

Monitoring ferrous debris identifies worn parts early

An updated range of AnalexPQ monitors from Kittiwake Developments offers a highly accurate means of detecting and measuring ferrous-wear debris in lubricating oils, hydraulic oils and greases, according to the UK-based company. The compact and rugged monitors are designed to deliver retrievable data quickly and simply for managing lube oil condition samples.

Condition monitoring of lubricants is a valuable method of predicting and avoiding machinery breakdowns, ferrous debris monitoring technology enabling worn parts to be identified early and replaced before serious damage occurs.

AnalexPQ technology detects and measures the mass of ferrous wear debris in a lubricant sample, irrespective of the size of the wear particles present. The result is displayed as a PQ index, a proprietary unit which can be trended with accepted linearity over a wide range of ferrous debris content and particle sizes.

Dual-coil magnetometers in the monitor construction foster greater measurement accuracy, Kittiwake asserts. When no oil sample is present, the sample coil (sensor) and the reference coil are in balance; both coils are designed to maintain this balance in conjunction with changes in the ambient temperature.

A sample of oil containing ferromagnetic debris is placed on the sensor, thus altering the balance between the coils. The resulting 'out of balance' signal is amplified, filtered and displayed as a PQ Index, which relates directly to the mass of the ferromagnetic debris in the sample.

A PQ measurement is an essential tool in any used oil programme, says Kittiwake. With minimal sample preparation required, the AnalexPQ monitor can be used to identify the presence of larger ferrous particles (greater than 5-10 microns) missed by more expensive analytical techniques, the company claims.

PQ technology measures the distortion of a magnetic flux field when a ferromagnetic sample (iron or nickel) is placed into the field. The resulting PQ index can be compared with DL and DS ferromagnetic measurements or with PPM output provided by other spectrographic techniques.

As wear debris in the tested sample settles, repeat readings show an increasing PQ Index, a high rate of increase indicating the presence of large particles. For multi-element oil analysis, on diesel engines for example, PQ is considered invaluable in identifying larger particle releases often associated with 'filter breakthrough'.

Through consistent and regular sampling, the PQ Index highlights important trend indicators for early detection of abnormal wear

conditions and impending machinery failure; it can also provide a useful screening check to quickly identify samples requiring further detailed analysis. The PQ Index measurement is reportedly delivered in less than five seconds after the samples have been loaded.

Ease of analysis and a swift test turnaround minimise laboratory time. The AnalexPQ monitors can also be operated remotely using WinPQBase software and a standard RS232 cable connection, and they can be programmed to perform automatic repeat measurements if required.



Kittiwake's AnalexPQ magnetometer measures the mass of ferrous-wear debris in oil samples

Kittiwake's AnalexPQ range comprises PQm and PQa units, each claimed to secure fast, effective and consistent ferrous debris measurements in laboratory environments.

The PQm monitor is a manually-operated unit for testing and analysing low to medium volumes of oil samples, which can be processed at up to five samples per minute. Fully automated handling of batches of samples is assigned to the PQa monitor.

The presence of water or the gradual degradation of total base number (TBN) of engine oil is among the first indicators of potential plant failure. Water can enter the oil from many sources, such as condensation, leakage and malfunction of the treatment system, and can cause corrosion, cavitation and additive package instability. It can also encourage the growth of undesirable micro-organisms.

Kittiwake's dual-purpose Digi test cell enables onboard engineers to analyse multiple oil breakdown characteristics, measuring both 'water in oil' and TBN. A fast and accurate digital measurement is provided for each parameter on an LED display.

An indication of hydraulic oil cleanliness is given by Kittiwake's new portable 'hydraulic particles' test kit, while the company's Econ TAN (total acid number) drop test kit can be used to check for increasing levels of TAN caused by oxidation of the lubricant. **MP**