



Standard Guide for Laboratory Simulation of Corrosion Under Insulation¹

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1. Scope

1.1 This guide covers the simulation of corrosion under insulation (CUI), including both general and localized attack, on insulated specimens cut from pipe sections exposed to a corrosive environment usually at elevated temperature. It describes a CUI exposure apparatus (hereinafter referred to as a CUI-Cell), preparation of specimens, simulation procedures for isothermal or cyclic temperature, or both, and wet/dry conditions, which are parameters that need to be monitored during the simulation and the classification of simulation type.

1.2 The application of this guide is broad and can incorporate a range of materials, environments and conditions that are beyond the scope of a single test method. The apparatus and procedures contained herein are principally directed at establishing acceptable procedures for CUI simulation for the purposes of evaluating the corrosivity of CUI environments on carbon and low alloy pipe steels, and may possibly be applicable to other materials as well. However, the same or similar procedures can also be utilized for the evaluation of (1) CUI on other metals or alloys, (2) anti-corrosive treatments on metal surfaces, and (3) the potential contribution of thermal insulation and its constituents on CUI. The only requirements are that they can be machined, formed or incorporated into the CUI-Cell pipe configuration as described herein.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:²

A106/A106M Specification for Seamless Carbon Steel Pipe for High-Temperature Service

C552 Specification for Cellular Glass Thermal Insulation

C871 Test Methods for Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate, and Sodium Ions

D1193 Specification for Reagent Water

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

G3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing

G5 Reference Test Method for Making Potentiodynamic Anodic Polarization Measurements

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

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

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

3. Terminology

3.1 The terminology used herein, if not specifically defined otherwise, shall be construed to be in accordance with Terminology G15.

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.

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