



## Standard Test Method for Adhesion of Solid Film Lubricants<sup>1</sup>

This standard is issued under the fixed designation D 2510; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method<sup>2</sup> covers the measurement of the adhesion characteristics of dry solid film lubricants.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided 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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

B 209M Specification for Aluminum and Aluminum-Alloy Sheet and Plate<sup>3</sup>

D 1000 Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications<sup>4</sup>

D 1193 Specification for Reagent Water<sup>5</sup>

D 1730 Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting<sup>6</sup>

D 3330 Test Methods for Peel Adhesion of Pressure-Sensitive Tape at 180° Angle<sup>7</sup>

F 22 Test Method for Hydrophobic Surface Films by the Water-Break Test<sup>8</sup>

#### 2.2 U.S. Military Specification:<sup>9</sup>

MIL-L-46010

### 3. Terminology

#### 3.1 Definition :

3.1.1 *dry solid film lubricants*—dry coatings consisting of lubricating powders in a solid matrix bonded to one or both surfaces to be lubricated.

### 4. Summary of Method

4.1 The dry solid film lubricant is applied to anodized aluminum panels, immersed in water or other fluids for 24 h, and then wiped dry. A strip of masking tape is pressed onto the panel and removed abruptly. Film removal exposing the surface of the metal panel is the criterion for failure.

### 5. Significance

5.1 Effective solid film lubricant coatings must adhere to surfaces to provide adequate lubrication in applications with restricted access where fluid lubricants cannot easily be replenished. Loss of coating adhesion results in metal to metal contact causing significant wear of contacting surfaces. Adhesion is critical to the performance of the solid film lubricant. Examples of solid film lubricant applications include fasteners, bearings and sliding members in automotive, aircraft, and aerospace hardware.

5.2 This test method is intended to determine the adhesion of solid film lubricant coatings when submitted to contact with water and other fluids. Results of this test provide an indication of the suitability of the lubricant coating in applications where contact with water or other fluids is likely.

### 6. Apparatus

6.1 *Rubber Covered Steel Roller*—A steel roller,  $82.6 \pm 2.5$  mm ( $3.25 \pm 0.1$  in.) in diameter and  $44.5 \pm 1.3$  mm ( $1.75 \pm 0.05$  in.) in width, covered with rubber approximately 6.4 mm ( $\frac{1}{4}$  in.) in thickness having a durometer hardness of  $80 \pm 5$ . The weight of the roller proper which applies pressure to the specimen shall be  $2.04 \pm 0.05$  kg ( $4.5 \pm 0.1$  lb). It shall be so constructed that the weight of the handle is not added to the weight of the roller during use.

6.2 *Stylus*, or equivalent.<sup>10</sup>

<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 D02.01 on Industrial Lubricants.

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<sup>2</sup> Refer to U. S. Military Specification MIL-L-46010—March 4, 1988.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 02.02.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 10.01.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 11.01.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 02.05.

<sup>7</sup> *Annual Book of ASTM Standards*, Vol 15.09.

<sup>8</sup> *Annual Book of ASTM Standards*, Vol 15.03

<sup>9</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

<sup>10</sup> The stylus shall be L. S. Starrett Scratch Gage No. 29 or equivalent.