

## Testing of a filter material in accordance with chapter 11 of EN779:2012

(2 appendices)

*This is an additional report to 9P01552A-1. The following modifications have been done compared to 9P01552A.*

- *The results of filter media 2 is excluded from the report. The report is only refer to one test.*
- *Descriptions of filter media 1 is changed to only refer to model name: Urban Air Filter 2.0 Optimal.*
- *The results from the discharge test have been excluded.*
- *Appendix 3 "The Interpretation of test reports according to section 13.2 in EN779:2012" has been excluded.*

A test of one filter material according to the initial measurement described in chapter 11 of EN 779:2012 was carried out by request from Airinum AB.

### Tested items

Model name: Urban Air Filter 2.0 Optimal, 3 samples, 250 mm x 250 mm.

Model name was confirmed and provided by Airinum AB on February 6, 2020.

Additional pictures can be found in appendix 2.

The items were sent to RISE by Airinum and were received by RISE on February 5, 2019.

The items were without visible defects.

### Date and Place

The test was carried out at RISE's laboratory of Energy and circular economy in Borås, Sweden on February 14-16, 2019.

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## Test method

The test was carried out according to initial measurement described in chapter 11 of EN 779:2012.

The nominal media velocity was specified to 2.6 cm/s which corresponded to a volume air flow of 1.03 l/s for the setup (dimension 1.8 x 2.2 dm) used. The calculation of the nominal media velocity was based on an estimation of the media velocity in the filter application (air mask).

Deviation from the standard:

The measurements were performed at 100% nominal air flow and 200% nominal air flow. According to the standard the measurement shall be performed at 100% and 50% nominal air flow.

## Results

The results are presented in appendix 1 and are valid only for the tested items.

## Measurement equipment

- Pressure gauge, Furness FC012, RISE's inventory no. 201 687
- Pressure gauge, Furness FC016, RISE 's inventory no. 202 587
- Pressure gauge Furness FC012, RISE 's inventory no. 200 345
- Pressure gauge Furness FC012, RISE 's inventory no. BX70937
- Particle counter Las-X II, RISE 's inventory no. 701 378
- Barometer, Testo 511, RISE 's inventory no. 701 274
- Temperature and RH, Testo 635, RISE 's inventory no. 900 066
- Weighing scale, Mettler, PBK 785-15 LA, RISE's inventory no. BX81958
- Flow meter, VEAB Ø25 , RISE 's inventory no. 201 407

## Uncertainty of measurement

The uncertainty of the Air flow is better than  $\pm 5 \%$

The uncertainty of the Pressure Drop is better than  $\pm 3 \%$

The uncertainty of the Temperature is better than  $\pm 0.5 \text{ }^\circ\text{C}$

The uncertainty of the Relative Humidity is better than  $\pm 3 \%$  RH

The uncertainty of the Atmospheric Pressure is better than  $\pm 1 \text{ mbar}$

The uncertainty has been calculated according to EA-4/16 with a coverage factor  $k=2$

The method error in determination of the filtration efficiency is:

$\eta = 0-90 \%$ :  $\pm 0.1$  of penetration value [%]

$\eta = 90-99 \%$ :  $\pm 0.2$  of penetration value [%]

$\eta = 99-99.99 \%$ :  $\pm 0.5$  of penetration value [%]

$\eta > 99.99 \%$ :  $\pm 1$  of penetration value [%]

The uncertainty of the filtration efficiency according to EN 779:2012 is presented in the appendix.

**RISE Research Institutes of Sweden AB**  
**Built Environment - Energy and Resources**

Performed by

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**Appendices**

1. Test results, Urban Air Filter 2.0 Optimal
2. Pictures of the test item

Appendix 1

**EN779:2012 - Efficiency and pressure drop of untreated filter material at 200 % nominal velocity**

Air filter: Urban Air Filter 2.0 Optimal  
 Test no.: SP201902141  
 Test aerosol: DEHS  
 Air flow rate: 2.05 l/s  
 Media velocity: 5.18 cm/s  
 Size of material sample: 3.96 dm<sup>2</sup>

Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		24 Pa	23 Pa	22 Pa	23 Pa
0.10 - 0.12	0.11	94.0 ± 1.5	92.7 ± 7.4	94.9 ± 0.6	93.9
0.12 - 0.15	0.13	95.4 ± 0.6	96.0 ± 1.8	95.6 ± 0.2	95.7
0.15 - 0.20	0.17	96.8 ± 0.3	97.5 ± 1.0	97.4 ± 0.4	97.3
0.20 - 0.25	0.22	98.1 ± 0.3	98.6 ± 0.6	98.3 ± 0.2	98.3
0.25 - 0.35	0.30	99.2 ± 0.1	99.3 ± 0.3	99.2 ± 0.2	99.2
0.35 - 0.45	0.40	99.5 ± 0.1	99.8 ± 0.2	99.7 ± 0.1	99.7
0.45 - 0.60	0.52	99.8 ± 0.1	99.9 ± 0.1	99.9 ± 0.1	99.9
0.60 - 0.75	0.67	99.9 ± 0.1	99.9 ± 0.1	99.9 ± 0.1	99.9
0.75 - 1.00	0.87	100 ± 0.0	99.9 ± 0.1	99.9 ± 0.1	99.9
1.00 - 1.50	1.22	99.9 ± 0.1	100 ± 0.1	100 ± 0.0	100.0
1.50 - 2.00	1.73	99.9 ± 0.1	100 ± 0.0	100 ± 0.0	100.0
2.00 - 3.00	2.45	100 ± 0.0	100 ± 0.0	100 ± 0.0	100.0

NOTE The uncertainty of the measured efficiencies is reported on a 95 % confidence level.

