

LISST-HAB

HARMFUL ALGAE BLOOM (HAB) INSTRUMENT

- **Particle Size Distribution**
- **Volume Concentration**
 - **Phycocyanin**
 - **Phycoerythrin**
 - **Chlorophyll**
- **Beam Attenuation**

The LISST-HAB is a self-contained, stand-alone instrument system for use on profiling packages, towed and remote vehicle applications, for deployment during a HAB event. The system will continuously measure particle size distribution and concentration, along with the fluorescence of Phycocyanin, Phycoerythrin, Chlorophyll, and Beam Attenuation.



FEATURES

- Complete package based on LISST-200X integrated with Turner Designs Cyclops-7F fluorometers
- Small angle forward scattering laser diffraction technology
- Measures Phycocyanin, Phycoerythrin, 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 Phycocyanin, Phycoerythrin, and Chlorophyll. Together with particle information from the LISST-200X, this package solution provides a comprehensive picture of HAB development.

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
- Phycocyanin fluorescence
- Phycoerythrin 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
Phycocyanin	2 ppb ^{PC}	0-450 ppb ^{PC}
Phycoerythrin	0.1 ppb ^{PE}	0-75 ppb ^{PE}
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: 160 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
- Phycocyanin – optical filters: EX 590, EM ≥ 645
- Phycoerythrin – optical filters: EX 531, EM ≥ 590
- Chlorophyll – optical filters: EX 465, EM 496



LISST-HAB optics end w/ and w/o protective cover.