MFP Filter test system
MFP 1000 HEPA with welas® digital 1000 (alternatively with Model 3340 or HSLAS II)

MFP 1000 HEPA

MFP filter test rigs from Palas® have been proven itselves worldwide in practical use of many applications in the development and quality control.

The MFP filter test rig is a modularly built filter test system for flat filter media and small filter elements.
Pressure drop development, fractional separation efficiency or loading can be determined reliably and therefore economically within shortest time.

With the new light-scattering spectrometer welas® digital 1000 an unambiguous and reliable determination of the aerosol concentration and the particle size are ensured and thereby an unambiguous determination of the separation efficiency and the MPPS range of HEPA filters.

As an alternative, other aerosol spectrometers like e. g. Model 3340 (from TSI) or HSLAS II (from PMS) can be applied for the filter test.
On request also other particle measuring devices can be retrofit with this test rig.

Due to the movable dilution cascades the test rig can be adapted shortly from salt aerosols to DEHS aerosols without cleaning effort.

The extensive automatisation of the test procedure together with the clearly defined single components and the individually adjustable sequence programs of the filter test software FTControl provide for the high reliability of the measuring results.

Contact
Palas® GmbH
Greschbachstraße 3b
76229 Karlsruhe, Deutschland
Phone: +49 721 96213-0
Fax: +49 721 96213-33
E-Mail: mail@palas.de
Internet: www.palas.de

Particular advantages:
- Internationally comparable measuring results
- Simple use of different test aerosols like e. g. NaCl/KCl or DEHS; others on request
- Simply movable dilution cascades with factors 10, 100, 1.000, 10.000 for the measurement of salt or DEHS
- Easy determination of fractional separation efficiency and MPPS range
- With fractional separation efficiency determination loading measurements up to 2500 Pa are possible
- High reproducibility of the testing procedure
- Flexible filter test software FTControl
- Easy handling, fast training even of untrained staff
- Cleaning can be accomplished by the customer himself
- Short set-up times, fast running times
- Mobile set-up, easy to slide on reels
- Proof of the clear function of the single components and the complete system during pre-acceptance and delivery
- Reliable function
- Low maintenance
- Reduces your operating expenses

Application examples:
- Testing of filter media and small filter elements in the product development and at the production control.
- Testing possibility according to EN 1822-3 (HEPA/ULPA), ISO 11155-1 (Cabin air filters), EN779/ASHRAE 52.2 (room air filters), CEN EN 143 and other standards in different versions.

Technical parameters:
- Volume flow: 0.54 - 16 m^3/h in pressurized operation
- Inflow velocity: 1.5 - 40 cm/s (others on request)
- Differential pressure measurement: 0 - 2500 Pa (others on request)
- Test surface of the medium: 100 cm^2
- Aerosol types: salts, e. g. NaCl, KCl; liquid aerosols, e. g. DEHS
- Particle measuring ranges:
  - welas® digital 1000:
    120 - 2000 nm, 200 - 9000 nm, 0.25 - 17 µm, 0.6 - 40 µm
  - Modell 3340: 90 nm - 7500 nm
  - HSLAS II: 60 nm - 1000 nm
- Dilution cascades with factors 10, 100, 1,000, 10,000
- Dimensions (WxHxD): approx: 600 x 1800 x 900 mm
- Compressed air supply: 5-8 bar; $\dot{V}_{max}$ = 24 m^3/h
- Power supply: 115/230V , 50/60 Hz

Accessories:
- Filter medium adapter for dense media or small filter elements
- Adapter for the installation of a krypton source for the aerosol discharge

The technical data on this sheet are for information only.
Technical modifications reserved. V0020312

MFP Filter test systems
Quality in detail

Variable aerosol generation by using special dispersers for KCl/NaCl or DEHS. Integrated drying system; no silica gel! The drying of the generated salt aerosol is effected by dry compressed air. The volume flow for the drying can be individually regulated via mass flow controllers.

