



Standard Specification for Mineral Lubricating Oil Used in Steam or Gas Turbines¹

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1. Scope

1.1 This specification covers mineral oils used in steam and gas turbine lubrication systems where the performance requirements demand a highly refined mineral base oil compounded with rust and oxidation inhibitors plus selected additives as needed to control foam, wear, demulsibility, and so forth.

1.2 This specification is intended to define the properties of mineral oil-based turbine lubricating oils that are functionally interchangeable with existing oils of this type, are compatible with most existing machinery components, and with appropriate field maintenance, will maintain their functional characteristics.

1.3 This specification is intended to define only new lubricating oil before it is installed in the machinery.

1.4 This specification is intended to be used as a guide. It is possible that oils that do not meet this specification may perform satisfactorily in some turbines.

2. Referenced Documents

2.1 ASTM Standards:

- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup²
- D 97 Test Method for Pour Point of Petroleum Oils²
- D 130 Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test²
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)²
- D 665 Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water²
- D 892 Test Method for Foaming Characteristics of Lubricating Oils²
- D 943 Test Method for Oxidation Characteristics of Inhibited Mineral Oils²
- D 974 Test Method for Acid and Base Number by Color-Indicator Titration²
- D 1401 Test Method for Water Separability of Petroleum Oils and Synthetic Fluids²

D 1947 Test Method for Load-Carrying Capacity of Fluid Gear Lubricants³

D 2272 Test Method for Oxidation Stability of Steam Turbine Oils by Rotating Bomb²

D 2422 Classification of Industrial Fluid Lubricants by Viscosity System²

D 3339 Test Method for Acid Number of Petroleum Products by Semi-Micro Color Indicator Titration⁴

D 3427 Test Method for Air Release Properties of Petroleum Oils⁴

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products⁴

D 4310 Test Method for Determination of the Sludging and Corrosion Tendencies of Inhibited Mineral Oils⁴

D 5182 Test Method for Evaluating the Scuffing (Scoring) Load Capacity of Oils (FZG Visual Method)⁵

2.2 ISO Standard:⁶

ISO 4406 Method for Coding the Level of Contamination by Solid Particles

3. Terminology

3.1 Definitions:

3.1.1 *Type I mineral oils, n*—oils for steam and gas turbine lubricating systems where the machinery does *not* require lubricants with enhanced load carrying capacity. Such oils normally contain rust and oxidation inhibitors plus other additives as needed to meet the specified performance characteristics. Type I oils usually are available in ISO-VG 32, 46, 68, and 100 (see Classification D 2422).

3.1.2 *Type II mineral oils, n*—oils for steam and gas turbine lubricating systems where the machinery requires enhanced load carrying capacity. These oils are similar to Type I and are typically used in marine turbines. Such oils contain rust and oxidation inhibitors, plus mild extreme pressure (EP) additives and other additives as needed to meet the specified performance characteristics. Type II oils usually are available in ISO-VG 68, 100, and 150.

3.1.3 *functional properties, n*—those properties of the mineral lubricating oil that are required for satisfactory operation of the machinery. These properties are listed in Section 5.

¹ This specification is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.C on Turbine Oils.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ Discontinued; see 1996 *Annual Book of ASTM Standards*, Vol 05.01.

⁴ *Annual Book of ASTM Standards*, Vol 05.02.

⁵ *Annual Book of ASTM Standards*, Vol 05.03.

⁶ Available from American National Standards Institute, 11 W 42nd Street, 13th Floor, New York, NY 10036.