



Designation: D4293 – 22

Standard Specification for Phosphate Ester-Based Fluids for Turbine Lubrication and Steam Turbine Electro-Hydraulic Control (EHC) Applications¹

This standard is issued under the fixed designation D4293; 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 specification covers the minimum requirements for phosphate ester-based fluids for turbine lubricants and electro-hydraulic control fluids, as delivered.

1.2 The use of this type of fluid is restricted to turbine systems designed or modified to accommodate phosphate ester fluids.

1.3 This standard does not cover the minimum requirements for in-service phosphate ester fluids for the turbine electro-hydraulic control (EHC) fluid. These requirements are provided in Guide [D8323](#).

1.4 The values stated in SI units are to be regarded as standard. For convenience, other units of measurement are provided in brackets.

1.5 *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.*

1.6 *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 specification is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, 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.

- [D92](#) Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- [D97](#) Test Method for Pour Point of Petroleum Products
- [D130](#) Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- [D445](#) Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- [D664](#) Test Method for Acid Number of Petroleum Products by Potentiometric Titration
- [D892](#) Test Method for Foaming Characteristics of Lubricating Oils
- [D974](#) Test Method for Acid and Base Number by Color-Indicator Titration
- [D1169](#) Test Method for Specific Resistance (Resistivity) of Electrical Insulating Liquids
- [D1298](#) Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- [D1401](#) Test Method for Water Separability of Petroleum Oils and Synthetic Fluids
- [D2422](#) Classification of Industrial Fluid Lubricants by Viscosity System
- [D3427](#) Test Method for Air Release Properties of Hydrocarbon Based Oils
- [D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products
- [D4175](#) Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- [D6304](#) Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration
- [D7546](#) Test Method for Determination of Moisture in New and In-Service Lubricating Oils and Additives by Relative Humidity Sensor
- [D8112](#) Guide for Obtaining In-Service Samples of Turbine Operation Related Lubricating Fluid
- [D8323](#) Guide for Management of In-Service Phosphate Ester-based Fluids for Steam Turbine Electro-Hydraulic Control (EHC) Systems

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