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## Standard Test Method of Aerated Total Immersion Corrosion Test for Metal Cleaners<sup>1</sup>

This standard is issued under the fixed designation D 1374; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the means of determining the corrosive effects of "metal cleaners for use in mechanical equipment," on all metals other than aluminum and its alloys, under conditions of aeration and total immersion, by quantitative measurement of weight change or by qualitative visual determination of change. The test is designed for the determination of the effects of the cleaner on metals being cleaned and is not for determination of the life of the cleaner or of the containing equipment.

1.2 When the test is used to assist in the choice of material for a specific use, the test conditions should simulate the conditions of use as closely as practicable.

1.3 Where no further processing subsequent to cleaning is indicated, a test for the effect of residual cleaner on the corrosion behavior of the material may be required.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage.

### 2. Referenced Document

#### 2.1 ASTM Standard:

D 1280 Method of Total Immersion Corrosion Test for Soak Tank Metal Cleaners<sup>2</sup>

### 3. Apparatus

3.1 *Test Tubes* fitted with a sintered-glass diffusion disk at the bottom, connected to a tubulation, for the purpose of saturating the solutions under test with air. The section containing the solution under test shall be 38 mm in diameter by 300 mm in length, and shall have a capacity of about 300 mL. The tubes shall be chosen so that the specimens will remain fully immersed during the test, the ratio of area of immersed metal to the volume of the solution will be as prescribed in 7.1, and sufficient space will be provided for foam formation.

3.2 *Source of Filtered Low-Pressure Air*, for aerating the test solution. The air used should be bubbled through sodium hydroxide solution (30 g NaOH/litre), maintained at

room temperature, in order to remove carbon dioxide, and then through water, at or near the temperature of test, in order to reduce evaporation in the test cell.

3.3 *Condensers*, Allihn-type, having jackets 200 to 250 mm in length. Condensers are not required for tests run at room temperature.

3.4 *Stoppers or Joints*—The connection between test tube and condenser optionally may be either standard-taper joints or rubber stoppers preboiled in aqueous caustic soda to remove free sulfur and boiled in a sufficient number of changes of distilled water until neutral.

3.5 *Constant-Temperature Device*—Any suitable means may be employed for maintaining the solutions actively at the boiling point for tests conducted at that temperature. For tests made at other temperatures, a suitable constant-temperature bath shall be provided to maintain the required temperature within  $\pm 2^\circ\text{F}$  ( $1^\circ\text{C}$ ). For control testing at room temperature, it is suggested that the solution be maintained at  $95 \pm 2^\circ\text{F}$  ( $35 \pm 1^\circ\text{C}$ ), which, being slightly above most room temperatures, is easy to maintain by heat input.

### 4. Apparatus for Residual Cleaner Corrosion Test

4.1 *Coating Apparatus* for producing a uniform film of cleaner on the surface of the test specimens.<sup>3</sup>

4.2 *Humidity Chamber* for exposing the contaminated specimens at a temperature of  $95^\circ\text{F}$  ( $35^\circ\text{C}$ ) and 90 % relative humidity.

### 5. Test Specimens

5.1 *Selection of Samples*—The samples selected for corrosion testing shall be identical in composition, metallurgy, and surface finishing with the metal at the stage where cleaning will be applied in practice.

5.2 *Size and Number of Specimens*—The test specimens shall have an area between 0.300 and 0.375 dm<sup>2</sup> and a length not to exceed 200 mm. (A specimen 18 by 85 by 1 mm in thickness would have an area of 0.327 dm<sup>2</sup>.) At least two, and preferably four, replicates shall be tested in each concentration of cleaner solution prescribed in 7.2. The number of replicates under test shall be reported.

### 6. Preparation of Test Specimens

6.1 Immediately prior to their use in the test, clean the test specimens as directed in the Apparatus Section of Method D 1280.

### 7. Test Conditions

#### 7.1 Ratio of Area of Immersed Metal to Volume of Solu-

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-12 on Soaps and Other Detergents and is the direct responsibility of Subcommittee D12.16 on Hard Surface Cleaning.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 15.04.

<sup>3</sup> The Fisher-Payne Dip Coater has been found satisfactory for this purpose.