



Standard Test Method for Wear Preventive Properties of Lubricating Greases Using the (Falex) Block on Ring Test Machine in Oscillating Motion¹

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1. Scope

1.1 This test method covers the determination of wear properties of lubricating greases by means of the Falex block-on-ring friction and wear test machine.

1.2 The values stated in SI units are to be regarded as standard except where equipment is supplied using inch-pound units and would then be regarded as standard. The metric equivalents of inch-pound units given in such cases in the body of the standard may be approximate.

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:

D 1403 Test Method for Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment²

D 2714 Test Method for Calibration and Operation of the Falex Block-on-Ring Friction and Wear Testing Machine³

3. Terminology

3.1 Definitions:

3.1.1 *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.

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

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

G 40

3.1.2 *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. **G 40**

3.1.3 *kinetic coefficient of friction, n* —the coefficient of friction under conditions of macroscopic relative motion between two bodies. **G 40**

3.1.4 *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. **G 40**

4. Summary of Test Method

4.1 The tester is operated with a steel test ring oscillating against a steel test block. Test speed, load, angle of oscillation, time and specimen surface finish and hardness can be varied to simulate field conditions.

4.2 The width of the wear scar, developed on the test block from contact with the oscillating test ring, is measured.

5. Significance and Use

5.1 This test method is used to differentiate between greases having high, medium, and low wear preventive properties using oscillating motion. The user of this method should determine to his own satisfaction whether results of this test procedure correlate with field performance or other bench test machines.

6. Apparatus

6.1 *Falex Block-on-Ring Test Machine with Friction Recorder*,⁴ described in detail in Annex A1 and illustrated in Fig. 1.

6.2 *Falex Oscillating Drive Accessory*,⁴ described in detail in A1.6 and illustrated in Fig. 2.

6.3 *Microscope*, low-power (50× to 60×) having sufficient clearance under objective to accommodate the test block. It should be fitted with a filar micrometer so that scar width may be measured with accuracy of ± 0.01 mm.

6.4 *Timer*, graduated in minutes and seconds.

7. Reagents and Materials

7.1 *Test Rings, Falex Type S-10 or S-25*⁴—SAE 4620 carburized steel, having a hardness of 58 to 63 HRC. The test ring has a width of 8.15 mm (0.321 in.), a diameter of 35 mm

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.

⁴ Available from Falex Corp., 1020 Airpark Dr., Sugar Grove, IL 60554.