



Designation: D 6676 – 01

Standard Test Method for Cathodic Disbonding of Exterior Pipeline Coatings at Elevated Temperatures Using Interior Heating¹

This standard is issued under the fixed designation D 6676; 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 coating systems applied to the exterior of steel pipe for the purpose of preventing or mitigating corrosion that may occur in underground or immersion where the pipe is carrying heated media and is under cathodic protection. This test method is intended for use with samples of coated pipe, or with a specimen cut from the section of coated pipe or flat plates, and is applicable to such samples when the coating is characterized by function as an electrical barrier.

1.2 This test method is intended to simulate conditions when external coatings are exposed to high temperature inside the pipe and to an ambient temperature outside, and thus are subjected to temperature gradient. If elevated temperatures are not required, see Test Method G 8. If a specific test method is required with no options, see Test Method G 80. If elevated temperatures are required but without temperature gradient, see Test Method G 42.

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:

- G 8 Test Methods for Cathodic Disbonding of Pipeline Coatings²
- G 12 Test Method for Nondestructive Measurement of Film Thickness of Pipeline Coatings on Steel²
- G 42 Test Method for Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperatures²
- G 62 Test Method for Holiday Detection in Pipeline Coatings²

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 Coatings and Linings.

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² Annual Book of ASTM Standards, Vol 06.02.

G 80 Test Method for Specific Cathodic Disbonding of Pipeline Coatings²

G 95 Test Method for Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method)²

3. Summary of Test Method

3.1 The test method described, subjects the coating on the test specimen to electrical stress in a highly conductive alkaline electrolyte. Electrical stress is obtained from an impressed direct-current system. An intentional holiday is to be made in the coating prior to starting of test.

3.1.1 Electrical instrumentation is provided for measuring the current and the potential throughout the test cycle. At the conclusion of the test period, the test specimen is physically examined.

3.1.2 Physical examination is conducted by comparing the extent of loosened or disbonded coating at the intentional holiday in the immersed area with extent of loosened or disbonded coating at a reference holiday made in the coating in an area that was not immersed.

3.1.3 The cathodic stress is applied under conditions of a constant temperature gradient, simulating a heated pipeline with an exterior coating.

3.1.4 Specimens that can be used are: (a) piece of pipe (Fig. 1) or (b) samples cut from pipe or flat plate (Figs. 2-4).

3.1.4.1 Some coatings rely on application tension (such as tape) for maximum cathodic disbondment resistance. Cut coupons or flat plates must not be used.

4. Significance and Use

4.1 Damage to a 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. Usually exterior pipeline coatings applied over pipes carrying hot media (oil, gas) are exposed to high temperature inside the pipe and low temperature outside and subjected to temperature gradient. Heat flux is directed from metal (substrate) to the coating. This test method provides accelerated conditions for