



SpectrOil 100 Series

OPTICAL EMISSION SPECTROMETER FOR ELEMENTAL ANALYSIS OF WEAR METALS, ADDITIVES AND CONTAMINANTS

SpectrOil Advantage

SpectrOil RDE technology is a proven means of precisely determining elemental composition in engine oil, coolant, fuel, grease, process water, and a wide variety of critical operating fluids. For decades this robust technology has been used as both a quality control tool and machine health monitor.

MACHINE HEALTH

Oil is the lifeblood of equipment, and oil analysis provides unique insights into machinery health. As a result, wear metals analysis with SpectrOil 100 is the backbone of used oil analysis programs, enabling effective condition-based maintenance programs.

FLUID QUALITY CONTROL

The precision of RDE spectrometry enables reliable, low concentration measurement of additive packages or harmful contaminants in virgin fuels, blended oil, coolants and wash down water.

The SpectrOil 100 Rotating Disc Electrode Optical Emission Spectrometer (RDE-OES) is the eighth generation of the market leading RDE elemental spectrometer. It is widely used in industrial plants commercial oil laboratories, on-site or trailer labs, as a proven means of precisely determining elemental composition in lubricating oil, coolant, light or heavy fuels, grease, and process water. It is also a key component of on-site (point of care) oil analysis systems in addition to production, QC, race team support and tribology laboratories.

Provides precise and reliable results

- Simultaneous multi-element analysis
- Repeatable and sensitive fluid characterization
- Conforms to ASTM-D6595 (oil), and ASTM-D6728 (fuel)

Fast and easy to operate

- No sample preparation required
- No solvents or gasses required
- Quick 30 second analysis time
- Minimal training/background required to operate

Immediate results on-site

- Analysis at your facility
- Bench-top, transportable system
- Low cost per sample

SpectrOil 100 Series

Laboratory Precision

At the core of the SpectrOil 100 is a precision Rotating Disk Electrode Optical Emission Spectrometer (RDE-OES).

- Measure sub-ppm elemental concentrations with high-purity carbon electrodes.
- Detect elements in solutions or particles as large as 10µm with RDE's precision pulsed-power, high-temperature plasma.
- Accurately identify elements in a wide variety of substances without sample preparation or dilution.



On-site Simplicity

The simplicity and ease of using the SpectrOil 100 enable RDE technology to be brought to on-site inspection and condition-based maintenance sites.

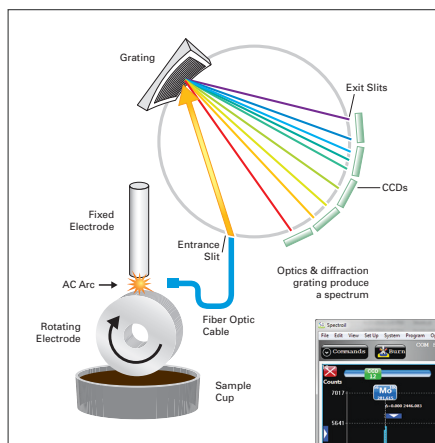
- The disposable electrodes and sample cup facilitate rapid sample changes and ensure contamination free measurements.
- Without the purge gas or sample dilution required by other technologies, the simple RDE-OES steps are: Pour your fluid, close the door, and press START.
- The sophisticated analytics are automated, so no highly skilled or trained users are required. Just follow the simple steps and read the elemental results.



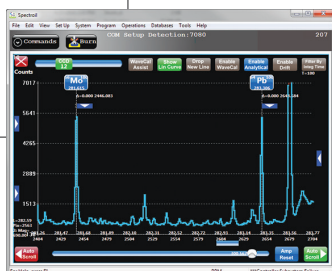
HOW IT WORKS

The RDE-OES technology utilizes a high-purity carbon electrode to transmit high-voltage electricity across a small gap to a nearby carbon disk. The rotating disk is partially submerged in a miniature cup of fluid sample and continuously carries the sample into the electrical discharge gap between electrodes. When the electricity arcs across the gap containing the sample, it forms a high-temperature plasma which emits a unique, sample-dependent spectrum of light from the ultraviolet, through the visible, and into the infrared wavelengths. The emitted light is collected and fiber-optically coupled to the SpectrOil 100's sensitive optics, which includes a diffraction grating to sort the light by wavelength and focus it onto an array of highly sensitive CCD cameras. Sophisticated spectral analysis software

processes the CCDs' spectra to precisely determine concentration of dozens of elements with sub-ppm precision.



