## Description of the FluidScan

The FluidScan is a handheld condition based maintenance system that delivers fluid condition assessment based on ASTM International and JOAP standard practices. It protects machinery by determining when a lubricant needs to be changed due to excessive contamination or degradation. FluidScan detects lubricant degradation and contamination by other fluids (water, glycol, incorrect lubricant) at the point of use by measuring key oil condition parameters in both synthetic and petroleum based lubricants and fluids.

The FluidScan analyzes lubricants and fluids using infrared spectroscopy, a technique that has found wide acceptance as a primary test for contamination and degradation. It performs the analyses with the same accuracy as laboratory instruments, but does so onsite in a handheld version. The FluidScan thus reports and stores information on lubricant condition at the point of use.

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v.1.0/ 28 May 2009

# FluidScan Handheld Lubricant Condition Monitor

### FluidScan's Analytical Capabilities

The FluidScan is capable of analyzing oil samples by several methods. Similar to FT-IR spectrometers, the FluidScan will analyze in-service oils using the direct or subtractive methods as described in ASTM International Standard Practice E 2412. The direct method uses no references and merely trends results over time or distance traveled. Variations in results are then indicative of changing physical properties or contamination. The subtractive method requires that clean oil identical to the in-service oil must be analyzed, or a previous analysis of it must be stored in the database. The spectrum from the clean oil is then subtracted from the analysis of the in-service oil and the results are the differences between the two.

The FluidScan, however, has an additional capability to analyze samples and to provide the user with quantitative results using the "Spectral Matching" capability. This is possible because the FluidScan has stored in its memory algorithms for many of the world's most common lubricant types. These algorithms provide a calibration for most lubricant types so that analytical results are given in physical units as follows:

- *TAN (mg of KOH per g)*
- *TBN (mg of HCL per g)*
- *Oxidation*
- *Nitration*
- *Sulfation*
- *Water (parts per million)*
- *Glycol (percent by weight)*
- *Soot (percent by weight)*
- *Incorrect Fluid (per cent by weight)*
- *Antioxidant Depletion (percent)*
- *Antiwear Depletion (per cent by weight)*

Due to the large number of lubricant types and individual lubricants throughout the world, Spectro Inc. is continuously developing new algorithms for the FluidScan. When a customer has a lubricant that does not already have an algorithm stored in memory, contact Spectro Inc. about the process of creating an additional algorithm. The alternative is to use the direct or subtraction methods as described in ASTM E 2412.

## FluidScan Specifications

| Item | Specification |
|---|---|
| Repeatability: | < 3% relative standard deviation within mid-range of measured parameters. |
| Reproducibility: | < 6% of measured parameters within mid-range of parameters |
| Meniscus Detection: | Optical (new and used oils) |
| Measurement Time : | 60 seconds, 30 samples per hour including data entry |
| Calibration: | Not required |
| Oil Types: | Applicable to commercial and military synthetic or petroleum based fluids. |
| Sample Volume: | 1-2 drops of oil |
| Consumables: | None |
| Operating Temperature Range: | -10°C to 50°C |
| Operating Humidity: | 0 to 100%, non condensing |
| Maximum Operating Altitude: | 5,000 meters (16,400 feet) |
| Battery Life: | 6 to 8 hours after a full charge, automatic shut-off to conserve battery |
| Weight: | 1.8 kg (4 lbs) |
| Dimensions: | 17 x 14 x 9 cm (6.5 x 5.5 x 3.5 inches) |
| Operating System: | Windows® CE |
| Display: | 320 x 320 pixel transflective color screen. |
| Alarms: | Pass/fail based on limits for each measured parameter. |
| Flash Memory: | 64 MB |
| Random Access Memory: | 64 MB |
| Data Logging: | Up to 5,000 samples |
| Synchronization: | To SQL database |
| Power Requirements: | Rechargeable battery or 100/220 V, 50/60 Hz with charger |

## Items Included with FluidScan

| P/N | Description |
|---|---|
| FL100 | FluidScan Base Spectrometer |
| FL200 | Flip-Top Cell Assembly |
| FL320 | Software CD, FluidScan Manager (for your PC) |
| FL305 | FluidScan USB Flash Drive |
| FL330 | FluidScan Mobility Case |
| M68270 | Cable USB A-B 1.0 meter |
| FL350 | Manual Handheld Lubricant Condition Monitor |
| P-10719 | Universal Battery Charger - Power Supply |
| FL310 | IR Check Fluid, 10 ml |

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