Spectro Scientific
Confidence in knowing

FluidScan® 1000 Series

PORTABLE FLUID CONDITION MONITOR

Handheld, Solvent-free, Immediate Results

The FluidScan 1000 Series provides quantitative measurement of a lubricant's condition and plays an important role in predictive maintenance. Using the device, you can eliminate unnecessary oil changes or service by testing not just servicing the oil.

Applications include:

- Mineral and synthetic oils used in gear boxes, engines, transmissions
- Hydraulic systems, turbines and other machinery components
- Biodiesel/Fuel
- Quality assurance of new oils

	FluidScan 1000	FluidScan 1100
Color	**Yellow**	**Blue**
Default library	One free library from FL364 to FL371 at time of purchase	Industrial
Upgradable to full library	Yes	Yes
Total water license	Optional	Optional
Route base analysis	No	Yes
OilView Interface	No	Yes
Intended application	Fleet, marine, military, aerospace, fuel QC	Industrial manufacturing plants, power plants

Rugged Direct Infrared Spectrometer

- No moving parts, designed for handheld and field use applications
- High signal to noise ratio (>7000:1) to ensure high accuracy and repeatability

Easy to use

- Needs just one drop of oil and one minute to test
- No solvents required to clean
- Color-coded, user adjustable alarm limits

Determine when in service oil is no longer fit for use due to liquid contamination or degradation

- Direct immediate measurement of water, TAN and oxidation for lubricants used in gearboxes, turbines and hydraulic systems
- Also measures TBN, water, glycol, soot, additive depletion and oxidation for engine oil

Highly repeatable and reproducible results

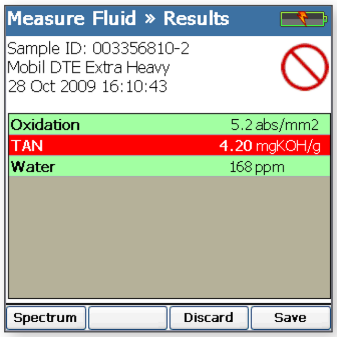
- ASTM D7889 Compliant – "Standard Test Method for Field Determination of In-service Fluid Properties Using IR Spectroscopy"
- High correlation to KF water, TAN and TBN laboratory tests
- Reproducibility and repeatability comparable to benchtop FTIR method ASTM E2412
- Data analysis compliant to ASTM E1655

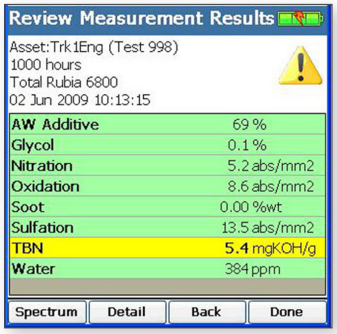
Comprehensive Fluid Library

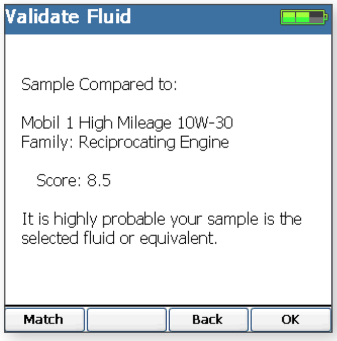
- Over 700 fluids for immediate, out-of-the-box operation
- Results for critical properties such as TAN and water contamination for industrial lubricants or TBN, water, glycol and soot for engine oils

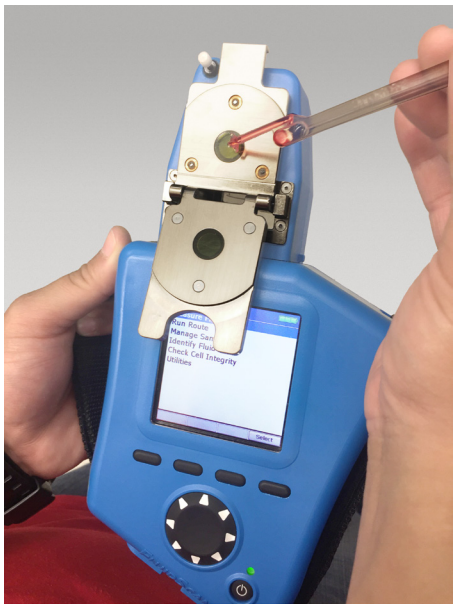
Easy dissolved water & free water measurement

