



Military Ground Vehicles

FieldLab 33M is a battery-powered, integrated oil analysis system that provides quick and comprehensive oil analysis in the field.

Military service professionals managing fleets of high-value assets require portable, lightweight devices that provide rapid oil analysis results with quality similar to oil analysis labs. Funded by the United States Department of Defense (DoD) in 2009, then developed and commercialized by Spectro Scientific, the FieldLab 33M Expeditionary Fluid Analysis System (EFAS) was designed.

The FieldLab 33M is a Tier I solution that provides the ability to perform CBM (condition based maintenance) and warn of impending component failures by monitoring fluid chemistry, viscosity, and ferrous debris.

Key Features

- Rugged design with battery power for on-site field use
- No solvents or chemicals required
- Complete oil analysis lab with 3 technologies integrated into a small case
 - Ferrous debris analyzer
 - Infrared (IR) spectrometer
 - Kinematic viscometer (40°C)
- 3 tests generate up to 10 oil analysis parameters in less than 5 minutes
- Built-in controller for measurement, data, and asset with touch screen interface
- Uses only 2 ml of oil
- ASTM compliant

See also the FieldLab 58M as a Tier II solution that provides fluid chemistry, viscosity, and a comprehensive analysis of particles and wear (13 elements).

TRANSPORTATION

ENGINEERING

GENERATORS

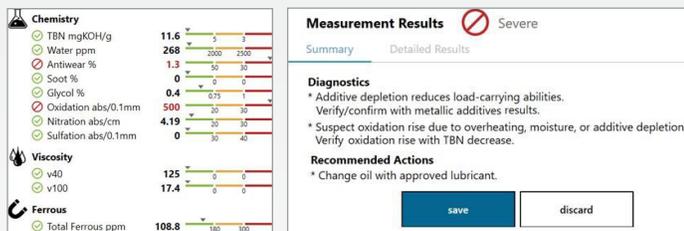
ORDNANCE

FieldLab 33M COMPLETE IN-SERVICE OIL ANALYSIS LAB IN THE FIELD

Easy to Use

- No solvents or reagents and small sample volumes required
- Intuitive Interface and simple workflow minimizes human error
- Built-In Video Instruction for inexperienced users

Comprehensive Report and Adaptive Rules Engine



- Easy to read oil analysis report with clear Observations, Diagnostics, and Recommended Actions.
- Factory alarm limit tables for common components
- User-customizable alarm limits and diagnostic sets for continuous improvement over time

Optional Interface with TruVu 360 Fluid Intelligence Software

- Summary dashboards for visibility into asset condition and fleet readiness
- Management dashboard for CBM oil-analysis program management views of cost savings and program key performance indicators (KPIs)

KEY PARAMETERS



MACHINE WEAR

> Ferrous debris analysis in ppm



CONTAMINATION

> Water, glycol, soot



CHEMISTRY & VISCOSITY

> Oxidation, nitration, sulfation, TAN, TBN

> Viscosity @40°C, calculated viscosity @100°C

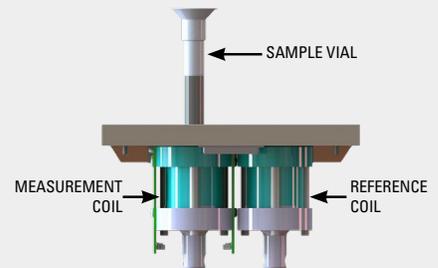


PRINCIPLES OF OPERATION

Ferrous debris analysis – ASTM D8120

The core of the ferrous debris analyzer is a pair of precision-rounded coils that when powered generate magnetic fields. When a small amount of in-service oil is inserted into one of the coils, ferrous particles such as iron, nickel and cobalt interact with the magnetic field and introduce current changes in the coils. The amount of current change is proportional to the amount of ferrous particles in the oil, calibrated in weight by parts per million (ppm).

 > WEAR  > PARTICLE CONTAMINATION



Schematic of Coil Around Sample

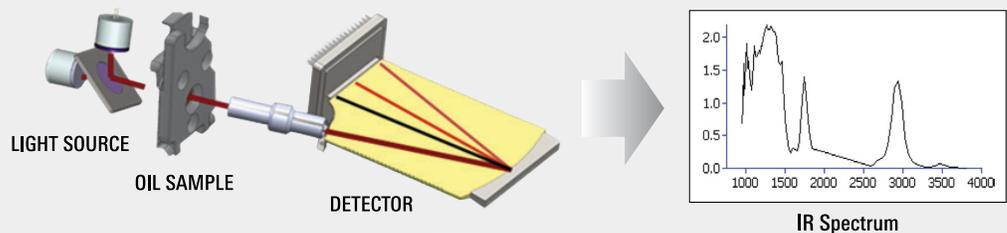


Fluid chemistry and contamination – ASTM D7889

 > CHEMISTRY  > WATER

The IR spectrometer measures the chemistry of the lubricant and contamination in one minute using only one drop of oil; no chemicals or solvents are required. It combines ease of use, ruggedness and laboratory precision in a small package, which is ideal for field use.

