



Designation: D5306 – 24

Standard Test Method for Linear Flame Propagation Rate of Lubricating Oils and Hydraulic Fluids¹

This standard is issued under the fixed designation D5306; 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 the linear flame propagation rates of lubricating oils and hydraulic fluids supported on the surfaces of and impregnated into ceramic fiber media. Data thus generated are to be used for the comparison of relative flammability.

1.2 This test method should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test method may be used as elements of fire risk which takes into account all of the factors that are pertinent to an assessment of the fire hazard of a particular end use.

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.N0 on Hydraulic Fluids.

Current edition approved March 1, 2024. Published March 2024. Originally approved in 1992. Last previous edition approved in 2018 as D5306 – 92 (2018). DOI: 10.1520/D5306-24.

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.

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

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 Military Specifications:³

MIL-H-83282C Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft NATO Code Number H-537

MIL-H-46170B Amm.1, Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic Hydrocarbon Base

3. Terminology

3.1 Definitions:

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

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *linear flame propagation rate, n* —the average quotient of the distance of flame travel and the time required for the flame front to travel that distance.

4. Summary of Test Method

4.1 A section of a ceramic fiber support medium (string) is impregnated with the sample under specific conditions. The impregnated fiber is placed on a standard support. The sample is ignited and the time required for the flame front to propagate across a measured distance is determined by use of a thermoelectric system. The average propagation rate is then calculated from the measured distance of flame travel and the time required for the flame front to propagate over that distance.

5. Significance and Use

5.1 The linear flame propagation rate of a sample is a property that is relevant to the overall assessment of the flammability or relative ignitability of fire resistance lubricants and hydraulic fluids. It is intended to be used as a bench-scale test for distinguishing between the relative resistance to ignition of such materials. It is not intended to be used for the evaluation of the relative flammability of flammable, extremely flammable, or volatile fuels, solvents, or chemicals.

³ Available from DLA Document Services, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <https://assist.dla.mil/online/start>.

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