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Standard Test Methods for Vulcanizable Rubber Tank and Pipe Lining¹

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1. Scope

1.1 These test methods cover the examination and testing of all types and constructions of vulcanized rubber tank and pipe lining that have been applied in the unvulcanized state.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety problems, 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.* For precautionary statements, see Notes 2 and 3.

2. Referenced Documents

2.1 ASTM Standards:

A 36/A 36M Specification for Structural Steel²

A 285/A 285M Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength²

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension³

D 429 Test Methods for Rubber Property—Adhesion to Rigid Substrates⁴

D 471 Test Method for Rubber Property—Effect of Liquids⁴

D 573 Test Method for Rubber—Deterioration in an Air Oven⁴

D 865 Test Method for Rubber—Deterioration by Heating in Air (Test Tube Enclosure)⁴

D 2228 Test Method for Rubber Property—Abrasion Resistance (Pico Abrader)⁴

D 2240 Test Method for Rubber Property—Durometer Hardness⁴

D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets⁴

D 3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products⁴

2.2 NACE Standard:

TM-01-70 Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive⁵

2.3 *Steel Structures Painting Council Standard: SSPC No. 5 Blast Cleaning to "White" Metal*⁶

3. Test Methods

3.1 Except as otherwise specified in these test methods for vulcanized tank and pipe lining, the following test methods applicable in general to vulcanized rubber (natural and synthetic) shall be utilized as required:

3.1.1 *General Physical Test Requirements*—Practices D 3182 and D 3183.

3.1.2 *Tension Test*—Test Methods D 412.

3.1.3 *Aging Test*—Test Methods D 573 and D 865.

3.1.4 *Adhesion Test*—Test Method D 429, Method E 1.

3.1.5 *Immersion Test*—Test Method D 471.

3.1.6 *Abrasion Test*—Test Method D 2228.

3.1.7 *Hardness Test*—Test Method D 2240.

3.1.8 *Chemical Resistance*—See Sections 4 to 11.

CHEMICAL RESISTANCE OF VULCANIZABLE RUBBER TANK LINING

4. Scope

4.1 This test method covers the evaluation of the chemical resistance of a rubber tank and pipe lining applied to a metallic substrate.⁷ The test method exposes one side of a lined panel and closely approximates the service conditions involving the temperature differential between the external and internal surfaces of a tank vessel that may accelerate the permeation of the lining by the corrosive medium.

5. Significance and Use

5.1 The results obtained by this test method should serve as a guide in, but not as the sole basis for, selection of a lining material for a particular application.

5.2 Pre-evaluation of lining materials might be performed more conveniently by the following test methods:

5.2.1 *D 471*—Chemical resistance of the lining, and

5.2.2 *D 3491*—Chemical permeation of the lining, including the accelerated effect of temperature differentials such as often occurs in field service.

6. Apparatus

6.1 *Test Unit*—The test unit illustrated in Fig. 1 shows parts list for a typical disassembled test cell. Figures 2 and 3

¹ These test methods are under the jurisdiction of ASTM Committee D-11 on Rubber and are the direct responsibility of Subcommittee D11.90.

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² *Annual Book of ASTM Standards*, Vol 01.04.

³ *Annual Book of ASTM Standards*, Vols 09.01 and 09.02.

⁴ *Annual Book of ASTM Standards*, Vol 09.01.

⁵ Available from the National Association of Corrosion Engineers (NACE), 2400 West Loop South, Houston, TX 77027.

⁶ Available from the Steel Structures Painting Council (SSPC), 4400 Fifth Ave., Pittsburgh, PA 15213.

⁷ Substrates other than metallic may be used as required and so reported in Section 11.