Schematic of how a SpectrOil analyzes a fluid sample to determine sub-ppm elemental content.



APPLICATIONS

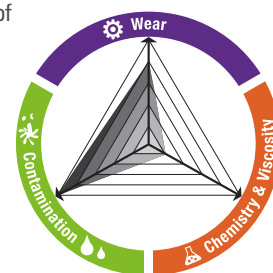
Oil & Grease Condition Monitoring

Detecting and quantifying elemental wear in lubricants enables a rapid, non-invasive determination of machine condition, while monitoring for additive depletion ensures that lubricating fluids continue to protect critical assets according to ASTM-D6595.

WEAR: Quantify elemental composition of wear debris to determine the location and severity of component wear.

CONTAMINATION: Detect unexpected elements to indicate fouled air filters, coolant leaks, sea water ingress, or dirt ingestion.

CHEMISTRY: Measure additive package depletion to ensure expected oil protection.



Fuel & Lubricant Quality Control

SpectrOil is used to ensure composition and quality of petrochemicals from crude through the final blended product to ensure that processing is acceptable and to protect finished fuel against trace contamination through handling, storage, and to the user in accordance with ASTM D-6728.

Coolant Condition Measurements

Analyzing in-service coolant is a quick and accurate means of ensuring that it continues to provide the required corrosion protection and heat transfer.

Process Water Condition Analysis

Measuring contamination in a variety of applications like power plant cooling water and turbine wash water provides unique system condition insights and ensures compliant disposal or reuse.

Spectroil 100 Series Programs and Calibration Ranges in ppm

			Commercial 24	Commercial Extended 24+7	Aviation 15	Aviation 20	Aviation 30	Synthetic Aviation POE/Turbo	Fuel	Low Detection Fuel (LD)	Glycol	Water	Engine Basic
P/N->			M99947	M99948	800-00226	800-00225	800-00183	M99950	M99977	M99949	M99903	M99917	110E only
Elements Tested			24	31	15	20	30	8	15	15	13	7	15
Element	Symbol	Common Source	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)	Range (ppm)
Silver	Ag	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	x	x	x	x	0-1,000
Aluminum	Al	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	0-500	0-100	0-50	x	0-1,000
Boron	B	Contaminants/Additives	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	x	x	x	0-1,000	x	0-1,000
Barium	Ba	Additives	5-6,000	5-6,000	x	0-10,000	0-1,000	x	x	x	x	x	x
Calcium	Ca	Contaminants/Additives	0-6,000	0-6,000	x	0-10,000	0-1,000	x	0-500	0-100	0-50	0-5	0-3,000
Cadmium	Cd	Wear Metal	0-1,000	0-1,000	x	0-1,000	0-1,000	x	x	x	x	x	x
Chromium	Cr	Wear Metal/Additives	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	0-500	0-100	x	x	0-1,000
Copper	Cu	Wear Metal/Additives	0-1,000	0-1,000	0-1,000	0-10,000	0-1,000	0-50	0-500	0-100	0-50	x	0-1,000
Iron	Fe	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	0-500	0-100	0-50	0-5	0-1,000
Potassium	K	Contaminants	0-1,000	0-1,000	x	0-1,000	0-1,000	x	0-500	0-100	0-1,000	0-5	x
Lithium	Li	Contaminant	0-1,000	0-1,000	x	x	0-1,000	x	0-500	0-100	x	0-5	x
Magnesium	Mg	Wear Metal/Additives	0-6,000	0-6,000	0-1,000	0-10,000	0-1,000	0-50	0-1500	0-100	0-50	0-5	0-3,000
Manganese	Mn	Wear Metal	0-1,000	0-1,000	x	x	0-1,000	x	0-500	0-100	x	x	x
Molybdenum	Mo	Wear Metal/Additives	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	x	x	x	0-500	x	x
Sodium	Na	Contaminants	0-6,000	0-6,000	0-1,000	0-1,000	0-1,000	x	0-500	0-100	0-1,000	0-5	0-3,000
Nickel	Ni	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	0-500	0-100	x	x	0-1,000
Phosphorus	P	Additives	10-6,000	10-6,000	x	10-10,000	0-1,000	x	x	x	0-2,500	x	0-3,000
Lead	Pb	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	x	0-500	0-100	0-50	x	0-1,000
Silicon	Si	Contaminants/Additives	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	x	0-500	0-100	0-500	0-5	0-1,000
Antimony	Sb	Wear Metal	0-1,000	0-1,000	x	x	x	x	x	x	x	x	x
Tin	Sn	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	x	x	x	x	x	0-1,000
Titanium	Ti	Wear Metal	0-1,000	0-1,000	0-1,000	0-1,000	0-1,000	0-50	x	x	x	x	x
Vanadium	V	Wear Metal	0-1,000	0-1,000	x	x	0-1,000	x	0-500	0-100	x	x	x
Zinc	Zn	Wear Metal/Additives	0-6,000	0-6,000	0-1,000	0-10,000	0-1,000	x	0-500	0-100	0-50	x	0-3,000
Bismuth	Bi	Wear Metal	x	0-100	x	x	0-100	x	x	x	x	x	x
Arsenic	As	Contaminant	x	0-100	x	x	0-100	x	x	x	x	x	x
Indium	In	Wear Metal	x	0-100	x	x	0-100	x	x	x	x	x	x
Cobalt	Co	Wear Metal/Additives	x	0-100	x	x	0-100	x	x	x	x	x	x
Zirconium	Zr	Wear Metal	x	0-100	x	x	0-100	x	x	x	x	x	x
Tungsten	W	Wear Metal	x	0-100	x	x	0-100	x	x	x	x	x	x
Cerium	Ce	Wear Metal	x	0-100	x	x	0-100	x	x	x	x	x	x
	Matrix		Mineral - 75 cSt	Mineral - 75 cSt	Mineral - DTL 85694	Mineral - DTL 85694	Mineral - DTL 85694	POE- 3514	Mineral - 75 cSt	Mineral - 75 cSt	Glycol	Water	Mineral - 75 cSt

