

The Thermo Scientific TEOM 1405-F is a continuous ambient air monitor with a Filter Dynamics Measurements System. The one-piece system provides total mass measurements by accounting for volatile and non-volatile PM fractions, making it the worldwide standard.

## Thermo Scientific TEOM® 1405-F



### Key Features/Benefits

- Accounts for volatile and non-volatile PM fractions
- Combines control unit, mass sensor and FDMS into a single integrated unit
- Touch screen user interface
- Embedded FTP server, ethernet, USB, RS-232 and RS485 communications
- Activo!™ flow control
- Candidate USEPA equivalent sampler for PM-10 and PM-2.5

### Quality

The Thermo Scientific TEOM 1405-F Monitor measures PM-10 and PM-2.5 mass concentration as it exists in the ambient air. The 1405-F system is composed of a Filter Dynamics Measurement System (FDMS) and a TEOM mass sensor housed in a single cabinet, network-ready configuration that includes the control system with touch screen user interface.

### Technology

The system is designed to provide representative short and long term reading of the ambient PM concentration, even in the presence of volatile materials. Conventional PM monitoring approaches do not account for the rapid loss that can occur with collection on a filter while sampling ambient PM. The 1405-F overcomes this challenge by automatically generating mass concentration measurements ( $\mu\text{g}/\text{m}^3$ ) that account for both non-volatile and volatile PM components.

The system's default data output consists of a running 1-hour and 24-hour average mass concentration updated every 6 minutes and on the hour respectively. The monitor computes a 1-hour FDMS base and reference mass concentrations updated every 6 minutes. Users can select additional averaging times from 30 minutes to 23 hours.

### Total Certainty

The 1405-F provides a self-referencing, NIST-traceable true mass measurement using Thermo Scientific's proven high reliability TEOM technology. The system differentiates itself from other PM measurement methods by utilizing a direct mass measurement that is not subject to measurement uncertainties found in surrogate techniques such as beta attenuation, light scattering and pressure drop.

# TEOM 1405-F Ambient Particulate Monitor

### Regulatory Designations

- Candidate USEPA and TUV equivalent method sampler for PM-10, PM-2.5

### Safety/Electrical Designations

Designed to meet:

- CE: EN 61326:1997 + A1:1998 + A2:2001 + A3:2003, EN:61010-1
- UL: 61010-1:2004
- CSA: C22.2 No. 61010-1:2004
- FCC: Part 15 Subpart B, Class B

### Standard System Configuration

- Menu-driven software for user interaction via 1/4 VGA display with touch screen
- Connecting and Interface Cables, and Vacuum Pump
- Consumables for average first year's operation (ambient)
- RPCOMM and ePort Software for Local or Remote Communication

### Instrument Performance (3 l/min, 1s, stable conditions)

- Measurement Range: 0 to 1,000,000  $\mu\text{g}/\text{m}^3$  (1  $\text{g}/\text{m}^3$ )
- Resolution: 0.1  $\mu\text{g}/\text{m}^3$
- Precision:  $\pm 2.0 \mu\text{g}/\text{m}^3$  (1-hour ave),  $\pm 1.0 \mu\text{g}/\text{m}^3$  (24-hour ave)
- Accuracy for Mass Measurement:  $\pm 0.75\%$

### Data Averaging and Output

- Real-time Mass Conc Average: 1 hour rolling average updated every six minutes
- Long-Term Averaging: 1, 8, and 24 hr
- Data Output Rate: selectable from 10 sec to 24 hour

### Operating Range

- The temperature of the sampled air may vary between -40 and 60 °C. The TEOM Sensor and Control Units must be weather protected within the range of 8 to 25 °C. An optional Complete Outdoor Enclosure provides complete weather protection.

### Sample Flow

- Activol flow control system uses the mass flow sensors and the measured ambient temperature and pressure to maintain constant volumetric flow rates.
- Main Flow Rate: 3 l/min
- Bypass Flow Rate: 13.67 l/min

### Data Storage

- Internal data logging of user-specified variables; capacity of 500,000 records.

### Filter Media

- Sample Filter: Pallflex TX40, 13 mm effective diameter
- Sample Conditioner Filter: 47mm diameter housed in an FRM-style molded filter cassette, maintained at 4°C. Suitable for collecting and archiving time-integrated PM samples for subsequent laboratory analysis.

### Sample Conditioning

- Nafion dryer lowers the main flow relative humidity and allows for mass transducer operation at 5°C over the peak air monitoring station temperature
- Purge Filter Conditioner contains a heat exchanger that maintains the temperature of the main flow and particle filter at 4°C to efficiently filter the volatile and non-volatile PM in the sample.

### Data Output and Input

- ePort software to view and change system operation from PC
- Touch screen user interface
- Ethernet with embedded FTP server, USB, RS232, RS485
- 8 User-Defined Analog Outputs (0-1 or 0-5 VDC)
- 2 User-Defined Contact Closure Alarm Circuits
- 4 Averaged Analog Inputs (0-5 VDC) with user-defined conversion to engineering units

### Power Requirements

- Model 1405: 100-240 VAC, 440 VA, 47-63 Hz
- Pump: 120 VAC/60 Hz: 4.25 A; 240 VAC/50 Hz: 2.25 A

### Physical Dimensions

- W: 17" (43.2 cm) x D: 19" (48.3 cm) x H: 50" (127 cm)
- Weight: 65 lbs (34 kg)

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