

Remaining Useful Life (RULer)

Measuring the Amount of Remaining Anti-oxidants

Linear Sweep Voltammetry

THE RULER USING LINEAR SWEEP VOLTAMMETRY DETERMINES THE EXACT AMOUNTS OF REMAINING ANTIOXIDANT IN THE OIL PROVIDING YOU WITH ABILITY TO EXTRACT THE FULL POTENTIAL FROM YOUR LUBRICANTS WITHOUT RISKING EQUIPMENT DAMAGE.



OVERVIEW

- Allows for the extension of oil drains without the risk of equipment damage.
- Easy to understand RUL (remaining useful life) measurement makes maintenance decisions easy.
- Testing can be conducted routinely, by exception, or as a yearly adjunct to the regular testing package.
- Suitable for use with gas and steam turbine oils, hydraulic oils, compressor oils, aircraft engine oils, ester-based hydraulic fluids and gear oils.



BENEFITS

In industrial equipment like turbines, compressors, injection moulding machines, and large hydraulic systems the oil may be in use for many years before a complete oil change. Although these oils are designed for long term lubrication, over-extending the lubricant to the point where base oil degradation occurs will lead to equipment damage.

As oils oxidize during operation, lubricant degradation products are formed. Many of these products are highly acidic, and negatively affect the acid level of the oil. All industrial oils are lubricated with anti-oxidant additives to combat the effect of oil oxidation, and to prevent rapid oil degradation. At the point where less than 25% of the anti-oxidants remain in the oil the base oil begins to degrade, leading to irreversible chemical changes to the lubricant.

Until now the RPVOT (Rotating Pressure Vessel Oxidation Test) was the sole method for determining the remaining useful life of the oil. Unfortunately the RPVOT does not determine the exact amount of anti-oxidants present in the oil and often, based solely on this test, lubricants are overextended causing equipment damage.

Now with Linear Sweep Voltammetry, oil analysis has a tool to accurately determine the level of antioxidants in used oil. The RULer uses Linear Sweep Voltammetry to provide you with the exact amounts of aminic and phenolic anti-oxidants present in the oil. Knowing the exact amount of remaining anti-oxidants in the oil allows operators to maximize the potential life of the lubricant without taking the risk of damaging critical equipment.

When utilized in conjunction with a regular oil analysis program, linear sweep voltammetry provides confidence in determining proper oil change intervals. In the long-term this can mean the difference between cost savings as the result of safely extending oil drains versus major equipment damage and failure as the result of harmful lubricant degradation. damage and failure as the result of harmful varnish build-up.

WEAR CHECK

THE LEADER IN OIL ANALYSIS

Remaining Useful Life (RULer)

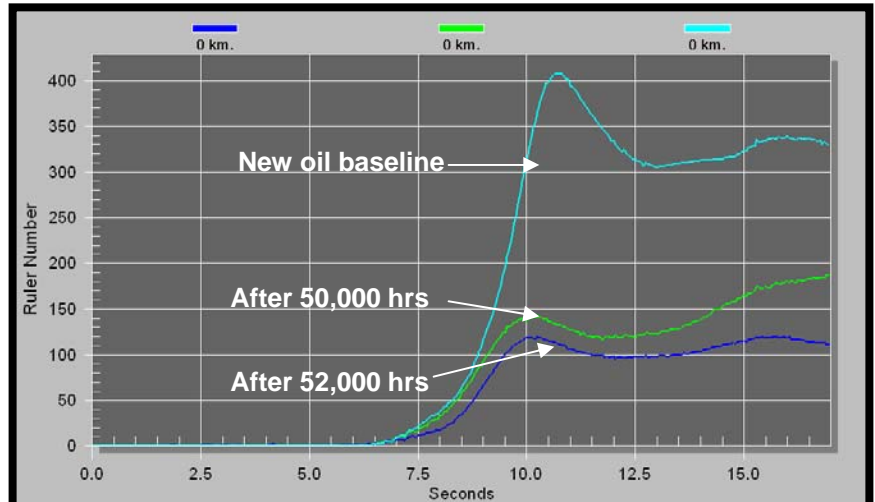
Measuring the Amount of Remaining Anti-oxidants



LINEAR SWEEP VOLTAMMETRY

RULer –

The RULer graph to the right demonstrates the ability to monitor the remaining amount of anti-oxidants present in the turbine oil. The new oil is pictured on top, and the 50,000 and 52,000 hrs samples are compared to this baseline.



System Details

Component: **Steam Turbine**
 Oil Type: **Turbo ISO 46**
 Oil Capacity: **10,000 Litres**

Maintenance Findings

An outage for a steam turbine was planned in 2 years time. The operators wanted to know if the oil would be suitable for use until the outage. Traditional oil analysis testing only shows that the viscosity and AN are within specification, however, a more conclusive results was required. RULer testing 3 months ago showed that the oil had 29% remaining anti-oxidants. The most current sample shows 27% remaining. **The oil will continued to be tested every 3 months until the RULer result is < 25% at which point a recommendation will be made to either change the oil (if this can be timed with the outage) or to drain off a portion of the oil and sweeten until the outage.**

Date	Base	Current	3 months ago
Time on Unit (hrs)		176186	174208
Time on Oil (hrs)		51920	49942
Air Release (min)	2	7	7
Foam I (tend/stab)	20/0	160/0	140/0
Color (ASTM)	1	3	3
Viscosity 40°C (cSt)	47.8	48.9	48.7
AN (mg/KOH/g)	0.07	0.11	0.11
P (ppm)	0	2	2
RULer (%)	100	27	29



Samples that have already been analyzed* can be upgraded to include Linear Sweep Voltammetry (RULer) 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.*



THE LEADER IN OIL ANALYSIS

© 2009 WearCheck. All Rights Reserved. All illustrations, photographs and specifications within this literature are based on the latest service information. Discuss actual service with a local WearCheck agent for complete accuracy. For information on additional options, contact your WearCheck agent. All service and product brand names are WearCheck trademarks.

WearCheck USA. 501 Madison Ave., Cary, NC, 27513 Tel 919-379-4102 Toll-free 1-800-237-1369 Fax 919-379-4050 URL <http://www.wearcheck.com>
 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.ca>