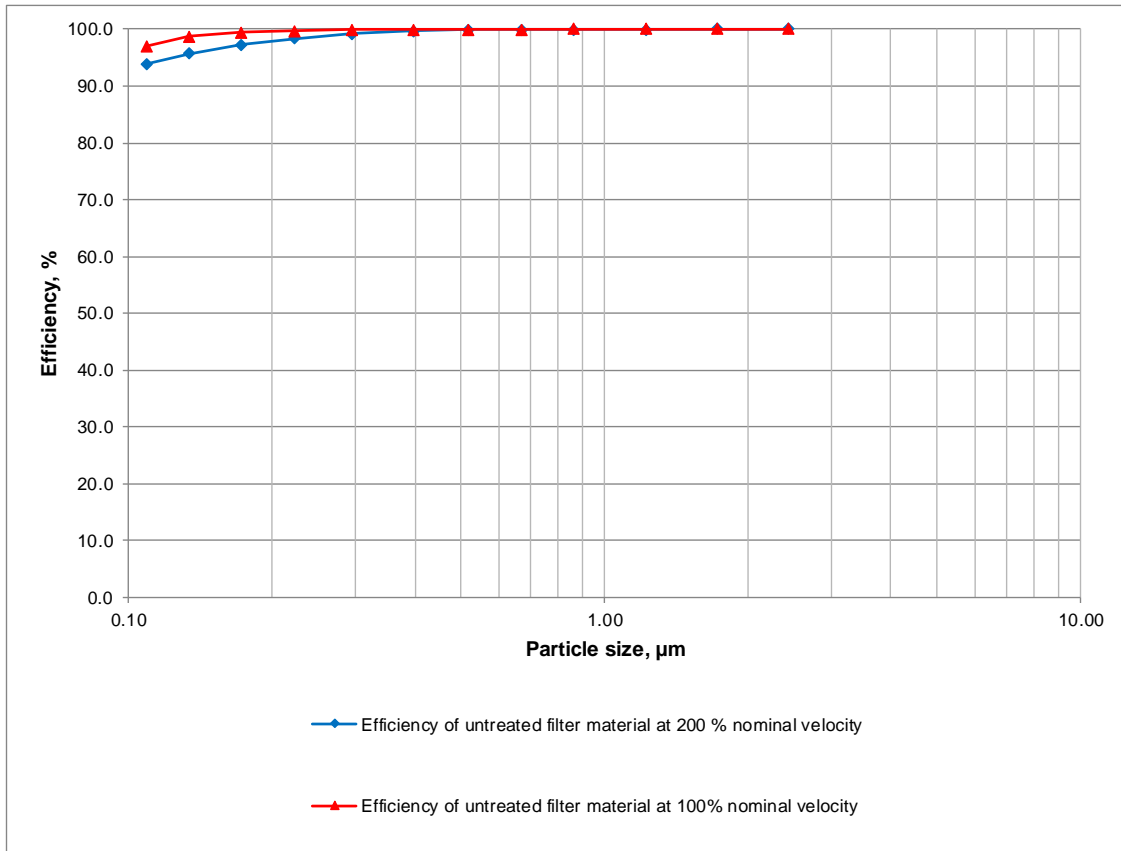
**EN779:2012 - Efficiency and pressure drop of untreated filter material at 100 % nominal velocity**

Air filter: Urban Air Filter 2.0 Optimal  
 Test no.: SP201902141  
 Test aerosol: DEHS  
 Air flow rate: 1.03 l/s  
 Media velocity: 2.59 cm/s  
 Size of material sample: 3.96 dm<sup>2</sup>

Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		12 Pa	12 Pa	11 Pa	11 Pa
0.10 - 0.12	0.11	98.5 ± 1.1	98.5 ± 0.3	94.0 ± 10.0	97.0
0.12 - 0.15	0.13	98.5 ± 0.4	98.6 ± 0.6	99.0 ± 0.3	98.7
0.15 - 0.20	0.17	99.4 ± 0.2	99.4 ± 0.3	99.4 ± 0.2	99.4
0.20 - 0.25	0.22	99.7 ± 0.1	99.7 ± 0.2	99.7 ± 0.1	99.7
0.25 - 0.35	0.30	99.8 ± 0.1	99.9 ± 0.1	99.9 ± 0.1	99.9
0.35 - 0.45	0.40	99.9 ± 0.1	99.9 ± 0.1	99.9 ± 0.1	99.9
0.45 - 0.60	0.52	100 ± 0.1	99.9 ± 0.1	100 ± 0.1	99.9
0.60 - 0.75	0.67	99.9 ± 0.1	99.9 ± 0.1	100 ± 0.1	100.0
0.75 - 1.00	0.87	100 ± 0.0	100 ± 0.1	100 ± 0.1	100.0
1.00 - 1.50	1.22	100 ± 0.0	100 ± 0.0	100 ± 0.0	100.0
1.50 - 2.00	1.73	100 ± 0.1	100 ± 0.0	100 ± 0.0	100.0
2.00 - 3.00	2.45	100 ± 0.0	100 ± 0.0	100 ± 0.1	100.0

NOTE The uncertainty of the measured efficiencies is reported on a 95 % confidence level.

Appendix 1



## Appendix 2



**Fig 1.** Overview of the filter material (upstream).



**Fig 2.** Overview of the filter material (downstream).