



Filter Tests with the Automated Test Rig AFC 131

Testing Filter Media

This is important for the development and optimization of filter materials as well as for quality assurance during the production process. Differential pressure drop, particle size dependent filtration efficiency and dust loading capacity are of most interest for filter material characterization. For these tasks Topas developed the series AFC test rig which facilitates filter tests in accordance to with international standards. Dust loading tests and dust capacity tests in accordance with the general requirements of EN 779 and ISO 11 155-| can also be performed in small scale.

Due to its compact and lightweight design this test rig can be used in the laboratory. Only single-phase mains power and compressed air are needed to run filter tests. The Topas control software runs under Windows on a standard PC.

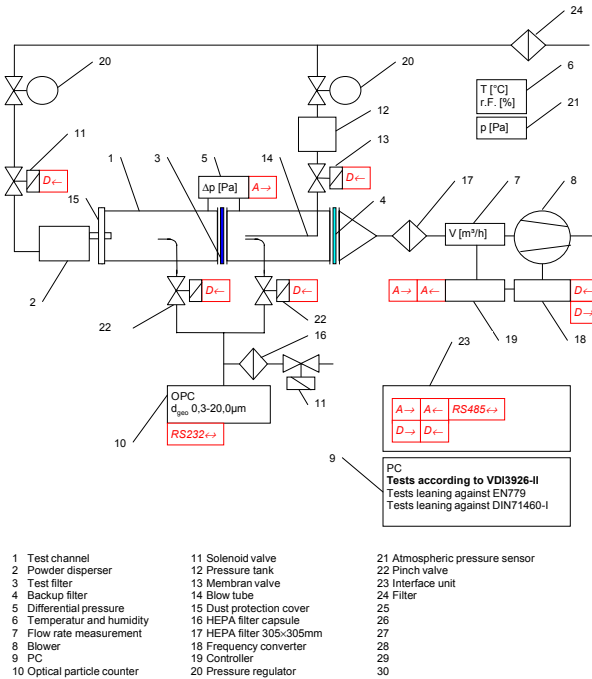
Special Advantages

- Flexible design facilitates modification and future extension
- Test rig is fully computer controlled by user-friendly PAFWin 3.0 software
- Wide variety of test aerosols possible (atmospheric, dust or droplets)
- Combination of Topas instruments ensures best performance at optimum price

Applications

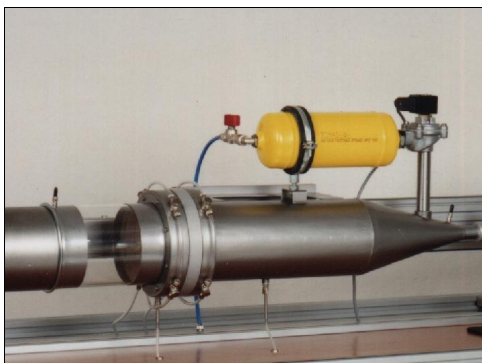
- Dust loading tests
- Small scale filter tests along the general lines of other standards
 - Air cleaning filters EN 779,
 - Cabin air filters ISO 11155-|
- Development and optimization of filter media
- Quality assurance

Filtration Efficiency



Scheme of the AFC Test Rig

The AFC test rig consists mainly of the test channel with filter holder, the flow rate control unit, dust dispersing unit, optical particle counter.



Test channel with upstream inspection window and pulse-jet cleaning unit according to VDI 3926-II (compressed air vessel with valve)

Filtration Efficiency

Fractional efficiency from 0.3 up to 20 µm is measured with an optical particle sizer. A switching valve controls aerosol sampling upstream and downstream of the filter. The particle counter is purged with particle free air between upstream and downstream samples. The sampling time is selectable from the software.



Efficiency Measurement with the LAP 321 Optical Particle Counter placed under the Test Channel below the Switching Valve

The backup filter at the end of the clean gas channel is needed to determine aerosol mass concentration downstream of the filter under test. Gravimetric measurements of both the backup filter and the test filter are used to determine the total filtration efficiency.

The flow rate unit uses a mass flow controller and is designed to keep the flow rate constant within 2% of the set value throughout the complete test procedure. Pressure drop across the filter is measured at 4 points over the filter holder.

The filter holder and the backup filter are easy to insert in and remove from the test channel. A dust protective cover can be placed at the inlet.

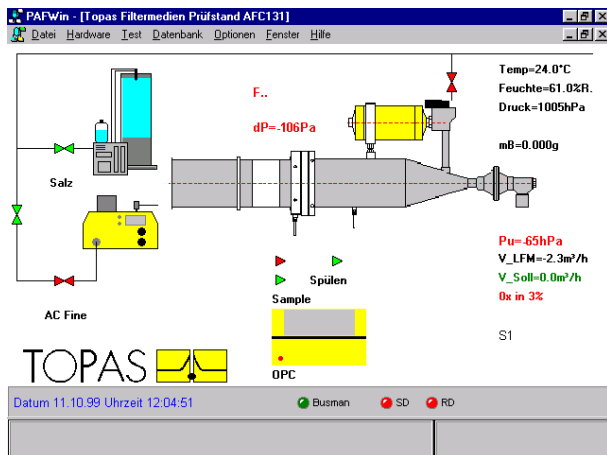
Testing Filters

Control and Data Acquisition Software PAFWin

The test rig control and data acquisition software PAFWin has been developed by Topas engineers. This software controls the whole test stand and records test data. This software runs under Windows3.x/95/NT and is easy to handle. The main parts of the test rig are displayed graphically. When started in an administrator mode the test rig can be operated manually using mouse clicks.