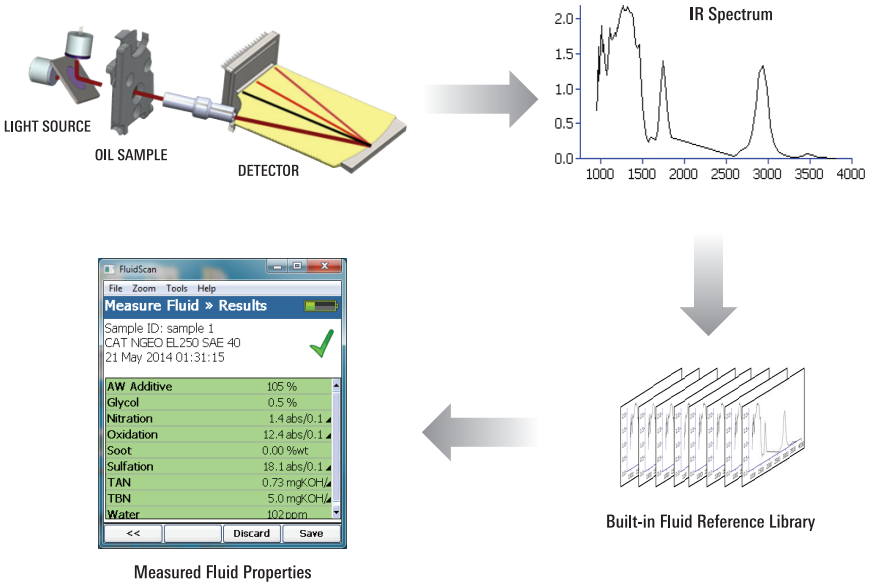
- For both dissolved and free water using homogenization technique
- Solvent free alternative to Karl Fischer titration
- Patented total water algorithm for both dissolved and free water
- Ideal for turbine oil, hydraulic fluids, and rotating machinery oils such as gear oil and compressor oil











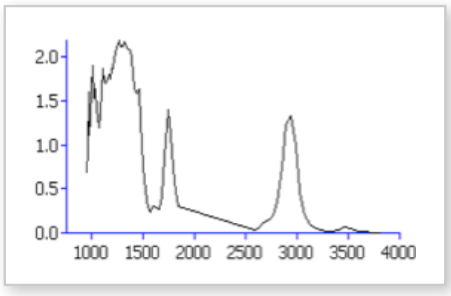
Multivariate Calibrations

The FluidScan® classifies fluids into groups called families based on their chemical makeup, usage and spectral signature. The spectrum of all fluids in each family changes in a similar way with a given amount of degradation or contamination. Family-specific algorithms are assigned that accurately quantify these amounts. These algorithms yield quantitative results for the most critical properties of the most common oil types. Multivariate calibrations are applied so that quantitative readings can be obtained, even with complex, contaminated samples.

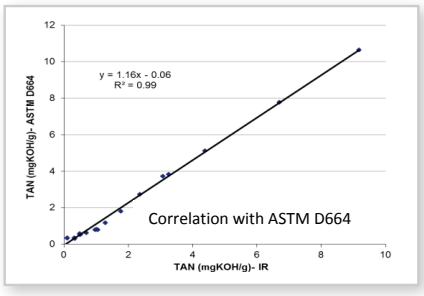
Innovation in hardware and calibration

At the core of the FluidScan is a patented, mid-infrared spectrometer with grating optics and a linear detector array. The spectrometer collects the infrared light transmitted through the fluid in the flip top cell into a waveguide. The waveguide then carries the light to a prism-like diffraction grating that reflects the light into a high-performance array detector which registers the infrared spectrum of the fluid. It provides more than adequate spectral range, resolution and signal-to-noise ratio for the rapid analysis of in-service lubricants.

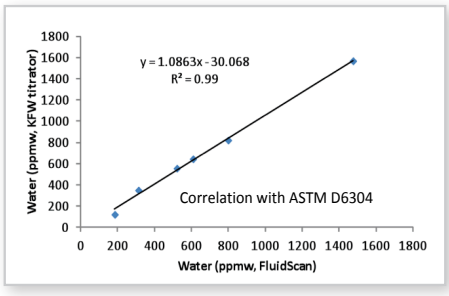
The FluidScan Applications Library includes over 700 oils and growing. Parameters for the oils differ based on oil type so engine oil parameters are different from gear oils. Parameters such as water, TAN or TBN are calibrated according to ASTM methods used in common oil analysis labs with excellent correlation using multivariate calibration methods. Fresh oils not in the library can be matched and added as user fluids, and existing calibration can be applied to the user fluid with custom slope and offset adjustments, if needed.



