



SARTEC
SARAS RICERCHE E TECNOLOGIE

EC/OC ANALYZER LABORATORY INSTRUMENT

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.

In the early 1990s, Sunset Lab began to make the thermal-optical OCEC lab instruments available commercially. Since then, the company has sold over 60 of these instruments worldwide, with a combined analysis base of well over 250,000 filter samples. The sample sources analyzed by this method are collected in a variety of environments, ranging from ambient urban and rural areas to mining sites, work environments, national parklands, forest fire plumes, and other unusual events. This instrument became the basis for the NIOSH Method 5040 for the measurement of organic and elemental carbon on quartz filters

Data is typically collected as time-integrated composite samples, with loadings and times determined by the sample source and study goals.

Features of the lab instrument include:

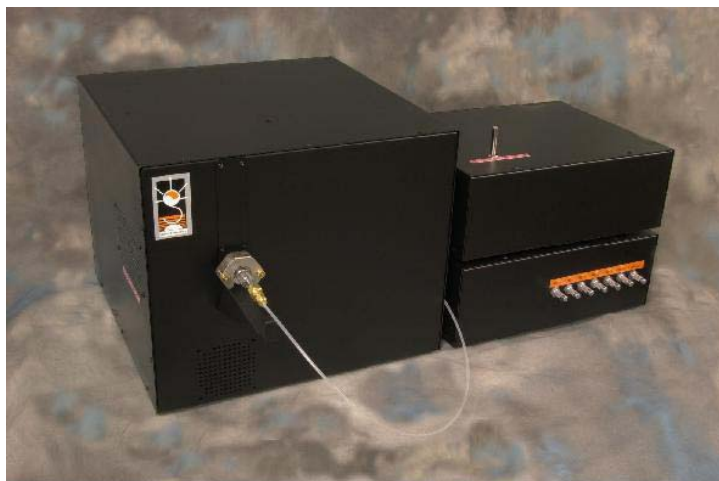
- OCEC measurements for bulk samples
- Excellent sensitivity with low instrument background contribution
- FID detection with linearity over four orders of magnitude
- Transmittance-based pyrolysis correction for better signal-to-noise and throughput
- 16-Bit data system with embedded CPU
- User-friendly Windows-based software

The proposed instrument is 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.



INSTRUMENT TECHNICAL CHARACTERISTICS



DIMENSIONS AND WEIGHT

Main oven:

- 406,5 x 406,5 x 342,9 mm (16" x 16" x 13.5")
- Weight; approximately 13,6 kg (30 pounds)

FID/Valve units (combined stack):

- 355,6 x 279,4 x 279,4 mm (14" x 11" x 11")
- Weight; approximately 13,6 kg (30 pounds)

POWER REQUIREMENTS

120 / 240 VAC; 12 A

COMPUTER/SOFTWARE

A PC- type is provided with Windows XP Pro and Sunset Laboratory Inc. proprietary software.

PERFORMANCE CHARACTERISTICS

- Minimum quantifiable total OC - 0.1 μgC
- Minimum quantifiable total EC - 0.1 μgC
- Maximum instrument blank contribution - 0.1 μgC (typical < 0.01 – 0.05 μgC)

OPTICAL CONFIGURATIONS USING 6 MW DIODE LASER FOR PYROLYSIS CORRECTION

- Transmittance - Standard
- Dual Mode – Simultaneous Transmittance and Reflectance (OPTION)

**MEASUREMENT METHOD (USER CONFIGURABLE)**

- a. NIOSH 5040
- b. EPA STN Method
- c. IMPROVE thermal profile (OPTION : configured for **Reflectance**). The dual optics mode allows for simultaneous Transmission/Reflectance operation, allowing both NIOSH 5040 (TOT) and IMPROVE (TOR) optical corrections to be performed on the same analysis.

DATA REPORTING

- a. Basic analytical results
 - i. OC – Organic Carbon in $\mu\text{gC}/\text{cm}^2$ plus error limits
 - ii. EC – Elemental Carbon in $\mu\text{gC}/\text{cm}^2$ plus error limits
 - iii. CC – Carbonate Carbon in $\mu\text{gC}/\text{cm}^2$ (user integrated Carbonate) plus error limits
- b. Additional parameters
 - i. Individual peaks in $\mu\text{gC}/\text{cm}^2$
 - ii. All calibration constants
 - iii. Laser correction constants
 - iv. Filter punch size
 - v. Optical EC in $\mu\text{gC}/\text{cm}^2$ based on optical absorbance

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.

DETECTION METHOD

- a. Flame Ionization Detector (Standard)

SUPPORT GAS REQUIREMENTS

- a. He (99.9999% or better) – Hydrocarbon and $\text{CO}_2 < 1$ ppm
- b. 5% Methane in Helium Balance – He (99.995%), Methane CP grade or better, certification to 2%.
- c. 10% Oxygen in Helium Balance – (99.999% or better)
- d. Air (Grade 0.1 or equivalent)
- e. Hydrogen (99.997 or better)