Further main features are:

- Automatic test procedures in accordance with issued standards
- Manual control for service, calibration procedures and research
- Data monitor for long term investigations
- Sample and tests database
- Test dusts database
- Data presentation and statistical calculations
- Data copy & paste, dynamic data exchange DDE

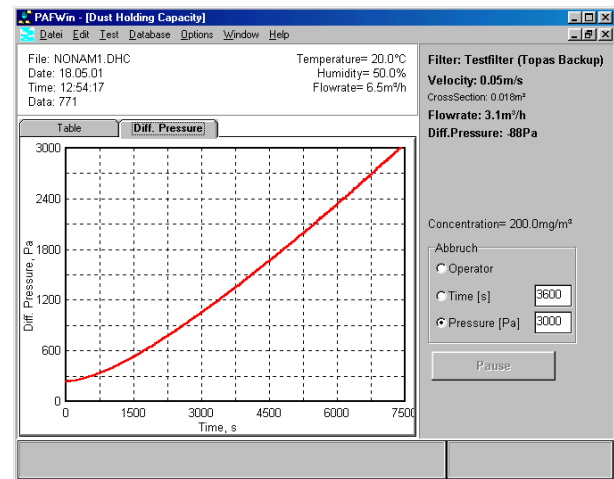


PAFWin Visualization of the AFC Test Rig

Fractional efficiency and particle size distributions can be separately determined, printed and saved. The operator is guided through all tests by the software. User defined test procedures are available on request.

Dust Holding Capacity

Tests can be performed with wide variation of dust concentration and face velocity. The differential pressure across the filter under test is recorded vs. time. Flow rate and other test air parameters (temperature, humidity) are also monitored.



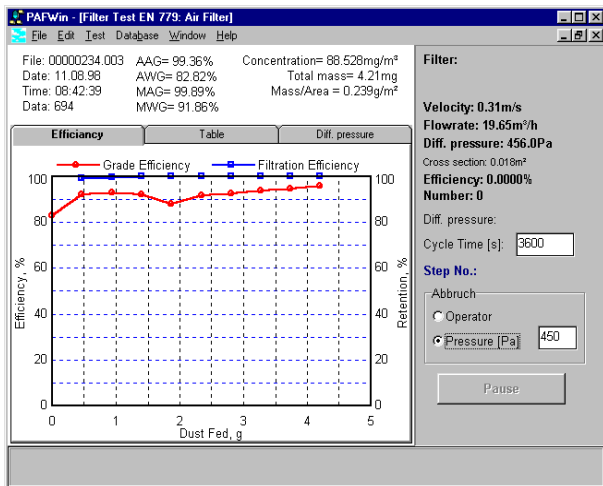
Test Result for a Cleanable Filter Media

Dust Loading Tests

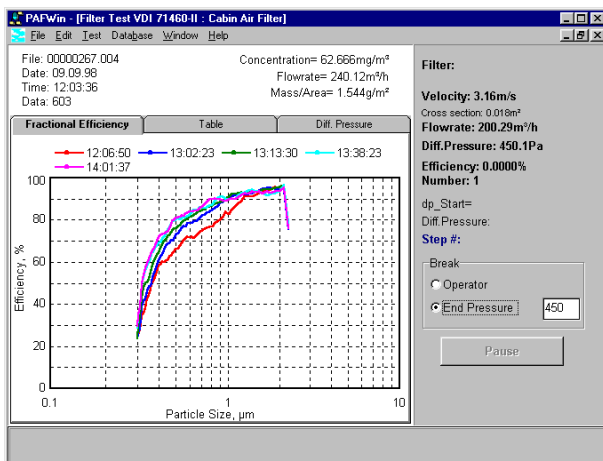
These tests can also be performed with the AFC test rig. Higher face velocities up to 1m/s can be selected. Standard tests as specified in EN 779 or DIN 71460-I has been scaled to the smaller AFC test rig.

Filtration efficiency with atmospheric aerosol is measured by the optical particle counter.

Specifications



PAFWin Window of the Grade Efficiency Dust Loading Test According to EN 779 (Air Filters)



PAFWin Window of the Fractional Filtration Efficiency Dust Loading Test According to DIN 71460-I (Cabin Air Filters)

Specifications

Air flow	2...64 m ³ /h ±2%
Face velocities	0.05...1 m/s
Diff. pressure	0...1250 Pa ±2%
Cross section	176 cm ² (Ø150 mm)
Sensors	Temperature, relative humidity
Tank pressure	0.2...0.6 Mpa
Blow time	50..150 ms
Optical particle counter	LAP 321, Topas 0.3...20 µm (<10 ⁵ Particles/cm ³)
Test aerosols	Dusts: AC fine, AC coarse, soot, calcite, lime stone, ... Droplets: DEHS, DOP; paraffin, Emery 3004 Salt aerosols PSL aerosols
Power supply	3 × 230 VAC, 16 A
Size	2800 × 800 × 1500 mm
Weight	approx. 120 kg

Other Topas devices for aerosol generation and measurement can also be integrated in the test rig. Special modifications are also possible.

QMS certified to
DIN EN ISO 9001.



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For more information please
visit our website at
www.topas-gmbh.de

Specifications are subject to
change without notice.

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