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Holiday Detection of Internal Tubular Coatings of Less Than 330 µm (13 mils) Dry-Film Thickness

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ABSTRACT

Provides a nondestructive test method for the detection of holidays in a nonconductive coating film (with a dry film thickness of less than 250 µm [10 mils]) that has been applied to the inner wall (bore) of oilfield tubular goods. Test apparatus are described along with the recommended procedure for conducting the test. Methods of reporting test data are also described.

KEYWORDS

coatings, corrosion testing, holiday detection.

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Foreword

In NACE standards, the terms shall, must, should, and may are used in accordance with the definitions of these terms in the NACE Publications Style Manual, 4th ed., Paragraph 7.4.1.9. Shall and must are used to state mandatory requirements. The term should is used to state something considered good and is recommended but is not mandatory. The term may is used to state something considered optional.

This NACE standard provides a nondestructive test method for evaluating the application of polymeric coatings of less than 330 µm (13 mils) dry-film thickness to the internal surfaces of metallic tubular goods used in the oil and gas industry. This test method is based on the current technology and experience of the petroleum production industry. NACE Standard TM0186[1] addresses holiday detection of internal tubular coatings of 355 to 760 µm (14 to 30 mils) dry-film thickness. This standard is intended for use by end users, manufacturers, applicators, corrosion engineers, and quality inspectors of internally plastic-coated (IPC) tubular goods.

This standard was originally prepared in 1984 by NACE Task Group (TG) T-1G-9 on Holiday Testing of Plastic Linings, a component of Unit Committee T-1G, "Protective Coatings, Elastomers, and Other Nonmetallic Materials for Oilfield Use," and was reaffirmed by T-1G in 1989 and 1994. It was reaffirmed in 2002 by Specific Technology Group (STG) 33, "Oil and Gas Production—Nonmetallics and Wear Coatings (Metallics)," and revised by TG 449, "Review of NACE Standard TM0384" in 2015. This standard is issued by NACE International under the auspices of STG 33.

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Figures

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Section 1: General

1.1 This NACE standard provides a nondestructive test method for the detection of holidays in a nonconductive coating film that has been applied to the inner wall (bore) of oilfield tubular goods. The apparatus and the recommended procedure for performing the test are described, as are methods of reporting the test data.

1.2 This test method applies to coatings that have a specified maximum dry-film thickness of 330 µm (13 mils). It is valid for coatings that have not been in service or previously tested with a salt solution. When holiday testing is performed on coatings that have been in service or that have been previously tested for holidays with a salt solution, there is a possibility of misleading results arising from surface contamination or salt bridging. The coating surface shall be free of materials that give added electrical insulation or that may mechanically damage the coating during the test.

1.3 This test method is not intended to provide a means of predicting the service life or service performance of these coatings.

1.4 A "holiday" is defined as a discontinuity in a protective coating that exposes unprotected surface to the environment. For the purposes of this test method, it means an area in an applied nonconductive coating that exhibits electrical conductivity when exposed to a known impressed voltage.

1.5 The specified resistance for holiday detection is 80,000 Ω ± 10% when measured between the wet probe sponge and the metallic tubular good.

Section 2: Test Apparatus

2.1 Apparatus and material required to perform this holiday test include a probe, a lance, a detector, and a wetting solution (see Figures 1 and 2).

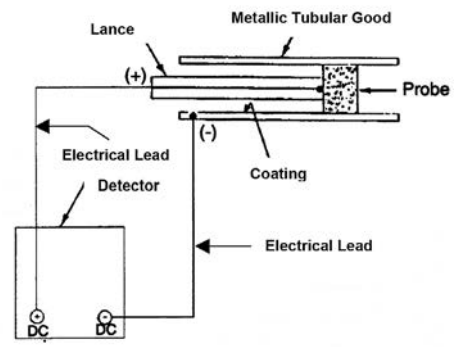

Figure 1: Holiday Detection Apparatus

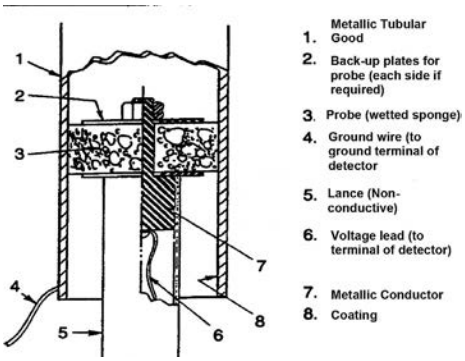

Figure 2: Test Apparatus

2.1.1 Probe—The composition and dimensions of the probe are as follows:

(a) The probe shall be a cylindrical piece of sponge that is conductive when wetted with the wetting solution.

(b) The sponge contact area shall be a minimum of 50 mm (2 in) thick. The diameter of the sponge shall be cut sufficiently larger than the inside diameter of the metallic tubular good to ensure a 360° contact throughout the metallic tubular good (Figure 1).

(c) Metallic tubular good sizes too large to practically use a 360° contact probe (e.g., 500 mm [20 in] diameter) may require a probe that covers less than 360° of the metallic tubular good. In this case, the probe shall be run through the metallic tubular good a sufficient number of times to cover the entire coating surface. For very large-diameter metallic tubular goods, a hand-held probe may be used, provided that the entire coated surface is holiday tested.

(d) The probe back-up plates (see Figure 2) for each side of the probe, if required, shall be constructed of a material and in such a manner that they shall not damage the coating.

2.1.2 Lance—The probe shall be attached to a lance that consists of a hollow, nonconductive tube to insulate the probe lead from the coating.