



Standard Test Method for Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperatures¹

This standard is issued under the fixed designation G 42; 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 describes an accelerated procedure for determining comparative characteristics of insulating coating systems applied to steel pipe exterior for the purpose of preventing or mitigating corrosion that may occur in underground service where the pipe will be exposed to high temperatures and is under cathodic protection. This test method is intended for use with samples of coated pipe taken from commercial production and is applicable to such samples when the coating is characterized by function as an electrical barrier.

1.2 This test method is intended for testing coatings submerged or immersed in the test solution at elevated temperature. When it is impractical to submerge or immerse the test specimen, Test Method G 95 may be considered where the test cell is cemented to the surface of the coated pipe specimen. If room temperatures are required, see Test Methods G 8. If a specific test method is required with no options, see Test Method G 80.

1.3 The values stated in SI units to three significant decimals are to be regarded as the standard. The values given in parentheses are for information only.

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

2. Referenced Documents

2.1 ASTM Standards:²

G 8 Test Methods for Cathodic Disbonding of Pipeline Coatings

G 12 Test Method for Nondestructive Measurement of Film Thickness of Pipeline Coatings on Steel

G 80 Test Method for Specific Cathodic Disbonding of Pipeline Coatings

G 95 Test Method for Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method)

3. Summary of Test Method

3.1 This test method subjects the coating on the test specimen to electrical stress in a highly conductive electrolyte. The coating is artificially perforated before starting the test. The electrical stress is produced by connecting the test specimen to the negative terminal of a source of direct current and by connecting an anode to the positive terminal. Electrical instrumentation is provided for measuring the current flowing in the cell. The electrical potential is also measured and the specimen is physically examined at intervals during the test period and upon conclusion of the test.

3.1.1 The cathodic stress is applied under conditions of a constant-elevated temperature.

4. Significance and Use

4.1 Damage to pipe coating is almost unavoidable during transportation and construction. Breaks or holidays in pipe coatings may expose the pipe to possible corrosion since, after a pipe has been installed underground, the surrounding earth will be moisture-bearing and will constitute an effective electrolyte. Applied cathodic protection potentials may cause loosening of the coating, beginning at holiday edges. Spontaneous holidays may also be caused by such potentials. This test method provides accelerated conditions for cathodic disbondment to occur and provides a measure of resistance of coatings to this type of action.

4.2 The effects of the test are to be evaluated by physical examinations and monitoring the current drawn by the test specimen. Usually there is no correlation between the two methods of evaluation, but both methods are significant. Physical examination consists of assessing the effective contact of the coating with the metal surface in terms of observed differences in the relative adhesive bond. It is usually found that the cathodically disbonded area propagates from an area where adhesion is zero to an area where adhesion reaches the original level. An intermediate zone of decreased adhesion may also be present.

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.48 on Durability of Pipeline Coating and Linings.

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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.