

Standard Practice for In-Service Monitoring of Mineral Turbine Oils for Steam and Gas Turbines¹

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INTRODUCTION

The in-service monitoring of turbine oils has long been recognized by the power-generation industry as being necessary to ensure long trouble-free operation of turbines.

The two main types of stationary turbines used for power generation are steam and gas turbines; the turbines can be used as individual turbines, or can be coupled to combine cycle turbines. The lubrication requirements are quite similar but there are important differences in that gas turbine oils are subjected to significantly higher localized “hot spot” temperatures and water contamination is less likely. Steam turbine oils are normally expected to last for many years. In some turbines up to 20 years of service life has been obtained. Gas turbine oils by comparison have a shorter service life. Many of the monitoring tests used for steam turbine oils are applicable to gas turbine oils.

This practice is designed to assist the user to validate the condition of the lubricant through its life cycle by carrying out a meaningful program of sampling and testing of oils in use. This practice is performed in order to collect data and monitor trends which suggest any signs of lubricant deteriorating. This can be used as a guide for the direction of system maintenance to ensure a safe, reliable, and cost-effective operation of the monitored plant equipment. Also covered are some important aspects of interpretation of results and suggested action steps so as to maximize service life.

1. Scope

1.1 This practice covers the requirements for the effective monitoring of mineral turbine oils in service in steam and gas turbines, as individual or combined cycle turbines, used for power generation. This practice includes sampling and testing schedules to validate the condition of the lubricant through its life cycle and by ensuring required improvements to bring the present condition of the lubricant within the acceptable targets.

1.2 *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:

D 92 Test Method for Flash and Fire Points by Cleveland Open Cup²

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 (and the Calculation of Dynamic Viscosity)²

D 664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration²

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 1500 Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)²

D 2272 Test Method for Oxidation Stability of Steam Turbine Oils by Rotating Pressure Vessel Oxidation Test²

D 2422 Classification of Industrial Fluid Lubricants by Viscosity System²

¹ This practice is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.C0 on Turbine Oils.

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² Annual Book of ASTM Standards, Vol 05.01.

