

Camfil AB  
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619 33 TROSA

## Testing of Air Filter according to EN779:2012

(4 appendices)

A test according to EN779:2012 was carried out by request of Camfil AB.

### Tested items

Camfil AB, HI-FLO XLT7/670 50+, HFGX-F7-0592/0592/0670-10, F7,  
592 mm x 592 mm x 670 mm, 10 pocket air filter.

Swedish Art.No: 619070

Camfil AB, HI-FLO XLT7/670 50+, HFGX-F7-0592/0592/0670-10, F7, filter media samples  
for discharging test.

(According to Camfil AB the article number may be different in other countries)

The items were sent to SP by Camfil AB and were received by SP on July 7 and August 19,  
2015.

The items were without visible defects.

### Date and Place

The test was carried out at SP's laboratory of Energy and bioeconomy in Borås, Sweden on  
August 19-20, 2015. Discharging test was carried out on August 14-17, 2015.

### Test method

The test was carried out according to standard EN 779:2012 "Particulate air filters for general  
ventilation – Determination of the filtration performance".

Additional to the test:

An energy calculation was performed according to Eurovent 4/21-2014 "Calculation method  
for the energy use related to air filters in general ventilation systems, First edition".

An energy efficiency classification of the tested filter was done according to Eurovent Certia  
Certifikation RATING STANDARD for the CERTIFICATION of AIR FILTERS,  
RS 4/C/001-2015, issued January 2015.

The calculation and classification are not covered by the accreditation.

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Conformity Assessment (SWEDAC) under the terms of Swedish legislation.  
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written approval of the issuing laboratory.

## Results

The results are presented in appendix 1 and appendix 4 and are valid only for the tested items.

## Measurement equipment

- Pressure gauge Furness model 318, SP's inventory no. 901 568 (static P Filter)
- Pressure gauge Furness model 318, SP's inventory no. 901 569 (static P Flow)
- Pressure gauge Furness FC012, SP's inventory no. 201 691 ( $\Delta P$  Filter)
- Pressure gauge Furness FC012, SP's inventory no. 201 690 ( $\Delta P$  Flow)
- Particle counter Las-X II, SP's inventory no. 701 378
- Barometer, Testo 511, SP's inventory no. 900 078
- Temperature and RH, Testo 635, SP's inventory no. 900 065
- Weighing scale, Mettler PC16, SP's inventory no. 202 741
- Flow meter, MFS-C-250, SP's inventory no. 202 742
- Flow meter, MFS-C-50, SP's inventory no. 202 190

## 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  $\pm 1$  mbar

The uncertainty of the Measured mass is better than  $\pm 0.5$  g

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.

## SP Technical Research Institute of Sweden Energy and bioeconomy - Building Services Engineering

Performed by

Examined by

Christian Mossberg

Markus Alsbjör

### Appendices

1. Test report according to EN779:2012

2. Picture of tested item

3. Interpretation of test reports according to section 13.2 in EN779:2012

4. Energy calculation according to Eurovent 4/21-2014 and energy efficiency classification according to RS 4/C/001-2015

Appendix 1

Testing organisation: SP Technical Research Institute of Sweden Report no.: 4P08803-01L

**EN 779:2012 AIR FILTER RESULTS**

GENERAL

Test no.: SP201508191	Date of test: 19/08/2015 - 20/08/2015	Supervisor: CM
Test requested by: Camfil AB	Device receiving date	
Device delivered by: Camfil AB	19/08/2015	

DEVICE TESTED

Model: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10	Manufacturer: Camfil AB	Construction: Pocket filter, 10 pockets
Type of media: Glass	Net effective filtering area: 7.8 m <sup>2</sup>	Filter dimensions (width x height x depth): 592 mm x 592 mm x 670 mm

