

10-AU Field Fluorometer

Turner Designs...
Over 25 Years of
Fluorescence
Technology



The Turner
Designs
10-AU Field
Fluorometer

An Overview

The 10-AU Field Fluorometer is a rugged, field-portable instrument that can be set up for continuous-flow monitoring or discrete sample analyses. A watertight case, internal data logging, automatic range changing, watertight quick-change filter paddles, and unmatched stability make the 10-AU the instrument of choice for field studies. A variety of compounds can be easily measured on-site using application-specific optical filters available from Turner Designs.

Features of the 10-AU

- ◆ **Stable Measurements.** The 10-AU makes long-term monitoring possible even when the ambient temperature changes dramatically or the power fluctuates. Stability is measured in months or weeks as opposed to days or hours.
- ◆ **Watertight filter paddles.** Allow easy change of excitation and emission filters. Conveniently located on the instrument front panel.
- ◆ **Wide Dynamic Range.** Measurements can be made across a range of almost four orders of magnitude with, in most cases, a simple, one-point calibration. Using the auto-ranging feature, both low and high concentrations can be read automatically.
- ◆ **Auto Ranging.** The 10-AU will find the appropriate sensitivity range for each sample and switch automatically to that range, without user intervention and without affecting calibration.
- ◆ **Flexible Sample Compartment.** Accommodates 25 mm, 10 mm, 3 mm, and 1 mm continuous-flow sample systems. Optional discrete sample cuvette system is available for 25 x 150 mm, 13 x 100 mm test tubes, and 10 x 10 mm adaptor.
- ◆ **Condensate-proof Sample Compartment.** The unique hermetically-sealed sample compartment eliminates erratic readings caused by flow cell condensation.
- ◆ **Rugged Watertight Design.** With a watertight case, the 10-AU can be taken out into the elements and used in a variety of field studies.
- ◆ **Field Portability.** Unattended, remote operation is easily accomplished. With a 12 Volt Power Cable, the 10-AU can be powered by a marine battery for days.

Optional Features

- ◆ **Internal Data Logging.** Allows measurements to be stored in the instrument's memory even after the power is turned off. Other data collection options include: RS-232 serial data output and analog output to an external data logger, chart recorder, or computer.
- ◆ **Temperature Compensation.** Eliminates manual calculation of fluorescence changes due to changes in sample temperature.

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Typical Field Configurations

Continuous-Flow Field Studies. A 10-AU equipped with the 25 mm one-piece continuous flow cell, a watertight case, internal data logging, and the 12 Volt DC Power & Signal cable is an ideal instrument for field studies. Temperature compensation is strongly recommended for dye studies. If the instrument will be transported or shipped between field sites, a transport case is recommended.

Discrete Sample Studies. A 10-AU equipped with an indoor case and the discrete sampling system for 13 mm or 25 mm test tubes allows the instrument to function well in an enclosed field setting, such as an ocean vessel research laboratory or field station.



The 25 mm One-Piece Flow Cell eliminates leaks and simplifies calibration.



The 10-AU configured with the 25 mm One-Piece Flow Cell, a garden hose, and a 12 VDC cable for continuous field operation.

Sampling Options

One-Piece Flow Cell. The 25 mm One-Piece Flow Cell is easy to clean, eliminates flow cell leaks and sample compartment flooding, and simplifies calibration. Designed with a Luer lock port for injection of discrete samples into the flow cell, calibration can be accomplished quickly without switching between sample systems. For cleaning, a built-in port provides easy access to the flow cell. Flow cells of borosilicate glass or Suprasil quartz are available.

Narrow Diameter Flow Cells. For special applications, one-piece continuous-flow cells with diameters of 10 mm, 3 mm, and 1 mm are available.

25 mm and 13 mm Cuvette Systems. The cuvette systems change easily. The 25 mm holder allows sampling with 25 x 150 mm test tubes. Simply insert the 13 mm adaptor into the 25 mm holder to accommodate 13 x 100 mm test tubes. Test tubes of borosilicate glass or Suprasil quartz are available.

10 x 10 mm Adaptor System. For applications where small sample volumes are required, the 10 x 10 mm adaptor system accommodates 10 x 10 mm square cuvettes, 100 μ l vials, and 9 μ l capillary tubes.



Configured for discrete sampling, the 10-AU is also an excellent laboratory instrument.

Data Handling Options

Internal Data Logging Package. With internal data logging, up to 64,800 data points can be stored in the instrument's memory. This eliminates the inconvenience and expense associated with transporting, operating, and maintaining additional data collection equipment. Downloading data stored in the fluorometer and converting data into ASCII format is a simple process. The ASCII data can be imported directly into a standard spreadsheet program for manipulation. Using the fluorometer keypad, parameters such as the data collection interval can be selected. Also, with the addition of the temperature compensation feature, sample temperatures can be recorded.

