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Product data sheet

Palas® Aerosol generator for solid particles DSP 3000

Applications

- Test of diesel soot filters (DPF)
- Test of CVS systems
- Inhalation tests
- Atmospheric tests
- Test of sensors in exhaust-gas systems
- Test of smoke detectors

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Benefits

- Mean particle sizes adjustable from approx. 10 nm to > 200 nm
- Soot mass flows adjustable from approx. 50 mg/h to 3 g/h
- Functions at positive pressure values of up to 300 mbar
- DSP 3000 H: Mixed air up to 60 m3/h, controlled heating unit (up to 300°C)
- Comprehensive safety package with a pneumatic safety feature, automatic non-software-dependent shut-off system, burst protection mechanism, automatic fuel gas shut-off in the case of an open burner or power outage
- Low maintenance
- Easy to operate
- Reliable function

Description

The DSP 3000 is used to generate a soot aerosol from the defined combustion of a fuel gas (e. g. ethylene + combustion air). The DSP 3000 and the DSP 3000 H enable the targeted adjustment of the mean particle size and the mass flow of the generated soot aerosol using the air-fuel mixing ratio. User-friendly software enables the setting of the desired operating parameters quickly and reproducibly on a laptop/PC. With a generated soot mass flow of up to 3 g/h, the DSP 3000 is ideally suited to load diesel soot particle filters (DPF) for filter efficiency tests.

The DSP 3000 and DSP 3000 H function at positive pressure values of up to approx. 300 mbar. Both models are equipped with a comprehensive safety package.

Function

The fuel gas is mixed with air prior to combustion. In comparison to a conventional diffusion flame, this process forms an extremely stable soot aerosol with respect to particle size and concentration.
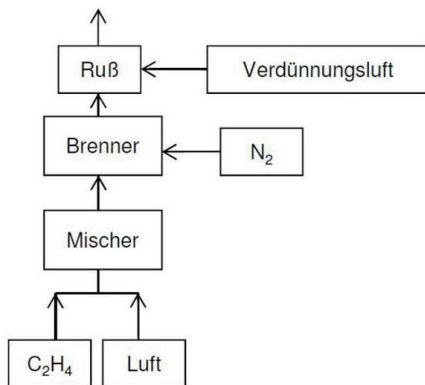

Fig. 1: Principle of operation

Environmental conditions, such as temperature and ambient pressure, have less of an impact on soot formation. The particle quantity depends on the mixing ratio (air- fuel ratio) in the fuel gas, as well as the overall volume flow through the burner. The higher the concentration of fuel gas in the air-fuel ratio, the more soot is generated during combustion and the larger the generated particles.

Safety precautions:

The DSP 3000 and DSP 3000 H are equipped with a comprehensive safety package:

- Pneumatic safety feature: Two-handed control
- (Pneumatically) closes the burner
- Ignites the fuel gas
- Automatic non-software-dependent shut-off system with thermal and optical flame monitoring
- Burst protection mechanism
- In the case of a power outage or activation of the emergency off switch, the burner opens and the supply of fuel gas is stopped.

DSP 3000 / DSP 3000 H particle size distributions:

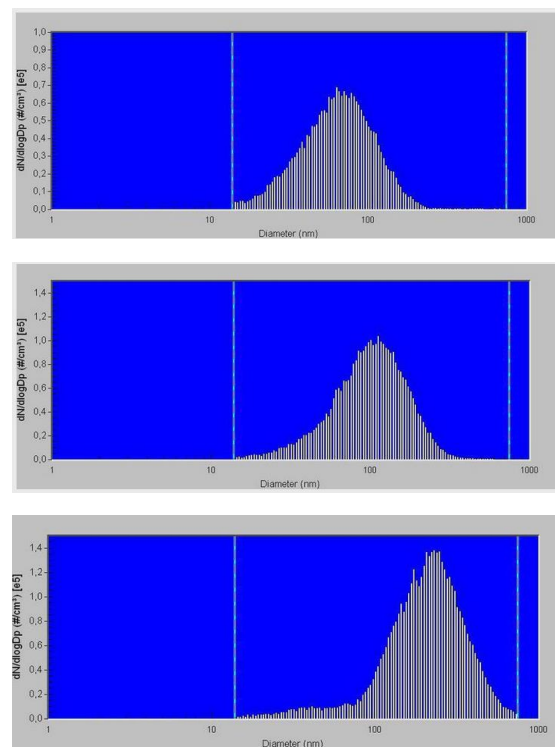Particle sizes adjustable from approx. 10 nm to > 200 nm

Fig. 2: Examples of typical distributions for the DSP system

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Mass flows:

Mass flows adjustable up to 3 g/h **A mass flow of 3 g soot/h is guaranteed with a modal value of 200 nm. Counter pressure up to approx. 300 mbar**

Software:

The software allows the fuel gas/air mixing ratio to be predefined. This enables various particle sizes and particle concentrations to be predefined as a "formula" and incorporated into an automated dispersion process. A display shows the DSP 3000 flowchart with the corresponding online values.

Specifications

Power supply	115 - 230 V, 50 - 60 Hz, 0.5 kW
Dimensions	Approx. 115 • 75 • 90 cm
Weight	Approx. 120 kg
Particle material	Flame soot
Dosing time	Several hours nonstop
Maximum particle number concentration	Approx. 107 particles/cm³
Mass flow (particles)	0.2 – 3 g/h
Particle size range	0.005 - 0.2 µm
Pre-pressure	4 - 8 barg
Compressed air connection	Quick coupling
Particle size range (primary particles)	Approx. 21 nm
Volume flow (dilution gas)	50 - 1000 l/min
Volume flow (fuel gas ethene + combustion air)	1 - 25 l/min
Volume flow (quench gas nitrogen)	0 - 12 l/min