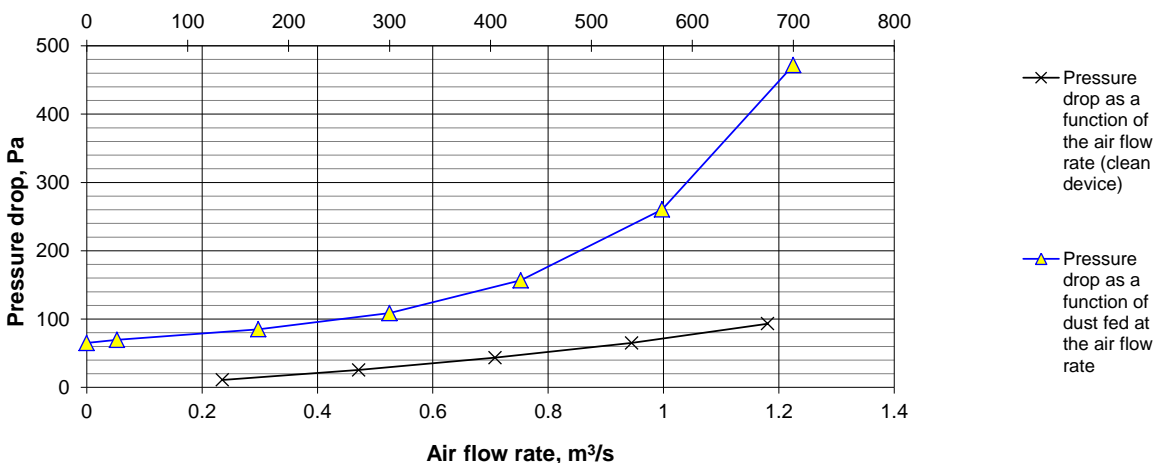
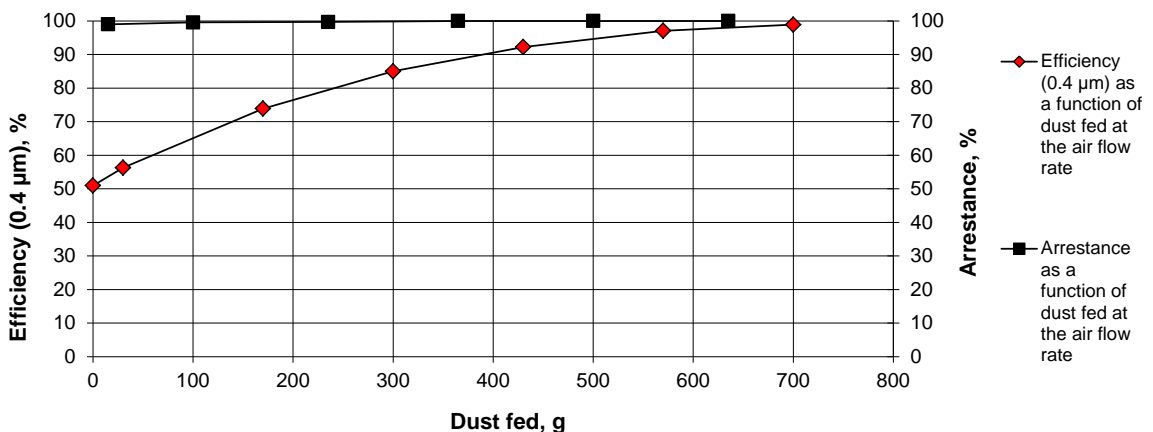
TEST DATA

Test air flow rate: 0.944 m <sup>3</sup> /s	Test air temperature: 22 to 23 °C	Test air relative humidity: 41 to 47 %	Test aerosol: DEHS	Loading dust: ASHRAE Test Dust
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RESULTS

Initial pressure drop: 65 Pa	Initial arrestance: 99 %	Initial efficiency (0.4 µm): 51 %	Test dust capacity: 555 / 624 / 686 g	Untreated/ discharged efficiency of media (0.4 µm): 60% / 57%
Final test pressure drop: 250 / 350 / 450 Pa	Average arrestance: >99% / >99% / >99%	Average efficiency (0.4 µm): 80% / 82% / 83%	Filter class (450 Pa): F7	Remarks:

Note: The performance results are only valid for the tested item and cannot by themselves be quantitatively applied to predict efficiency and lifetime in service



Appendix 1

**EN779:2012 - Efficiency after different dust loading phases**

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s

Particle size		Efficiency %										
Interval μm	Mean μm	Pressure drop, Pa and Dust fed, g										
		65 0	Pa g	70 30	Pa g	85 170	Pa g	109 300	Pa g	157 430	Pa g	260 570
0.10 - 0.12	0.11	40.4 ± 5.0		39.8 ± 6.9		62.1 ± 6.3		71.9 ± 3.9		82.4 ± 3.5		91.1 ± 2.4
0.12 - 0.15	0.13	34.8 ± 1.1		40.5 ± 1.9		57.6 ± 1.4		70.8 ± 0.7		81.0 ± 0.9		90.3 ± 0.8
0.15 - 0.20	0.17	33.5 ± 1.0		39.4 ± 1.7		56.4 ± 1.9		70.2 ± 0.9		81.7 ± 0.8		91.0 ± 0.8
0.20 - 0.25	0.22	37.1 ± 1.9		41.9 ± 2.2		59.4 ± 2.7		73.0 ± 0.9		83.9 ± 0.9		92.9 ± 0.3
0.25 - 0.35	0.30	41.5 ± 1.2		48.0 ± 0.9		65.1 ± 0.5		78.1 ± 0.7		87.5 ± 0.6		94.7 ± 0.3
0.35 - 0.45	0.40	51.0 ± 1.0		56.3 ± 1.0		73.9 ± 1.1		85.0 ± 0.4		92.2 ± 0.7		97.1 ± 0.3
0.45 - 0.60	0.52	60.6 ± 1.3		66.0 ± 1.5		82.1 ± 1.0		90.6 ± 1.0		95.6 ± 0.5		98.3 ± 0.2
0.60 - 0.75	0.67	69.0 ± 1.4		73.4 ± 2.6		87.0 ± 2.1		93.8 ± 0.6		97.6 ± 0.5		99.3 ± 0.3
0.75 - 1.00	0.87	75.7 ± 1.8		81.3 ± 1.5		91.6 ± 0.9		95.9 ± 0.6		98.9 ± 0.3		99.6 ± 0.2
1.00 - 1.50	1.22	84.1 ± 1.5		87.9 ± 1.8		94.6 ± 0.7		98.1 ± 0.6		99.5 ± 0.5		99.8 ± 0.1
1.50 - 2.00	1.73	90.3 ± 2.2		93.8 ± 0.6		98.1 ± 0.6		99.3 ± 0.3		99.7 ± 0.2		99.8 ± 0.1
2.00 - 3.00	2.45	96.2 ± 1.6		98.6 ± 1.2		99.8 ± 0.3		99.9 ± 0.2		100.0 ± 0.0		99.9 ± 0.3