MODEL	CALIBRATION INCLUDED	OPTIONAL CALIBRATION
120C	M99947	Any above
120F	M99977	Any above
110E	110E	None

SpectroOil 100 Product Information

PRODUCT INFORMATION	
Part #	Spectro-[Model]-[Hz]-[Volts]
Applications	Mineral and synthetic lubricants, distilled fuel, heavy fuel oil (HFO), crude, glycol coolants and turbine washdown water
Output	Concentration mg/kg (ppm)
Methodology	ASTM D6595; D6728
Standard Analytical Range	Up to 31 elements from Li to Pb Typically 0-1000ppm (varies by application)
Calibration	Factory set, no maintenance required
Excitation Source	Oscillatory arc discharge, JOAP characteristic
OPTICAL SYSTEM	
Optical System	Pashen-Runge polychromator optic (Rowland Circle Alignment)
Spectral Range	203 nm to 810 nm
Temperature Control	Thermally Stabilized; 40°C ± 1°C
Detectors	CCD proprietary design for frequency range of interest
OPERATIONAL SPECIFICATIONS	
Sample Volume	2 mL of fluid
Solvents/Reagents	None
Ambient Operating Temperature	0° to 40°C (32°F to 104°F)
Relative Humidity	0 to 90%, non-condensing
USER INTERFACE SPECIFICATIONS	
Software/Operating System	Windows 10 Pro, 32 or 64 bit, US English version
Display	External Monitor
Data Storage	External PC
Data Transfer	USB
Data Entry	External Keyboard and Mouse
POWER REQUIREMENTS	
Voltage Input	AC 120/240V, 50/60 Hz
Power Consumption	500 Watts at test
Fusing	10 amps
MECHANICAL SPECIFICATIONS	
Dimensions	70.6 cm (H) x 38.4 cm (W) x 66 cm (L) (27.8 in x 15.1 in x 26 in)
Weight	70 kg (154 lbs)
Shipping Package Dimensions	121.9 cm (H) x 63.5 cm (W) x 109.2 cm (L); (48 in x 25 in x 43 in)
Shipping Package Weight	150 kg (330 lbs)
COMPLIANCE	
CE Mark: EMC Directive (2004/108/EC); RoHS	



RECOMMENDED CONSUMABLES

P-10524	2 ml, Sample Holder High Temperature (1000/pkg, black)
M97008	Graphite Disc D-2 AGKSP 500/Box
M97009	Graphite Rod .24x6" AGKSP Pkg/50
M97200	Mil spec Graphite Disc
M97201	Mil spec Graphite Rods

Use Spectro Scientific certified consumables and standards to ensure the accuracy and repeatability of your measurements.