Dekati® Fine Particle Sampler FPS

- Engine exhaust dilution
- Combustion aerosol dilution
- Real-time dilution condition control

DEKATI

Excellence in Particle Measurements

Dekati®
Fine Particle Sampler FPS

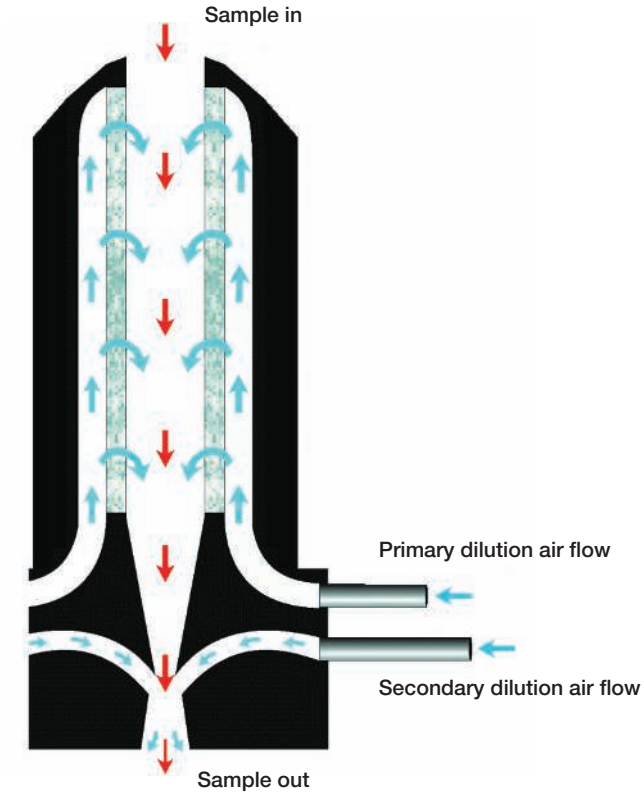
The Dekati® Fine Particle Sampler is a versatile solution for diluting and conditioning aerosol and gaseous samples for measurement instruments. This two-stage dilution system allows dilution factor adjustment between 1:20 and 1:200 and first stage dilution temperature settings between 0 and 350 °C. Temperatures and pressures in different parts of the dilution probe are measured in real-time enabling second-by-second dilution factor calculation, which takes changes in raw sample properties into account. The dilution factor calculation result is saved in real-time along with temperature and pressure data in an easily accessible form for post-processing of the data. The Dekati® Fine Particle Sampler applications range from engine exhaust measurements both before and after after-treatment devices to combustion process research and nucleation studies.

Operating principle

The Dekati® FPS dilutes aerosol sample in two stages employing a perforated tube diluter and an ejector diluter. The primary dilution takes place within the perforated tube where dilution air is forced into the tube through small pores in the tube wall. The secondary dilution stage is an ejector type diluter. The dilution factor in both dilution stages can be adjusted by increasing or decreasing the amount of used dilution air. The dilution air flows are regulated with the FPS valve unit which contains critical orifices for accurate and repeatable control. The third component of the FPS is the control unit that controls different dilution parameters. The whole system is controlled with the provided FPSVI software or directly at the front panel of the control unit.

Features

- Two stage dilution system with perforated tube and ejector diluters
- Stainless steel probe construction with no moving parts
- Dilution factor adjustable in discrete steps between 1:20 and 1:200
- Adjustable dilution temperature for efficient removal of volatile matter
- Wide sample pressure and temperature range
- Controlled with a user friendly FPSVI software that includes real-time dilution factor calculation and data storage
- Each unit individually calibrated by gas flow measurements that span all operating conditions
- Extremely low particle losses
- Sophisticated handling of volatile vapours
  - Removal with heated dilution
  - Nucleation tendency studies with cooled dilution and a residence time chamber
- Accessories available for direct engine exhaust (pre- and post DPF) and stationary source emission sampling
- Analog output of the dilution factor available for easy integration into existing data logging systems
- Possibility to control an external heater e.g. heating sampling line or Dekati® Thermodenuder



