

# Thermo Scientific Particulate Matter Continuous Emissions Monitoring System

True mass concentration in dynamic wet stack conditions

Thermo Scientific™ Particulate Matter Continuous Emissions Monitoring System (CEMS), featuring a dual-measurement method provides a true mass concentration traceable to NIST-standards in meeting stringent accuracy requirements that facilitate successful audits and reduce regulatory risk.

- Continuously monitors filterable particulate matter
- Unaffected by changed in particulate characteristics
- Compliant with U.S. EPA PS-11 regulation
- TEOM offers internal mass referencing
- Designed for saturated flue gas conditions



## Advanced Technology

The Particulate Matter (PM) CEMS combines the strengths of the light-scattering and inertial microbalance methods to determine the precise concentration of particulate matter in saturated flue gas. The system is unaffected by changes in particulate size, water droplets and chemical composition, which ensures that the monitor response correlates linearly against a gravimetric reference method. The system is designed to meet the requirements of U.S. EPA Performance Specifications (PS) 11 and Procedure 2 Quality Assurance (QA) in addition to passing annual audit Methods 5 or 17.

Particulate matter in the flue gas can exhibit highly variable and dynamic characteristics that are dependent on the plant fuels, processes and control parameters. The PM CEMS has an intrinsic ability to discern between changes in mass concentration and other variations in particulate characteristics because of the dual-measurement method, which employs a light-scattering device and a Tapered Elemental Oscillating Microbalance (TEOM). The TEOM, a mass transducer, acts as an internal reference to the continuously

operating light-scattering device.

The PM CEMS utilizes the dilution-extractive method for wet stack applications to allow sample transport to occur under controlled temperature conditions reducing maintenance and improving uptime and system longevity. A portion of the diluted sample is drawn through the light-scattering stage, which generates the continuous system response. On a selected schedule, the sample is transported through the scattering stage to the TEOM where the inertial microbalance stage scales the scattering response to a true mass measurement.

The PM CEMS is comprised of the Extractive Dilution Probe Monitor, Probe Controller Model 3880i, pneumatic and electrical umbilicals. Analog and digital stack velocity inputs are permitted and optional system equipment can include a Clean Air Panel and HVAC Enclosure.



Thermo Scientific Particulate Matter Probe Controller, Model 3880i

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## Thermo Scientific Particulate Matter Continuous Emissions Monitoring System

Range	0–10 mg/m <sup>3</sup>
Accuracy	± 20% without PS-11 source correlation in wet stacks ± 20% with PS-11 source correlation in wet stacks
Detection Limit	0.25 mg/m <sup>3</sup> @ 15-minute integration time
Response Time	15 minutes to 90% of value
Power Requirements	200–240 VAC @ 50/60 Hz, ~30 amp service
Clean Dry Air	80 slpm @ 75–100 psi
Probe Dilution Temperature	120–165°C
Dilution Ratio	10:1
Probe Monitor Dimensions	44.01" (W) + 36"/60" Mantle X 18.69" (H) X 12.09" (D)
Probe Monitor Weight	130 lbs (59 Kg)
Probe Controller Dimensions	19" (W) X 8.62" (H) X 25.8" (D)
Probe Controller Weight	55 lbs. (25 Kg)
Maximum Stack Temperature	200°C (higher available, depending on application)
System Temperature Range	4–50 °C; non-condensing for 19" rack mounted probe controller
Analog Outputs	6 voltage outputs; 0–100 mV, 1, 5, 10 V, 5% of full-scale over/under range, 12 bit resolution, measurement output user selectable per channel. 6 current outputs configured for any one of the following ranges, while maintaining a minimum resolution of 11 bits: 0–20 mA, 4–20 mA
Digital Outputs	1 power fail relay Form C, 10 digital relays Form A

### Thermo Scientific Tapered Element Oscillating Microbalance (TEOM)

Thermo Scientific™ TEOM® series of monitors are the only instrumentation that contains the technology to provide a NIST traceable, direct mass measurement of airborne particulates. The TEOM technology has the ability to measure particulate in the range 0 to 250 mg/m<sup>3</sup> while maintaining a resolution of 0.1 mg/m<sup>3</sup>. The TEOM technology has a mass accuracy of ±20% with source correlation, making it the industry benchmark for precision and accuracy in particulate measurement. With decades of operation in the field and an ASTM Reference Method (ASTM D6831-02 Standard Test Method), TEOM technology is the reliable solution to trust for your particulate monitoring needs.



### Ordering Information

The Thermo Scientific Extractive Dilution Probe Monitor, Probe Controller Model 3880i are they primary components of the Thermo Scientific Particulate Matter CEMS and require custom configuration based on your application. Please contact your local Thermo Fisher Scientific sales representative and we will work with you to complete an application datasheet that will accurately determine the best configuration for your plant process.

**To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific air quality products.**

For more information, visit our website at [thermoscientific.com/systems](http://thermoscientific.com/systems)

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