

Partisol® Model 2300 Sequential Speciation Sampler



Full-Featured Speciation Sampling

- 4- and 12-Channel Models
- Sample Integrity by Design
- Modular ChemComb® Cartridges
- Active Volumetric Flow Control



USEPA Compliant Speciation Sampler
of Gaseous and PM-Related Atmospheric Pollutants

Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

Advanced Speciation Sampling Technology

The Partisol Speciation Sampler builds upon the features and reliability of the Partisol-Plus Air Sampler. It provides a convenient and flexible means of collecting atmospheric species in gaseous and particulate form for later analysis in a laboratory. The system incorporates the well-characterized ChemComb Speciation Cartridges developed and patented by Harvard University.

The system is available in a basic 4- and sequential 12-channel speciation configurations. Both versions contain four individual mass flow controllers that actively maintain a constant volumetric sampling flow rate, and can be operated either as single-day or sequential samplers.

USEPA Compliance

The Partisol Speciation Sampler complies with the USEPA performance requirements for the chemical speciation of PM-2.5.



The Speciation Sampler Shares the Same User Interface with the Partisol-Plus Sequential Air Sampler.

Field-Proven Sample Collection

The ChemComb Speciation Cartridges used in the Partisol Speciation Sampler have been used in numerous measurement campaigns, with their performance characterized in peer-reviewed articles. They contain a sharp-cut PM-2.5 impactor operating at a flow rate of 10 or 16.7 l/min, up to two coated honeycomb denuders for the collection of selected gases, and a four-stage filter pack.

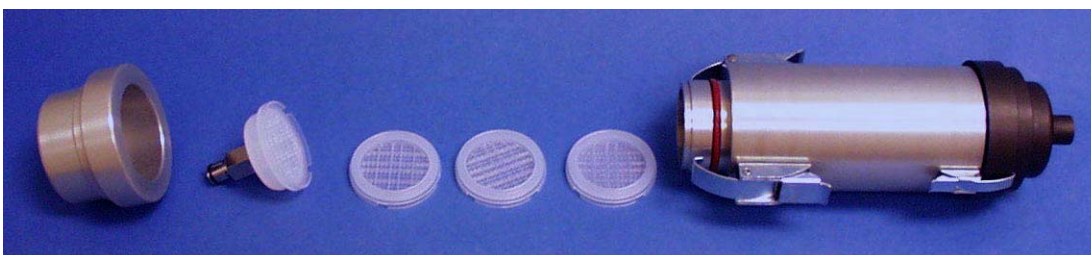
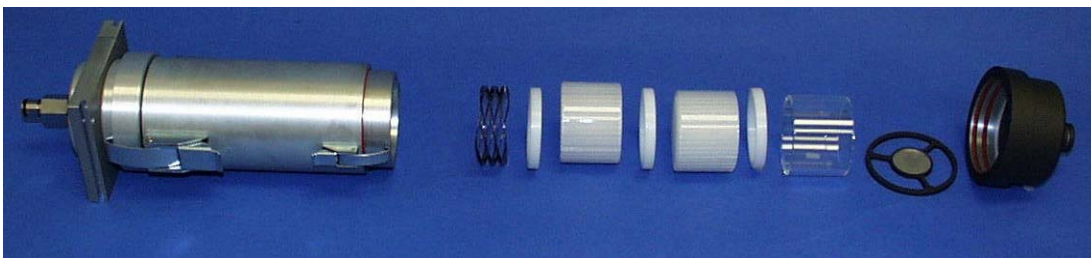
The system makes use of the high-capacity glass honeycomb denuder design developed and patented by Harvard University for operation at 10 l/min. The honeycomb denuders are reusable, and may be coated differently for each use. The glass construction not only allows for the stripping of selected gases, but also their collection for lab analysis. The four-stage filter pack for 47 mm diameter filters is made of Teflon® material, and can accommodate between one and four filters in individual stages.



Glass Honeycomb Denuder.



ChemComb Speciation Cartridge.



Open ChemComb Cartridges, Showing Denuder Section (Top) and Filter Pack Section (Bottom).

Sample Handling and Integrity

The system's ChemComb Cartridges mount on rails for convenient installation and retrieval. All sampling components are assembled in the laboratory and enclosed in the cartridge, which is sealed for transport. This eliminates the risks inherent in the in-field assembly of sampling components. A small, rugged form factor permits easy transport or shipment of ChemComb cartridges in their assembled form between the laboratory and the air sampling site.

The ChemComb cartridges are sheltered from direct solar radiation and passively ventilated with ambient-temperature air in a protective shield.

Each cartridge may be configured in a different way, depending upon the type of species being sampled. Up to four of the sample lines may be operated concurrently at flow rates as high as 16.7 l/min (1 m³/h).