A typical IR spectrum from FluidScan



TAN correlation to titration



Dissolved water correlation to Karl Fischer

Comparison of FluidScan ASTM D7889 and corresponding IR ASTM methods

OIL PROPERTY	FLUIDSCAN REPEATABILITY	IR REPEATABILITY	IR ASTM
Oxidation (abs/0.1 mm)	0.2	0.68	D7414
Nitration (abs/cm)	0.53	0.078	D7624
Sulfation (abs/0.1 mm)	0.31	0.3	D7415
Antiwear Additive (abs/0.1 mm)	0.38	0.53	D7412
Soot (abs/cm)	0.43	0.9	D7844

Oil category and properties

APPLICATION CATEGORIES	PROPERTIES MEASURED BY FLUIDSCAN
Transmission	Water (ppm), Oxidation (Abs/0.1mm)
Hydraulic – Fire resistant (Phosphate Ester)	Water (ppm), TAN (mg KOH/g)
Hydraulic – Aerospace (Synthetic Hydraulic Fluid)	Water (ppm), Oxidation (Abs/0.1mm), Alien Fluid mineral based (MIL-H-2304) (%), and Alien Fluid engine oil (MIL-H-23699) (%)
Heat Transfer (Quenching Oil)	Water (ppm), Oxidation (Abs/0.1mm)
Industrial (Steam and CCGT Turbine, Hydraulic, compressor, Chiller, Gear, etc.)	Water (ppm), Oxidation (Abs/0.1mm), TAN (mg KOH/g)
Turbine Aerospace (Synthetic Gas Turbine Oil)	Water (ppm), TAN (mg KOH/g), Antioxidant (% depletion)
Engines (Engine oil for different engine types, including Gasoline, Diesel, Heavy Duty Diesel, HFO, Natural Gas, etc)	Water (ppm), Oxidation (Abs/0.1mm), TBN (mg KOH/g), TAN (mg KOH/g) (Natural Gas only), Sulfation (Abs/0.1mm), Nitration (Abs/cm), Soot (%), Glycol (%), Anti Wear (%)
Ethanol in Gasoline	Ethanol (%)
FAME in Diesel	FAME (%)
Biodiesel Feedstock	Water (ppm), FFA %
Biodiesel	Water (ppm), TAN (mg KOH/g), Total Glycerin (%)

Fluid libraries and application categories included

P/N	LIBRARY	OIL CATEGORIES INCLUDED
FL364	Automotive	Engine, Engine-Natural Gas, Hydraulic, Transmission
FL365	Aviation	Compressor, Engine, Hydraulic, Hydraulic – Fire resistant, Hydraulic-Aero, Turbine-Aero
FL366	Fuel QC	Biodiesel, Biodiesel Feedstock, Ethanol in Gasoline, FAME in Diesel
FL367	Industrial	Chiller, Compressor, Engine, Engine-Heavy Duty, Engine-Natural Gas, Gear-Pressure, Gear-Splash, Heat Transfer, Hydraulic, Hydraulic-Fire Resistant, Slideway, Transmission, Turbine-Aero, Turbine-CCGT, Turbine-Steam
FL368	Lab Trend	ASTM Petroleum Engine, ASTM Polyol Ester (Turbine)
FL369	Marine	Chiller, Compressor, Engine, Engine-Heavy Duty, Engine-HFO, Gear-Pressure, Gear-Splash, Hydraulic, Transmission, Turbine-CCGT, Turbine-Steam
FL370	Military	Chiller, Compressor, Engine, Engine-Heavy Duty, Engine-HFO, Gear-Pressure, Gear-Splash, Hydraulic-Fire Resistant, Hydraulic-Aero, Turbine-Aero
FL371	Railroad	Compressor, Engine, Engine-Natural Gas, Hydraulic, Transmission
FL360	All Libraries	All Categories of oils included

Examples of fluid chemistry types included in the library

- Mineral oil-based hydraulic, compression, transmission, turbine and gear blends
- Polyol Esters
- Phosphate Esters
- Organic Esters
- Synthetic hydrocarbon-based hydraulic, compression, transmission, turbine and gear blends
- Ester-based Blends
- Biodiesel
- Diesel Fuel
- Polyglycols
- Polyalkylene Glycols
- Polyalphaolefins
- Polyinternal Olefins

Note: Fluid chemistry in the library is not inclusive. Call Spectro Scientific support for more details before ordering.

