

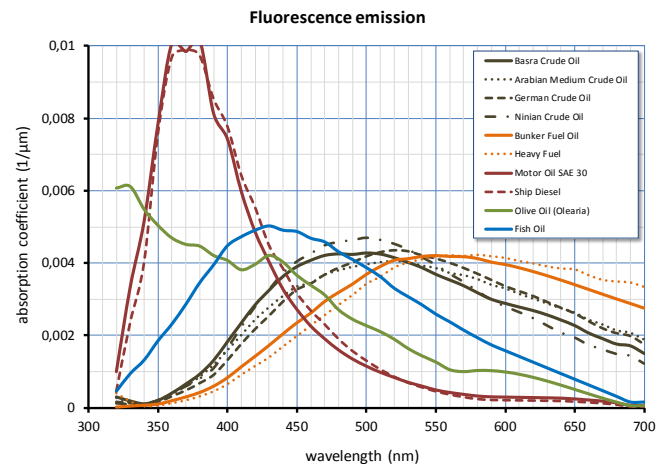
# FL007 Oil in Water Analyzer

## Benefits:

- Unique simultaneous turbidity and UV fluorescence measurement of trace oil in water
- Drift free operation with zero maintenance measurement cell
- User specific calibration for up to 8 different oil types
- Alarm, 4-20mA and Modbus communications (profibus optional)
- User friendly interface with advanced diagnostics and remote management

The Kemtrak FL007 analyzer utilizes a unique dual fluorescence and turbidity measurement technique for continuous monitoring of trace oil and hydrocarbon contamination in water.

Water, when contaminated by oils and hydrocarbons, will become visually turbid or "cloudy". This turbidity can be measured and is directly proportional to the concentration of the non-soluble organic contaminants present. This technique works well for any oil contamination in clean water but results can be affected by entrained gas and solids present in the stream.



Fluorescence emission spectra of typical fluorescing oils

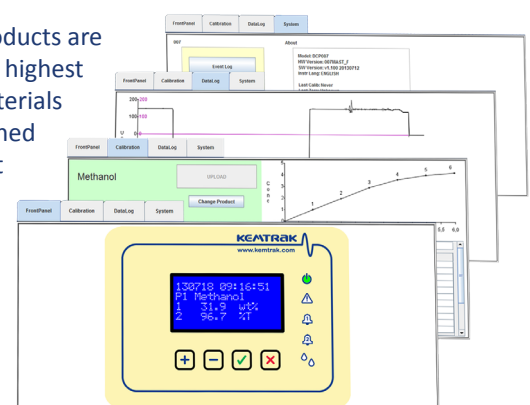
Mineral oils rich in aromatic content will fluoresce when illuminated with ultraviolet light. The intensity of this fluorescence is primarily dependent upon the polyaromatic hydrocarbon (PAH) content of the oil. Typical oils that fluoresce include fuel oil, crude oil, hydraulic oil and transformer oil. Each oil has its own unique fluorescence intensity resulting from its specific PAH content. The combined fluorescence from both dissolved and dispersed oil in water can be measured

and correlated to oil content. Entrained gas and solids present in the stream do not fluoresce and therefore do not affect the measurement. Non-mineral oils may not fluoresce.

The Kemtrak FL007 uses a proprietary dual wavelength ratio measurement technique to simultaneously measure fluorescence and turbidity and provides high confidence in the reported results. Automatic compensation for color and optical window fouling maintains the measurement at a high level of reliability. Built-in advanced diagnostics of measurement cell condition prompts when cleaning is required to ensure trouble free operation.

The FL007 can be calibrated for up to 8 specific oil types/grades. Robust inline measurement cells with scratch resistant sapphire optics have no on-board electronics or moving parts and are suitable for hazardous area use. A native graphical network based interface allows remote operation, calibration, validation and data trending through standard web browsers.

All Kemtrak products are made from the highest quality materials and are designed to the most demanding specifications to ensure long life and the highest reliability.



**Housing**

Stainless steel EN 1.4301 (X5CrNi18-10), AISI 304 (V2A)  
 Captive lid screws & external mounting brackets stainless steel  
 224 x 215 x 105 mm (L x W x D)  
 IP 65 / EN 60529

**Display**

16 x 4 alphanumeric white on blue dot matrix LCD display  
 LED background illuminated  
 Measurement updates every second  
 LED 1 (green): Power on  
 LED 2 (red): System fault  
 LED 3 & 4 (orange): Alarm 1 & Alarm 2  
 LED 5 (blue): Clean / Hold

**Operation**

4 push buttons  
 Remote HTML/Java interface (TCP/IP connection via Ethernet port)

**Software Features:**

- Auto gain: Fully automatic photometer gain switching
- Auto zero: Automatically, locally or remotely activated zero
- Calibration: 8 Products, Concentration & mA output
- Damping: From 0 to 9999s with noise (air bubble / particle) filter
- Memory: Nonvolatile - all data retained upon power failure
- Security: Alphanumeric password protection

**Data Logger**

- >23 000 data points (timestamp, average, max. & min.), ring buffer
- Configurable log time interval 1s to 24hr

**Event Logger**

- >16 000 events, ring buffer
- Timestamp, alarms, zeroing, cleaning, product change, calibration & system events (power, system warning & error messages)

