

● Application

The Automated Filter Scanner Test System AFS 150 is designed to meet the requirements of testing high efficiency air filters (typical HEPA and ULPA classification) according to EN1822-4 with a high grade of automatization.

Filter under test are rectangular shaped with maximum filter sizes of length 1830mm, width 610mm, and depth 300mm. Minimum dimensions are given by 305 x 305 x 30 mm.



The whole system is operating in over pressure mode. Test air is taken from the room and cleaned by means of a HEPA inlet filter after passing the flow rate measuring device. Both an atomizer aerosol generator for challenging aerosol injection and the upstream particle counter are positioned in front of the filter holder where the filter under test is mounted by clamping it against a filter adapter panel. On downstream side of the filter under test a scanning traverse carrying the 30 x 30mm sampling probe connected to the 1cfm 0.1µm particle counter. The entire test system is connected to electrical cupboard and host PC placed on a separate moveable computer table.



Filter holder cabinet with scanning traverse

● The Solution

The upstream concentration is measured continuously during a filter scan. Based on the number of particles counted downstream of the filter element during the scan, the average efficiency or penetration of the filter element is calculated.

During the scan, particle count rates higher than the leak signal value will be detected as potential leaks. Potential leaks are mapped and displayed graphically on the computer screen.

After the scan is finished, potential leak positions will be measured a second time for leak verification. If a leak is verified, it's coordinates and the local efficiency will be documented in the test protocol and the test report. The result of the scanning test (pass of fail plus leak coordinates) can be transferred to a repair station through a serial port.

It desired, the filter scan may be followed by the measurement of the filter flow velocity downstream of the element. This measurement follows a user-definable grid pattern. Besides the particle instruments necessary for filter leak scanning the system includes analog inputs, typically used to acquire data from sensors for pressure drop across the filter, filter flow rate, barometric pressure, temperature and relative humidity.



The complete set of test parameters, the data describing the filter, and all test results are saved in a test-result file. A complete test report is printed. The contents of the test report can be customized.

● Test Rig Control and Data Acquisition Software

In addition to controlling the tests, the Topas scanning software includes numerous system test tools that may be used to check proper system operation.

- Manual control and data logger for service, calibration procedures, maintenance and research
- Sample and test data base
- Data presentation, protocols, and statistics, Excel spreadsheets
- Data copy & paste, dynamic data exchange DDE to Excel
- Automated test procedure of differential pressure curve with tare differential pressure correction
- Test protocol according to EN1822-4, -5

● System Components

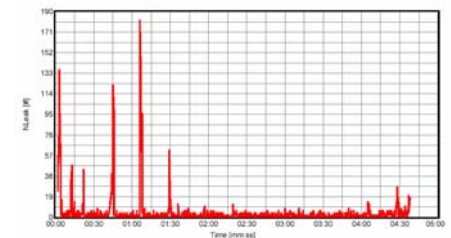
- Aerosol generator to produce the challenge aerosol from DEHS, DOP, PAO (Emery 3004), PSL &c
- Upstream particle counter with aerosol diluter (Topas DIL 550/C)
- Filter holder cabinet for easy to perform filter and matching adapter panel mounting
- Computer-controlled 2-axis scanning traverses
- Downstream particle counter with sampling probe
- On-site system installation and start-up, operator training
- Downstream filter velocity measuring probe (optional)

● Specifications

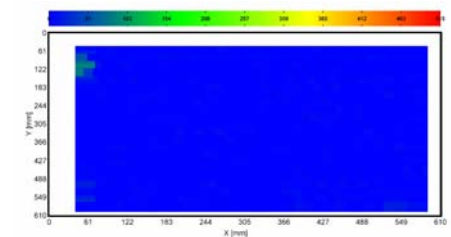
Air Flowrate	200 ... 4000 m ³ /h ±1%
Filter face velocity	0.45m/s
Differential Pressure	0...1000 Pa ±0.5%
Aerosol Generator	Wide concentration range atomizer aerosol generator ATM241/S
Scanning Traverse	3-axis computer controlled, precision stepper motors, positioning precision and reproducibility better than 0.05mm, maximum velocity of 25cm/s, 1 ... 10cm/s as per EN1822-4
Sampling Probe	30 x 30mm
Compressed air supply	Max. 6 bar
Air Quality	Room air (20 °C, <75 %rH)
Aerosol material	DEHS, DOP, PAO (Emery 3004), PSL, NaCl, KCl
Power supply	3x400 VAC, 100 A, 50/60 Hz
Required Space	10 x 3 x 2.5 m
Required footprint	10 x 3 m

● Test Results

Leak signal shows the fingerprint of filter downstream scan.



No leaks found



A complete test report is printed. Due to transfer of test data to MS Excel the contents of the final test report can easily be customized.

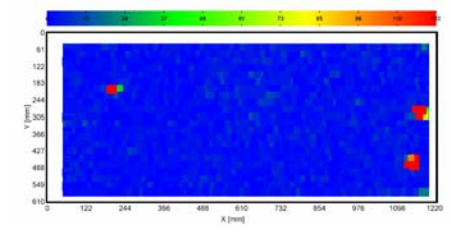
Prüfbericht gemäß EN 1822-5
Test report according to EN 1822-5
Rapport de test selon EN 1822-5

Arbeitsanweisung / Type designation: Disposition

Filterdaten / Filter data / Fichez techniques			
Hersteller	Modell	Hersteller	Prüfdatum
Topas	AFS 150	Topas	2007-08-28
Produktions-Nr.	Material-Nr.	Prüfstandort	Prüfstandort
111	XXX	Topas	Topas
Prüfbedingungen / Test Conditions / Conditions de test			
Prüfmethode	Prüfmethode	Prüfmethode	Prüfmethode
EN 1822-5	EN 1822-5	EN 1822-5	EN 1822-5
Prüfprotokolle / Test results / Résultats de test			
Prüfprotokoll	Prüfprotokoll	Prüfprotokoll	Prüfprotokoll
99.99974%	99.99974%	99.99974%	99.99974%

Leak Signal: 428

Leaks will be found with high reproducibility. Leak position can be more precise evaluated.



● Our References

- Freudenberg, Germany
- Mikropor, Turkey

Depending on dimensions of filters under control, lot size, personal resources, and further conditions at the customer side the appropriate version of filter testing system can be chosen:

- The **Adapter Filter Holder** of **AFS 150** consists of a testing chamber, in which the filter gets clamped against an adapter plate. Changeover to an other filter size only needs a change of the adapter plate. Handling of big filter dimensions is considerably facilitated by rolls that allow easy slide of the sample filter into the testing chamber.
- The **Universal Filter Holder** of **AFS 151** features the maximum flexibility for all filter dimensions. The unique selling point of the AFS 151 is its very fast changeover because of a continuously size adjustability for different filter sizes in the range: 305 x 305 x 30 mm to 1830 x 1220 x 300 mm (B x H x T).
- The **Manual Filter Scanner** of **AFS 152** can be integrated into existing leakage testing systems subsequently. The sampling probe is moved manually over the whole filter or the sections under control. By means of a particle counter the leakage detection is carried out. This method provides more certainty and accuracy than alternatively used methods. The user-friendly software, available for all scanner versions, determines and records the clean gas particle concentration, coordinates of sampling probe and scanning velocity.