



## Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases<sup>1</sup>

This standard is issued under the fixed designation D 1838; 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.

<sup>ε1</sup> NOTE—Editorial changes were made throughout in January 1996.

<sup>ε2</sup> NOTE—This designation was corrected in November 1996.

### 1. Scope

1.1 This test method detects the presence of components in liquefied petroleum gases which may be corrosive to copper.

NOTE 1—For an equivalent copper strip test applicable to less volatile petroleum products, see Test Method D 130.

1.2 The values stated in acceptable metric units are to be regarded as the standard. The values in parentheses are for information only.

1.3 *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.* For specific hazard statements, see 6.1, 8.3.1, and Annex A1.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 130 Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test<sup>2</sup>
- E 1 Specification for ASTM Thermometers<sup>3</sup>

### 3. Summary of Test Method

3.1 A polished copper strip is immersed in approximately 100 mL of the sample and exposed at a temperature of 37.8°C (100°F) for 1 h in a cylinder of suitable working pressure. At the end of this period, the copper strip is removed and rated as one of the four classifications of the ASTM Copper Corrosion Standards.

### 4. Significance and Use

4.1 Copper corrosion limits provide assurance that difficulties will not be experienced in deterioration of the copper and copper-alloy fittings and connections that are commonly used in many types of utilization, storage, and transportation equipment.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.H on Liquefied Petroleum Gas.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.03.

### 5. Apparatus

5.1 *Corrosion Test Cylinder*, constructed of stainless steel with an O-ring removable top closure according to the dimensions given in Fig. 1. Provide a flexible aluminum connecting hose with swivel connections with adapter to a 6.4 mm (¼-in.) pipe. The whole assembly shall be capable of withstanding a hydrostatic test pressure of 6895 kPa (1000 psig). No leak shall be discernible when tested at 3450 kPa (500 psig) with gas.

5.2 *Water Bath*, capable of being maintained at 37.8 ± 0.5°C (100 ± 1°F). Incorporate suitable supports to hold the test cylinder in an upright position. Make the bath deep enough so that the entire cylinder and valves will be covered during the test.

5.3 *Thermometer*—An ASTM Density Thermometer having a range from –20 to 105°C (–5 to +215°F), graduated in 0.2°C (0.5°F) subdivisions, and conforming to the requirements for Thermometer 12C (12F), as prescribed in Specification E 1.

5.4 *Strip Polishing Vise*, to hold the copper strip firmly without marring the edges. For convenient vises see Test Method D 130.

### 6. Materials

6.1 *Wash Solvent*—Use acetone or knock test grade 2.2.4 trimethylpentane.

NOTE 2—**Warning:** Extremely flammable. See Annex A1.

6.2 *Copper Strip*, 12.5 mm (½ in.) wide, 1.5 to 3.0 mm (⅛ to ⅜ in.) thick, cut 75 mm (3 in.) long from smooth-surfaced, hard-temper, cold-finished copper of 99.9 + percent purity; electrical bus bar stock is generally suitable. Drill a 3.2 mm (⅛ in.) hole approximately 3.2 mm (⅛ in.) from one end in the center of the strip. The strips can be used repeatedly but should be discarded if the surfaces become deformed.

6.3 *Polishing Materials*—Silicon carbide grit paper of various degrees of fineness including 65-μm (240-grit) paper or cloth; also a supply of 105-μm (150-mesh) silicon carbide grain and pharmaceutical grade absorbent cotton (cotton wool).

6.4 *Copper Corrosion Standard Plaques* are available.<sup>4</sup>

<sup>4</sup> The ASTM Copper Strip Corrosion Standards approved by Committee D-2 are available from ASTM Headquarters. Request Adjunct No. ADJD0130