**Automatic Cleaning Control**

- Automatic cleaning sequence, triggering dedicated relay output
- Manual trigger or external trigger via digital input
- Configurable automatic cleaning interval, 15min to 24hr
- Configurable cleaning duration from 0 to 9999s
- Auto-zero after clean option
- Hold value after clean (to equilibrate) 0 to 9999s

**PID Controller**

Control method: Pulse width modulated relay output or 0/4-20mA output  
 Control period: 2 - 99s  
 Proportional gain: 0.0000 - 999 999  
 Integral time: 0.0000 - 999 999s  
 Derivative time: 0.0000 - 999 999s

**Remote Input**

- 5 x Digital input (potential free contact) for:
- Input 1-3: Product/range selection
  - Input 4: Zero, Instant Zero, Clean or Clean & Zero
  - Input 5: Hold (Freeze output) or Data log control

**Light Source**

High performance UV & NIR light emitting diodes (LEDs)  
 Typical lamp lifetime >10 000 hrs

**Turbidity**

Measuring principle: Turbidity in accordance with ISO 7027:1999(E)  
 Nominal Range: 0.1 – 4000 NTU/FNU  
 ca. 0.2 – 8000 ppm oil in water  
 Resolution: Typically < ± 0.05 % of respective measuring range

**Fluorescence**

Measuring principle: UV fluorescence  
 Nominal Range: 0 – 100 FLU  
 ca. 0 – 1000 ppm oil in water  
 Resolution: 0.01 FLU  
 ca. 0.5 – 5 ppm (dependent upon oil type)  
 1 FLU = 1 mg/L quinine sulfate reference calibration solution  
 Important: Turbidity must be less than 100 NTU/FNU for correct operation!

**Linearity**

± 0.5% of respective measuring range

**Accuracy**

Typically < ±2% of reading

**mA Output**

1 x selectable 0 – 20 mA / 4 - 20 mA (NAMUR, max 21.6mA)  
 Optional second mA output  
 Galvanically isolated, tested during final inspection to 500 VDC  
 Accuracy: < 0.1 %  
 Resolution: 0.025 %  
 Load: 0 – 600 Ohm

**Relay Outputs**

1 x 1A 240 VAC Failsafe output (active when system is ok)  
 2 x 1A 240 VAC User configurable (alarm, PID)  
 1 x 1A 240 VAC Automatic cleaning control  
 Fuses: 4x 1A (type: MXT), max 100A breaking capacity  
 LED status indicators flash when relays are active

**Fail-Safe:**

Dedicated relay output, 1A 240 VAC  
 mA output value used to signal a system fault (NAMUR <3.6mA or >21.0 mA)

**Network interface (remote communications):**

TCP/IP, 10Base-T and 100Base-TX Link  
 Connector: RJ45  
 Protocol:  
 1) HTML/Java interface using native protocol over TCP/IP  
 Software: Web browser with Java version 6 or later  
 2) MODBUS server (slave) over TCP/IP (V1.1b3 compliant)  
 Functions: (0x03, 0x04, 0x2B/0x0E - conformity 0x01)

**Operating Conditions**

Ambient temperature: 0°C to +50°C (32°F to 122°F)  
 Transport: -20°C to +70°C (-4°F to 158°F)

**Power Supply**

100 - 240V AC, 50-60Hz, & 22 - 30 VAC/VDC  
 Mains fuse: 1A (type MST), Max breaking capacity 35A

**Power Consumption**

25 VA (max.)

**Certificates**

ISO 9001:2000, CE, ATEX Exd IIB + H2 T6 IP66 Category II 2 G (option)

**Manifolds**

Standard designs include DIN Flange (DIN EN 1092-1), ANSI (ANSI B 16.5 and B53293) Tri-Clamp® (ISO 2852 & DIN 32676), Straight pipe thread (DIN ISO 228 BSP), NPT tapered pipe thread. Line size up to DN100.

**Materials**

Standard material stainless steel 316L (EN 1.4435 or EN 1.4404)  
 Other materials include Titanium Gr 2, Hastelloy C-276 & C-22, Monel 400, PTFE C25 (TFMC, carbon filled Teflon) & PVDF (Kynar)

**Window**

Sapphire, UV Fused silica

**Surface Finish**

Ra < 0.4 µm (on hygienic measurement cells)

**Elastomers**

FPM (FKM, Viton®, Fluorel®), EPDM (FDA), NBR (nitrile), Silicone, FFKM (Kalrez® Spectrum 6375, Kalrez® 6230 FDA) and others

**Operating Conditions**

Ambient & process temperatures up to 250°C (482°F)  
 Process pressure from 10 mbar to 200 bar (0,14 – 2900 psi)  
 Operating conditions subject to material and design in use  
 Higher temperatures available on request.

**Fibre Optic cable**

Silica core photonic fiber with fully-interlocked flexible stainless steel jacket and Kevlar® reinforcement.  
 Terminated with SMA 905 connectors.  
 Lengths up to 100m (328 foot)

**Operating Temperature**

Normal: -60°C to +125°C (-76°F to +257°F), Autoclave.  
 Higher temperature option: -60°C to 250°C (-76°F to +482°F)

**Protection**

IP66 / EN 60529



Kemtrak AB • Box 2940 • SE-187 29 Stockholm • Sweden  
 Info@kemtrak.com • www.kemtrak.com

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Distributor

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