Fluid properties and corresponding (compliance or correlation) methods

PROPERTY	
Oxidation	D7889[1]
Nitration	D7889[1]
Sulfation	D7889[1]
AW Additive	D7889[1]
Soot	D7889[1] Gravimetric[2]
TBN	D4739[2]
TAN	D664[2]
Water	D6304[2]
Glycol	Gravimetric[2]
Antioxidant	E2412[2] Gravimetric[2]

Notes:
1. FluidScan complies with ASTM D7889
2. FluidScan correlates to ASTM method for TBN, TAN, Water, and gravimetric method for Glycol, antioxidant

FluidScan Series Product Information

FluidScan can also be ordered in a combination kit with the MiniVisc 3050 portable viscometer. The battery-operated MiniVisc 3050 is a 40°C kinematic viscometer. It uses a few drops of oil to measure viscosity and does not require solvents to clean between samples.

FluidScan 1000 & MiniVisc 3050 Combination Kit

FluidScan 1100 & MiniVisc 3050 Combination Kit

PART NUMBER	
800-00134	FluidScan 1000 (requires SA1001 and Library license to operate)
SA1001	FluidScan standard accessories
800-00139	FluidScan 1000 & MiniVisc 3050 Combination Kit (requires SA1022 and Library license to operate)
800-00135	1100 FluidScan. Requires SA1001 Accessory Kit.
800-00141	FluidScan 1100 & MiniVisc 3050 Combination Kit. Requires SA1022 Accessory Kit.
SA1022	Fluidscan MiniVisc Combination Kit standard accessories
400-00051	Comprehensive Water Solution with Portable Homogenizer and license, 115 V, 50/60 Hz charger
400-00053	Comprehensive Water Solution with Portable Homogenizer and license, 220 V, 50/60 Hz charger
PRODUCT INFORMATION	
Application Library	Mineral and synthetic lubricants including gear, engine, transmission, hydraulics, turbine and biodiesels
Output (varies by fluid type and application)	TAN (mgKOH/g), TBN (mgKOH/g); Oxidation (abs/0.1 mm); Nitration (abs/cm); Sulfation (abs/0.1 mm); Water, ppm (dissolved, dissolved + free water with Comprehensive Water Solution option); Glycol (% by weight); Soot (% by weight); Incorrect Fluid (% by weight); Antioxidant Depletion (% remaining); Antiwear Depletion (% by weight).
Methodology	ASTM D7889, ASTM E1655
Standard Analytical Range	Mid infrared range 950-3850 cm^{-1}
Accuracy	≤ ± 3% of measured value, typical
Repeatability	≤ ± 6% of measured value, typical
Calibration	Factory calibrated to wet chemistry methods ASTM D664 for TAN and ASTM D4739 for TBN. Use Check Fluid for instrument validation.
OPERATIONAL SPECIFICATIONS	
Sample Volume	<100 µL (1 drop)
Solvents/Reagents	None
Ambient Operating Temperature	10°C to 50°C (14°F to 122°F)
Relative Humidity	0 to 100%, non-condensing
Ambient Altitude	up to 5,000 meters (16,404 feet)

USER INTERFACE SPECFICATIONS	
Software/Operating System	Microsoft Windows® CE
Display	320 x 320 transflective color screen
Data Storage	Up to 5,000 analyses
Data Transfer	USB for data updates and synchronization
Data Entry	Directional pad and soft buttons
POWER REQUIREMENTS	
Battery Power Source	Built in Rechargeable Lithium Ion Battery
Power	AC 110/240 V, 50/60 Hz, 10 Watts
Typical Runtime	6-8 hours
Recharge Time	6.5 hours
MECHANICAL SPECIFICATIONS	
Dimensions	24 cm (H) x 14 cm (W) x 7 cm (D) (9.5 in x 5.5 in x 2.75 in)
Weight	1.4 kg (3 lbs)
Shipping package dimensions	45.7 cm (H) x 40.6 cm (W) x 35.6 cm (L) (18 in x 16 in x 14 in)
Shipping pkg weight	8.1 kg, (18 lbs)
COMPLIANCE	
CE Mark: EMC Directive (2004/108/EC); RoHS	
ACCESSORIES & CONSUMABLES	
FL310	IR Check Fluid 5 mL
PV1011	Disposable Non-Abrasive Cleaning Pads; pkg of 500
P-11052	60 µL Disposable Pipettes, package of 500
PV1012	60 µL Disposable Pipettes & Non-Abrasive Cleaning Pad Kit; package of 100 each
FL360	Reference Fluid Application Library – all categories
P-11178	Pipette tips for positive displacement pipette (used with MiniVisc 3050), package of 192

FluidScan 1000 Series consumables

Spectro Scientific
Confidence in knowing

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