TOPAS®
Technologie-orientierte Partikel-, Analysen- und Sensortechnik

Robot Filter Scanner for HEPA and ULPA Filter Testing acc. to EN 1822/ISO 29463

AFS 151

AFS 151 Robot HEPA/ULPA Filter Scanning System.

The AFS 151 filter scanning test system is used to determine the integral and local particle filtration efficiency and leak detection of 2-dimensional and 3-dimensional filter elements.

Due to the modular setup, different types of test aerosols such as DEHS, paraffin oil and PSL can be used. By default, optical particle counters (OPC) are used for efficiency testing and leak detection, but SMPS measurements or tests with DMA-classified aerosols in combination with condensation particle counters (CPC) can be performed as well. The initial test system is designed for HEPA/ULPA panel filters and cartridges used at moderate volume flow rates. Upon request, this setup is subject to be upscaled to higher flow rates.

Applications

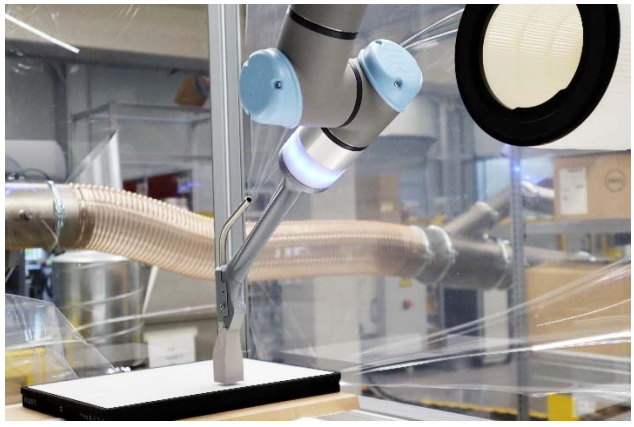
- product development and quality control of HEPA/ULPA filters
- scanning of panel filters and filter cartridges
- 3-dimensional scanning of V-bank filters

Special Advantages

- first commercial solution on automatic 3-dimensional filter scanning
- all filter sample dimensions within the robot working range can be defined by the operator
- programming of the robot done by Topas enabling fast implementation of new scanning concepts

Principle of Operation

The multi-functional test setup of AFS 151 allows integral filtration efficiency tests by using a suitable hood assembly in terms of a quick production control check. Furthermore, filters can be scanned on leak detection and local efficiency in moderate time intervals using a polydisperse test aerosol. Working stepwise with a classified aerosol, reliable MPPS curves can be determined during filter development.



Scanning of panel filters and filter cartridges using AFS 151.

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Specifications

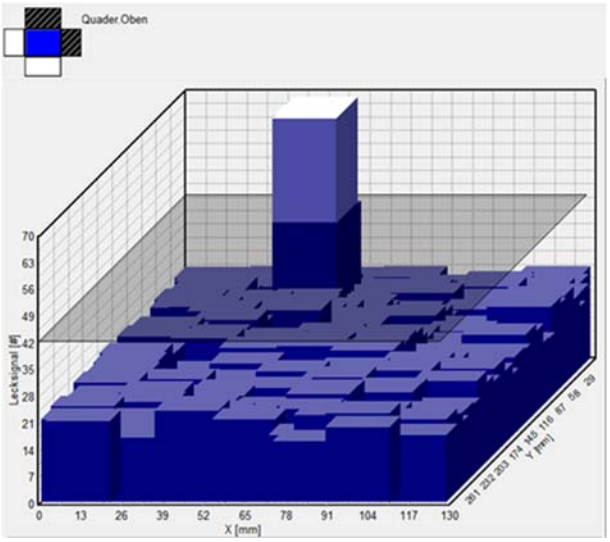
Details

This modular filter test setup can be equipped customised regarding aerosol generation and measurement instrumentation. This results in different test procedures that can be applied by the operator. The first projects have been made on moderate air flow rates of small to medium sized HEPA/ULPA filters used for mobile air cleaners. This testing concept can be designed to be applicable to higher air flow rates and larger filter dimensions as well.

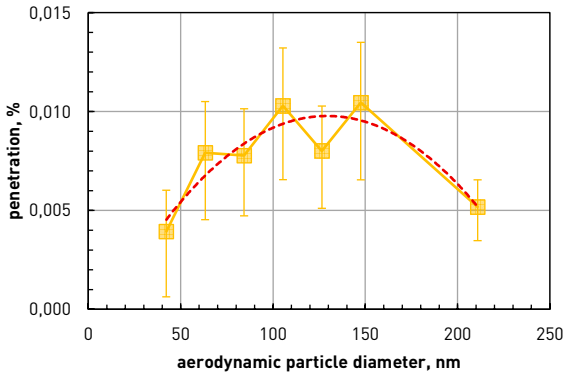
As the covered air flow rate range is wide two parallel blowers and flow rate sensors are used in combination with a bypass system. A variable downstream sampling velocity can be realised integrating the Regulated Flow Unit RFU 564. An upstream-to-downstream OPC correlation is considered within the test routines the same way as the residence time of downstream sampling.

The AFS 151 software design is based on the AFSWin concept approved at many AFS 150 and AFS 152 installations and results in a test report compliant to ISO 29643.

Moreover, AFS 151 realised a reliable safety concept required for handling test aerosols in overpressure mode.



Panel filter scan result with one leak detected. All 5 areas can be scanned at mounted panel filter.



MPPS curve of a HEPA filter element from integral measurement with classified challenge aerosol.

Technical Data

filter dimensions (mm)	min 50 x 30 x 7 max 500 x 500 x 280 (L × W × D, panel filter) min 40 x 45 max 350 x 600 (DxH, filter cartridge)
filter classes	H13 – U17
flow rate	1 ... 300 m³/h ***higher flow rate upon request***
differential pressure	50 ... 5000 Pa
aerosol materials	DEHS, paraffin oil, PSL
aerosol generation	ATM 222 (DEHS), ATM 233 (paraffin oil), ATM 240/L (PSL)
particle measurement	Optical Particle Counter (OPC), Condensation Particle Counter (CPC), Scanning Mobility Particle Sizer (SMPS)
scan speed	5 ... 100 mm/s
sampling probe	1 upstream, 1 downstream
power supply	3 x 400 VAC, 32 A
compressed air supply	6 bar
space required	4 m × 4 m × 3 m
standard	ISO 29463

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