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Filter Media Test System

MBP 116



Figure: Filter Media Test System MBP 116

Performance of filter media is essentially defined by parameters such as differential pressure, fractional efficiency, gravimetric filtration efficiency and dust holding capacity. The Topas Manual Filter Media Test Rig MBP116 can be applied to determine these filter parameters at flat sheet materials. This test rig has been designed as universal testing equipment. It combines a simple and robust setup with a manual, and therefore cost efficient, handling and operation.

Applications

- Fast and easy quality assurance of flat sheet filter media in terms of a production control and incoming goods inspection
- Performance testing of filter mask materials during research and development process

Special Advantages

- Reliable and timesaving testing of
 - Differential pressure
 - Fractional filter efficiency
 - Gravimetric filtration efficiency
 - Dust holding capacity
- Simple operation in combination with a robust and space saving design, modular setup (benchtop unit and diverse options)
- Automatically or manually adjustable flow rate generation
- Connectors for differential pressure measurement and fractional efficiency measurement
- Customized test rig specification possible

Principle of Operation

The testing setup is operated in suction mode provided by a vacuum pump. Filter media under test will be placed into a filter holder. The test flow rate is automatically setup by the test system or manually by the operator. Inlet air and exhaust air are HEPA filtered.

Depending on the test requirements an ATM 221 is operated with paraffin oil or NaCl solution. In case of NaCl aerosol a diffusion dryer DDU 570 is needed. Depending on the aerosol, different particle measurement instrumentations can be used. The NaCl aerosol can be measured with optical particle counters or with a flame photometer FAP 620. The paraffin oil can be measured with photometers or with optical particle counters. Required test aerosol dilution is done by a DIL 5xx.

Specifications

Details

- Vertically arranged measuring tube for fractional efficiency test and dust loading of filter media sheets
- Flat sheet filter media, thickness up to 1.5 mm
- Side channel blower and Mass Flow Meter
- Flow rate: 1.5 ... 18 m³/h
- Fully automated control of test system and testing procedure via PLC (Ethernet)
- Including MBP116Win test system control and data acquisition & processing software

Fractional Efficiency Test Setup

- Consisting of atomizer aerosol generator ATM 221, dilution system DIL 5xx, switching unit SYS 520, optical particle counter LAP 340

Solid Aerosol Generator Series SAG 410

- Dust disperser for very low powder mass flow
Suitable for test dusts Dolomite dust,
ISO 12103-2 A2/A4, VDI 3926-2 Pural SB/NF

The following particle size distributions will be resulting for paraffin oil and NaCl when generated by any ATM 2xx model.

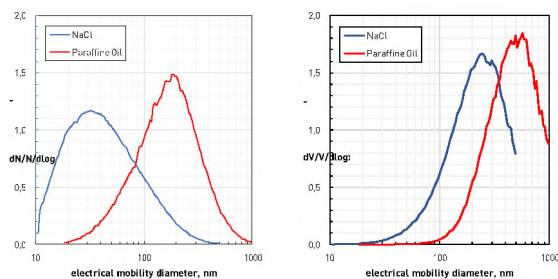


Figure: Number (left) and volume (right) weighted density distribution of Paraffin Oil (CAS 8042-47-5) generated by ATM 2xx

In case of using an optical sizing instrumentation with this setup it will be possible to achieve fractional efficiency curves as shown below. Optimization of filter material can be done much

better with fractional efficiency compared to total efficiency.

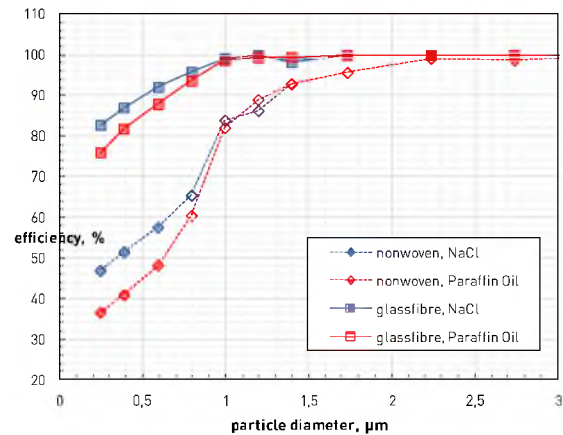


Figure: Fractional efficiency curves with NaCl and paraffin oil for two filter media samples measured with LAP 340

The following table shows the deviation of total penetration measured by different particle measurement methods.

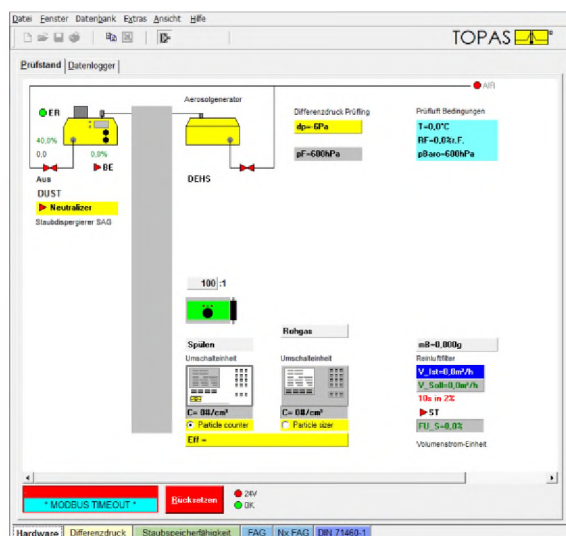
Table: Total penetration [%] measurement with different particle measurement methods at two different types of sample compared to a standard mask filter media tester

Aerosol	NaCl		Paraffin oil	
Filter media	glass-fiber	non-woven	glass-fiber	non-woven
LAP 340	13.3	48.1	15.8	55.1
LAP 322	16.9	49.8	21.1	60.4
CPC	16.8	32.3	18.3	58.2
Flame photometer	15.2	51.3	n/a	n/a
Standard tester	14.9	n/a	n/a	n/a

Control and data acquisition & processing software

The software MBP116Win 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 MBP116Win 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

Flow Rate	1.5 ... 18 m³/h *)
Face Velocity	4.2 ... 50 cm/s *)
Differential Pressure Range	0 ... 50 hPa
Open Filter Cross Section	100 cm²
Diameter Test Filter	125 mm
Diameter Backup Filter	125 mm
Test Dust Dosing	Solid Aerosol Generator SAG 410
Dosing Range	1.5 ... 20 g/h (ISO 12103-2, A2)
Media Contacting Materials	Stainless steel, aluminum, NBR
Power Supply Benchtop Unit	N/A
Power Supply Complete Test Rig	110...230 V AC, 50/60 Hz
Dimensions benchtop unit W x D x H	454 x 584 x 2000 mm
Dimensions Complete Test Rig W x D x H	650 x 1300 x 2550 mm
Weight	approx. 140 kg

*) Customized specification of the test rig possible on request.

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