



Standard Test Method for Evaluating Pipeline Coating Patch Materials¹

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1. Scope

1.1 This test method provides an accelerated means of determining the relative sealing abilities of pipeline patching materials that are used to seal holidays in pipeline coatings on steel pipe. This test method is intended for utilization of specimens of pipeline coatings on small-diameter pipe, for representing coatings used for buried or submerged service, and where the purpose of the coating is to provide an electrical barrier between the steel pipe and its environment.

1.2 This test method is not intended for evaluating patch materials that are overlapped upon themselves.

1.3 The values stated in SI units 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. Summary of Test Method

2.1 Patched pipeline coating specimens are suspended in an aqueous, alkaline, low-resistivity electrolyte. The specimens are individually connected to a magnesium anode or rectifier at a point external to the electrolyte. The coated, patched pipeline specimens are sealed at the base and at all other areas except the patch boundaries, such that the only paths for current flow are at the boundaries of the patches. Current flow in each patch area is averaged from monthly readings taken for one year.

3. Significance and Use

3.1 Holidays in pipeline coatings may be repaired by circumferential wrapping with a suitable pipe wrap tape. However, this technique is not always practicable and patching

may be required. The effectiveness of a patch material depends upon its adhesion to the original pipeline coating to effect sealing.

3.2 The results of this accelerated test have been found to yield comparative data useful for the selection of patching materials. The user is cautioned against the use of this method for absolute material properties characterization.

3.3 This procedure provides an accelerated method by exposing the patch to a severe radius of curvature on small-diameter pipe. The specimen is also exposed to a stress voltage in the presence of a highly conductive electrolyte.

4. Apparatus

4.1 *Test Vessel*—A cylindrical glass battery jar (or equivalent), approximately 300 mm (12 in.) in diameter and 300 mm in height. One magnesium anode shall be contained in each battery jar, with a maximum of eight pipe specimens, and with each specimen measuring about 25 mm (1 in.) in diameter by approximately 300 mm in length of coated pipe. (See 4.3 and Fig. 1 and Fig. 2.)

4.2 *Suspension*—The suspension ring for supporting the pipe specimens shall be an electrically nonconductive circular disk, measuring approximately 300 mm (12 in.) in diameter and approximately 5 mm ($\frac{3}{16}$ in.) in thickness. (See 6.4.) Drill a 15-mm ($\frac{1}{2}$ -in.) diameter hole through the center of the ring for external extension of the anode lead wire. Drill eight suspension holes, about 45 mm ($1\frac{3}{4}$ in.) in diameter, through the suspension ring for the pipe specimens; these holes shall be centered 110 mm ($4\frac{1}{2}$ in.) from the center of the suspension ring and evenly spaced around the ring at 45° increments as measured from the center of the suspension ring.

4.3 *Potential*—A high-purity magnesium anode shall be used, weighing approximately 2.3 kg (5 lb), and having an open-circuit potential of approximately 1.7 d-c V relative to a copper-copper sulfate electrode, and complete with a factory-sealed lead wire. The magnesium anode may be replaced by a controlled d-c voltage from a rectifier, and then maintaining the potential between the specimen having the least current flow and a copper-copper sulfate reference cell (with the cell being properly immersed in the electrolyte) at 1.50 ± 0.05 d-c V.

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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