



To reliably determine the quality and efficiency of filter elements, it is crucial to test energy consumption (pressure drop), loading, particle separation efficiency, and 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 40 years of experience in filter testing and continuously develops test rigs of the highest quality to meet various requirements.

The FET 100 enables defined testing of filter elements of the smallest sizes up to 100 x 100 mm, such as medical filters, vacuum cleaner filters, and fan filters.

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

- ISO 29463-5 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.

OPERATION PRINCIPLE

TEST SYSTEM FOR SMALL FILTER ELEMENTS UP TO A CROSS-SECTIONAL AREA OF 100 • 100 MM

The aerosol and mixed air feed is pressure-operated on the upstream side of the FET 100.

The air volume flows required for this are precisely controlled on the input side via a mass flow controller. In the case of HEPA filter testing, the aerosol is classified monodispersely. In the vertically arranged test duct, the aerosol is then homogeneously mixed.

Aerosol extraction for particle measurement is then carried out representatively under consideration of the isokinetic. One measuring point is provided for aerosol extraction.

The measuring instruments used are the Palas **U-SMPS**¹ or the aerosol spectrometers of the **Promo ® system**², which can cover a measuring range from 0.01 to 40 µm, depending on the selection.

After the raw gas measurement has been completed, 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, clean gas concentration, and size of the clean gas aerosol are determined, and fractional separation efficiency is calculated.

The system is easily controlled via the integrated **FTControl**³ test rig control system. Individual sequence programs ensure that the measurements are carried out safely.

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

Extensions/Accessories

Aerosol generation

Due to the modular design, various test aerosols can be generated depending on the aerosol generator used: DEHS, oils, paraffin oil, NaCl or KCl, and test dust such as ISO A2 Fine.

Aerosol discharge

Depending on the application, the aerosol discharge is carried out via the electrical corona discharge **CD 2000**⁴ or the X-ray source **XRC 049**⁵, which is not subject to approval.

Aerosol dilution

The dilution systems of the VKL series 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-SMPS**⁶,
- in the range from approx. 0.12 to 100 µm with the aerosol spectrometer of the **Promo ® system**⁷.

The two measuring instruments can be combined and used simultaneously as a **U-Range**⁸ for the entire range.

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

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

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

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

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

⁶U-SMPS: <https://www.palas.de//product/usmps>

⁷Promo® system: <https://www.palas.de//product/promo>

⁸U-Range: <https://www.palas.de//product/seriesurange>

BENEFITS

- Accurate, versatile testing
 - Measurement according to ISO 29463-5 and 29463-3, as well as ISO 16890 (ISO ePM₁; ISO ePM_{2.5}) in one channel possible
 - Use of measurement technology in FET 300 and FET 600; dual channels on request
 - Extensive range of applications 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 small filter elements, low space requirement
 - Horizontal design for minimization of particle losses
 - Calibration of raw gas/pure gas is 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

Aerosols	Dusts (e.g., SAE dusts), salts (e.g., NaCl, KCl), liquid aerosols (e.g., DEHS), latex particles (PSL)
Measuring range (total penetration)	Up to 0.0005 %
Measurement range (size)	0.02–100 μm
Volume flow	1 – 27 m^3/h - pressurized operation
Differential pressure measurement	0 – 1,200 Pa selectable, 0 – 2,500 Pa selectable, 0 – 5,000 Pa selectable
Size filter element	100 • 100 • 100 mm (H • W • D)

APPLICATIONS

- Quality control for
 - HEPA/ULPA clean room filters
 - Cabin air filters
 - Cabin filters
 - Engine air filters
 - Compressor supply air filters
- Development
- Measurement of MPPS according to ISO 29463-5 and ISO 29463-3
- 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/FET100>