
**NACE International
Standard Practice**

High-Voltage Electrical Inspection of Pipeline Coatings

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Section 1: General

1.1 Electrical inspection (holiday detection) is a test of the continuity of a protective coating. This type of inspection does not provide information concerning coating resistance, bond, physical characteristics, or the overall quality of the coating, nor is it intended to do so. It detects bubble or blister-type voids, cracks, thin spots, and foreign inclusions or contaminants in the coating that are of such size, number, or conductivity as to significantly lower the electrical resistance or dielectric strength of the coating.

1.2 An initial electrical inspection, performed as soon after the application of the coating as practical, serves to check the materials and the application procedures. A final coating inspection, performed before lowering-in operations, will disclose any defect or damage (except disbonding) that has occurred during the construction period.

1.3 This standard presents acknowledged techniques for the use of holiday detectors currently used on pipeline coatings and presents a table of minimum testing voltages for various coating thicknesses. These minimum testing voltages do not apply to thin-film coatings (i.e., coating materials usually applied by a fusion-bonding process). Thin-film pipeline coatings are generally applied to a dry film thickness less than 0.5 mm (20 mil).

Section 2: Definitions

Holiday: A discontinuity in a protective coating that exposes unprotected surface to the environment.

Holiday detector: A device for locating discontinuities in a coating.

Pulse-type detector: A type of holiday detector that supplies a high-voltage pulse of very short duration (e.g., a pulse duration of 0.0002 seconds at a rate of 30 pulses per second).

Section 3: Testing Voltages

3.1 All testing voltages in this standard refer to direct current (DC) or peak alternating current (AC) values.

3.2 The minimum testing voltage in volts (V) for a particular coating thickness shall be within 20% of the value determined using Equation (1) or (2), or as shown in Table 1:

$$\text{Testing Voltage} = 7,900\sqrt{t} \quad (1)$$

where t = average coating thickness in mm

$$\text{Testing Voltage} = 1,250\sqrt{t} \quad (2)$$

where t = average coating thickness in mil.