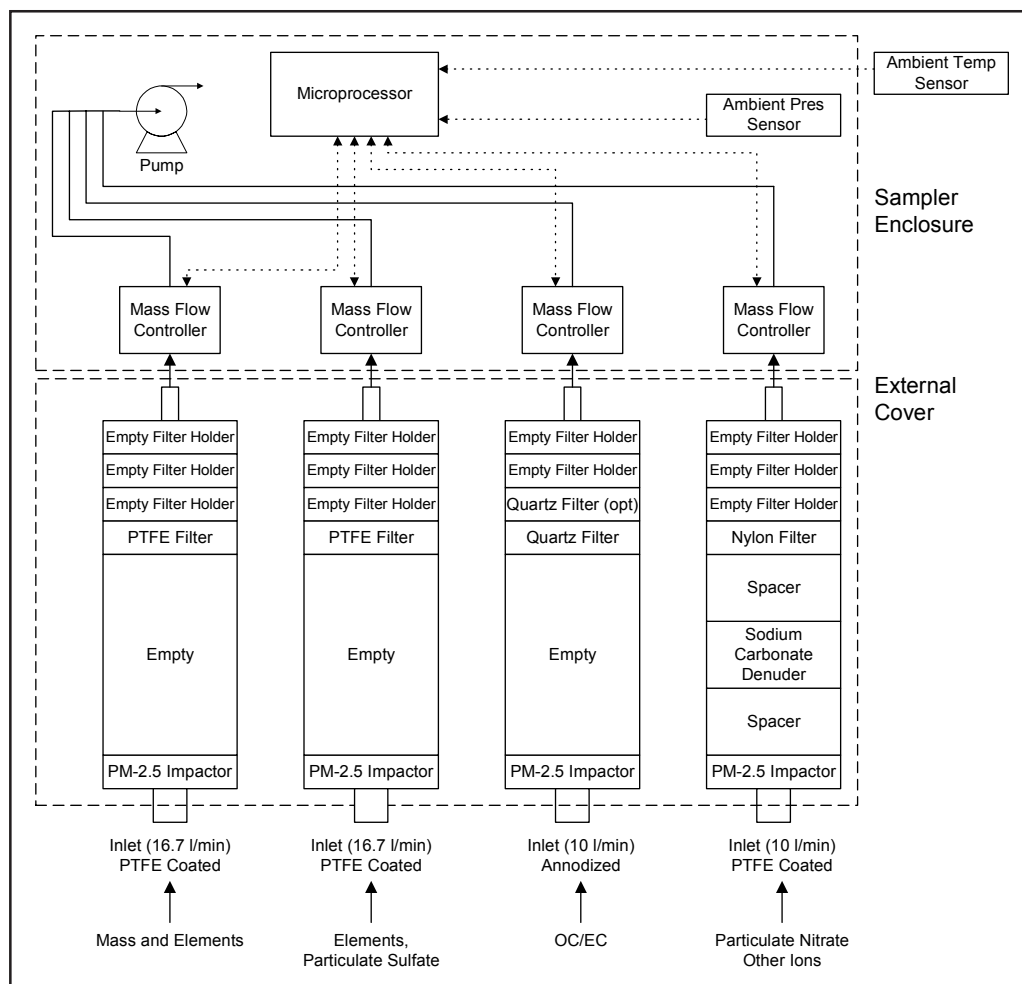
Installation of a ChemComb Cartridge.



Insertion of Leak Check Plug.



Auditing the Partisol Speciation Sampler Using the Streamline FTS Flow Transfer Standard.



Illustrative Configuration of Four-Channel Partisol Speciation Sampler.

Advanced Features

The sampler measures, averages and stores the ambient temperature, pressure and relative humidity. In addition, it contains a connection for an optional wind vane/anemometer and three additional analog inputs for capturing other externally-generated data. The device supports bidirectional RS232 communications and is available with an optional low-temperature modem.

Thermo's Activol™ flow control system maintains a constant volumetric flow in each of the sampler's four flow controllers at user-defined rates (usually 10 or 16.7 l/min). The sampler's microprocessor constantly adjusts the set point of the mass flow controllers in accordance with the latest measurements from ambient temperature and pressure sensors. This flow control system is not sensitive to the increasing pressure drop across sample filters, which can affect orifice-based flow systems. Reported volumes are expressed in terms of either actual or standard temperature.

In four-channel systems, channels may be operated in groups of four, two or one. Up to four channels may be operated concurrently at a flow rate of up to 16.7 l/min (1 m³/h).

In the twelve-channel configuration, sampling channels may be defined as three groups of four, three groups of three, six groups of two, or twelve groups of one.



Connector to Optional Wind Vane/Anemometer.

Sample Programming

The operation of the Partisol Speciation Sampler can be based upon time and/or conditions.

In the most common sampling setup, each group of flow channels is active from midnight to midnight on a repeating sequence. Groups of channels may also be programmed individually with a starting and ending time/date.

For conditional sampling, the operation of the sampler may be based upon the status of one or more of the meteorological measurements or the analog inputs from external sources. Sampling by condition may also be combined with time-based sequencing among groups of flow channels.

Flow Paths and Groupings in Twelve-Channel Systems.

