

LISST-BLACK

OIL-SPILL RESPONSE INSTRUMENT

- **Particle Size Distribution**
- **Volume Concentration**
 - **Refined Fuels**
 - **Crude Oil**
 - **Chlorophyll**
- **Beam Attenuation**

The LISST-Black is a self-contained stand-alone instrument for use on profiling packages, towed and remote vehicle applications, for deployment during and after an oil spill event. The system will continuously measure particle size distribution and concentration, along with the fluorescence of refined fuels, crude oil and chlorophyll, as well as beam attenuation.



FEATURES

- Complete package based on LISST-200X integrated with Turner Designs Cyclops-7F fluorometers
- Small angle forward scattering laser diffraction technology
- Measures refined fuels, crude oil, chlorophyll, particle size, concentration, beam attenuation, VSF, depth, temperature
- Self-contained with internal programmable datalogger for autonomous data collection
- Externally powered; short- and long-term deployment battery packs included
- USB connection to PC for programming, offloading and real-time size distribution displays
- Integrated depth and fast response temperature sensors
- Real-time output (s/n 2131 and higher)
- Wide range of accessories available

Fluorometer Performance

The Turner Designs submersible instrumentation modules used in the LISST-Black includes single-channel fluorometers for detection of refined fuels, crude oil, and chlorophyll. Together with particle information from the LISST-200X, this package solution provides a comprehensive picture of potential contamination.

SPECIFICATIONS (subject to change without notice)

Parameters Measured

- Particle size distribution from 1 μm to 500 μm in 36 size ranges
- Depth @ 0.01 m resolution
- Temperature @ 0.01 $^{\circ}\text{C}$ resolution; response time 2.5 s
- Optical transmission @ 0.1 % resolution
- Volume Concentration @ 0.1 $\mu\text{L}\cdot\text{L}^{-1}$ resolution
- Beam attenuation
- Refined Fuels fluorescence
- Crude Oil fluorescence
- Chlorophyll fluorescence

Operating Concentration Range

- Optical transmission from 0.3 to 0.99 (30 % to 99 %)
Concentration from $\sim 0.5 \text{ mg}\cdot\text{L}^{-1}$ to $700 \text{ mg}\cdot\text{L}^{-1}$ (particle-size dependent)

	Minimum Detection	Linear Range
Oil - Fine	0.4 ppm	0-20 ppm
Oil - Crude	1.5 ppm	0-275 ppm
Chlorophyll	0.03 $\mu\text{g}\cdot\text{L}^{-1}$	0-50 $\mu\text{g}\cdot\text{L}^{-1}$

Fluorometer outputs reported in Volts. Absolute calibration, if any, must be executed by users according to their own requirements.

Technology (laser diffraction)

- Small-angle forward laser light scattering
- 670 nm laser diode
- 32-ring custom photodiode Ring detector + 4 large angle detectors
- 25 mm optical path

Mechanical and Electrical

- Dimensions [W×H×L]: 10.03 cm × 13.21 cm × 63.9 cm (3.95" × 5.2" × 25.2")
- Weight: [air / water]: 6 kg / 2.5 kg (13.2 lbs / 5.5 lbs)
- Depth rating: 600 m
- External power input: 12 VDC nominal, 9 VDC to 24 VDC
- Current drain at 12 V: 205 mA Sampling
- Sampling rate: Up to 1 Hz
- Data storage: 1 GB ($\sim 12,000,000$ measurements; ~ 140 days @ 1 Hz)
- SubConn MCBH3M, MCBH5M and MCBH6M connectors
- Refined fuels – EX 290, EM 350
- Crude oil – EX 325 nm, EM 410-600 nm
- Chlorophyll – optical filters: EX 465, EM 496



LISST-Black optics end w/ and w/o protective cover