



Standard Practice for Conducting Wire-on-Bolt Test for Atmospheric Galvanic Corrosion¹

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1. Scope

1.1 This practice covers the evaluation of atmospheric galvanic corrosion of any anodic material that can be made into a wire when in contact with a cathodic material that can be made into a threaded rod.

1.2 When certain materials are used for the anode and cathode, this practice has been used to rate the corrosivity of atmospheres.

1.3 The wire-on-bolt test was first described in 1955 (1),² and has since been used extensively with standard materials to determine corrosivity of atmospheres under the names CLIMAT Test (Classify Industrial and Marine Atmospheres) (2-5) and ATCORR (Atmospheric CORrosivity) (6-9).

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:³

G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

G3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)⁴

G16 Guide for Applying Statistics to Analysis of Corrosion Data

G50 Practice for Conducting Atmospheric Corrosion Tests on Metals

G82 Guide for Development and Use of a Galvanic Series for Predicting Galvanic Corrosion Performance

G84 Practice for Measurement of Time-of-Wetness on Surfaces Exposed to Wetting Conditions as in Atmospheric Corrosion Testing

G91 Practice for Monitoring Atmospheric SO₂ Deposition Rate for Atmospheric Corrosivity Evaluation

G92 Practice for Characterization of Atmospheric Test Sites

G104 Test Method for Assessing Galvanic Corrosion Caused by the Atmosphere (Withdrawn 1998)⁴

3. Terminology

3.1 For definitions of terms used in this practice, refer to Terminology G15. For conventions related to this method, refer to Practice G3.

4. Summary of Practice

4.1 The practice consists of wrapping a wire of the anode material around the threads of a bolt or threaded rod of the cathode material, exposing the assembly to atmosphere, and determining mass loss of the anode wire after exposure. Reference specimens of the anode wire on a threaded, non-conductive, non-porous rod are used to separate general and crevice corrosion effects from galvanic corrosion effects.

5. Significance and Use

5.1 The small size of the wire compared to the short galvanic interaction distance in atmospheric exposures gives a large cathode-to-anode area ratio which accelerates the galvanic attack. The area between the wire and the threads creates a long, tight crevice, also accelerating the corrosion. For these reasons, this practice, with a typical exposure period of 90 days, is the most rapid atmospheric galvanic corrosion test,

¹ This practice is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.04 on Atmospheric Corrosion.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

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