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

Particle size		Efficiency %			
Interval μm	Mean μm	Pressure drop, Pa and Dust fed, g			
		472 700	Pa g		
0.10 - 0.12	0.11	94.2 ± 2.4			
0.12 - 0.15	0.13	95.5 ± 0.8			
0.15 - 0.20	0.17	95.9 ± 0.4			
0.20 - 0.25	0.22	96.6 ± 0.2			
0.25 - 0.35	0.30	97.6 ± 0.2			
0.35 - 0.45	0.40	98.9 ± 0.1			
0.45 - 0.60	0.52	99.4 ± 0.1			
0.60 - 0.75	0.67	99.6 ± 0.1			
0.75 - 1.00	0.87	99.8 ± 0.1			
1.00 - 1.50	1.22	99.9 ± 0.1			
1.50 - 2.00	1.73	100.0 ± 0.0			
2.00 - 3.00	2.45	99.7 ± 0.5			

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

Appendix 1

**EN779:2012 - Average efficiency at different final test pressure drops**

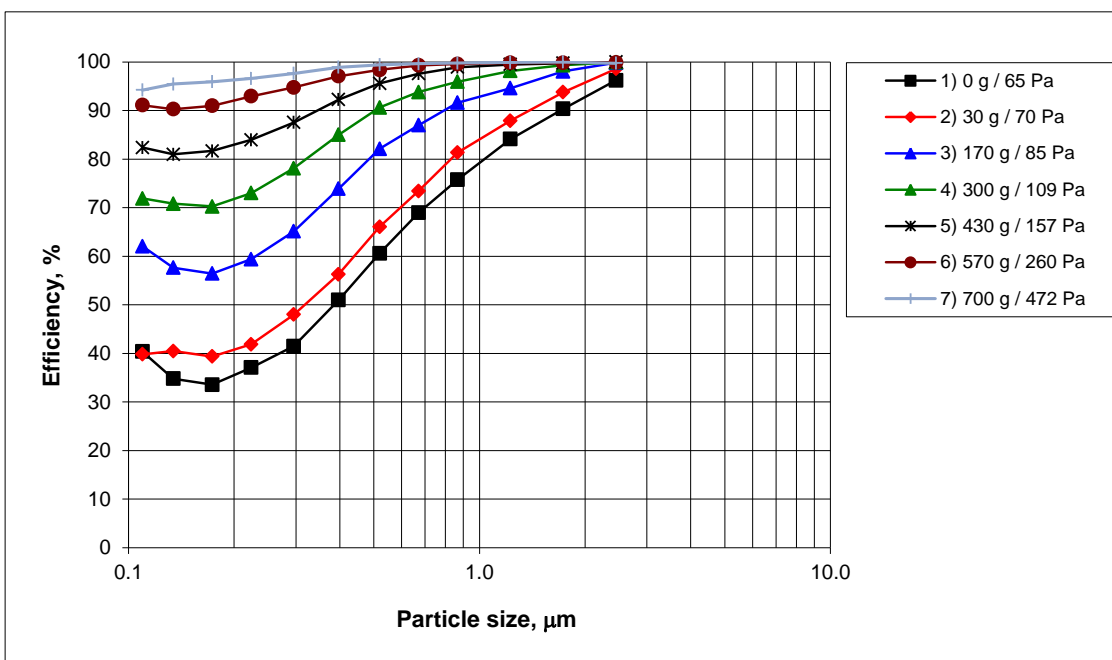
Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s

Particle size		Average efficiency %					
Interval µm	Mean µm	Final test pressure drop					
		250 Pa		350 Pa		450 Pa	
0.10 - 0.12	0.11	68.2 ± 5.3	70.7 ± 4.8	72.8 ± 4.3			
0.12 - 0.15	0.13	66.4 ± 1.3	69.1 ± 1.2	71.3 ± 1.1			
0.15 - 0.20	0.17	66.0 ± 1.4	68.8 ± 1.2	71.1 ± 1.1			
0.20 - 0.25	0.22	68.6 ± 1.6	71.2 ± 1.4	73.5 ± 1.3			
0.25 - 0.35	0.30	73.3 ± 0.7	75.6 ± 0.6	77.6 ± 0.6			
0.35 - 0.45	0.40	79.9 ± 0.8	81.8 ± 0.7	83.3 ± 0.6			
0.45 - 0.60	0.52	85.9 ± 0.9	87.3 ± 0.8	88.4 ± 0.7			
0.60 - 0.75	0.67	89.8 ± 1.3	90.8 ± 1.2	91.6 ± 1.0			
0.75 - 1.00	0.87	93.2 ± 0.8	93.8 ± 0.7	94.4 ± 0.6			
1.00 - 1.50	1.22	95.8 ± 0.8	96.2 ± 0.7	96.6 ± 0.6			
1.50 - 2.00	1.73	98.1 ± 0.4	98.3 ± 0.4	98.4 ± 0.4			
2.00 - 3.00	2.45	99.6 ± 0.5	99.6 ± 0.4	99.6 ± 0.4			
Test dust capacity		555 g		624 g		686 g	
NOTE The uncertainty of the measured efficiencies is reported on a 95 % confidence level.							

