

ENVIRONNEMENT

Fast Track II

A new design that measures aspects of photo-synthetic activity in live chlorophyllcontaining organisms by means of fluorescence.

- Measurement of established (single turnover) dynamic fluorescence parameters as well as direct concentration ($\mu\text{g/l}$)
- High sensitivity ($0.015\mu\text{g/l}$)
- Broad concentration range (0 to $150\mu\text{g/l}$) for both marine and fresh water analysis.



In dynamic mode, a series of rapid, high-intensity 'actinic' light pulses are delivered to the sample volume to induced rapid ($< 200\mu\text{S}$) saturation in all the photosynthetic reaction centres present. Having induced saturation, the instrument allows the PSII reaction centres to open and monitors their progress with the occasional probe flash over several tens of milliseconds. From the data collected, the FAST_{tracka} II can derive diagnostic parameters of the photosynthetic state of any phytoplankton present. When combined with data from second instrument fitted with a dark chamber and photosynthetically active radiation (PAR) sensor, estimates of primary phytoplankton production can be made.

Applications

- Monitoring of photosynthetic parameters in marine phytoplankton
- Environmental monitoring of phytoplankton populations (e.g. water supply, fish farming)
- Oceanographic, estuarine, limnological and riverine studies
- Water quality monitoring (e.g. reservoirs)
- Fisheries and ecosystems monitoring and studies
- Bloom detection and toxicity monitoring

Features

- Measurement of established (single turnover) dynamic fluorescence parameters as well as direct concentration ($\mu\text{g/l}$)
- High sensitivity ($0.015\mu\text{g/l}$)
- Broad concentration range (0 to $150\mu\text{g/l}$) for both marine and fresh water analysis.
- Fully flexible protocols allowing both Single and Multiple Turnover Capability and targeting for species.
- Provides full range of parameters required for Primary Production Analysis.
- Near surface operation in high ambient light conditions.
- Real time 'synopsis' data providing approximations for F_0 , F_m and F_v/F_m .
- Variable flash durations from $1\mu\text{s}$ to 25ms.



FAST_{tracka} II provides a number of pre-defined flash protocols, however, the user has the flexibility to configure their own protocols for more demanding applications or for specific research interests. FAST_{tracka} II incorporates an efficient illumination system that provides uniform and intense excitation of the sample ensuring a rapid and consistent saturation response. The detection optics have been designed to provide enhanced fluorescence collection efficiency together with excellent stray light rejection, making the instrument useable in difficult measurement situations such as near-surface, daylight conditions. The parameters F_0 , F_m and hence F_v/F_m (the photochemical quantum yield) are estimated in real time and can be transmitted in text format to a host PC. A large volume of non-volatile logging memory is built in to the FAST_{tracka} II allowing raw

data from each flash sequence to be stored internally for subsequent download and analysis. FAST_{tracka} II is supplied with a digital interface unit, dark chamber and profiling cage.

FAST_{tracka} II options:

- Dark chamber for pumped operation (in-situ and flow through systems)
- Profiling cage for dark chamber or open chamber operation

FAST_{tracka} II is a versatile and flexible instrument. It will find applications in ocean observing systems, scientific oceanography, including estuarine, littoral and fresh water studies and catchment monitoring. In addition it can be used for water quality monitoring in the water supply or fish farming sectors.

Technical Specifications	
Instrument Body	• 339.5 mm
Body plus dark chamber and profiling cage	• 550.0 mm
Instrument Body	• 112.5 mm
Maximum Dark Chamber	• 170.5 mm
Body / Delyement Cage	Titanium
Dark Chamber	Acetal C
Connector	Stainless steel
Weight in air / water	6 kg / 3 kg approximately
Measurement Range	0 to 150µg/l
Sensitivity	0.015 µg/l
Illumination	460 to 490 nm
Detection	665 to 695 nm
Illuminated sampling volume	1 ml
Maximum sampling rate	2 flash acquisitions per second
Data storage	512 Mbytes internal non-volatile memory
Power requirements	9 to 15 VDC and 18 to 72 VDC input
Operating Temperature	- 10 °c to + 50°c
Storage temperature	- 10°c to +40°c
Maximum Operating Depht	600 m
Data Communications	RS422 Protocol at 115.2 kBaud