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Test Method for Assessing the Impact of an Insulation Material on Corrosion Under Insulation

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Foreword

This AMPP standard test method provides a comprehensive methodology to evaluate the relative performance of insulation materials in accelerated and simulated field conditions on bare metal substrates. This test method is intended for use by corrosion control personnel, design engineers, project managers, purchasing personnel, and construction engineers and managers. It is applicable to insulated piping and equipment in industrial applications such as oil and gas gathering, distribution, transmission and refining, power generation, mining, and chemical industries.

Rationale

Corrosion Under Insulation (CUI) test methods currently available in industry do not seem to mimic the field conditions and are based on a pass-fail criterion conducted for a fixed exposure time, unsuitable for assessing the impact of insulation materials on corrosion under insulation. This standard provides a comprehensive test methodology to simulate field conditions of an insulation system (insulation and metal jacket) in order to establish the performance of the insulation in service.

Referenced Standards and Other Consensus Documents

Unless specifically dated, the latest edition, revision, or amendment of the documents listed in the table below shall apply.

AMPP/NACE/SSPC* [*www.ampp.org*](http://www.ampp.org)*:	
NACE SP0198	Control of Corrosion Under Thermal Insulation and Fireproofing Materials—A Systems Approach
SSPC VIS 3	Guide and Reference Photographs for Steel Substrates prepared by Power and Hand Tool Cleaning
SSPC-SP 5/NACE No. 1	White Metal Blast Cleaning
ASTM International,* [*www.astm.org*](http://www.astm.org)*:	
ASTM C1193	Standard Guide for Use of Joint Sealants
ASTM D610	Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM G1	Standard Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens
ASTM G46	Standard Guide for Examination and Evaluation of Pitting Corrosion
International Organization for Standardization (ISO)* [*www.iso.org*](http://www.iso.org)*:	
ISO 10289	Methods for Corrosion Testing of Metallic and Other Inorganic Coatings on Metallics Substrates – Rating of Test Specimens and Manufactured Articles Subjected to Corrosion Tests
ISO 8501-1	Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings

In AMPP standards, the terms *shall* and *must* are used to state requirements and are considered mandatory. The term *should* is used to state something that is recommended, but is not considered mandatory. The term *may* is used to state something considered optional.

Section 1: Scope

1.1 This test method provides a methodology for assessing the impact of thermal insulation on the corrosion rate of a metal substrate under atmospheric conditions.

1.2 This standard test method defines four different CUI temperature conditions (as detailed in Paragraph 5.1) for the evaluation of the effects of insulation materials on the corrosion of the metal substrate beneath the insulation.

1.3 The test method is intended to standardize test procedures used in determining the impact of the insulation properties on the corrosion rate and severity.

1.4 The test method provides a means to evaluate insulation materials under various conditions that can lead to corrosion under insulation (CUI).

1.5 The test method can be used to determine the relative influence of different insulation materials on CUI.

1.6 Thermal Insulative Coatings are not within the scope of this test method, and this test method should not be used to assess their corrosion performance.

Section 2: Definitions

Cycle: A cycle is defined as one wet/dry event and one hot/cold temperature event.

End-User: The entity ultimately receiving and/or utilizing the results of the test.

Pipe Spool: An individual section of pipe that will be used for testing the impact of insulation material on the corrosion of the uncoated pipe surface. It will be referred to as "spool" throughout this document.

Segment: Two or more spools connected longitudinally in order to perform testing on multiple samples concurrently in a single vessel.

Vessel: The container in which spools are mounted in order to perform wet/dry cycle testing.

Section 3: Objectives of This Standard Test Method

3.1 This standard test method does not contain defined pass/fail criteria. Instead, this test method is to be used as a means of establishing the relative performance of an insulation given the test criteria.

3.2 The design of the test method is based on an approach that is representative of accelerated corrosive field conditions under insulation.

3.3 The test methods are designed to replicate severe degradative but realistic conditions under insulation in an accelerated fashion.

3.4 The CUI environments can be modeled to specifically represent the requirements of the end user.

3.5 The results of the tests provide useful information on the performance of a given insulation.

3.6 The test methods allow for the use of any insulation materials.