

Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

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Foreword, Scope, Rationale	4
Referenced Standards and Other Consensus Documents	4
Section 1 General	5
Section 2 Definitions	5
Section 3 High-Voltage Testing	6
3.1 Significance and Use	6
3.2 Apparatus	7
3.3 Calibration	7
3.4 Equipment Setup and Verification	7
3.5 Inspection Process	10
Section 4 Low-Voltage Holiday Detectors	10
4.1 Significance and Use	10
4.2 Apparatus	11
4.3 Calibration	11
4.4 Equipment Setup and Verification	11
4.5 Inspection Process	13
Other Referenced Documents	14
Appendix A Recommended Voltage Settings for High-Voltage Holiday Testing for Various Coating Thicknesses (Nonmandatory)	15
Appendix B Basis for Testing Voltages (Nonmandatory)	17
Tables	
Table A1 Recommended Voltage Settings for High-Voltage Holiday Testing	15
Figures	
Figure B1 Data Points from AMPP Paper No. 17662 Compared to Testing Voltages	17

Foreword

The purpose of this standard is to provide the means of detecting pinholes, flaws, or holidays in a coating system that may result in its premature failure, thereby possibly decreasing the life expectancy of the asset. This standard documents the equipment and the process of using electrical current to identify these holidays in a repeatable and realistic manner for both field and shop coating applications.

Scope

This standard provides procedures for high and low-voltage holiday detection of new, non-conductive coatings or linings applied to conductive (typically metal) substrates.

Rationale

This standard was first issued in 1988. This revision has been prepared as a result of the required periodic review. The 2013 version had not been recently updated due in large part to concerns regarding the inability of the high-voltage spark testing voltage settings to be tied back to any scientific study or mathematical model. The “rule of thumb” of 100 volts per mil of coatings cannot be traced back to any foundational document. Significant short-circuitings were seen in the field when this standard was utilized, resulting in many coating systems passing the high-voltage testing standard but failing prematurely in the field. A peer-reviewed paper was presented at the AMPP Annual Conference + Expo 2022 that provided test data and utilized Paschen’s Law and the breakthrough voltage of air to provide additional data for this.

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.amp.org:

NACE/ASTM G193	Standard Terminology and Acronyms Relating to Corrosion
SSPC-PA 2	Procedure for Determining Conformance to Dry Coating Thickness Requirements
SSPC-PA 9	Measurement of Dry Coating Thickness Using Ultrasonic Gages

ASTM International, www.astm.org:

ASTM D149	Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D7091	Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals
ASTM D6132	Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Coating Thickness Gage

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