Appendix 1

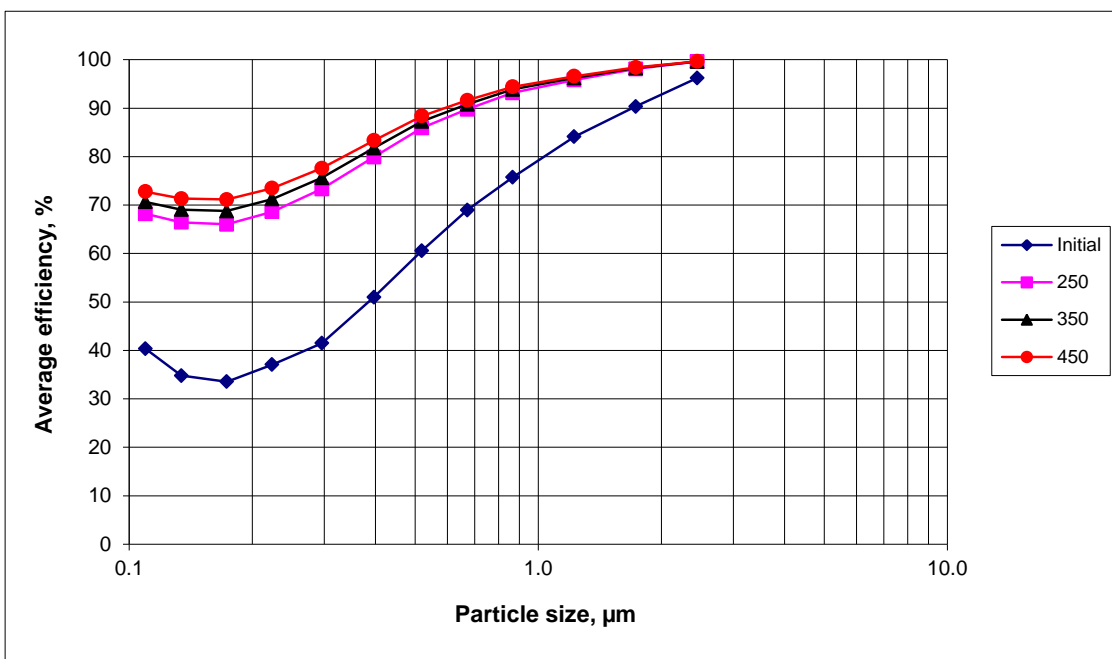
**EN779:2012 - Efficiency after different dust loading phases**

Air Filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s



**EN779:2012 - Initial and average efficiency at different final test pressure drops**

Air Filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s



Appendix 1

**EN779:2012 - Air flow rate and pressure drop after different dust loading phases**

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s

Date	Dust fed	Air flow meter				Filter						
		m <sub>tot</sub>	t <sub>f</sub>	p <sub>st</sub>	dp <sub>f</sub>	q <sub>m</sub>	t	φ	p <sub>a</sub>	ρ	q <sub>v</sub>	Δp
	g	°C	Pa	Pa	kg/s	°C	%	kPa	kg/m <sup>3</sup>	m <sup>3</sup> /s	Pa	Pa
Clean filter												
19/08/2015	0	22.4	-65	32	0.28	22.4	43.3	100.4	1.178	0.235	11	11
19/08/2015	0	22.3	-158	128	0.56	22.3	43.7	100.3	1.177	0.472	26	26
19/08/2015	0	22.5	-276	287	0.83	22.5	42.6	100.2	1.175	0.708	44	44
19/08/2015	0	23.3	-432	508	1.11	23.3	41.2	100.0	1.170	0.945	65	65
19/08/2015	0	22.8	-600	792	1.38	22.8	42.5	99.8	1.170	1.181	93	93
Clean filter pressure drop is proportional to (q <sub>v</sub> ) <sup>n</sup> , w here n = 1.3121												
Dust loading phase												
19/08/2015	30	22.5	-420	509	1.108	22.5	40.9	100.0	1.173	0.944	70	70
19/08/2015	30	22.8	-425	509	1.108	22.8	40.1	100.0	1.172	0.945	70	70
19/08/2015	170	22.6	-414	509	1.108	22.6	40.7	100.0	1.173	0.945	85	85
19/08/2015	170	22.6	-416	509	1.108	22.6	39.8	100.0	1.173	0.945	85	85
19/08/2015	300	22.2	-410	510	1.110	22.2	41.3	100.0	1.175	0.945	109	109
19/08/2015	300	22.8	-410	508	1.106	22.8	39.9	100.0	1.172	0.944	109	109
19/08/2015	430	22.8	-402	509	1.107	22.8	40.5	100.0	1.172	0.945	157	157
19/08/2015	430	22.7	-406	509	1.108	22.7	40.9	100.0	1.173	0.945	155	155
20/08/2015	570	22.2	-379	511	1.112	22.2	45.0	100.3	1.178	0.944	260	260
20/08/2015	570	22.7	-380	510	1.110	22.7	44.5	100.3	1.176	0.944	259	259
20/08/2015	700	22.3	-328	511	1.112	22.3	46.5	100.4	1.178	0.944	471	472
20/08/2015	700	22.6	-333	511	1.112	22.6	45.8	100.4	1.177	0.945	470	471

