Spectro Scientific
AMETEK

FieldLab 58MA

EXPEDITIONARY FLUID ANALYSIS SYSTEM



Military Aviation

FieldLab 58MA is a battery-powered, integrated oil analysis system that provides quick and comprehensive oil analysis in the field.

Military and commercial field 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 58 Expeditionary Fluid Analysis System (EFAS) was designed for Military use.

The FieldLab 58 provides the ability to perform CBM (condition based maintenance) and warn of impending component failures by monitoring fluid chemistry, viscosity, particle contamination, and elemental analysis of wear debris.

Key Features

- Rugged design with battery power for on-site field use
- No solvents or chemicals required
- Complete oil analysis lab with 4 technologies integrated into a small case
  - X-Ray Fluorescence (XRF) spectrometer for elemental analysis
  - Filter Particle Quantifier (FPQ) pore blockage particle counter
  - Infrared (IR) spectrometer
  - Kinematic viscometer (40°C)
- 4 tests generate up to 20 oil analysis parameters in less than 10 minutes
- Built-in controller for measurement, data, and asset with touch screen interface
- Uses only 12 ml of oil
- ASTM compliant
- Optional Magnetic Chip Debris (MCD) Tab analysis for aircraft
- Zinc analysis for identifying possible contamination of turbine engine oil with automotive engine oil.

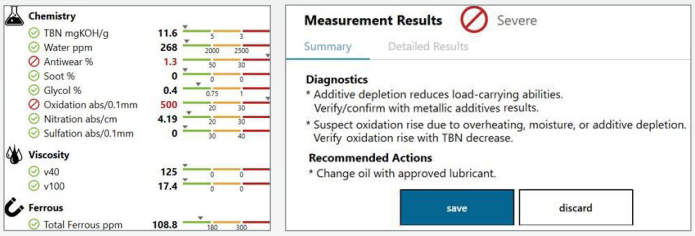
AVIATION | TRANSPORTATION | ENGINEERING | GENERATORS | ORDNANCE

FieldLab 58MA 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

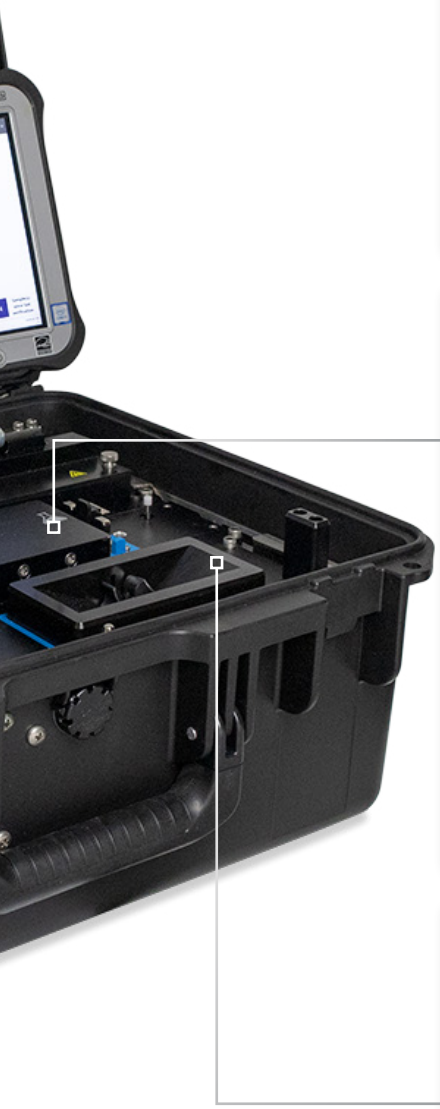
KEY PARAMETERS

MACHINE WEAR
› Up to 16 elements for particles: Si, Al, Cr, Ti, Fe, Ni, Pb, Cu Sn, Mo, Ag, Zn, V, Mg, W, Co

CONTAMINATION
› Particle count, ISO codes
› Water, glycol, soot

CHEMISTRY & VISCOSITY
› Oxidation, nitration, sulfation, TAN, TBN
› Viscosity @40°C, calculated viscosity @100°C





PRINCIPLES OF OPERATION

Particle count and elemental analysis – ASTM D8127

› WEAR › PARTICLE CONTAMINATION

Particle counts are generated using our patented FPQ pore blockage particle counter (ISO 21018-3). It captures the particles of interest for severe wear detection onto a unique filtergram. This debris may now be measured on the companion XRF spectrometer for immediate results in ppm for up to 16 elements.

