

BMI: Particle into Liquid Sampler (PILS Model 4002)

The next generation PILS Systems offer a field proven design for rapid observations of PM1 and PM2.5 water soluble aerosol chemical composition.

The PILS collects liquid samples that may be analyzed for multiple water soluble inorganic or organic species as well as total water soluble organic carbon.



BMI PILS Model 4002

Key Features:

- Quantitative sampling efficiency and field tested
- Fully automated local or remote operation
- Rapid water soluble composition data
- Variable sample time resolution from 30 seconds-12 hours
- Off-line analysis capability for using vial collection or integrate PILS directly to user's Ion Chromatography system
- Remote controlled sampling cycle via external host computer
- Multiple off-line analytical techniques may be applied to a single vial liquid sample
- Up to **19 days** of continuous unattended operation supported
- Suitable for aircraft or ground sampling
- 80 vial carousel offers numerous rapid sample collections with 20 second to 2 hour time resolution in 1 or 2 ml vial size options
- 38 vial carousel with 10, 12 or 20 ml vials enables sampling times between 5 minutes and 12 hours.

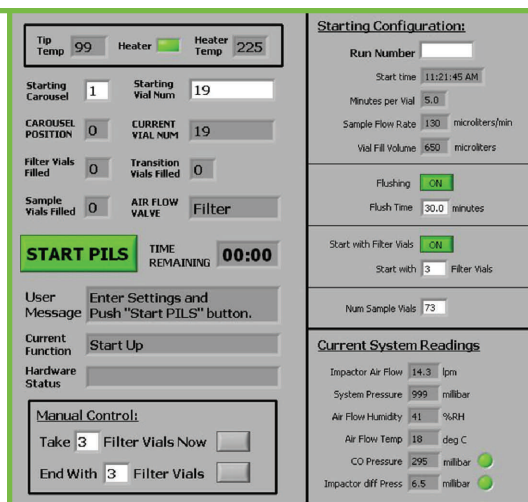
- PILS Options:**
- Auto Collector
 - Automated Zero Air System
 - Airflow Control System
 - Denuders

PILS User Interface Software

BMI has developed an advanced Windows based real time software platform to simplify PILS operation with an intuitive graphical User Interface.

Innovative control software automates local and remote collection of samples and controls various system parameters:

Air temperature, air flow rates, air relative humidity, air pressure, vial number and filling times are all recorded.



The screenshot displays the PILS User Interface Software with several control panels:

- Tip Temp:** 99, Heater: , Heater Temp: 225
- Starting Carousel:** 1, Starting Vial Num: 19
- CAROUSEL POSITION:** 0, CURRENT VIAL NUM: 19
- Filter Vials Filled:** 0, TransRion Vials Filled: 0
- Sample Vials Filled:** 0, AIR FLOW VALVE: Filter
- START PILS:** TIME REMAINING 00:00
- User Message:** Enter Settings and Push "Start PILS" button.
- Current Function:** Start Up
- Hardware Status:** (empty)
- Manual Control:** Take 3 Filter Vials Now ; End With 3 Filter Vials
- Starting Configuration:** Run Number: (empty); Start time: 11:21:45 AM; Minutes per Vial: 5.0; Sample Flow Rate: 130 microliters/min; Vial Fill Volume: 650 microliters; Flushing: ; Flush Time: 30.0 minutes; Start with Filter Vials: ; Start with 3 Filter Vials; Num Sample Vials: 73
- Current System Readings:** Impactor Air Flow: 14.3 lpm; System Pressure: 999 millibar; Air Flow Humidity: 41 %RH; Air Flow Temp: 18 deg C; CO Pressure: 295 millibar; Impactor dff Press: 6.5 millibar



For more information about our PILS System, please visit our website at www.brechtel.com/aerosol.html or contact our sales department by email at sales@brechtel.com or 510-732-9723

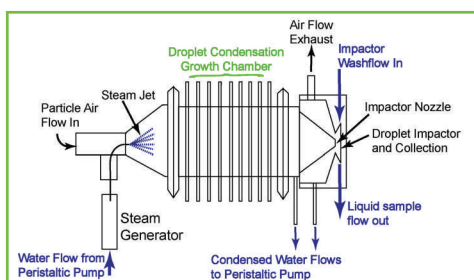
BMI: Particle into Liquid Sampler (PILS Model 4002)

The combination of a precise PILS and flexible Auto Collector enables a reliable and rapid analysis of aerosol species critical to air quality research.

Technical Specifications

Components:

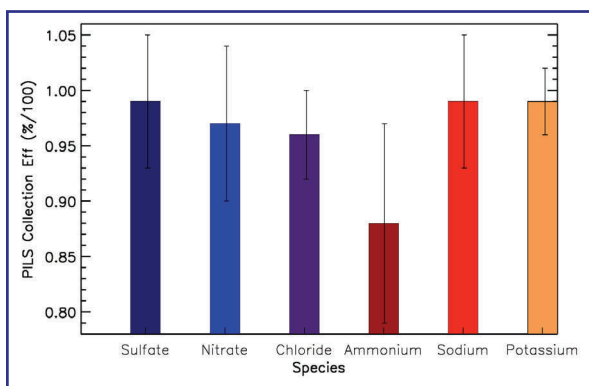
- Pre-Impactor Cut Size: 1.0 or 2.5 Microns
- PILS Inlet Flow: 15.0 lpm
- Steam Generator Liquid flow rate: 1.5 ml/min
- Syringe Pump Water Wash and Sample flow rates: 0.03-1.0 ml/min
- Tip Temperature: 98.5 +/- 1.5° C
- Heater Temperature (controlled automatically): 100-300° C
- Droplet Impactor cut size: 1.0 micron



BMI PILS Head Schematic

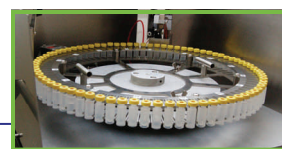
Chemical Species Detected:

- Sulfate, Nitrate, Nitrite, Chloride (100 ng/m³ LOD)
- Ammonium, Potassium, Sodium, Calcium, Magnesium (100 ng/m³ LOD)
- Acetate, Formate and Oxalate Organic Acids (50 ng/m³ LOD)
- Water Soluble Organic Carbon (10 ppb LOD)



Sample Auto Collector:

- Number of total vial positions in sample holding carousel: 38 or 80
- Vial sample collection time: 30 seconds-12 hours
- Collectable vial liquid volume: 0.03-20 ml
- Available sample vial sizes: 1, 2, 10, 12 and 20 ml



Electrical:

- Supply Voltage: 100-230 VAC
- Maximum current with Auto Collector: 1.5-2.5 amps
- Operating Temperature Range: 15-45° C

PILS Software Interface:

- Windows based data acquisition system with adaptable control software
- Recorded parameters include:
 - Air temperature, pressure, relative humidity, air sample flow rate, tip and steam generator temperatures, vial filling times and vial number
- Software utilities to configure each PILS run cycle and calibrate sensors annually
- Remote control communication link: RS-232

Physical:

- Dimensions with Auto Collector: 43wx48dx69h cm (17wx19dx27h in)
- System Total Weight with Auto Collector: 52 kg (115 lbs)



For more information about our PILS System, please visit our website at www.brechtel.com/aerosol.html or contact our sales department by email at sales@brechtel.com or 510-732-9723