



Designation: D8503 – 23

Standard Test Method for Determining the Scuffing Temperature Limit of Lubricating Oils Using the SRV Test Machine¹

This standard is issued under the fixed designation D8503; 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 This test method covers the determination of a scuffing temperature limit of lubricating oils at prescribed conditions and the retention of friction over temperature load step increases in a roller-on-disk (flat) geometry when subjected to high-frequency, linear oscillation motion. This test method is executed under constant load, frequency and stroke in a SRV test machine. The evolution of coefficient of friction of lubricating oils as function of temperature is recorded and assessed.

1.2 Tribometrical scuffing tests were so far related to load step tests. This test method determines the upper temperature limit for operating a lubricant and can also be used to determine the ability of a non-EP lubricating oil to protect against scuffing with increasing temperature.

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

1.4 *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.*

1.5 *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

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 on Industrial Lubricants and Engineering Sciences of High Performance Fluids and Solids.

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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.

A295 Specification for High-Carbon Anti-Friction Bearing Steel

D235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)

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

D5706 Test Method for Determining Extreme Pressure Properties of Lubricating Greases Using a High-Frequency, Linear-Oscillation (SRV) Test Machine

D6425 Test Method for Measuring Friction and Wear Properties of Extreme Pressure (EP) Lubricating Oils Using SRV Test Machine

D7755 Practice for Determining the Wear Volume on Standard Test Pieces Used by High-Frequency, Linear-Oscillation (SRV) Test Machine

E45 Test Methods for Determining the Inclusion Content of Steel

G40 Terminology Relating to Wear and Erosion

2.2 DIN Standards:³

DIN 5402-1 Rolling bearings – Parts of rolling bearings – Part 1: Cylindrical rollers

DIN 51631:1999 Mineral spirits; special boiling point spirits; requirements

DIN 51834 Tribological Test in the Translatory Oscillation Apparatus (Part 4: Determination of friction and wear data for lubricating oils with the cylindrical roller-disk geometry)

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminologies D4175 and G40.

3.1.2 *break-in, n—in tribology*, an initial transition process occurring in newly established wearing contacts, often accompanied by transients in coefficient of friction or wear rate, or both, that are uncharacteristic of the given tribological system's long-term behavior. (Synonym: **run-in, wear-in**)

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

³ Available from Deutsches Institut für Normung e.V. (DIN), Am DIN-Platz, Burggrafenstrasse 6, 10787 Berlin, Germany, <http://www.din.de>.