

TEOM® Series 1400a Ambient Particulate Monitor



Most Advanced Technology

The TEOM Series 1400a Ambient Particulate Monitor is the choice of air pollution monitoring networks worldwide to measure particulate mass concentrations continuously. The system has become the de facto standard for particulate mass concentration measurements in areas such as Canada, Hong Kong, the United Kingdom and France due to its high data quality, reliability and unparalleled support.

The instrument incorporates the patented *tapered element oscillating microbalance*, a true microweighing technology that provides true mass measurements. Using a choice of sample inlets, the hardware can easily be configured to measure PM-10, PM-2.5, PM-1 or TSP concentrations. This microprocessor-based unit easily accommodates all siting requirements and provides internal data storage, and advanced analog and serial data input/output capabilities.

Regulatory Approvals

The TEOM Series 1400a monitor has received the following major regulatory recognitions:

- USEPA PM-10 equivalency approval EQPM-1090-079.
- PM-2.5 measurements within the context of a USEPA correlated acceptable continuous monitor(40 CFR 58).
- European Union PM-10 recognition within the context fo European Norm EN12341.
- German EPA approval as an equivalent TSP monitor.





Filter-Based Mass Measurement

Filter-based, direct mass measurements are considered the standard technique for determining particulate mass concentration.

TEOM instruments from Rupprecht & Patashnick are the only filter-based systems with real-time data output and real-time mass measurement capability. The exchangeable filter in the Series 1400a monitor can also be used to determine heavy metal concentrations using atomic absorption (AA) and inductively coupled plasma (ICP).

Unique Principle of Operation

The Series 1400a monitor incorporates an inertial balance that directly measures the mass collected on an exchangeable filter cartridge by monitoring the corresponding frequency changes of a tapered element. The sample flow passes through the filter, where particulate matter collects, and then continues through the hollow tapered element on its way to an active volumetric flow control system and vacuum pump. The TEOM mass transducer does not require recalibration because it is specially designed and constructed from non-fatiguing materials. Its mass calibration may be verified, however, using an optional Mass Calibration Verification Kit that contains a filter of known mass. Active volumetric flow control is maintained by mass flow controllers whose set points are constantly adjusted in accordance with the measured ambient temperature and pressure.

Application Range

The TEOM Series 1400a monitor is used to monitor ambient air quality in the following major applications:

- Air quality monitoring networks, including background sites.
- Special studies and super sites for PM-10, PM-2.5 and PM-1 characterization.
- Routine input for air quality index or pollutant standards index.
- In and around industrial and material handling facilities.
- Remediation projects (Superfund, hazardous waste).
- Indoor air, exposure chamber, and industrial hygiene measurements.

Unsurpassed Short-Term Precision

One-hour average mass concentration data from two co-located TEOM monitors demonstrate the instrument's unsurpassed precision. The Series 1400a monitor meets the stringent one-hour performance acceptance criteria established by the California Air Resources Board.

The instrument's data quality also permits different particle size fractions such as PM-10 and PM-2.5 to be compared with each other at short averaging times. With this resolution, one can see the relationship between different PM measures changes with meteorology, regional or local conditions. This can provide vital information in the study of human health effects. Other applications of time-sensitive data include source identification and control, short-term compliance monitoring, emergency response, forensic investigations, and numerical modeling.