2 = after dust increment  
 1 = before next dust increment

Symbols and units

- dp<sub>f</sub> air flow meter differential pressure, Pa
- m<sub>tot</sub> cumulative mass of dust fed to filter, g
- Δp measured filter pressure drop, Pa
- Δp<sub>1.20</sub> filter pressure drop at air density 1.20 kg/m<sup>3</sup>, Pa
- p<sub>a</sub> absolute air pressure upstream of filter, kPa
- p<sub>st</sub> air flow meter static pressure, kPa
- q<sub>m</sub> mass flow rate, kg/s
- q<sub>v</sub> air flow rate filter, m<sup>3</sup>/s
- t<sub>f</sub> temperature at air flow meter, °C
- t temperature upstream of filter, °C
- φ relative humidity upstream of the filter, %
- ρ air density upstream of filter, kg/m<sup>3</sup>

Appendix 1

**EN779:2012 - Pressure drop and arrestance after different dust loading phases**

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508191  
 Test aerosol: DEHS  
 Air flow rate: 0.944 m<sup>3</sup>/s

Date	$\Delta p_1$	dm	$m_{tot}$	$\Delta p_2$	$m_1$	$m_2$	$\Delta m$	$m_d$	A	$A_m$
	Pa	g	g	Pa	g	g	g	g	%	%
19/08/2015	65	30	30	70	2609.1	2609.4	0.3	0.0	99.0	99.0
19/08/2015	70	140	170	85	2609.4	2610.0	0.6	0.0	99.6	99.5
19/08/2015	85	130	300	109	2610.0	2610.4	0.4	0.0	99.7	99.6
19/08/2015	109	130	430	157	2610.4	2610.4	0.0	0.0	100.0	99.7
20/08/2015	155	140	570	260	2610.4	2610.4	0.0	0.0	100.0	99.8
20/08/2015	259	130	700	472	2610.4	2610.4	0.0	0.0	100.0	99.8

Symbols and units

- A arrestance, %
- $A_m$  average arrestance, %
- dm dust increment, g
- $\Delta p_1$  pressure drop before dust increment (air density 1.20 kg/m<sup>3</sup>), Pa
- $\Delta p_2$  pressure drop after dust increment (air density 1.20 kg/m<sup>3</sup>), Pa
- $m_d$  dust in duct after device, g
- $m_1$  mass of final filter before dust increment
- $m_2$  mass of final filter after dust increment
- $m_{tot}$  cumulative mass of dust fed to filter, g
- $\Delta m$  mass gain of final filter, g

**Mass of tested item:**

Clean filter:	2 091.4 g
After complete test:	2 759.5 g

**Test dust**

Ashrae Test Dust, Blue Heaven Technologies  
 Batch no: 14\*005



Appendix 1

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

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508141  
 Test aerosol: DEHS  
 Discharging method: Isopropanol  
 Air flow rate: 11.2 l/s  
 Media velocity: 0.12 m/s  
 Size of material sample: 9.24 dm<sup>2</sup>

Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		42 Pa	42 Pa	45 Pa	43 Pa
0.10 - 0.12	0.11	47.9 ± 4.6	56.8 ± 8.4	49.4 ± 14.4	51.4
0.12 - 0.15	0.13	39.5 ± 2.4	44.2 ± 1.9	45.9 ± 3.7	43.2
0.15 - 0.20	0.17	39.0 ± 1.6	44.8 ± 2.4	45.2 ± 1.6	43.0
0.20 - 0.25	0.22	40.9 ± 1.5	44.4 ± 3.2	46.8 ± 2.7	44.0
0.25 - 0.35	0.30	46.1 ± 1.5	52.4 ± 2.4	53.3 ± 1.6	50.6
0.35 - 0.45	0.40	57.0 ± 2.4	61.3 ± 1.2	62.5 ± 1.1	60.3
0.45 - 0.60	0.52	68.0 ± 1.2	69.9 ± 1.0	72.7 ± 1.3	70.2
0.60 - 0.75	0.67	72.8 ± 2.6	75.6 ± 1.7	79.6 ± 3.0	76.0
0.75 - 1.00	0.87	80.6 ± 1.6	81.9 ± 1.7	85.0 ± 2.2	82.5
1.00 - 1.50	1.22	87.3 ± 1.4	88.6 ± 1.2	90.5 ± 1.3	88.8
1.50 - 2.00	1.73	92.7 ± 0.8	93.4 ± 1.1	95.3 ± 1.5	93.8
2.00 - 3.00	2.45	97.4 ± 1.3	97.9 ± 1.0	98.5 ± 1.3	97.9

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

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

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no. SP201508141  
 Test aerosol: DEHS  
 Discharging method: Isopropanol  
 Air flow rate: 11.2 l/s  
 Media velocity: 0.12 m/s  
 Size of material sample: 9.24 dm<sup>2</sup>

Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		52 Pa	52 Pa	55 Pa	53 Pa
0.10 - 0.12	0.11	46.8 ± 9.6	48.3 ± 7.2	50.3 ± 4.2	48.5
0.12 - 0.15	0.13	37.4 ± 3.0	42.7 ± 3.3	42.2 ± 2.4	40.8
0.15 - 0.20	0.17	37.0 ± 2.5	41.9 ± 2.2	42.8 ± 1.2	40.6
0.20 - 0.25	0.22	40.6 ± 2.4	44.6 ± 1.8	43.9 ± 1.9	43.0
0.25 - 0.35	0.30	45.9 ± 1.7	50.0 ± 1.7	50.3 ± 1.4	48.7
0.35 - 0.45	0.40	55.3 ± 1.5	58.4 ± 1.4	59.1 ± 1.5	57.6
0.45 - 0.60	0.52	65.6 ± 1.1	69.0 ± 1.3	70.6 ± 1.2	68.4
0.60 - 0.75	0.67	73.7 ± 1.6	76.5 ± 2.4	77.5 ± 1.3	75.9
0.75 - 1.00	0.87	80.6 ± 1.4	83.8 ± 1.4	84.3 ± 1.1	82.9
1.00 - 1.50	1.22	87.1 ± 1.0	89.6 ± 1.2	90.4 ± 1.0	89.0
1.50 - 2.00	1.73	92.8 ± 1.2	94.4 ± 1.0	95.3 ± 0.5	94.2
2.00 - 3.00	2.45	98.4 ± 1.0	98.3 ± 0.9	99.1 ± 0.7	98.6

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

Appendix 1

**EN779:2012 - Efficiency and pressure drop of untreated filter material at 50 % nominal velocity**

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no.: SP201508141  
 Test aerosol: DEHS  
 Discharging method: Isopropanol  
 Air flow rate: 5.6 l/s  
 Media velocity: 0.06 m/s  
 Size of material sample: 9.24 dm<sup>2</sup>

Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		21 Pa	21 Pa	22 Pa	21 Pa
0.10 - 0.12	0.11	53.0 ± 14.3	59.4 ± 4.8	65.3 ± 6.0	59.2
0.12 - 0.15	0.13	48.4 ± 2.4	52.2 ± 2.9	57.3 ± 3.2	52.6
0.15 - 0.20	0.17	46.3 ± 1.4	49.4 ± 2.9	55.0 ± 2.6	50.2
0.20 - 0.25	0.22	46.3 ± 2.1	50.9 ± 1.2	54.5 ± 0.9	50.6
0.25 - 0.35	0.30	49.6 ± 2.2	53.7 ± 2.1	58.1 ± 2.1	53.8
0.35 - 0.45	0.40	58.1 ± 1.3	60.6 ± 1.0	65.9 ± 1.1	61.5
0.45 - 0.60	0.52	67.5 ± 2.6	68.9 ± 1.2	73.6 ± 1.6	70.0
0.60 - 0.75	0.67	73.1 ± 2.0	74.5 ± 2.2	80.6 ± 1.3	76.0
0.75 - 1.00	0.87	80.8 ± 1.4	80.7 ± 1.3	85.8 ± 0.7	82.4
1.00 - 1.50	1.22	85.3 ± 0.9	87.7 ± 1.1	89.5 ± 1.4	87.5
1.50 - 2.00	1.73	91.3 ± 1.1	91.9 ± 0.8	95.0 ± 0.9	92.8
2.00 - 3.00	2.45	97.1 ± 0.5	97.1 ± 1.2	97.0 ± 0.8	97.1

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

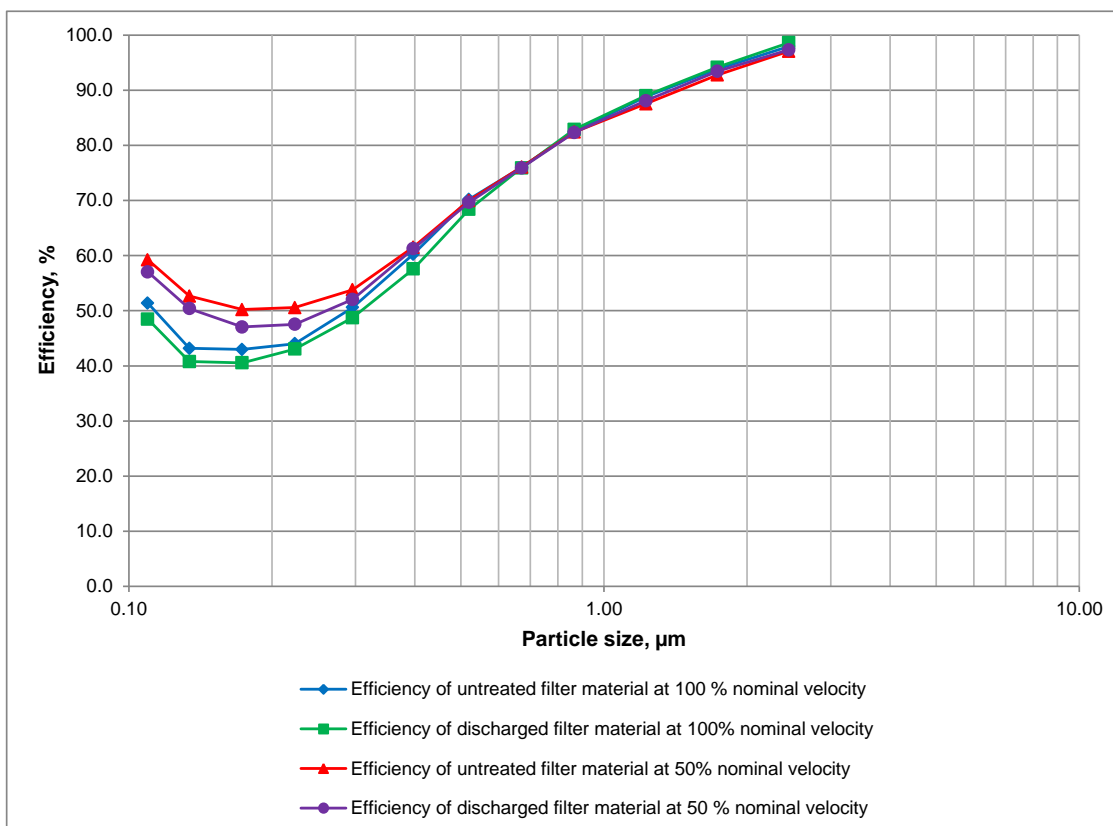
**EN779:2012 - Efficiency and pressure drop of discharged filter material at 50 % nominal velocity**

