

FluidScan® Application Library

Multivariate Calibrations

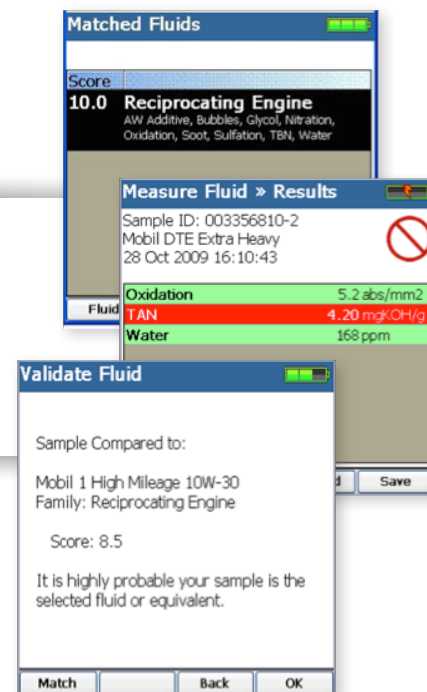
The FluidScan® classifies fluids into groups called families based on their chemical makeup, usage and spectral signature. The spectrum of all fluids in each family changes in a similar way with a given amount of degradation or contamination. Family-specific algorithms are assigned that accurately quantify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

Advantages of FluidScan Application Library

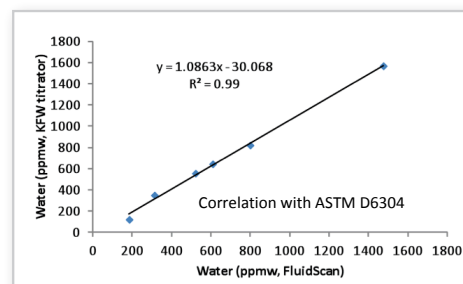
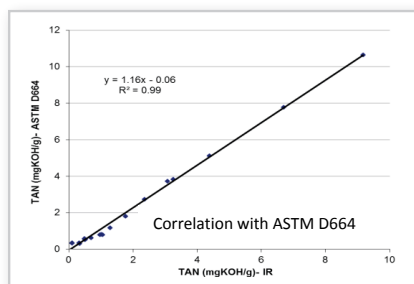
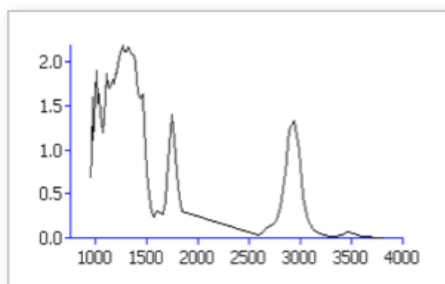
- Preloaded based on application; 12 use type categories with over 450 fluids for immediate, out-of-the-box operation
- Ability to report absolute quantitative results for critical properties such as TAN and water contaminations for industrial lubricants or TBN, water, glycol and soot for engine oils.
- Multivariate calibration highly correlated to laboratory results using KF, Titrators, and gravimetric methods
- Broad application ranging from in service lubrication to biofuel analysis

FluidScan Application Libraries are a set of lubricant and industrial fluid infrared spectra signatures classified into groups based on their fluid chemistry and application.

- ASTM D7889 compliant
- Quantitative fluid properties
- Unique calibration for different fluids for accurate quantitative results
- Validate unknown new fluid to a specific fluid in the library
- Add new fluid into library using the best matched fluid and calibration from the library
- Custom calibrations available for brand fluid families
- Built-in alarm limits based on industrial best practices



FluidScan Q1000



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 Inc. support for more details before ordering.

Fluids 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

Comparison of FluidScan ASTM D7889 and corresponding FTIR ASTM methods

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

Oil category and parameters

OIL PROPERTY	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), 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 (%)

Library licenses and categories of oil 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