



DESCRIPTION

In order to reliably determine the quality and efficiency of filter elements, it is crucial to test energy consumption (pressure drop), loading and particle separation efficiency in addition to total penetration. Accurate measurement requires adaptation of the test channel with regard to flow guidance and aerosol distribution to the size of the filter elements

Palas® has over 35 years of experience in the field of filter testing and continuously develops test rigs of the highest quality to meet a wide variety of requirements.

The FET 300 enables defined testing of filter elements up to 300 x 300 mm, such as ventilation filters, HEPA/ULPA filters, hoover end filters, car cabin filters.

Designed for optimum flow guidance, the channel can also be used for smaller filter elements by means of adapters.

Coarse filters up to ULPA filters are tested for separation via particle size as well as differential pressure. The FET 100 measures better than the standards require:

- ISO 24693-5 HEPA/ULPA filter elements
- ISO 16890 room air filters
- ISO 11155-1/3 Automotive cabin air filters
- DIN 71460 Automotive cabin air filters

Thanks to individual adapters and customer-specific adaptations in the air duct, the FET system can be used for a wide variety of filter elements.

Operating principle

A controlled fan sucks a defined test volume flow from the environment via a HEPA inlet filter through the test duct and a protective filter.

The aerosol and pressure are operated on the upstream side of the FET 300. In the vertically constructed test duct, the aerosol is then homogeneously mixed and directed onto the filter element.

The aerosol extraction for the particle measurement is representative on the raw and clean gas side, considering the isokinetic. Two measuring devices can be used simultaneously or only one measuring device with a measuring point switch.

The measuring instruments used are the Palas® U-SMPS¹ or the aerosol spectrometers of the Promo® system², which can cover a measuring range from 0.01 to 40 µm, depending on the selection.

Now the filter element is inserted into the test channel. The filter holder can be easily and quickly opened pneumatically for this purpose. Individual adapters can be made for different designs of filter elements.

Now the filter element is tested. The pressure drop and the clean gas concentration and size of the clean gas aerosol are determined and the fractional separation efficiency is calculated.

The system is easily controlled via the integrated FTControl³ test rig control system. Individual sequence programs ensure that the measurements are carried out safely.

A comprehensive analysis section allows simple and fast evaluation of the measurement results.

Extensions / Accessories

Aerosol generation

Due to the modular design, a wide variety of test aerosols can be generated depending on the aerosol generator used:

DEHS, oils, paraffin oil, NaCl or KCl, test dusts such as ISO A2 Fine.

Aerosol discharge

Depending on the application, the aerosol discharge is carried out via the electrical corona discharge CD 2000⁴ or the X-ray source XRC 049⁵, which is not subject to approval.

Aerosol dilution

The dilution systems of the VKL series⁶ are to be used especially when measuring high HEPA filter qualities (filter efficiency >99.95%). When using dilution systems, a measuring point switch for the dilution factor (1,10,100,1000,10000) is used for easy filter testing.

Aerosol measurement

The aerosol measurement takes place

- in the range from 0.01 to max. 1.2 µm with the Palas® U-SMPS⁷,
- in the range from approx. 0.12 to 100 µm with the aerosol spectrometer of the Promo® system⁸.

The two measuring instruments can be combined and used simultaneously as an U-Range⁹ for the entire range.

¹U-SMPS: <https://www.palاس.de/en//en/product/usmps>

²Promo® system: <https://www.palاس.de/en//en/product/promo>

³FTControl: <https://www.palاس.de/en//en/product/ftcontrol>

⁴CD 2000: <https://www.palاس.de/en//en/product/cd2000>

⁵XRC 049: <https://www.palاس.de/en//en/product/xrc049>

⁶VKL series: <https://www.palاس.de/en//en/product/vkl>

⁷U-SMPS: <https://www.palاس.de/en//en/product/usmps>

⁸Promo® system: <https://www.palاس.de/en//en/product/promo>

⁹U-Range: <https://www.palاس.de/en//en/product/seriesurange>

BENEFITS

- Accurate, versatile testing
 - Measurement according to ISO 29463-5, as well as ISO 16890 (ISO ePM₁; ISO ePM_{2.5}) possible in one channel
 - Use of measurement technology in FET 100 and FET 600; dual channels on request
 - Particularly wide range of application for separation efficiency measurement from 0.02 to 40 μm
 - Measurement of dust holding capacity possible
- Flexibility and ease of use
 - Customization of filter adapters, flow channel and measuring ranges possible for optimal test performance
 - Modular compact design for middle sized filter elements, low space requirement
 - Horizontal design for minimization of particle losses
 - Calibration of raw gas/pure gas not necessary, because only one sampling and one measuring device is used
- Safety
 - Logged results based on relevant standards
 - Factory tested and calibrated test stands

DATASHEET

Measuring range (total penetration)	Up to 0.0005 %
Measurement range (size)	0.02 – 100 μm
Volume flow	2 – 200 m^3/h - pressurized operation
Differential pressure measurement	0 – 1,200 Pa selectable, 0 – 2,500 Pa selectable, 0 – 5,000 Pa selectable
Aerosols	Dusts (e.g., SAE dusts), salts (e.g., NaCl, KCl), liquid aerosols (e.g., DEHS), latex particles
Size filter element	300 • 300 • 300 mm

APPLICATIONS

- Development
- Quality control for
 - Cabin filters
 - HEPA/ULPA clean room filters
 - Cabin air filters
 - Engine air filters
 - Compressor supply air filters
- Measurement of MPPS according to ISO 29463-5
- Measurement of the fractional separation efficiency according to ISO 16890
- Determination of the pressure loss at different volume flows
- Determination of dust holding capacity



Mehr Informationen:
<https://www.palas.de/product/FET300>