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<https://topas.nt-rt.ru> || tac@nt-rt.ru

Испытательные системы AFC132/132 QC. Технические характеристики

Filter media test rig **AFC 132**



AFC 132 Filter media test rig according to ISO 16890

For the characterization of filter media, Topas developed the filter media test system AFC 132. This test system allows to test filter media and small filter elements according to various standards. The reliable, reproducible test of filter media is important for development and optimization, as well as quality assurance during production. Important features for characterizing filter media are:

- pressure drop depending on flow rate or dust loading,
- fractional efficiency with DEHS and KCl,
- gravimetric arrestance,
- loading capacity

The AFC 132 can also be used to realize a customized filter media test with individual test conditions and freely configurable sequences.

Application

- Filter tests on the basis of several standards
 - Air filter for general ventilation acc. ISO 16890 (Discharging with TDC 585), EN779 and ASHRAE 52.2
 - High efficiency filters (EPA, HEPA and ULPA) ISO 29463
 - Air filters for passenger compartments acc. to DIN 714560-1/ ISO/TS 11155-1
 - Inlet air cleaning filters for internal combustion engines and compressors according to ISO 5011
- Development and optimization of filter media in accordance with internal company standards
- Quality assurance during production
- Quality inspection of flat filter media as final test during production or as incoming inspection before further processing



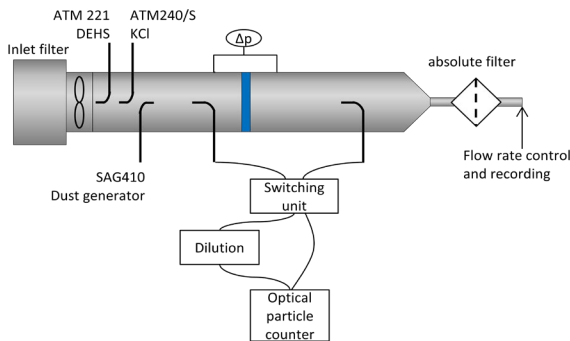
TDC 585 Discharging cabinet for filter media

Special Advantages

1. Use of different aerosols possible (solid and liquid aerosols)
2. Flexible design allows quick modifications and future enhancements
3. User-friendly AFC132Win data acquisition and test rig control software
4. Variable volume flow range
5. Excellent component matching through combination of Topas devices

Specification

Test system components



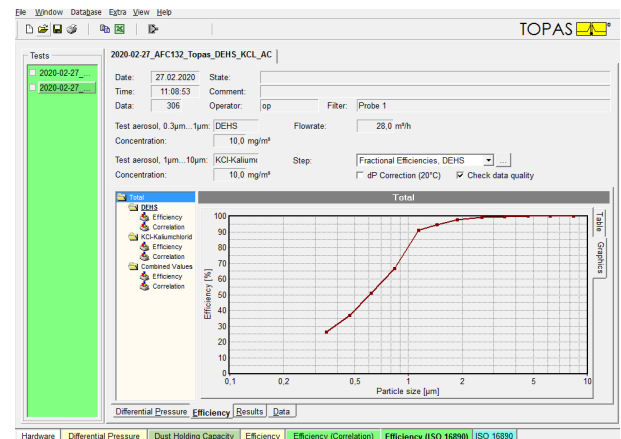
AFC132 schematic drawing of the test system

- Air treatment with high efficiency filter (H13)
- DEHS-aerosol (ATM 221) and KCl-aerosol (ATM 240/S) for fractional efficiency measurement of filter media
- Dust generator for dust loading procedure
- Test duct made of stainless steel with inner diameter of 150 mm
- Safety filter
- Particle measurement with optical particle counter (0,2 - 10,0 µm, 16 particle sizes classes)
- Filter holder for filter media
- Sensors for differential pressure, flow rate, temperature, relative humidity
- Flow rate range 2 - 64 m³/h
- Software

Filter holder

The filter medium is clamped in a special filter holder, which guarantees the secure and tight fit of the test object during the test. With a few simple steps, the filter holder is removed from the test channel to change the filter medium or to determine its mass. A support grid prevents strong deformation of the test specimen at high flow rates. The final filter (absolute filter) downstream of the test filter can also be easily installed and removed for mass determination.

Fractional efficiency of filter media



AFC132Win - Diagram with fractional efficiency test according to ISO 16890

The fractional efficiency is determined with an optical particle counter LAP 340 in a particle sizes range of 0.2 to 10.0 µm. The sampling between upstream, downstream and purge is controlled by and sample switching unit SYS 520. This means that only a single particle measuring device is required. The switching time of the sample switching unit SYS 520 is freely adjustable by the user. If required, a Topas dilution system series DIL 55x or an aerosol spectrometer LAP 322 with a particle size range from 0.2 to 40 µm can be supplied.

