



Designation: D7917 – 14 (Reapproved 2018)

Standard Practice for Inductive Wear Debris Sensors in Gearbox and Drivetrain Applications¹

This standard is issued under the fixed designation D7917; 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

Wear debris sensors, employing inductive sensing technologies (1, 2),² are able to quantify wear debris to classify size and material composition (ferrous/non-ferrous) of metallic debris found in lubricating oil as a consequence of wear. Initial applications have been largely confined to industrial aero-derivative and aircraft gas turbine engine monitoring installations where the failure of high speed ball and roller bearings results in significant secondary damage (2, 3). With an almost exponential growth in the wind turbine industry, one engineering issue still to be resolved is the unacceptable gearbox failure rate (4). Wear debris sensors can play an important role in understanding the varied bearing failure modes observed. There are thousands of inductive sensors operating in wind turbines and other gearbox and drivetrain applications accruing millions of operational hours. While it is generally accepted that these sensors provide early warning of abnormal condition, the industry will benefit from a standard practice for data usage and interpretation.

1. Scope

1.1 This practice covers the minimum requirements for an online inductive sensor system to monitor ferromagnetic and non-ferromagnetic metallic wear debris present in in-service lubricating fluids residing in gearboxes and drivetrains.

1.2 Metallic wear debris considered in this practice can range in size from 40 μm to greater than 1000 μm of equivalent spherical diameter (ESD).

1.3 This practice is suitable for use with the following lubricants: industrial gear oils, petroleum crankcase oils, polyalkylene glycol, polyol esters, and phosphate esters.

1.4 This practice is for metallic wear debris detection, not oil cleanliness.

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

1.5.1 *Exception*—Subsection 7.7 uses “G’s”.

¹ This practice is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.96.07 on Integrated Testers, Instrumentation Techniques for In-Service Lubricants.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

1.6 *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.*

1.7 *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:*³

D4175 *Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants*

D7669 *Guide for Practical Lubricant Condition Data Trend Analysis*

D7685 *Practice for In-Line, Full Flow, Inductive Sensor for Ferromagnetic and Non-ferromagnetic Wear Debris Determination and Diagnostics for Aero-Derivative and Aircraft Gas Turbine Engine Bearings*

D7720 *Guide for Statistically Evaluating Measurand Alarm Limits when Using Oil Analysis to Monitor Equipment*

³ 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.