



Designation: C536 – 83 (Reapproved 2009)

Standard Test Method for Continuity of Coatings in Glassed Steel Equipment by Electrical Testing¹

This standard is issued under the fixed designation C536; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the detection of discontinuities in the glass coating of glassed steel equipment where such discontinuities would result in early failure due to the attack of the chemical contents of the vessel on the metal substrate. It is applicable to (1) provide a manufacturing and inspection test of glassed-steel equipment designed for relatively mild, low-temperature corrosive service, and (2) the field testing of similar equipment used in more severely corrosive environment.

NOTE 1—A manufacturing test method for the latter type of equipment is described in Test Method C537.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Document

2.1 *ASTM Standards:*²

C537 Test Method for Reliability of Glass Coatings on Glassed Steel Reaction Equipment by High Voltage

3. Summary of Test Method

3.1 The test method consists essentially of grounding the metal structure of the equipment being tested to the ground side of a voltage generator and sweeping the surface of the glass with a suitable probe electrically connected to the other side of the generator. Wherever a discontinuity exists, a discharge will

¹ This test method is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.12 on Materials for Porcelain Enamel and Ceramic-Metal Systems.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

give a positive indication that such a discontinuity exists. The voltage is set at 5000 V in order to show existing discontinuities without breaking through the existing glass coating. A built-in current limiting device ensures electrical safety for the operator.

4. Significance and Use

4.1 This test method is designed to detect existing discontinuities in the glass coating of glassed steel equipment while maintaining a voltage low enough as to be unlikely to cause breakdown of the coating. The test is adaptable for manufacturing inspection in the processing of equipment and for field use to find existing defects which can be “plugged” or repaired before serious damage is done to the equipment. As a means of positive detection, it is applicable to process studies, quality control, or specification.

5. Definition

5.1 *glassed steel (glass-lined steel or glass-coated steel)*—designations generally applied to a class of porcelain enamels that have high resistance to chemical attack at elevated temperatures and pressures.

6. Interferences

6.1 Since the test method is electrical, it is necessary to have a good ground connection between the instrument and the metal substrate of the equipment being tested. It is also necessary that the surfaces of the glass be reasonably clean and dry. A wet surface will conduct enough voltage to any exposed metal to give an indication of a “contact” over a large area instead of at a specific area of discontinuity. Such a capacitance discharge can be distinguished from a true failure by extending over a large area instead of at local spots that could be identified and marked for repair.

7. Apparatus³

7.1 The test apparatus comprises a voltage stabilizing transformer, a step-up transformer, a current-limiting resistance, a voltmeter and pilot light, along with a suitably

³ When requesting information, specific reference should be made to the ASTM designation number.

insulated cable

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