

# TEOM 1405-F Ambient Particulate Monitor

## Continuous monitor with a Filter Dynamics Measurement System (FDMS)

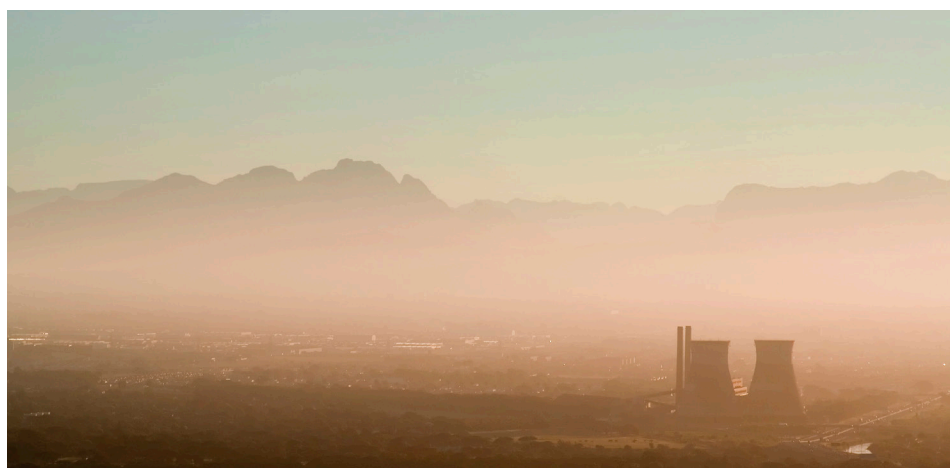
The Thermo Scientific™ TEOM™ 1405-F Ambient Particulate Monitor measures PM-10 and PM-2.5 mass concentration as it exists in the ambient air. The 1405-F monitor is composed of a Filter Dynamics Measurement System (FDMS) and a Tapered Element Oscillating Microbalance (TEOM) mass sensor housed in a single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

### Features

- U.S. EPA PM-2.5 Equivalent Monitor EQPM-0609-181
- Candidate for U.S. EPA and TÜV Equivalency
- Accounts for volatile and non-volatile PM fractions
- Combines control unit, mass sensor and FDMS into a single integrated unit
- Embedded FTP server, Ethernet, USB, RS-232 and RS485 communications
- Activol flow control

### Introduction

The system is designed to provide representative short and long term reading of the ambient Particulate Matter (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 monitor 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 found in surrogate techniques such as beta attenuation, light scattering and pressure drop.

The 1405-F monitor provides a self-referencing, NIST-traceable true mass measurement using our proprietary 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.



Thermo Scientific™  
TEOM™ 1405-F Monitor

## Thermo Scientific TEOM 1405-F Ambient Particulate Monitor

Specifications	
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
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, 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 H
Pump	120 VAC/60 Hz: 4.25 A; 240 VAC/50 Hz: 2.25 A
Physical dimensions	W: 17" (43.2 cm) × D: 19" (48.3 cm) × H: 29.5" (140 cm), Weight: 73 lbs (33 kg)
Safety/electrical designations	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
Approvals and certifications	U.S. EPA PM-2.5 Equivalent Monitor EQPM-0609-181 Candidate for U.S. EPA PM-10 and PM-2.5 Equivalent Monitor Candidate for TÜV PM-10 and PM-2.5 Equivalent Monitor

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