Corona discharging unit (optional) – Ion flow adjustable for different mass flows. Mixed air adjustable for inflow velocities from1.5 to 40 cm/s.
The regulation is effected by mass flow controllers.

Mobile pneumatic **filter holder** for the fast removal and assembly of the test rig.

Movable dilution cascades:
The dilution cascades allow the defined dilution of the released test aerosols by the factors 10, 100, 1.000 and 10.000. As they are simply movable, the test rig can shortly be adapted from salt aerosols to a DEHS aerosols.
A time and cost-consuming cleaning of the systems is not necessary.

Light-scattering spectrometer welas® digital 1000 for HEPA filters
The Palas® filter test software FTControl controls the applied light-scattering spectrometer and evaluates the data.

MFP 1000 HEPA

For the clear measurement of the fractional separation efficiency and the determination of the MPPS range Palas® recommends:

- The light-scattering spectrometer welas® digital 1000 for HEPA filters
- The light-scattering spectrometers Model 3340 (from TSI) or HSLAS II (from PMS) for HEPA/ULPA filters

Fractional separation efficiency measurement, MPPS determination

Figure 1: welas® digital 1000 :
Fractional separation efficiency, MPPS at 130 nm

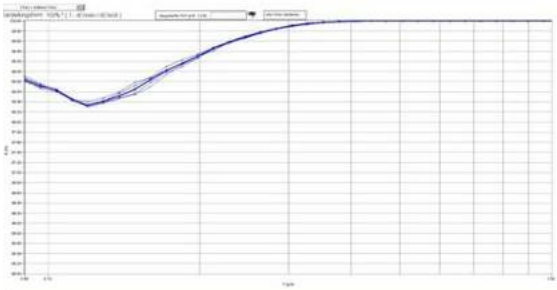

Figure 2: Model 3340: Comparison of fractional determination efficiencies, MPPS at 120 nm

- Clear proof of the separation efficiency of your filter medium over the complete measuring range
- Clear determination of the MPPS range
- Highest reproducibility and repeatability of the measurements make also fine differences in the separation efficiency visible
- Short measuring periods of approx. 2 minutes per separation efficiency measurement by optimal aerosol release
- Easy comparison of the separation efficiency curves, also averaging

Automatisation:

The MFP 1000 HEPA has an integrated mass flow controller for the regulation of the volume flow which can be controlled automatically by means of the FTControl filter test software. The sensor data like volume flow and differential pressure on the filter are registrated automatically during the filter test.

Loading/Lifetime measurement and Registration of the pressure drop curve

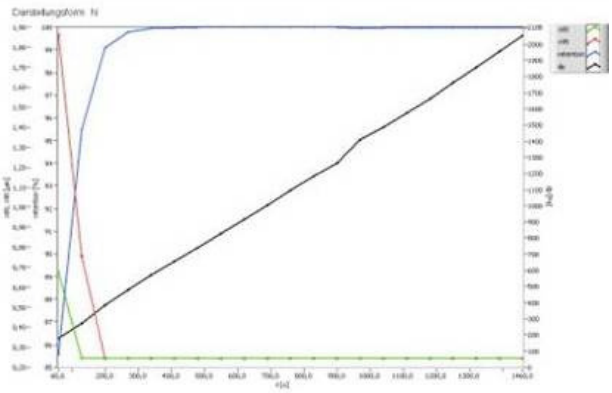

Figure 2: Example: Lifetime measurement

- Accomplishment of fractional separation efficiency measurements during the dust loading; the pressure drop or the measuring time can be pre-selected as abort criterion.
- Determination and display of the pressure drop curve and the retention curve in diagram and tabular form.
  Additional information is provided by the display of the particle diameters with 80 % and 95 % separation.
- Comparison of the fractional separation efficiency at different loading steps.
- Reduction of the measuring times, e. g. by increase of the dust concentration

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