



Designation: D4293 – 83(Reapproved 2008)

Standard Specification for Phosphate Ester Based Fluids for Turbine Lubrication¹

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1. Scope

1.1 This specification covers the requirements for phosphate ester based fire resistant fluids for use in turbine lubrication.

1.2 The specification defines only unused fluid before it is installed in the turbine. It is not intended for fluids used in electrohydraulic control (EHC) systems.

1.3 The use of this type of fluid is restricted to turbine systems that have been designed or modified to accommodate phosphate ester lubricants.

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

1.5 The following precautionary caveat pertains only to Sections 5 and 5.3. *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:*²

D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester

D97 Test Method for Pour Point of Petroleum Products

D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

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

D892 Test Method for Foaming Characteristics of Lubricating Oils

D974 Test Method for Acid and Base Number by Color-Indicator Titration

¹ This specification is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.C0.01 on Turbine Oil Monitoring, Problems and Systems.

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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.

D1744 Test Method for Determination of Water in Liquid Petroleum Products by Karl Fischer Reagent (Withdrawn 2000)³

D2619 Test Method for Hydrolytic Stability of Hydraulic Fluids (Beverage Bottle Method)

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

2.2 *Federal Test Method Standard:*⁴

791B, Method 5308 Corrosiveness and Oxidation Stability of Light Oils (Metal Strip)

2.3 *SAE Aeronautical Material Specification:*⁵

SAE AMS 3150C Hot Manifold and High Temperature Ignition Flammability Tests

3. Functional Property Requirements

3.1 Requirements for ISO viscosity grades 32 and 46 phosphate ester based fire resistant fluids are shown in Table 1.

3.2 The choice of viscosity grade for use in a particular turbine should comply with the turbine manufacturer's recommendation.

3.3 The autoignition temperature property for phosphate esters, although important to turbine manufacturers and to fluid users, is not listed because there is no published procedure in the ASTM manual.

4. Significance and Use

4.1 This is a specification to define the requirements of fire resistant fluids for use in turbine lubrication. This specification defines phosphate ester fluids which will give satisfactory lubrication performance in a turbine engine. However, it is possible that phosphate esters that do not meet this specification may give adequate performance in the field.

4.2 Fire resistant fluids are more difficult to ignite and show little tendency to propagate a flame. The term "fire resistant fluid" does not mean that the fluid will not burn.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.

⁵ Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.