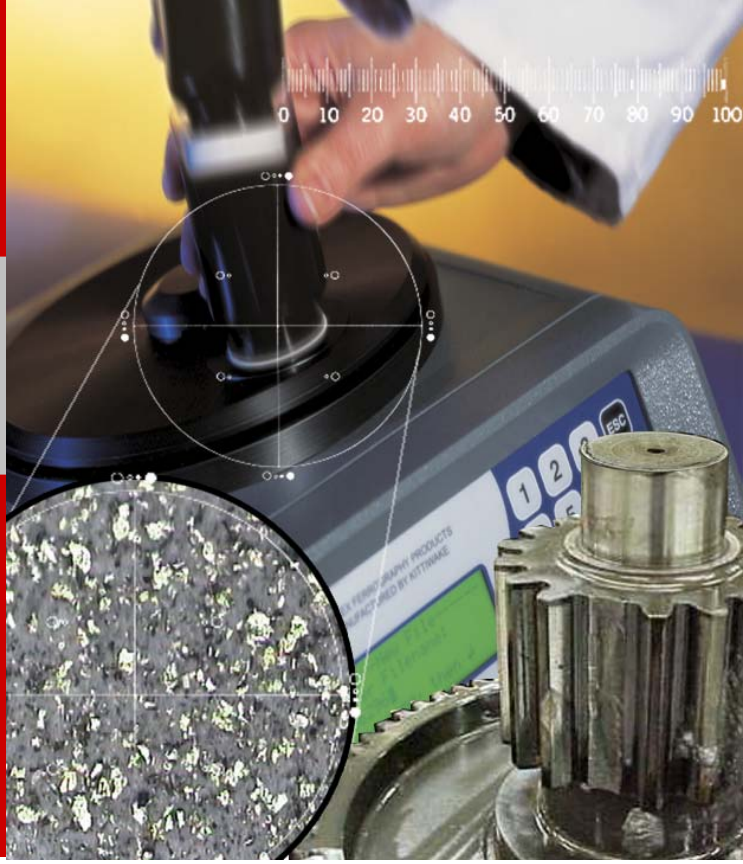
Ferrous Particle Analysis

Identifying Wear of Ferrous Components

PQ Analysis



PQ ANALYSIS QUICKLY AND EASILY IDENTIFIES LARGE FERROUS WEAR PARTICLES PRESENT IN THE LUBRICATING OIL IN TIME TO CONDUCT DETAILED ANALYSIS TO PINPOINT AN IMPENDING FAILURE.

OVERVIEW

- Easy screening test to identify both small and large ferrous wear particles.
- Provides a PQ Index that can be trended from sample to sample.
- Picks up some wear modes that are invisible to spectrographic analysis.
- A relatively inexpensive test that provides an early warning of impending equipment failure.

BENEFITS

Many large industrial systems generate ferrous wear particles when they are in an abnormal wear mode. These large particles are *invisible* to traditional techniques like spectrographic analysis. In fact analytical ferrography was developed to provide for the assessment of wear particles in oil as a result. The disadvantage of analytical ferrography, however, is that this test is time consuming, and therefore costly.

The fact that PQ can be done easily makes this measurement an essential tool in any used oil analysis program. PQ Analysis can be used to quickly identify the presence of larger ferrous particles (greater than 5-10 microns) missed by other more expensive analytical techniques like spectrographic analysis.

PQ Analysis detects and measures the mass of ferrous wear debris within a lubricant sample irrespective of the size of the wear particles present. The result is reported as a PQ Index. The PQ Index can be trended over a wide range of ferrous debris content and particle sizes, making this test suitable for turbines through to gearboxes.

Through consistent and regular sampling, the PQ Index highlights important trend indicators for the early detection of abnormal wear conditions and impending machinery failure. In this manner the PQ Index can be used as a screening check to quickly identify samples that require further detailed analysis such as analytical ferrography.

When utilized in conjunction with a regular oil analysis program, PQ Analysis provides an early warning of the large wear particles that are a sign of impending failure. The warning is early enough so that additional testing, such as analytical ferrography, can be used to pinpoint the exact wear condition, and allow for more decisive maintenance decisions.

WEAR CHECK

THE LEADER IN OIL ANALYSIS

Ferrous Particle Analysis

Identifying Wear of Ferrous Components

EXAMPLES OF PQ ANALYSIS FINDINGS

PQ: 60 Iron: 286

Oftentimes when only spectrographic analysis is conducted, only the part per million (ppm) metal values are available. In this case the iron reading is 286 ppm. In a typical system this is a high reading for iron and indicates abnormal wear.

The PQ Analysis, on the other hand, indicates a reading of 60. When factored with the 286 ppm iron reading this indicates that the iron is not as the result of abnormal wear, but rather as the result of corrosive wear, most likely as the result of leaving the oil in the system for an extended period.

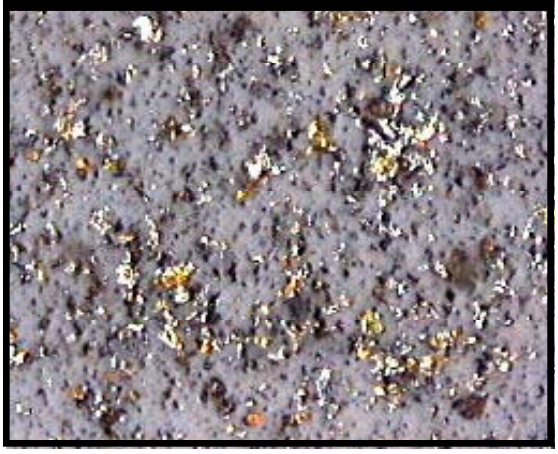
The filter debris patch of the oil confirms this. In the patch we can see that the iron is actually fine corrosive wear, and not abnormal component wear.

PQ: 66 Iron: 64

In this next example, we can see that both the ppm iron level and the PQ analysis index are very close. As a result we know that the iron particles present in the oil sample are most likely small wear particles. For most gear systems, this is a typical analysis, and so the report is normal.

The particle debris patch, in fact, confirms this analysis. We can see a moderate amount of small wear particles for this system.

PQ: 82 Iron: 12



In this final example, we see the opposite of the first example. Now the ppm iron reading is quite low, and the PQ index is much higher. Although the PQ reading is not dramatically higher than in either of the previous two examples, the fact that the ppm iron value is so low is an obvious indication that the iron in this oil sample is large ferrous wear particles.

The filter debris patch again confirms this analysis. The oil does contain a large amount of considerably large wear particles. This equipment is approaching a catastrophic failure. Had we only done spectrographic analysis (iron ppm levels) we would have entirely missed this condition.

Samples that have already been analyzed* can be upgraded to include PQ Analysis simply by phoning the laboratory and requesting this additional test.

**- Testing can only be conducted if samples are still in storage at the laboratory. Samples are typically stored for a period of 2 months prior to disposal.*

WEAR CHECK

THE LEADER IN OIL ANALYSIS

WearCheck Canada Inc. C8-1175 Appleby Line, Burlington ON, L7L 5H9 Tel 905-569-8600 **Toll-free** 1-800-268-2131 **Fax** 905-569-8605 **URL** http://www.wearcheck.com

WC-PQ-ANALYSIS-2008-04-25