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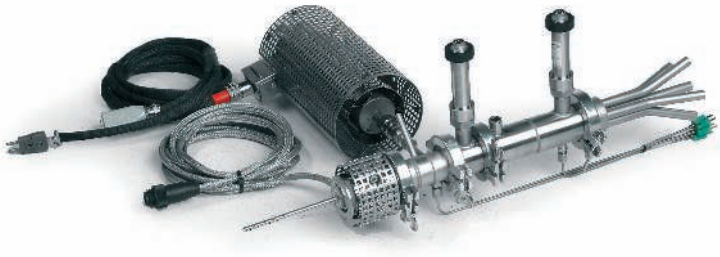
Accessories

Full stack sampling setup

Accessories for a complete dilution and conditioning system for stack or large duct sampling. Includes:

- Pressurised air heater for heating dilution air up to 350 °C
- Stack heater, pre-cut cyclone and isokinetic sampling nozzles
- Dilution air filtration and drying unit
- Automatic pressure controller for dilution air pressure
- Extension cable set (8 m)



Full automotive sampling setup

Accessories for a complete dilution and conditioning system for automotive and any small-scale application:

- Pressurised air heater for heating dilution air up to 350 °C
- Heater for the dilution probe
- Dilution air filtration and drying unit
- Automatic pressure controller for dilution air pressure

Other Accessories

- Residence time chamber for nucleation studies
- Dekati® Thermodenuder for volatile matter removal
- Vortex type cooler from primary diluter cooling
- Mobile rack for Dekati® Instruments

Applications

- Engine exhaust dilution
  - Pre- and post after-treatment devices
- Power plant flue gas dilution
- Small-scale stationary source dilution
- Aerosol transformation research for all sources
  - Nucleation/condensation studies
  - Agglomeration studies

ENG

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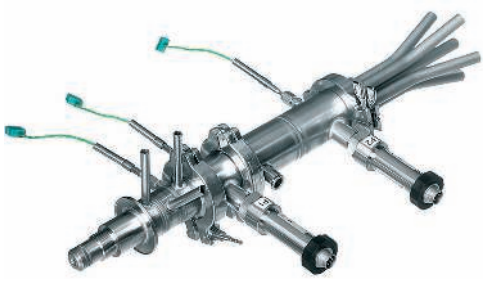
Dilution Specifications

Dilution factor*	Total: 1:20-1:200 Primary diluter: 1:3-1:20 Secondary diluter: 1:7-1:15
Dilution temperature	0-350 °C
Raw sample temperature	0-600 °C
Raw sample pressure	750-2000 mbar abs
Dilution air pressure	Max. 9 bar abs min. 6 bar abs, operates at 4.5 bar abs
Dilution air flow rate (at 1.013 bar, 20 °C)	Max. 220 lpm
Sample/inlet flow (at 1.013 bar, 20 °C)	0-10 lpm
Diluted sample flow (at 1.013 bar, 20 °C)	60-160 lpm
Cooling agent (if applied)	Pressurised air or water
Pressurised air for cooling	3-8 bar, 600 lpm, moisture free

*Dilution factor displayed within +/- 10% of reading
*Dilution factor over 100 achievable only with a stable inlet pressure
*Dilution factor adjustable in discrete steps with at least one step between 100 and 200



FPS sampling probe

System Specifications

Dimensions of the control + valve unit	560 mm x 410 mm x 310 mm (can be mounted in a 19” rack)
Weight	30 kg
Dilution probe material	AISI 316
Power consumption	1 earthed electrical power outlet, max. 2000 W
Connections:	
Probe inlet	NW40 flange or 6 mm drilled through pipe connector (e.g. Swagelok®, Gyrolok®)
Probe outlet	NW40 flange or 1-5 pcs. of 12x1 mm tube
Pressurised air and water inlets	Quick connector for 10 mm plastic tube
Computer requirements	MS-WINDOWS XP™, 7™ or 8™
PC/Laptop connection	RS-232, USB adapter provided
Analog inputs	2 x 1-5 V
Analog output (dilution factor)	1-5 V
K-type thermocouples	8 channels total; 3 connected to dilution probe, 1 for pressurised air heater
Pressures	2 channels, both connected to dilution probe

The Dekati® Fine Particle Sampler has been specially designed to comply with the standard criteria of the European Union’s DG-TREN Particulates Project for harmonized particle measurements. It incorporates the requirements of modern particle sampling instruments for both scientific research and industrial quality control measurements.

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Dekati Ltd. is specialized in the design and manufacture of innovative fine particle measuring and sampling devices. Since its founding in 1994, Dekati has become the technological market leader in producing fine particle measurement instrumentation for various applications and thousands of customers.

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