Evaluation of Internal Plastic Coatings for Corrosion Control of Tubular Goods by Autoclave Testing

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Foreword

This test method has been prepared to provide manufacturers, applicators, and users of internal pipe coatings with a method of comparing the performance of these coatings. The method used in this standard is not intended to correlate with any particular field performance but is intended solely to compare samples of internally coated tubular goods under uniform laboratory test conditions.

Rationale

This revision includes clarifications to requirements for data, process, and sample requirements for the autoclave test program, additional references, and revisions that reflect recent updates to the existing references.

Referenced Standards and Other Consensus Documents

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

AMPP/NACE/SSPC, www.ampp.org:	
ANSI/NACE MR0175/ISO 15156	Petroleum and Natural Gas Industries – Materials for Use in H2S-containing Environments in Oil and Gas Production
NACE TM0384	Holiday Detection of Internal Tubular Coatings of Less Than 330 µm (13 mils) Dry-Film Thickness
NACE TM0186	Holiday Detection of Internal Tubular Coatings of 330 to 760 µm (13 to 30 mils) Dry Film Thickness
ASTM International, www.astm.org:	
ASTM D714	Standard Test Method for Evaluating Degree of Blistering of Paints
ASTM D6677	Standard Test Method for Evaluating Adhesion by Knife
International Organization for Standardization (ISO), www.iso.org:	
ISO 16773-2	Paints and varnishes — Electrochemical impedance spectroscopy (EIS) on high-impedance coated specimens — Part 2: Collection of data

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 standard establishes a laboratory test method for evaluating the performance of plastic coatings for tubular goods in specific environments at elevated temperatures and pressures by use of an autoclave.

1.2 This standard is intended to standardize laboratory test procedures and aid in evaluating the general performance of plastic coatings for tubular goods.

1.3 The data obtained from this test may not indicate the performance of plastic coatings for tubular goods in actual field service and may not provide any direct correlation to such performance.

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 before use.

Section 2: Principle

2.1 The corrosion protection of steel tubular goods by a plastic coating may be altered by exposure to elevated temperatures and pressures and by the composition of the corrosive media. An autoclave test is a static test that demonstrates field conditions by exposing coating specimens to corrosive environments at elevated temperatures and pressures for evaluation of the coating performance. The coating must meet agreed-upon pass criteria.

Section 3: Test Apparatus

3.1 Autoclave

3.1.1 The autoclave shall be rated to working pressure and temperature with adequate pressure gauges and indicating temperature controllers to withstand the test conditions.

3.1.2 A continuous recorder shall be adapted to the autoclave as a monitor to ensure that the designated pressure and temperature are maintained throughout the test period.

3.1.3 The autoclave shall be manufactured from a suitable material to withstand the corrosive nature of the various test media that may be used during testing. When hydrogen sulfide (H_2S) or chloride solutions are used in the test media, care should be taken to prevent failure of the autoclave components.

3.2 Autoclave Heating

3.2.1 The autoclave shall be heated in a manner that will provide uniform heating during the test. Typical methods include an electrical jacket and a heated oil bath.

3.2.2 The heating zone shall extend from the bottom of the autoclave to a point above the top of the test specimen contained within and must ensure uniform heating of the test specimen and test media.

3.2.3 The temperature of the autoclave shall be controlled to within 6 °C (10 °F) of the reported test temperature.