



SARTEC
SARAS RICERCHE E TECNOLOGIE

SEMI-CONTINUOUS EC/OC ANALYZER

TECHNICAL SPECIFICATION



The instrument is produced by **Sunset Laboratory Inc.**, an USA Company and distributed in Italy by **Saras Ricerche e Tecnologie s.p.a.**.

Sunset Laboratory specializes in the analysis of air pollution for carbon aerosols. As well as performing the analysis, Sunset Laboratory also designs and provides instruments which do this analysis of carbon aerosol both lab-based and semi-continuously in the field.

Saras Ricerche e Tecnologie proposes the Sunset Lab. product and will take care of installation and commissioning, together with Sunset personnel.

The proposed instrument is similar to the Lab-based instrument as described in the article:

Elemental Carbon-Based Method for Monitoring Occupational Exposure to Particulate Diesel Exhaust; M. E. Birch and R. A. Cary, Aerosol Science and Technology, 25:221-241, October, 1996.



SCOPE OF SUPPLY

The main components of the OC/EC Analyzer are as follows:

- 1. Quartz Sample Oven; includes separate integrated oxidizer bed, laser-diode (25 mW meeting international safety standards) and photodetector unit.**
- 2. NDIR Detector Unit**
- 3. Electronics and Analog/Digital Conversion Interface Board**
- 4. Valve/Flow Sensor Components**
- 5. Embedded CPU Controller Board**

All of the above are enclosed in a single case, with the exception of the ballast tank and pump, which is external to the instrument.

The supply includes also the following item.

- 6. Personal Computer with Dual-Serial Ports and Software**

One dedicated circuit of at least 15 Amps, at either 220VAC or 120VAC is needed for the instrument as well as computer.

The software for instrument operation and results calculations are designed to run on a PC-type computer (Pentium II or better) under the Windows operating system (WinXP Professional or Win2000 Professional. This software is included with the Base Instrument.

The software consists of two modules:

- A) Instrument Operation Application** that controls the instrument operation and data collection during sample analysis and saves the raw data for calculations later.
- B) Calculation Application** that uses the raw data produced from the instrument and calculates organic and elemental carbon, creates a spreadsheet-usable reduced data file of the results and optional prints the individual analysis report.



INSTRUMENT TECHNICAL CHARACTERISTICS



DIMENSIONS AND WEIGHT

- a. 18" x 18" x 12" (457,2 x 457,2 x 304,8 mm)
- b. Weight; approximately 40 pounds (18,14 kg)

POWER REQUIREMENTS

120 VAC/15 A or 220VAC/8A

COMPUTER/SOFTWARE

Small footprint laptop computer provided with Win 2000 and Sunset Laboratory Inc. proprietary software

PERFORMANCE CHARACTERISTICS

- a. 8 LPM sample rate typical;
- b. Sample analysis time: 6 – 12 minutes depending on analysis method;
- c. Time resolution; depends on requirements but 1 hour is typical for a single instrument application (80% or better sampling duty cycle)
- d. Sensitivity:
 - i. OC – 0.5 $\mu\text{gC}/\text{m}^3$ total organic carbon for a 30 minute sample at 8 lpm (minimum).
 - ii. EC
 - 1. Thermal - 0.5 $\mu\text{gC}/\text{m}^3$ total elemental carbon for a 30 minute sample at 8 lpm (minimum).
 - 2. Optical – 0.2 $\mu\text{gC}/\text{m}^3$ total elemental carbon for a 30 minute sample at 8 lpm (minimum).

MEASUREMENT METHOD (USER CONFIGURABLE)

- a. NIOSH 5040



- b. Fast TOC with optical EC (BC)
- c. User defined

CALIBRATION

- a. External Standard – Present configurations use an external standard calibration gas. A fixed-loop volume of this gas is injected at the end of every analysis. All calculated results are referenced against this external standard.
- b. Primary calibrations are referenced against sucrose solutions or NIST traceable gas standards.

LASER CORRECTION

Transmission using a 30 mW temperature stabilized diode laser

DETECTION METHOD

Non-dispersive IR

SUPPORT GAS REQUIREMENTS

The Operational gases suggested by the instruments manufacturer are the following ones.

a) OCEC Configuration

- 1) He (99.999 or better)
- 2) 5% Methane in Helium (99.999 or better) Balance
- 3) 10% Oxygen in Helium (99.999 or better) Balance

OR**b) Optical-EC/TC Configuration**

- 1) 2% Oxygen in Helium Balance
- 2) 5% Methane in Helium Balance

Gas cylinder regulator, tubing fittings and an oxygen trap (for the helium carrier installed just before the connection to the instrument) have to be provided. The oxygen trap should not be used on the EC/TC only configuration, which only uses He/2%Oxygen as the carrier gas.