



Designation: D2714 – 24

Standard Test Method for Calibration and Operation of the Falex Block-on-Ring Friction and Wear Testing Machine¹

This standard is issued under the fixed designation D2714; 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 U.S. Department of Defense.

1. Scope*

1.1 This test method covers the calibration and operation of a block-on-ring friction and wear testing machine.

1.2 The values in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that 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, 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

D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology **D4175**.

¹ This test method is under the jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.L0.05** on Solid Lubricants.

This test method was prepared under the joint sponsorship of the American Society of Lubrication Engineers with the cooperation of the Coordinating Research Council, Inc. (CRC) Aviation Committee on Bonded Solid-Film Lubricants.

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

3.1.2 *coefficient of friction, μ or f , n —in tribology, the dimensionless ratio of the friction force (F) between two bodies to the normal force (N) pressing these two bodies together.*

$$\mu \text{ or } f = (F/N) \quad (1)$$

3.1.2.1 *Discussion*—A distinction is often made between *static coefficient of friction* and *kinetic coefficient of friction*.

3.1.3 *friction force, n —the resisting force tangential to the interface between two bodies when, under the action of an external force, one body moves or tends to move relative to the other.*

3.1.4 *kinetic coefficient of friction, n —the coefficient of friction under conditions of macroscopic relative motion between two bodies.*

3.1.5 *wear, n —damage to a solid surface, generally involving progressive loss of material, due to relative motion between that surface and a contacting substance or substances.*

4. Summary of Test Method

4.1 The test machine is operated using a steel test ring rotating against a steel test block, the specimen assembly being partially immersed in the lubricant sample. The velocity of the test ring is 7.9 m/min $\pm$ 0.16 m/min (26 ft/min $\pm$ 0.52 ft/min) which is equivalent to a spindle speed of 72 r/min $\pm$ 1 r/min. The specimens are subjected to 68 kg (150 lb) normal load applied by 6.8 kg (15 lb) of dead weight on the 10:1 ratio lever system. Test duration is 5000 cycles.

4.2 Three determinations are made: (1) The friction force after a certain number of revolutions, (2) the average width of the wear scar on the stationary block at the end of the test, and (3) the weight loss for the stationary block at the end of the test.

5. Significance and Use

5.1 This test method is used for the calibration of a block-on-ring testing machine by measuring the friction and wear properties of a calibration fluid under the prescribed test conditions.

5.2 The user of this test method should determine to his or her own satisfaction whether results of this test procedure correlate with field performance or other bench test machines.

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