect localized corrosion activity and to estimate corrosion rate on a continuous basis without removal of the monitoring probes from the plant or experimental cell.

1.2 This guide presents briefly some generally accepted methods of analyses that are useful in the interpretation of corrosion test results.

1.3 This guide does not cover detailed calculations and methods; rather it covers a range of approaches that have found application in corrosion testing.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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

- G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens
- G3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing
- G4 Guide for Conducting Corrosion Tests in Field Applications
- G5 Reference Test Method for Making Potentiodynamic Anodic Polarization Measurements

¹ This guide is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.11 on Electrochemical Measurements in Corrosion Testing.

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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.

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

G16 Guide for Applying Statistics to Analysis of Corrosion Data

G31 Guide for Laboratory Immersion Corrosion Testing of Metals

G46 Guide for Examination and Evaluation of Pitting Corrosion

G59 Test Method for Conducting Potentiodynamic Polarization Resistance Measurements

G61 Test Method for Conducting Cyclic Potentiodynamic Polarization Measurements for Localized Corrosion Susceptibility of Iron-, Nickel-, or Cobalt-Based Alloys

G96 Guide for Online Monitoring of Corrosion in Plant Equipment (Electrical and Electrochemical Methods)

G102 Practice for Calculation of Corrosion Rates and Related Information from Electrochemical Measurements

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

3. Terminology

3.1 *Definitions*—The terminology used herein, if not specifically defined otherwise, shall be in accordance with Terminology G15. Definitions provided herein and not given in Terminology G15 are limited only to this guide.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *coupling current, n*—measured current flowing between two electrodes in an electrolyte coupled by an external circuit.

3.2.2 *current measuring device, n*—device that is capable of measuring the current flow across the electrode/electrolyte interface or the coupling current of a pair of electrodes, usually a zero resistance ammeter (ZRA) or current-to-voltage converter.

3.2.3 *electrochemical current noise measurement, n*—electrochemical noise measurement using an electrochemical current signal.

3.2.4 *electrochemical noise measurement (ENM), n*—technique involving the acquisition and analysis of electrochemical current and potential signals.

³ The last approved version of this historical standard is referenced on www.astm.org.