



Designation: D3233 – 19

Standard Test Methods for Measurement of Extreme Pressure Properties of Fluid Lubricants (Falex Pin and Vee Block Methods)¹

This standard is issued under the fixed designation D3233; 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.

1. Scope*

1.1 These test methods cover two procedures for making a preliminary evaluation of the load-carrying properties of fluid lubricants by means of the Falex Pin and Vee Block Test Machine.

NOTE 1—Additional information can be found in [Appendix X1](#) regarding coefficient of friction, load gauge conversions, and load gauge calibration curve.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

[B16/B16M](#) Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines

[D2670](#) Test Method for Measuring Wear Properties of Fluid Lubricants (Falex Pin and Vee Block Method)

[D2783](#) Test Method for Measurement of Extreme-Pressure

Properties of Lubricating Fluids (Four-Ball Method)

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *actual gauge load, n*—the value obtained from the gauge while running the test and before any corrections are made.

3.1.1.1 *Discussion*—This gauge reading is irrespective of the particular gauge used, and corrections are made by comparison to a standard reference.

3.1.2 *direct load, n*—that which is applied linearly, bisecting the angle of the vee block corrected to either the 800 lbf or 3000 lbf gauge reference.

3.1.2.1 *Discussion*—This load is equivalent to the true load times the $\cos 42^\circ$.

3.1.3 *true load, n*—the sum of the applied forces normal to the tangents of contact between the faces of one vee block and the journal pin corrected to the 4500 lbf gauge reference line.

3.1.4 *true load failure value, n*—the true load at which the lubricant tested can no longer support the applied load resulting in either test pin or shear pin breakage, or inability to maintain or increase load.

3.1.4.1 *Discussion*—This value is also referred to as the limit of extreme pressure.

4. Summary of Test Methods

4.1 Both test methods consist of running a rotating steel journal at $290 \text{ rpm} \pm 10 \text{ rpm}$ against two stationary V-blocks immersed in the lubricant sample. Load is applied to the V-blocks by a ratchet mechanism. In Test Method A ([Note 1](#)), increasing load is applied continuously. In Test Method B ([Note 1](#)), load is applied in 250 lbf (1112 N) increments with load maintained constant for 1 min at each load increment. In both methods the load-fail value obtained is the criteria for level of load-carrying properties. Both methods require calibration of the load gauge and reporting of test results as true (corrected) loads rather than actual gauge loads.

NOTE 2—Test Method A is referred to as the Falex Run-Up Test. Test Method B is referred to as the Falex One-Minute Test.

¹ These test methods are under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.L0.11 on Tribological Properties of Industrial Fluids and Lubricates.

Current edition approved Dec. 1, 2019. Published January 2020. Originally approved in 1986. Last previous edition approved in 2014 as D3233 – 93 (2014). DOI: 10.1520/D3233-19.

² 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.

*A Summary of Changes section appears at the end of this standard