Air filter: HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10  
 Test no. SP201508141  
 Test aerosol: DEHS  
 Discharging method: Isopropanol  
 Air flow rate: 5.6 l/s  
 Media velocity: 0.06 m/s  
 Size of material sample: 9.24 dm<sup>2</sup>

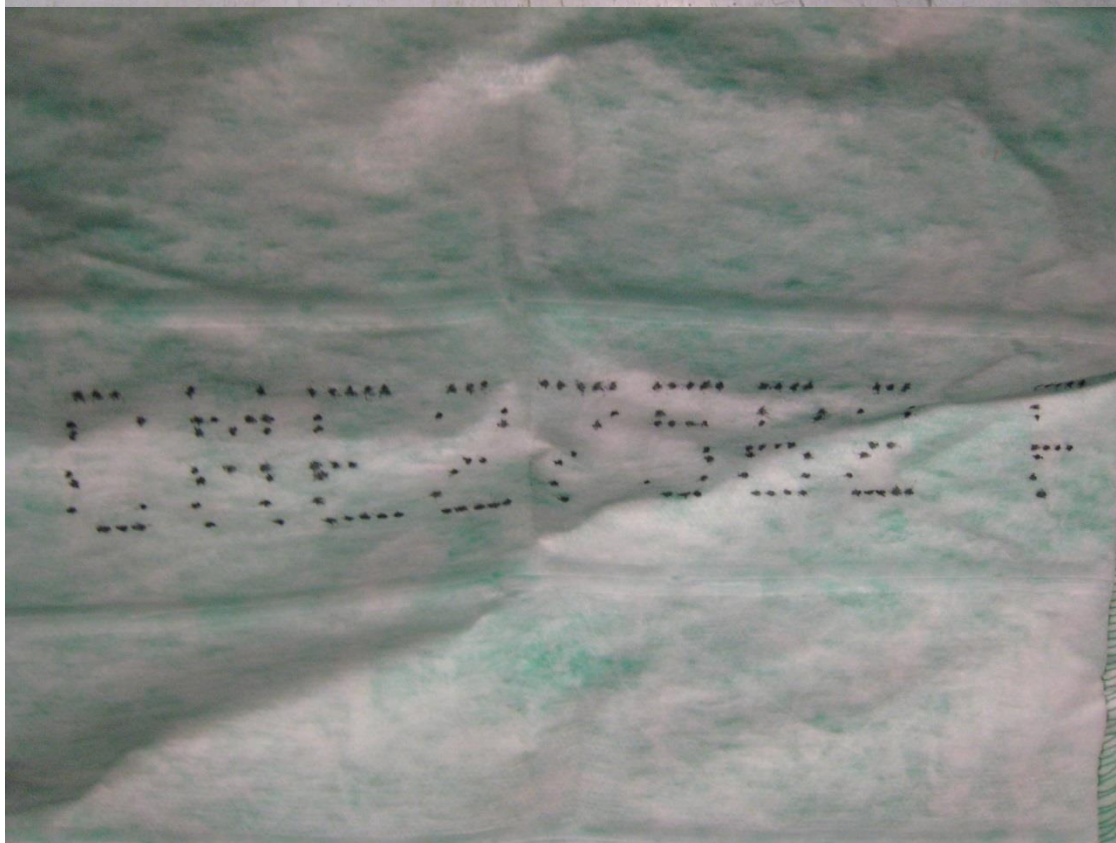
Particle size µm		Sample 1	Sample 2	Sample 3	Average
		Efficiency %			
Interval	Mean	Pressure drop			
		26 Pa	26 Pa	28 Pa	27 Pa
0.10 - 0.12	0.11	52.3 ± 9.4	57.8 ± 7.5	61.0 ± 8.5	57.0
0.12 - 0.15	0.13	45.7 ± 2.9	53.1 ± 2.5	52.4 ± 3.5	50.4
0.15 - 0.20	0.17	42.9 ± 1.2	49.4 ± 1.5	48.8 ± 2.1	47.1
0.20 - 0.25	0.22	43.0 ± 2.0	49.8 ± 1.8	49.8 ± 1.1	47.5
0.25 - 0.35	0.30	48.3 ± 2.1	53.6 ± 1.8	54.2 ± 1.5	52.0
0.35 - 0.45	0.40	57.5 ± 2.4	63.0 ± 1.9	63.3 ± 1.8	61.2
0.45 - 0.60	0.52	66.8 ± 1.1	70.9 ± 1.4	71.3 ± 1.7	69.7
0.60 - 0.75	0.67	72.6 ± 2.1	76.7 ± 2.4	78.5 ± 1.1	75.9
0.75 - 1.00	0.87	79.3 ± 1.8	83.5 ± 1.1	84.1 ± 1.4	82.3
1.00 - 1.50	1.22	85.3 ± 1.8	89.8 ± 0.9	89.1 ± 1.0	88.1
1.50 - 2.00	1.73	91.8 ± 1.2	93.7 ± 1.0	94.7 ± 0.6	93.4
2.00 - 3.00	2.45	96.5 ± 1.6	97.7 ± 0.9	97.7 ± 0.9	97.3