Dust loading

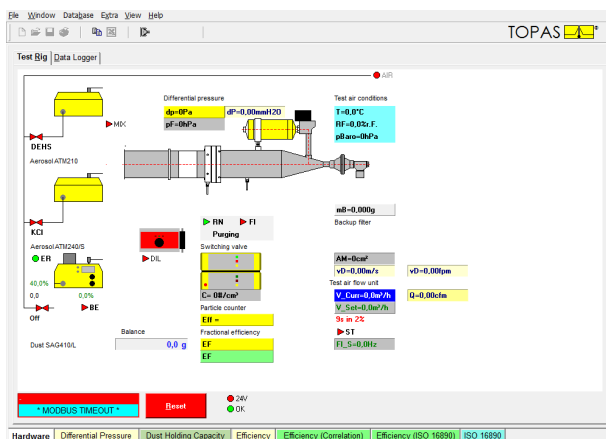
Dust tests can also be performed with the AFC 132 test rigs. In this case, the differential pressure increase is determined as a function of the deposited dust mass. Via a scale transfer, statements to filter testing based on the standards ISO 16890, EN 779, DIN 71460-1, ISO / TS 11155-1 and ISO 5011 are possible.

Specification

Control and data acquisition software

The software AFC132Win was designed for Windows and takes over the complete control of the test rig, the data acquisition and the data processing. The test procedure is carried out automatically, but can also be run manually by the user. Other benefits of AFC132Win include:

- automatic test procedures according to the selected test standard,
- manual control for calibration service and research tasks,
- data output and logging also for long-term investigations,
- databases for filter samples, test results and test substances,
- data presentation and statistical calculations,
- data transfer via clipboard and dynamic data exchange to Excel.



The fractional efficiency and particle size distribution can be determined, stored and printed separately. The user is informed via special instructions and pop-ups and guided through the tests. User-defined test procedures can be implemented on request.

Technical Data

Standard flow rate	2 m³/h ... 64 m³/h 0,4 m³/h ... 40 m³/h
Filter dimension	176 cm² (Ø150 mm)
Flow rate measurement	MFM, ±2 %
Differential pressure measurement	0 ... x ± 2 % (costumer specifications)
Ambient temperature and humidity	0 ... 50°C ±0.5 K, 0 ... 100 % r.H. ±2 %
Atmospheric pressure	700 ... 1 100 mbar ±2 %
Air supply	Conditioned room air suitable for standard tests
Pressurized air supply	max. 10 bar
Power supply	400 V AC, 16 A
Dimensions	2 100 x 850 x 1 400 mm
Mass	ca. 300 kg

Special Solutions

Upon request, customer-specific filter test systems can also be implemented. The integration of alternative measurement devices can also be examined by Topas upon costumer request.

Specification

Example – customer specific test rig for air filters for car passenger compartments



Special test rig with standard flow rate up to 300 m³/h with filter box for cabin air filters; limited functionality of absolute filter due to high flow velocity

Standard flow rate	60 m ³ /h ... 300 m ³ /h
Filter dimensions	Max. 310 x 222 x 100 mm
Flow rate measurement	Wilson grid, ± 2 %
Differential pressure measurement	0 ... 1 000 Pa ± 2 %
Ambient temperature and humidity	0 ... 50°C ± 0.5 K, 0 ... 1 00 % r. H. ± 2 %
Temperature and humidity in unit under test	-80 ... 200°C ± 0.15 K [at 23°C] 0 ... 100 % r.H. \pm 1,5 % r.H.
Atmospheric pressure	700 ... 1100 mbar ± 2 %

Media and power supply analogue to standard rig.



Filter test system AFC 132 / QC HEPA

Operating Principle

This air filter test system is designed to meet requirements of EN1822-4 Appendix E "efficiency leakage test for particle sizes from 0.3 μm to 0.5 μm ". This part of the standard is related to filter elements which cannot be scanned due to its geometrical design. In this case determination of integral filtration efficiency is sufficient for quality control.

