



Designation: D8128 – 17

Standard Guide for Monitoring Failure Mode Progression in Industrial Applications with Rolling Element Ball Type Bearings¹

This standard is issued under the fixed designation D8128; 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.

INTRODUCTION

Oil analysis is a part of condition based maintenance programs. Despite being widely used for several decades, there is no systematic approach in selecting oil tests based on failure mode analysis. Most users select tests primarily based on oil degradation criteria, minimizing the potential for detecting surface damage and limiting the potential benefits of the oil analysis program. This guide provides justification for oil analysis in industrial applications from a failure standpoint to include both rolling element bearing wear and fluid deterioration.

1. Scope

1.1 This guide approaches oil analysis from a failure standpoint and includes both the rolling element ball type bearing wear and fluid deterioration in industrial application.

1.2 This guide pertains to improving equipment reliability, reducing maintenance costs and enhancing the condition-based maintenance program primarily for industrial machinery by applying analytical methodology to oil analysis program for the purpose of detecting specific failure modes.

1.3 This guide reinforces requirements for appropriate assembly, operation within the original design envelope as well as the need for condition-based and time-based maintenance.

1.4 This guide covers the principles of Failure Mode and Effect Analysis (FMEA) as described in Guide [D7874](#) and its relationship to rolling element ball type bearing wear in industrial application and its fluid deterioration.

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.*

¹ This guide is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.96.04](#) on Guidelines for In-Service Lubricants Analysis.

Current edition approved Oct. 1, 2017. Published October 2017. DOI: 10.1520/D8128-17.

2. Referenced Documents

2.1 *ASTM Standards:*²

- [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
- [D1500](#) Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)
- [D6304](#) Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration
- [D6595](#) Test Method for Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectrometry
- [D7042](#) Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity)
- [D7414](#) Test Method for Condition Monitoring of Oxidation in In-Service Petroleum and Hydrocarbon Based Lubricants by Trend Analysis Using Fourier Transform Infrared (FT-IR) Spectrometry
- [D7483](#) Test Method for Determination of Dynamic Viscosity and Derived Kinematic Viscosity of Liquids by Oscillating Piston Viscometer
- [D7596](#) Test Method for Automatic Particle Counting and Particle Shape Classification of Oils Using a Direct

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.