MFP 3000 HF

With the MFP 3000 HF, it is possible to set the relative humidity from 10 to 80 % or the temperature from -10 to 50 °C. The inflow velocity has been extended compared to standard models to a range of 4 cm/s – 2 m/s.

The MFP 3000 HF serves to determinefilter parameters under realistic air conditions, such as

- the differential pressure of the filter medium at different inflow velocities
- the fractional efficiency and the differential pressure at a defined air volume flow
- the differential pressure and the fractional efficiency at a defined air volume flow
- the dust holding capacity and the associated gravimetric efficiency at a prescribed air volume flow and increase in differential pressure.

Operation principle

Active control of the relative humidity from 10 to 80 % and temperature from -10 to 50 °C

Air conditioning

The MFP 3000 HF provides exceptionally stable data on air conditioning. This includes an isothermal measuring chain to prevent evaporation and condensation effects of particles in the test channel and during sampling and particle measurement. For this reason, the MFP 3000 HF was equipped with active cooling and heating elements, which allows the air conditioning to be almost independent of the climatic conditions in the lab.

Aerosol generation
The modular system of the MFP 3000 series enables the use of different test aerosols like salt particles, DEHS particles, and test dusts like ISO A2 Fine. Aerosol generation is characterized by extremely high consistency in the aerosol concentration and the particle size distribution emitted.
The aerosol measurement from 5 nm to 40 μm
For the first time, the U-SMPS particle sizer has been integrated into the MFP 3000 series to measure nanoparticles from 5 nm to 1 μm. The MFP 3000 HF has automatic manual switching between rawand pure gas measurement points.
The light scattering spectrometer Promo® 3000 HP performs precise particle measurements in the range from 200 nm to 40 μm and, depending on the choice of sensor, also in high concentrations up to 5000 mg/m^3 (SAE Fine) or

low concentrations for determination of the initial fraction separation efficiency.
Automation
The MFP 3000 has an integrated mass flow controller to control the volume flow. The FTControl filter test software automatically monitors and controls the volume flow rates. The data from the integrated sensors – such as the volume flow, temperature, relative humidity, and differential pressure at the filter – are also recorded automatically during the filter test.

Sampling and layout The vertical layout allows even large particles (up to 40 μm) to make their way onto the filter medium. On the raw and clean gas side, isokinetic sampling probes are provided for the raw and clean gas sensor.

Benefits

- Settable relative humidity: 10 – 80 %
- Temperature regulation of the air volume flow: 20 to 35 °C (-10 to 50 °C on request)
- Expansion of the inflow velocity to 4 cm/s – 2 m/s
- Integration of an U-SMPS into the MFP 3000 HF expands the size range for the measurement of filter efficiency at the MFP 3000 to 10 nm – 40 μm
- Quasi-simultaneous particle measurement in raw gas and pure gas
- Measurement of $C_{n\ max}$= 10^6 particles/cm^3 without dilution
- Internationally comparable measuring results, high distribution of the test system
- Top reproducibility of the test procedure
- Easy use of various test aerosols, such as SAE Fine and Coarse, NaCl/KCl, DEHS
- Top raw gas concentrations up to > 1000 mg/m^3 ISO Fine or > 5000 mg/m^3 ISO Coarse with fraction separation efficiency measurement for load testing
- Flexible filter test software FTControl
- Sequential programs for pressure loss measurement, fraction separation efficiency measurement and load measurement
- Easy to operate, fast induction even of untrained personnel
- Short set-up times
- Cleaning and calibration can be carried out by customers themselves
- Easy use of the measurement technology components, also in other applications
- For mobile use, easy to move on rollers
- Reliable function
- Demonstration of the clear function of the individual components and the entire system on preliminary acceptance and delivery
- Low maintenance
- Reduces your operating expenses

DATASHEET

Aerosols	Dusts (e.g., SAE dusts), salts (e.g., NaCl, KCl), liquid aerosols (e.g., DEHS)
Test area of the medium	100 cm^2
Measurement range (size)	0.2 – 40 μm (Promo® system), 5 nm – 1 μm (U-SMPS system)
Measurement range (mass)	For SAE-Fine without additional dilution to 1,000 mg/m^3 (ISO A2 Fine)
Volume flow	1.2 – 72 m^3/h - suction mode
Power supply	400 V, 50 Hz
Differential pressure measurement	0 – 20,000 Pa
Inflow velocity	4 – 200 cm/s
Compressed air supply	6 – 8 bar
Temperature regulation	+20 – +35 °C (-10 – 50 °C on request)
Luftfeuchteregelung	10 – 80 %
Dimensions	2,300 • 800 • 2,000 mm (H • W • D)

APPLICATIONS

- Testing of filter media and of small filter elements in product development and during production monitoring with variable rel. humidity and temperature.
- Testing option based on ISO 11155-1 / DIN 71460-1 (cabin air filters), ISO 5011 (engine pre-air filters), ISO 16890 / EN779 / ASHRAE 52.2 (room air filters), EN 1822-3 (HEPA filters), CEN EN 143 and other standards in various versions.
- Simulation for testing
  - car interior air intake filters or engine air filters at high temperatures, under dusty and dry or extremely humid conditions
  - turbine air filters from power plants (like those exposed to salt particles at high humidity on the coast under bad weather condition)
  - performance of room air filters in summer (warm and humid / dry) and winter (cold / humid / dry)
  - performance of ice formation in the filter medium

Mehr Informationen:
https://www.palas.de/product/mfp3000hf