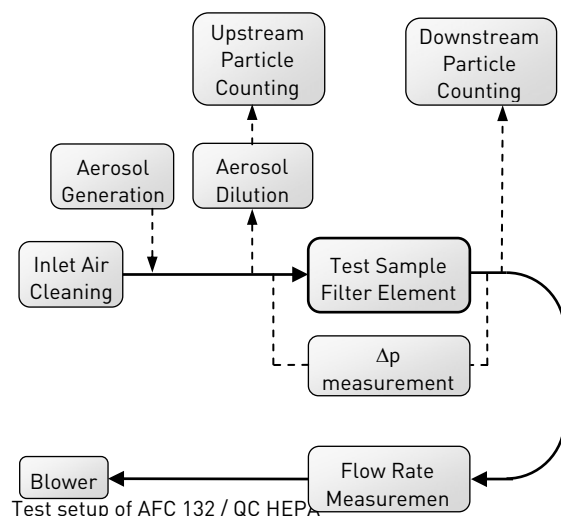
In comparison to the alternative oil thread test procedure this method gives much more reliable and much faster results on defective filter elements. Furthermore filters are much less loaded by test aerosol from the test procedure. The required test aerosol is produced by a special aerosol generator (ATM 221) using standard DEHS test liquid. For upstream concentration measurement an second optical particle counter is used in combination with cascaded self-adjusting dilution systems (DIL 540/C). A parallel optical particle counter determines downstream particle number concentration. Resulting integral filter efficiency is compared to nominal filter efficiency giving a final "pass" or "fail" result to each tested filter.

Special Advantages

- Free configuration of target filter efficiency and pressure drop
- Customized filter adapter for different small HEPA filter elements, easy to change (5 min)
- Compact test system design
- High degree of automation for minimum operator interactions
- Designed for 24/7 production operation
- Fast cycle time (30 s) for short test time per filter
- Safety features for use in production
- Retractable test data handling and documentation

Applications

- Efficiency testing of not scannable HEPA filter elements
- According to EN1822-4 Appendix E
- Confirmation of nominal HEPA filter class
- Suitable for integrated filter production control

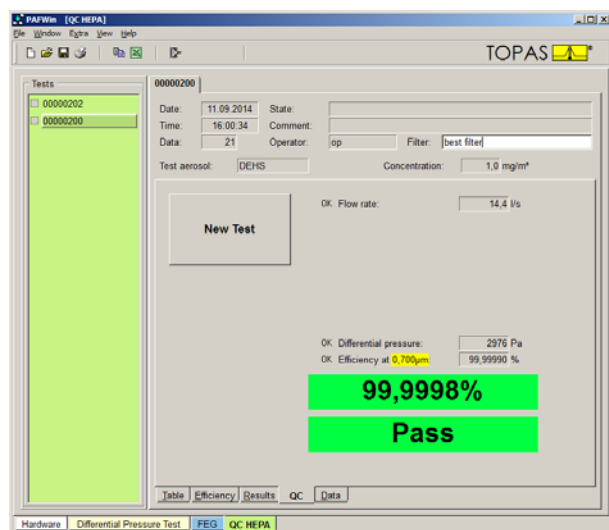


Specifications

Software

The control of all implemented aerosol instruments including data acquisition is supported by a state-of-the-art AFCWin software. It reliably guides the operator through the complete test procedure and finally generates the test report. All tests are stored in a database which enables a retraceable quality assurance during filter production.

- Two basic human-interface operation modes
 - a) touchscreen operation
 - b) standard operation with keyboard/mouse
- Automatic test procedures and test protocols of
 - a) fractional efficiency measurement (pass/fail)
 - b) differential pressure measurement
- Integrated automatic test system self-check routines (test system OK / NOK)
- Manual control and data logger for service, calibration, maintenance
- Database system for filter samples, test results
- Data transfer via the clipboard and Dynamic Data Exchange to Excel
- Network integration capabilities



AFCWin operator interface

Technical Data

Air flow rate	7 ... 35 l/s (25...126 m³/h)
Maximum filter adapter dimension	300 x 300 x 300 mm
Test cycle time	30 sec
Filter cross section	Customer specific
Face velocity	Customer specific
Differential pressure	3000 Pa ±1%FS
Climate sensors	Temperature, relative humidity, air pressure
Test aerosol	DEHS
Aerosol generator	ATM 221
Dilution systems	DIL 540/C (3 x 1:100/1:10)
Particle counter with vacuum pump	1:10 ... 1:100.000 4 channel 0.3/0.5/0.7/1.0 µm OR 4 channel 0.1/0.2/0.3/0.5 µm OR 8 channel 0.1/0.15/0.2/0.25/0.3/0.5/ 0.7/1.0 µm
Power supply	3x 400VAC, 50/60Hz, 16A
Dimensions (HxWxD)	1500 x 2000 x 1000 mm
Weight	approx. 600 kg

^{*)} individual configuration on request

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