Benchmark Monitoring

MAGEE SCIENTIFIC

Real-Time Measurement of Total Carbon

Total Carbon Analyzer - Model TCA-08

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KEY FEATURES

- Continuous analysis of Total Carbon content of aerosol
- Combine with Aethalometer® data to derive EC/OC
- Sampling time 15 min to 24 hours (1 hr. default)
- Uses ambient air as carrier gas
- Rugged, All-Steel Construction
- Easy installation, operation and maintenance

Aerosol

APPLICATIONS

- Air Quality monitoring
- Health Effects, Climate Change research
- Emissions testing

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PRODUCT SPECIFICATIONS

MEASUREMENT PRINCIPLE
Two identical flow channels for sampling and analysis.
Sample is collected on 47-mm. quartz fiber filter in stainless-steel combustion chamber. At end of sampling timebase, collection flow is switched to second channel while first channel is analyzed. Collected sample is flash-heated to convert all Carbon to CO_2. Ambient air is used as carrier gas at low flow rate. The background level of CO_2 in ambient air during the heating cycle is determined before and after the heating cycle. Large pulse of CO_2 in carrier flow is integrated over ambient baseline to determine Total Carbon content of sample.

"NO GLASS, NO GAS"
No glass. Chambers constructed entirely from stainless steel. Rugged ceramic-Nichrome heating elements.
No gas. Uses ambient air as carrier: does not need any specialty gas supplies.

DETERMINATION OF OC AND EC
BC data from Aethalometer AE33 is used to derive 'EC'.
OC is obtained by simple subtraction: OC = TC – EC.

COMBINATION WITH AE33 AETHALOMETER
Cable connection: TCA software receives Aethalometer data.

SAMPLING
Standard flow rate of 16.7 SLPM (1 m^3/h), provided by closed-loop stabilized internal pump. Standard PM2.5 inlet is included.
Sampled air stream must be non-condensing (RH < 90% at instrument temperature).
Operating altitude 0 ~ 3000 m.
Ambient meteorological sensor (P, T, RH) is included to control sampling flow to ambient volumetric conditions.

TIME RESOLUTION
Timebase for sampling and analysis is adjustable from 15 minutes to 24 hours. Default setting is 1 hour.

ANALYTICAL PERFORMANCE
Analytical sensitivity: <0.5 µg C.
Detection limit: <0.1 µg C/m^3 for 1-h timebase, 16.7 SLPM flow
Range: <0.03 µg/m^3 to > 300 µg/m^3 Total Carbon

OPERATOR INTERFACE
8.4" color touch-screen with status indicator LED's.

REMOTE MANAGEMENT
Network ready for remote management and data transfer.*
* When connected to AethNET

QUICK-CHANGE ANALYTICAL CHAMBER
Modular for easy servicing, routine replacement of quartz sampling filter, or exchange of heating elements.

PHYSICAL SPECIFICATIONS
- Constructed in standard 19-inch rack-mount chassis..
- Dimensions (H x W x D): 42 x 48 x 60 cm.
  Height required for inlet assembly: 120 cm.
- Weight: 35kg.
- Electrical supply: 100~240 VAC, 50/60 Hz.
- Power consumption (maximum): 100 W sampling, 600 W analysis (typical 1-minute duration).
- Internal sampling pump: dual diaphragm, brushless speedcontrolled DC motor, stabilized flow.
- Modular internal hardware for rapid servicing.
- Constructed in fully-enclosed, self-contained rack-mount chassis.

INSTALLATION REQUIREMENTS
Indoor or laboratory use, rack or benchtop.
Ambient environment 10°C ~ 40°C, non-condensing.

ACCESSORIES
$PM_{2.5}$ inlet
Shockproof and waterproof transit case
Air flow calibrator (BGI TetraCal)
Tube couplings
Flow divider
Sample line system (full set of different lengths, curvatures, 14/18-mm. diameter)
Filter Cartridge (for Clean Air performance test)

CONSUMABLE & OPERATIONAL SUPPLIES
47-mm. quartz fiber filters, package of 25
Cartridge filter
Capsule filter

EXCHANGE SERVICE COMPONENTS
VOC Denuder Cartridge
Analytical Chamber Assembly

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