



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

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

2. Terminology

2.1 Definitions:

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

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

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

2.1.2 *friction force*—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.

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

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

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3. Summary of Test Method

3.1 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 ± 0.16 m/min (26 ± 0.52 ft/min) which is equivalent to a spindle speed of 72 ± 1 rpm. 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.

3.2 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.

4. Significance and Use

4.1 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.

4.2 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. If the test conditions are changed, wear values can change and relative ratings of fluids can be different.

5. Apparatus

5.1 *Falex Block-on-Ring Test Machine*,² shown in Fig. 1 and Fig. 2 and described in detail in Annex A1.

NOTE 1—Consult the instruction manual for each machine to determine respective capabilities and limitations.

5.2 *Analytical Balance*, capable of weighing to the nearest 0.1 mg.

5.3 *Measuring Magnifier Glass*, with SI or inch-pound calibration so that the scar width can be measured with a precision of 0.01 mm, or equivalent.

² Trademarked and manufactured by Falex Corp., 1020 Airpark Dr., Sugar Grove, IL 60554.