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ECOTECH

## Aurora™ 2000

**PM<sub>2.5</sub> CORRELATING NEPHELOMETER**



The Aurora™ 2000 PM<sub>2.5</sub> Correlating Nephelometer is part of the new generation nephelometers, using a single wavelength and an LED light source to measure aerosol light scattering and derive particulate concentrations.

The Aurora™ 2000 enables a correction factor to be used in order to derive PM<sub>2.5</sub> concentrations. This improves the correlation between the Aurora™ and Reference PM<sub>2.5</sub> methods while providing 1 minute measurements from the Aurora™ 2000. The correction factor can be entered manually or automatically derived from hourly averages from a continuous PM<sub>2.5</sub> monitor.

### BENEFITS

- Simplified automatic calibration using internal valves, ideal for remote locations
- Fully integrated package including: internal sample pump, sample heater, internal calibration valves, zero air pump and data logger
- Internal sample heater with temperature or RH control, which can be enabled by the user to eliminate the effects of humidity (RH: < 30 to < 90 %)
- 12 VDC operation (45 watts max, 13 watts nominal)
- Remote control through serial interface.

### Light Source

The Aurora™ 2000 can be equipped with any one of the following LED light sources:

- 450 nm (blue) for fine and ultra fine particulates (wood fires, automobiles)
- 525 nm (green) for visibility
- 635 nm (red) for large particulates (e.g. pollen).

### CONFIGURATIONS

#### Aurora™ 2000 PM<sub>2.5</sub> Nephelometer - manual correction factor configuration

In applications where the aerosol chemistry is stable, a correction factor can be manually entered which then provides excellent results with minimal maintenance and a high degree of correlation.

#### Aurora™ 2000 Automatic correlating PM nephelometer configuration

In applications where aerosol chemistry is subject to change, a correction factor derived from manual sampling may be unreliable. In this case the Aurora™ 2000 may be connected directly to a PM<sub>2.5</sub> compliance monitor, either the ACOEM Ecotech Spirant BAM or the Met One BAM 1020, in order to monitor and log PM hourly averages generated by the BAM (PM<sub>BAM</sub>). These hourly averages are compared to the Aurora's hourly average scattering coefficient ( $\sigma_{scat}$ ) and a scattering to PM coefficient factor ( $\sigma_{scat}/PM$ ) is calculated. This factor is then applied to the next hour of 1 minute scattering coefficients measured in order to determine a 1 minute average for PM concentrations (PM<sub>aurora</sub>).

The derived correction factor can also be used to determine changes in aerosol sources through deviations in light scattering from the expected values.

#### This configuration of the Aurora™ 2000 nephelometer provides the following parameters:

- US EPA compliance data for PM<sub>2.5</sub> measurement
- Scattering coefficient ( $\sigma_{scat}$ )
- BAM<sub>PM</sub> averages – 1 hour average only
- Corrected real time 1 minute PM concentrations PM<sub>aurora</sub>
- Sample temperature, relative humidity and barometric pressure.

## SPECIFICATIONS

<b>Measured parameters:</b>	$\mu\text{g}/\text{m}^3$ and $\sigma_{\text{Scat}}$
<b>Ranges:</b>	0 - 2000 $\mu\text{g}/\text{m}^3$ and 0 - 20,000 $\text{Mm}^{-1}$
<b>Lower detectable limit:</b>	3 $\mu\text{g}/\text{m}^3$ ( $<0.3 \text{ Mm}^{-1}$ ) (60 second averaged data)
<b>Secondary measurements:</b>	Sample air temperature, relative humidity (RH), barometric pressure and enclosure temperature
<b>Flow rate:</b>	$\approx 5 \text{ l/min}$ with default blower. Higher flow can be obtained using the external pump option (e.g. in case of common inlet)
<b>Operating temperature:</b>	- 20 to 45 °C
<b>Operating RH:</b>	10 to 95 %
<b>Calibration:</b>	Span gas available for $\text{CO}_2$ , $\text{SF}_6$ , FM-200, R-12, R-22, R-134 or a user defined gas
<b>Optics:</b>	Reference light source measurement
<b>Light source:</b>	Stable LED light source (US patent 7,671,988)
<b>Wavelength:</b>	525 nm (green), 450 nm (blue) or 635 nm (red)
<b>Operating voltage:</b>	12 VDC (incl 110 - 240 VAC 50/60 Hz power supply converter)
<b>Power consumption:</b>	13 watts nominal, 45 watts with heater active
<b>Dimensions:</b>	170 x 700 x 215 mm
<b>Weight:</b>	11.2 kg
<b>Altitude:</b>	2000 m

## COMMUNICATIONS & DATA LOGGING

<b>Outputs:</b>	25 pin external I/O analog outputs (2 voltage & 2 current) 2 x RS232 serial ports (multi-drop, service)
<b>Filtering:</b>	Kalman (digital adaptive filter), moving average (30 seconds) and no filter
<b>Stored parameters:</b>	Date & time, $\mu\text{g}/\text{m}^3$ , $\sigma_{\text{sp}}$ (635, 525 or 450 nm), hourly $\text{BAM}_{\text{PM}}$ average, hourly mass correction factor, sample air temperature, enclosure temperature, RH and barometric pressure and instrument status
<b>Capacity:</b>	Maximum of 48 days of 5 minute averages, or 10 days of 1 minute averaged data.

## OPTIONS

- Exhaust tubing kits
- External pump and pump controller kit
- Automated ball valve (sample bypass)
- Roof flange kit and rain cap with insect screen
- Gas calibration kit
- Wall mount bracket.



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