



Designation: D5534 – 94 (Reapproved 2018)

Standard Test Method for Vapor-Phase Rust-Preventing Characteristics of Hydraulic Fluids¹

This standard is issued under the fixed designation D5534; 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 ability of hydraulic fluids to prevent the rusting of steel in the vapor phase over the hydraulic fluid and water.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.3 **WARNING**—Mercury has been designated by many regulatory agencies as a hazardous material that can cause central nervous system, kidney and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website—<http://www.epa.gov/mercury/faq.htm>—for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.

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.

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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.

A108 Specification for Steel Bar, Carbon and Alloy, Cold-Finished

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

D91 Test Method for Precipitation Number of Lubricating Oils

D665 Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water

D1193 Specification for Reagent Water

D3603 Test Method for Rust-Preventing Characteristics of Steam Turbine Oil in the Presence of Water (Horizontal Disk Method)

E1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 Other Standards:

IP 60/80 Specification for Petroleum Spirit³

BS 970: 1955–EN3B Specification for wrought steels⁴

3. Summary of Test Method

3.1 This test method is divided into two parts:

3.1.1 *Part A*—Used only for fluids where water is the continuous phase. Examples of such fluids include water-glycol hydraulic fluids and high-water-content hydraulic fluids. Do not use Part A to evaluate invert emulsion hydraulic fluids.

3.1.2 *Part B*—Used for both water-containing fluids and completely water-free fluids such as petroleum based hydraulic fluids, except phosphate esters. In Part B a small beaker of water is present to provide water vapor to cause corrosion in the absence of a vapor-phase inhibitor in the fluid. Part B is the appropriate procedure for evaluating invert emulsion hydraulic fluids.

3.2 In both Part A and Part B, a steel specimen is attached to the underside of the cover of a beaker containing the fluid under test. The apparatus and specimen are identical to those of Test Method D3603. The fluid is brought to a test temperature of 60 °C (140 °F).

³ Available from Energy Institute, 61 New Cavendish St., London, WIG 7AR, U.K., <http://www.energyinst.org>.

⁴ Available from IHS, 15 Inverness Way East, Englewood, CO 80112, <http://www.global.ihs.com>.