



Designation: D1831 – 11

## Standard Test Method for Roll Stability of Lubricating Grease<sup>1</sup>

This standard is issued under the fixed designation D1831; 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.

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

### 1. Scope

1.1 This test method covers determination of the changes in the consistency, as measured by cone penetration, of lubricating greases when worked in the roll stability test apparatus.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.2.1 *Exception*—The values stated in inch-pound units for the apparatus dimensions are to be regarded as standard; the SI conversions 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*:<sup>2</sup>

[D217 Test Methods for Cone Penetration of Lubricating Grease](#)

[D1403 Test Methods for Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment](#)

[D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants](#)

### 3. Terminology

3.1 *Definitions*:

3.1.1 *consistency, n—of lubricating grease*, the degree of resistance to movement under stress.

3.1.1.1 *Discussion*—The term consistency is used somewhat

synonymously with penetration. Generally, consistency refers to the worked penetration of a grease. **D217**

3.1.2 *lubricant, n*—any material interposed between two surfaces that reduces the friction or wear between them. **D4175**

3.1.3 *lubricating grease, n*—a semi-fluid to solid product of a dispersion of a thickener in a liquid lubricant.

3.1.3.1 *Discussion*—The dispersion of the thickener forms a two-phase system and immobilizes the liquid lubricant by surface tension and other physical forces. Other ingredients imparting special properties are often included. **D217**

3.1.4 *penetration, n—of lubricating grease*, the depth that the standard cone, when released to fall under its own weight for 5 s, enters the sample. **D217**

3.1.5 *thickener, n—in lubricating grease*, a substance composed of finely divided particles dispersed in a liquid lubricant to form the product's structure.

3.1.5.1 *Discussion*—The thickener can be fibers (such as various metallic soaps) or plates or spheres (such as certain non-soap thickeners) which are insoluble or, at the most, only very slightly soluble in the liquid lubricant. The general requirements are that the solid particles be extremely small, uniformly dispersed, and capable of forming a relatively stable, gel-like structure with the liquid lubricant. **D217**

3.1.6 *worked penetration, n—of lubricating grease*, the penetration at 25°C (77°F), without delay, of a sample after 60 double strokes in a standard grease worker. **D217**

3.1.7 *working, n—of lubricating grease*, the subsection of a sample to the shearing action of the standard grease worker. **D217**

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *roll stability, n—of lubricating grease*, the change in consistency of a sample after a specified amount of working in a test apparatus utilizing a weighted roller inside a rotating cylinder.

### 4. Summary of Test Method

4.1 The Test Methods [D1403](#) cone penetration of an approximately 50-g aliquot of lubricating grease is determined. The grease is then subjected to low shear at 20 to 35°C for 2 h  $\pm$  5 min in a standard roll stability apparatus, before the cone penetration is again measured. The difference between the cone

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.