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Viscosity Measurement for Oil Condition Monitoring and Asset Management

Monitoring and controlling viscosity has been a challenge in the maintenance of equipment where there is a critical need to detect changes in oil viscosity as they occur in real-time based on equipment usage conditions in harsh operating environments providing an important aspect of determining equipment readiness and proactive maintenance intervals in today's sophisticated fleet and asset maintenance programs.

In equipment assets, proper lubrication of moving parts plays a critical role in asset performance and longevity. Determination of oil condition via a direct viscosity measurement enables efficient change intervals, machine efficiency and usage life. Contaminants in oil (water, solvents and fuel) are known to degrade viscosity and cause damage to internal components of assets, whether they are trucks or dozers or excavators or large rotating equipment.

According to Kerem Durdag, Director of Sales & Marketing, SenGenuity, "Having real-time, in-line viscosity data can eliminate the need to make decisions based on intermittent "snapshot" data acquired from periodic sampling. However, making accurate in-line viscosity measurements has been a problem because it is difficult to integrate conventional viscometers into in-line process flows. The technology to address this problem is now becoming commercially available in ViSmart, the acoustic wave viscosity sensor of SenGenuity."

Solid-state sensors use reliable and robust semiconductor packaging technology. The sensors usually weigh less than 227 grams, are smaller than a



Solid-state acoustic wave viscosity sensor (photo: SenGenuity)

matchbox (approximately 3.8 x 3.8 x 1.25 cm) and require no field recalibration. Hermetically sealed so it is completely immersible and can be used in harsh chemical environments, solid-state sensors have the on-board electronics, viscosity, temperature and communication protocols (allowing for communication protocols such as Profibus, CanBus, DeviceNet, etc. for integration) OEMs

need to provide viscosity measurement and control as a value-added and cost-effective feature in asset management platforms and embedded applications for oil condition monitoring.

A major customer in the asset equipment market of SenGenuity conducted performance qualification tests using standard oils. The viscosity for these oils was previously measured at the Customer Laboratory for the following temperatures of 40, 50, 60, 70, 80, 90 and 100°C. These measurements are the reference measurement against which the results from solid-state viscometer are to be compared with. Samples of 200 ml were weighed to obtain an idea of the relative difference of densities between the oils. The results showed less than 3% of difference.

"Manufacturers are looking to OEMs to provide equipment with ready-to-run in-line instrumentation that can be integrated into their assets providing a continuous audit trail to control operating costs and to extend the life of the assets. SenGenuity's ViSmart™ is in a commercial position to provide solutions to that need," says Durdag.

For more information, visit www.vectron.com