Electronic Chart Recording Package. Graphically view the internally logged data without downloading with Electronic Chart Recording. By viewing 240 data points at a time and scrolling through the data, the user can observe trends in the field without processing the data on a computer. Internal Data Logging must be installed to use this feature.

Temperature Compensation Package. As the temperature of fluorescent samples rises, the fluorescence decreases. Serious errors can result if temperature changes are ignored. The temperature compensation package includes a temperature probe that mounts onto the flow cell and software that compensates for changes in sample temperature. Using the keypad, the appropriate temperature coefficient can be entered directly into the fluorometer, so there is no need for manual correction for temperature changes.

Hardware Options

Instrument Cases. The watertight case is designed for rugged use out-of-doors and is factory-installed on the fluorometer to ensure a watertight seal. The indoor case provides protection for the instrument when used in enclosed or protected environments.

Optical Kits. Optical kits with appropriate filters and lamps are available for applications including: *In vivo* & extractive chlorophyll, extractive chlorophyll *a* (acidification or non-acidification methods), *in-vivo* chlorophyll *a*, Rhodamine WT dye, fluorescein dye, refined petroleum, and crude oil. Individual filters and lamps can be purchased as replacements or to customize the fluorometer for other applications.

Applications Include

- ◆ Oceanographic Studies
- ◆ Chlorophyll Analysis
- ◆ Lake and Reservoir Management
- ◆ Fluorescent Tracer Studies
- ◆ Emergency Oil Spill Response



Rugged and watertight, the 10-AU is the instrument of choice for field studies.

Instrument Transport Case. To protect the fluorometer and accessories during shipment, the instrument transport case is recommended. Designed specifically for the 10-AU, it is equipped with wheels for easy maneuvering.

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About Fluorescence

Certain compounds absorb light of one wavelength and re-emit light at a longer wavelength. Using the proper optical filter and lamp combination, a filter fluorometer can measure this light and quantify select compounds. Filter fluorometry is often chosen over other analytical techniques because of its superior sensitivity, high selectivity, and low cost.

Option Specifications

Power, DC (optional): 11-16 V; 2.5 amperes.

Internal Data Logging (optional): From 18,510 to 64,800 data points. Intervals: 1, 2, 3, 5, 10, 20, or 30 seconds; or 1, 2, 3, 5, 10, 20, or 30 minutes.

Electronic Chart Recording (optional with Internal Data Logging): 240 data points viewed at a time.

Temperature Compensation (optional): Celsius or Fahrenheit degrees. Temperature coefficient: Linear, 0 - 15.0000 %/°C or °F; Exponential, 0 - 15.0000% / °C or °F. Long-term stability +/- 0.16°F. Nonlinearity: +/- 0.35°F (from -50 to 300°F).

Instrument Specifications

Sensitivity: 10 parts per trillion of Rhodamine WT in potable water; 30 parts per trillion of extracted chlorophyll *a*; 10 parts per billion of crude oil in pure water.

Dual Beam Optics: Compensate for drift in lamp intensity and/or photomultiplier drift.

Watertight Filter Paddles: Easily removable filter paddles make excitation and emission filter changes quick and convenient.

Auto-Ranging: Manual or automatic range changing in response to changing concentration levels (user selectable).

Ranges: 3 ranges, each a factor of 10 more sensitive than the next, 0 to 9999.999 Fluorescent Signal Units.

Blank: Reads and subtracts blank (user selectable).

Operating Temperature: ; 0 - 55°C; 32 - 131°F (ambient).

Software: Menu-driven microprocessor-controlled.

Digital Output: 100% ASCII format through a 9-pin RS-232 serial cable at 4800 or 9600 bits per second (bps).

Analog Output: Full scale voltage: 0.1, 1, 2, or 5 volts (user selectable).

Readout: Direct Concentration or Raw Fluorescence.

Detector: Factory installed photomultiplier tube. Standard: 300-650 nm; Optional: Red Sensitive 185-870 nm.

Discrete Sample Averaging (user selectable): Pre-averaging delay: 1 to 60 seconds; Averaging period: 2 to 60 seconds.

Lamp: Low Pressure Mercury Vapor Lamp (4 watts; 8000 hours lamp life). Several different wavelengths are available.

Alarm: Audible and visible when fluorescence of sample falls below or exceeds user-selectable limits (user may disable alarm). Alarm delay time: 10 to 3600 seconds.

Diagnostics: Diagnostic screen displays status of internal instrument electronics for easy troubleshooting.

Display: 40 x 8 character, backlit LCD (132 mm x 39 mm).

Keypad: 4 x 5 keys (3" x 2.7"; 7.6 cm x 6.9 cm).

Power, AC: 100-130 V; 200-240 V, 50/60 Hz, 30 watts.

Physical Characteristics: Dimensions and weight vary with instrument configuration. Maximum: 24 cm H (9.45") x 55 cm W (21.65") x 34 cm D (13.39").

Weight: 15.6 Kg (34.5 lbs).

Warranty: One year warranty.

Approvals: TUV, VDE & CE.

