



# SpectrOil 100 Series

MARKET-LEADING RDE-OES SPECTROMETER  
FOR ELEMENTAL ANALYSIS

## SpectrOil Advantage

SpectrOil RDE technology is a proven means of precisely determining elemental composition in engine oil, coolant, fuels, 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 thus 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 and enables 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 precision of SpectrOil 100 makes it an essential fluids analysis tool in QC labs, and its simplicity and ease of use brings these reliable measurements to on-site predictive maintenance teams.

The SpectrOil 100 is a Rotating Disk Electrode, Optical Emission Spectrometer (RDE-OES) built upon decades of technology development in support of the U.S. Military's Joint Oil Analysis Program (JOAP). This robust technology enables measurements to be made quickly and accurately on a variety of fluid types for condition monitoring and QC.

### 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 110 –

Basic Engine Wear package  
(15 essential elements)

### SpectrOil 120 –

Standard (24 elements) & Extended Range packages (31+ elements); options include Wear Metals, Coolants, Fuels and custom application packages

MODEL	110E	120C	120F	120M
Number of Elements	15	24	15	15
Default Calibration	Lubricating Oils	Lubricating Oils	Light/Heavy Fuel	JOAP
Optional Calibrations	No	Yes	Yes	Yes

# SpectrOil 100 Series

## Laboratory Precision

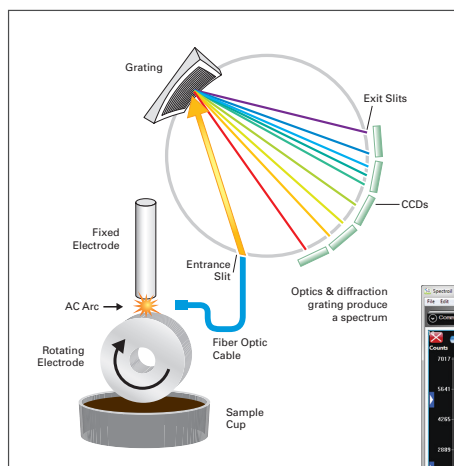
At the core of the SpectrOil 100 is a precision Rotating Disk Electrode, Optical Emission Spectrometer (RDE-OES).

- Measure sub-ppm elemental concentrations with high-purity carbon electrodes.
- Detect elements in solution 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.

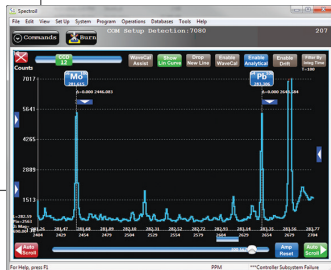


### HOW IT WORKS

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.



## On-site Simplicity

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

- The disposable electrodes & 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.



## 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.

## 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 or Windows 7 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	

## SpectroOil Models and Calibration Ranges in ppm

APPLICATION	110E	120C			120F
	BASIC ENGINE	STANDARD LUBRICANTS	EXTENDED OPTION	COOLANT	FUELS
Ag	0 - 1000	0 - 1000			
Al	0 - 1000	0 - 1000		0 - 50	0 - 500
As			0 - 100		
B	0 - 1000	0 - 1000		0 - 1,000	
Ba		0 - 6,000			
Bi			0 - 100		
Ca	0 - 3,000	0 - 6,000		0 - 50	0 - 500
Cd		0 - 1000			
Ce			0 - 100		
Co			0 - 100		
Cr	0 - 1000	0 - 1000			0 - 500
Cu	0 - 1000	0 - 1000		0 - 50	0 - 500
Fe	0 - 1000	0 - 1000		0 - 50	0 - 500
In			0 - 100		
K		0 - 1000		0 - 10,000	0 - 500
Li		0 - 1000			0 - 500
Mg		0 - 6,000		0 - 50	0 - 1,500
Mn		0 - 1000			0 - 500
Mo	0 - 1000	0 - 1000		0 - 500	
Na	0 - 3,000	0 - 6,000		0 - 10,000	0 - 100
Ni	0 - 1000	0 - 1000			0 - 500
P	0 - 3,000	0 - 6,000		0 - 2,500	
Pb	0 - 1000	0 - 1000		0 - 50	0 - 500
Sb		0 - 100			
Si	0 - 1000	0 - 1000		0 - 500	0 - 300
Sn	0 - 1000	0 - 1000			
Ti		0 - 1000			
V		0 - 1000			0 - 500
W			0 - 100		
Zn	0 - 3,000	0 - 6,000		0 - 50	0 - 500
Zr			0 - 100		
Total#	15	24	+7	13	15

## Consumables & Standards

KITS	
M97007	Consumables Kit for 500 measurements (rod & disk electrodes, sample cups, pipettes, wipes, cleaning solution, swabs, gloves)
M97016	Oil Standards
M97017	Fuel Standards
M97018	Fuel Standards, Low Detection
M97019	Water Standards
M97020	Coolant Standards
M96380	Routine Maintenance Kit

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