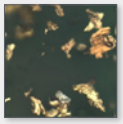
Wear and contamination particles larger than 4 microns deposit on the filtergram, and are tested using an X-Ray Florescence (XRF) spectrometer. The concentration (in ppm) for up to sixteen different elements is reported.

The filtergram coupon can be stored for future analysis, such as microscopic wear debris analysis of particle colors and shapes.

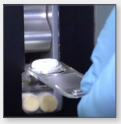




Oil Insertion



Particles



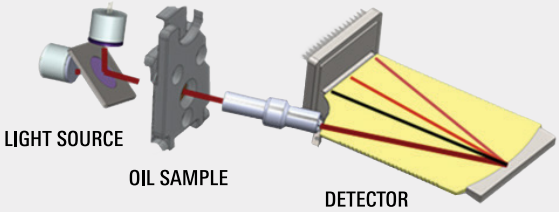
Filtergram

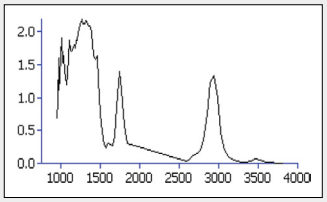
Fluid chemistry and contamination – ASTM D7889

› 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.





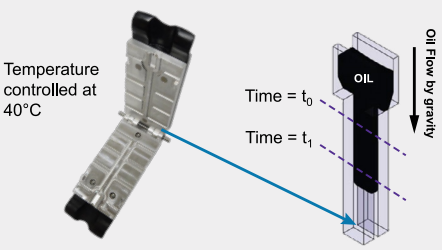
IR Spectrum

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.



Kinematic Viscosity (40°C) = A* (t_1-t_0) + B

*A and B are calibration coefficients

FieldLab 58MA Product Information

PRODUCT INFORMATION	
Part Numbers	FieldLab 58MA: 800-00223, NSN 6650-01-678-4220 FieldLab 58MA-FMS: 800-00263, NSN pending
Applications	Mineral and synthetic lubricants including gear, engines, transmissions, hydraulics, turbine as well as military, marine and mining applications
ELEMENTAL MODULE	
Detector	25 mm2 SDD detector; Peltier cooled
Resolution	122 eV FWHM resolution at 5.9 keV
Excitation Source	X-ray tube with Rhodium target; max voltage 50 kV
OPERATIONAL SPECIFICATIONS	
Sample Volume Required (all tests)	12 ml to run all 4 tests
Sample Time Required	Less than 10 minutes through all 4 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	58MA: Ethernet, serial, optional USB 58MA-FMS: WiFi, Bluetooth
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	Instrument: 19.2 x 15.2 x 9” Instrument in transit case 27.2 x 27.5 x 16.3”
Weight	19 kg (42 lbs); 35 kg (77 lbs) in transit case

COMPLIANCE

CENELEC EN 60610-1:2010
EN 61010-2-030
CENEIEC EN 61326-2-1
MIL-STD 461 EMI
MIL-PRF 28800F Class II Drop Test

EXPORT CONTROL

ECCN 9B610.a

OUTPUTS	
Elemental Concentration (ppm)	Silicon (Si); Aluminum (Al); Chromium (Cr); Titanium (Ti); Iron (Fe); Nickel (Ni); Lead (Pb); Copper (Cu); Tin (Sn); Molybdenum (Mo); Silver (Ag); Zinc (Zn); Vanadium (V) Optional: Tungsten (W), Magnesium (Mg), Cobalt (Co)
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
Particle Count	Particle count #/ml (> 4 µm) ISO Codes 4/6/14 ISO codes >6 and >14 are extrapolated
Methodology	ASTM D7889 (Chemistry) ASTM D8092 (Viscosity) ASTM D8127 (Particles and Elements)
Calibration	Factory, verification standards: NIST traceable verification standards provided

CONSUMABLES – FIELDLAB 58MA (AVIATION/HYDRAULIC)	
000-00034	FieldLab 58MA Consumables Kit, 100 pk
600-00058	FieldLab 58MA Consumables Kit, 500 pk
600-00174	FieldLab 58M/MA Standardization Kit
600-00173	FieldLab 58M/MA Verification Fluid
000-00075	FL58 Cupgram Starter Kit



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

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