

Advancements in Grease Sampling and Analysis Using Simple Screening Techniques

MRG Navigator™ and ASTM Standards Provide High-Value Grease Analysis at Low-Cost

Gretchen Kowalik, LLA II
MRG Labs, York, Pennsylvania, USA
gkowalik@mrqcorp.com

Richard Janosky, LLA II
MRG Labs, York, Pennsylvania, USA
rjanosky@mrqcorp.com

Summary

Oil analysis is well established as a routine tool to optimize maintenance activities, improve reliability and equipment life and prevent component failures. As part of a comprehensive Condition Based Maintenance program, lubricant analysis is an effective complement to other diagnostic technologies such as vibration analysis, infrared thermography, ultrasonic detection and motor circuit evaluation. However, when the equipment is grease lubricated rather than oil lubricated, the important lubricant analysis piece is often ignored. The reasons for this include challenges in obtaining samples that can be trended, as well as the large sample volumes required for most current standardized tests for greases. Unlike oil, grease does not typically flow uniformly or circulate in the machine, so particulate and contaminants are present in varying concentrations in the grease. When a grease sample is obtained, it cannot be simply agitated to suspend and distribute particulate, as is the case with oil. These fundamental differences present barriers to acceptance of grease analysis as a routine aspect of diagnostic monitoring programs.

ASTM standardized tools and lab tests have been developed providing improved sampling techniques and lab tests to allow the inclusion of lubricant analysis for grease lubricated equipment. ASTM D7718 and ASTM D7918 are available to optimize grease sample trending as well as accommodate small sample sizes typically available in grease lubricated components. Utilizing the Grease Thief® sampling device outlined in ASTM D7718, a variety of grease analysis tests can be performed per ASTM D7918, Standard Test Method for Measurement of Flow Properties and Evaluation of Wear, Contaminants and Oxidative Properties of Lubricating Grease by Die Extrusion Method and Preparation. The unique design of the Grease Thief® allows the laboratory to perform up to 10 different lab tests with just one gram of grease. The one gram sample is extruded on to a thin film substrate where it can be distributed around the laboratory to perform a variety of different tests including: FTIR, RDE Metals Spectroscopy, RULER, fdM, analytical ferrography, rheology, colorimetry, moisture, microbial content and particle counting. While a full test slate is desirable to maximize information gathered from the grease sample, for large populations with uniform operating conditions, a reduced test slate measuring a few key factors can be utilized to “screen out” samples that do not require the advanced testing. This can provide a low cost solution while still obtaining valuable data looking at wear and contamination.

This paper will discuss how these new technologies can produce improvements in reliability and reductions in lubrication costs through condition-based greasing and trending of wear levels, with samples as small as one gram. A low cost screening test slate, which looks at wear and contamination for evaluating characteristics of used greases will be discussed. Additionally, a case study will be shared that demonstrates how the screening test slate may be used for routine grease sampling and in making maintenance decisions.

If you are interested in reading the entire white paper, please reach out to rjanosky@mrqcorp.com for the full document.