

Slick performer

Portable oil analysis solutions empower ship maintainers to act fast in preventing failure

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ABOVE: Q5800 Portable Fluid Analysis System

BELOW: The Q5800 comprises four major modules and associated technology

RIGHT: SpectroVisc Q3000 portable kinematic viscometer

BELOW: FluidScan Q1000 handheld infrared spectrometer



Marine operators have known why oil analysis is a critical part of a good maintenance program for quite some time, and they practice it with combinations of onboard test kits and shoreside analysis laboratories commonly provided by the lubricant supplier.

Slow steaming, long component lead times, constant switchovers from HFO to low-sulfur fuel, and high and low BN lubricants means having an effective oil analysis program to monitor these fluctuations is more important than ever before. The challenge to asset maintainers is unlocking the value of oil analysis to maintain or improve ship performance while lowering the costs of maintenance.

Portable oil analysis solutions have been developed to unlock the value of oil analysis on board, enabling maintenance personnel to take action as soon as the issue is discovered, thereby eliminating the wait for results, or the need for extra tests to understand the issue.

Current challenges

Vessels use a combination of oil analysis methods, including daily onboard testing (using wet chemistry kits) and periodically sending samples to an offshore laboratory to analyze wear debris. Wet chemistry kits have a number of challenges: the cost can be up to US\$23 per test when you factor in the cost of shelf-life limited chemicals, storage and training, and frequent recalibration offshore. Results may not be repeatable and it can take a long time to do one test – valuable time a maintainer can put to good use somewhere else on board. Shore-based labs adequately analyze for trending metals and lubricant condition parameters; however, the time delay will always remain an issue, particularly when a known problem is developing in a critical asset and it needs to be monitored closely. So what can be done to overcome these challenges?

FLUID CHEMISTRY	VISCOSITY	PARTICLE COUNT	ELEMENT ANALYSIS
FluidScan Q1000 infrared spectrometer with flip-top cell design; tests for TAN/TBN, water content, soot, oxidation, new fluid validation	SpectroVisc Q3000 Series kinematic viscometer @40oC (cSt); solvent-free; low sample volume	Filtration Particle Quantifier (FPQ); solvent-free particle counting > 4µm/ml; handles the dirtiest and wettest samples; filter patch for evaluation of debris	Wear metals and sand/dirt analysis for abnormal wear and contamination ingress using x-ray fluorescence (XRF) technology

Spectro Inc offers a set of solutions to transform the vessel owner's onboard oil analysis program. As instrumentation size decreases and becomes more portable, oil analysis devices are now being put in the hands of the end user. It has been proven that these new smaller devices do not sacrifice analytical performance. This brings

the end user closer to the vessel and its problems, enabling time-sensitive, critical decision making.

The solution

To meet the demands of vessel owners who continue to seek ways to reduce the operational and maintenance costs of

offshore laboratory oil analysis, Spectro offers two cost-effective, technologically superior and therefore realistic, portable device solutions – the Q5800 Expeditionary Fluid Analysis System and the FluidScan Q1000 and SpectroVisc Q3000 Portable Kit.

The Q5800 is an expeditionary fluid analysis system that provides portable, all-in-one testing. That is, it is a multipurpose portable measurement tool that combines all the critical components necessary for condition monitoring by oil analysis. Tests include abnormal wear analysis, particle count, viscosity and fluid chemistry using infrared spectroscopy. The device operates entirely solvent-free, so you can use it anywhere. In addition, it has a touchscreen and is designed to be easy to use. It combines an array of portable-sized instrumentation into a single unique device that users can carry.

Because it analyzes oil for wear debris, it eliminates the need for off-site laboratory analysis. You can get critical oil information when you need it to make quick decisions regarding the health of your vessel's equipment. Also, the initial investment cost can be spread over all assets on the ship, and marine support vendors can bring equipment from ship to ship, spreading the investment over multiple assets.

Some operators want to start the transformation of their oil analysis program by replacing their current wet chemistry kits designed for lubricant condition only. The portable infrared spectrometer (FluidScan Q1000) and kinematic viscometer (SpectroVisc Q3000) Portable Kit provides lubricant and viscosity testing, resulting in major cost reductions and improved monitoring.

Test results can be obtained in just 2.5 minutes, which saves considerable shipboard manpower. Only a few drops of oil are required for analysis, which dramatically reduces waste. The instruments simplify the process of testing oil and do not require any

measuring key oil condition parameters in both synthetic and petroleum-based lubricants and fluids. The technology works by first identifying and classifying the fluid via its infrared spectrum into its general chemical family. From this information, the instrument selects the appropriate set of chemometric algorithms to analyze the fluid and provide quantitative total base number (TBN), oxidation, nitration, sulfation, additive depletion, incorrect lubricant, water, glycol, soot, glycerine and FAME in biodiesels.

The SpectroVisc Q3000 reports kinematic viscosity at a standard operating temperature of 40°C. The device does not need reagents, just a shop rag or paper towel, and only 60µl of sample (a few drops). It operates as a capillary viscometer.

By taking advantage of capillary effects and highly repeatable mechanical spacing, the operator can open the capillary tube to clean it instead of running solvents down a glass capillary tube and drying, as is typically done with laboratory viscometers. Each sample is measured at a constant temperature for consistent accuracy without pre-test measurements.

Summary

The time has come for marine vessel owners to receive immediate information about the condition of their oil and critical equipment. Portable devices enable operators to get immediate onboard oil analysis information. The initial investment costs are quickly offset by the benefit of real-time results, leveraged across many machines and/or vessels. The guarantee of continuous oil monitoring improvement and the positive effect of safe practices is, however, priceless. \\

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interpretation by the operators, so results are more accurate and repeatable. The instruments store test results and provide automatic alarms, and eliminate the need for manual logging.

The FluidScan Q1000 is a rugged, handheld infrared spectrometer that measures a range of key oil condition parameters in synthetic and petroleum-based lubricants and fluids. It can determine lubrication contamination, degradation and cross-contamination at the point of use by