The oil condition parameters measured by FluidScan include oxidation, nitration, sulfation, anti-wear additive, Total Base Number (TBN), glycol, soot, and water for engine oil; and oxidation, Total Acid Number (TAN), and water for rotating machine lubricants such as gear oil, transmission oil and hydraulic oil.

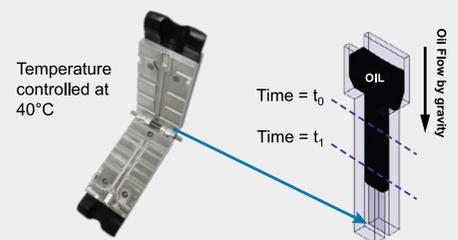


Viscosity – ASTM D8092

 > VISCOSITY

Viscosity is measured using a temperature-controlled kinematic viscometer with a patented split-cell design.

A funnel, with a 100 micron gap, is formed in the center of the cell. Optical sensors in the cell detect the flow of oil under the influence of gravity. The time it takes the oil to flow through the cell is proportional to the viscosity of the oil. When open, the cells can be cleaned using a non-abrasive wipe. No solvents are required.



$$\text{Kinematic Viscosity (40°C)} = A * (t_1 - t_0) + B$$

*A and B are calibration coefficients



FieldLab 33M Product Information

PRODUCT INFORMATION	
Part Numbers	800-00154 FieldLab 33M
Applications	Mineral and synthetic lubricants including gear, engines, transmissions, hydraulics, turbine as well as military, marine and mining applications In-service grease, optional
OPERATIONAL SPECIFICATIONS	
Sample Volume Required (all tests)	2ml
Sample Time Required	Less than 10 minutes through all 3 tests
Ambient Operating Temperature	0° to 40°C
Operational Humidity	RH< 80% non-condensing
Ambient Altitude	Up to 5,000 meters (16,404 feet)
USER INTERFACE SPECIFICATIONS	
Display	Color touchscreen display
Data Storage	Internal flash memory, Optional USB thumb drive
Data Transfer	Ethernet, Serial, Optional USB
Data Entry	Desktop software via touchscreen or optional USB keyboard
POWER REQUIREMENTS	
Battery Power Source	Lithium-ion battery pack
Charge Power	110/240 VAC, 50/60 Hz, 12 Watts
Typical Runtime	>3 hours on battery
Recharge Time	<3 hours
MECHANICAL SPECIFICATIONS	
Dimensions	48 cm (L) x 39 cm (W) x 23 cm (H); 19.2" x 15.2" x 9"
Weight	16.5 kg (36 lbs); 35 kg (77 lbs) in transit case
COMPLIANCE	
CENELEC EN 60610-1:2010 EN 61010-2-030 CENELEC EN 61326-2-1 MIL-STD 461 EMI MIL-PRF 28800F Class II Drop Test	

OUTPUTS	
Fluid Chemistry	TAN & TBN (mg KOH/g); Oxidation, Nitration, Sulfation (Abs/.1mm); Water (parts per million); Glycol (% by weight); Soot (% by weight); Incorrect fluid (% by weight); Antioxidant Depletion (% remaining); Antiwear Depletion (% by weight)
Viscosity	Kinematic viscosity @ 40°C Calculated viscosity @ 100°C
Ferrous Debris	Total content by weight in ppm Calibration range 0-2000 ppm; and 2000 to 10,000 Limit of detection of 3 ppm Relative standard deviation of 3%
Methodology	ASTM D7889 (IR) ASTM D8092 (viscosity), ASTM D8120 (Ferrous)
Calibration	Factory, verification standards: NIST traceable verification standards provided
CONSUMABLES – FieldLab 58C (Ground)	
800-00178	FieldLab 33M Consumables Kit (without Verification Fluid), 100 pk
800-00179	FieldLab 33M Consumables Kit (without Verification Fluid), 500 pk
600-00170	FieldLab 33M Verification Fluid
600-00171	FieldLab 33M Standardization Kit



For more info visit: www.spectrosci.com/fieldlab