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

Appendix 1



Appendix 2



## Appendix 3

**The interpretation of test reports – according to EN779:2012 13.2 Interpretation of test reports**

This brief review of the test procedures, including those for addressing the testing of electrostatically charged filters, is provided for those unfamiliar with EN 779 procedures. It is intended to assist in understanding and interpreting the results in the test report/summary. (For further details of procedures the full EN 779 document should be consulted).

Many types of air filter rely on the effects of passive static electric charges on the fibers to achieve high efficiencies, particularly in the initial stages of their working life. Environmental factors encountered in service may affect the action of these electric charges so that the initial efficiency may drop substantially after an initial period of service. In many cases this is offset or countered by an increase in efficiency (“mechanical efficiency”) as dust deposits in filter media. In the later stages of operating life the efficiency may increase to equal or exceed the initial efficiency. The reported untreated and conditioned (discharged) efficiencies show the extent of the electrical charge effect on initial performance. It should not be assumed that the measured conditioned (discharged) efficiency represents real life behaviour. It merely indicates the level of efficiency obtainable with the charge effect completely removed and with no compensating increase in mechanical efficiency.

For reasons of consistency filter efficiencies are measured using artificially generated clouds of synthetic DEHS material (droplets) with closely controlled particle size. These efficiency measurements are repeated after the filter has been loaded with ASHRAE loading dust until the resistance has risen to a value of 250 Pa in the case of the coarse (G) procedure and with up to a value of 450 Pa for the fine and medium (F and M) procedure. Test dust capacities measured in this way may be used for to compare performances and for rankings but should not be assumed to simulate real life operating conditions as the properties of dusts encountered in service conditions vary very widely.

Appendix 4

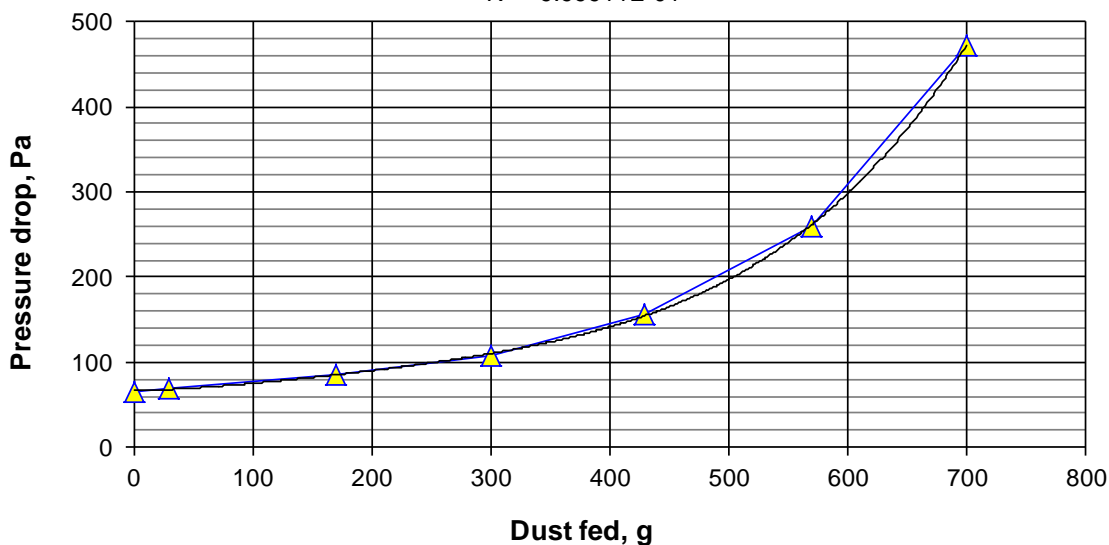
**EUROVENT 4/21 - 2014**

**Calculation method for the energy use related to air filters in general ventilation systems**

<b>Air filter:</b>	HI-FLO XLT7/670 50+, Art No 619070, HFGX-F7-0592/0592/0670-10
<b>Group of filter:</b>	F7

$$y = 2.97024E-09x^4 - 1.93919E-06x^3 + 6.73673E-04x^2 + 3.84780E-02x + 6.63196E+01$$

$$R^2 = 9.99911E-01$$



$\Delta p_i$	65 Pa
<b>a</b>	2.97E-09 Pa/g <sup>4</sup>
<b>b</b>	-1.94E-06 Pa/g <sup>3</sup>
<b>c</b>	6.74E-04 Pa/g <sup>2</sup>
<b>d</b>	3.85E-02 Pa/g
<b>M<sub>x</sub></b>	100 g

<b>Average <math>\Delta P</math></b>	68.8 Pa
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<b>Energy, W</b>	780.3 kWh
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<b>Energy class*</b>	A+
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\* According to RS 4/C/001- 2015