AquaPen-C AP-C 110 & AquaPen-P AP-P 110

AquaPen is a lightweight, hand-held fluorometer that is very convenient for quick, reliable, and easily repeatable measurements of photosynthetic parameters both in algal, and cyanobacterial or eventually plant cell suspensions. AquaPen is equipped with blue and red LED emitters, optically filtered and precisely focused to deliver PAR values of up to 3,000 µmol.m^{-2}.s^{-1} to measured suspensions. Blue excitation light (455 nm) is intended for chlorophyll excitation, i.e., for measuring chlorophyll fluorescence in algal cultures. Red--orange excitation light (620 nm) is intended for excitation through phycobilins and is suitable for measuring in cyanobacterial cultures.

AquaPen is available in two versions. **AquaPen-C AP-C 110** is a cuvette version of the AquaPen fluorometer and contains an inbuild turbidometer for measurement of optical density. **AquaPen-P AP-P 110** is a probe version of AquaPen, which allows the same measurements of chlorophyll fluorescence in suspension by directly placing the probe in the suspension medium.

Due to ultra-high sensitivity – up to 0.5 µg Chl/l – the AquaPen C can measure natural water samples containing very low concentrations of phytoplankton.

Measured data are sequentially stored in the internal FluorPen memory. Data transfer is via USB and Bluetooth communication. Comprehensive FluorPen 1.1 software provides data transfer routines and many additional features for data presentation in tables and graphs.

APPLICATIONS

- Photosynthesis research of algal and cyanobacterial suspensions
- Photosynthesis education
- Phycology
- Limnology
- Oceanography
- Biotechnology

KEY FEATURES

- Rapid and accurate measurement of photosynthetic parameters
- Fast chlorophyll fluorescence induction kinetics measurements
- Both lab and field applications
- Ultra-high sensitivity
- Rugged and compact device
- Easy-to-use two-button operation
- Comprehensive software for data processing
- USB and Bluetooth communication for data transfer
- Li-ion rechargeable battery via USB port of a PC

AQUAPENS MEASURE

- F_T: Instantaneous chlorophyll fluorescence. F_T is equivalent to F_0 if the sample is dark-adapted.
- QY: Quantum Yield. QY is a measure of the Photosystem II efficiency. QY is equivalent to F_V/F_M in dark--adapted samples and to F'_V/F'_M in light-adapted samples.
- OJIP: Chlorophyll fluorescence transient. OJIP measurement is used as an important biophysical signal that reflects the time course of photosynthesis.
- NPQ: Non-photochemical quenching. NPQ indicates thermal dissipation of absorbed light energy during photosynthesis.
- LC: Light Curve. LC1, LC2 and LC3 protocols serve to describe adaptation of QY to 5, 6 or 7 light levels.
- Optical Density: by two far-red LEDs (720 nm, 680 nm) – only in the AquaPen-C AP-C 110

TECHNICAL SPECIFICATION

- **Measured/Calculated Parameters:** F_0; F_T; F_M; F'_M ; QY; OJIP; NPQ 1,2; LC 1,2,3; OD680, OD720
- **Saturating Pulse Illumination:** Adjustable from 0 to 100 % (up to 3,000 $\mu mol.m^{-2}.s^{-1}$)
- **Actinic Illumination:** Adjustable from 0 to 100 % (up to 1,000 $\mu mol.m^{-2}.s^{-1}$)
- **Measuring Illumination:** Adjustable from 0 to 100 % (up to 0.09 $\mu mol.m^{-2}$ per pulse)
- **Detector Wavelength Range:** PIN photodiode with 667 to 750 nm bandpass filters
- **FluorPen 1.1 Software:** Windows 7, or higher
- **Memory Capacity:** 16 Mbit
- **Internal Data Logging:** Up to 149,000 data points
- **Display:** Graphical display
- **Keypad:** Sealed, 2-key tactile response
- **Keypad Escape Time:** Turns off after 8 minutes of no use
- **Power Supply:** Li-ion rechargeable battery
- **Battery Life:** 48 hours typical with full operation
- **Low Battery Detection:** Low battery indication displayed
- **Size:** 165 × 65 × 55 mm
- **Weight:** 290 g
- **Sample Holder:** 4 ml cuvette
- **Operating Conditions:**
  - Temperature: 0 to +55 °C
  - Relative humidity: 0 to 95 % (non-condensing)
- **Storage Conditions:**
  - Temperature: -10 to +60 °C;
  - Relative Humidity: 0 to 95 % (non-condensing)

SOFTWARE

- FluorPen 1.1 software (Windows 7, or higher compatible)
- Bluetooth and USB communication
- Real-time and remote control functions
- Export to Microsoft Excel
- GPS mapping