

EN 779:2012 - AIR FILTER TEST RESULTS

Testing organisation:

Report nr.:

GENERAL

Test no.: 643

Date of test: 05.10.2023

Supervisor:
Tkach

Test requested by:

Device receiving date:

Device delivered by:

DEVICE TESTED

Model: F7

Manufacturer: PHAUF

Construction:

Type of media:

Net effective filtering area: 3,7m²Filter dimensions
(width x height x depth):

TEST DATA

Test air flow rate:
0,943 m³/sTest air temperature:
19,7°C to 29°CTest air relative humidity:
18,4% to 49,9%Test aerosol:
DEHSLoading dust:
ASHRAE

RESULTS

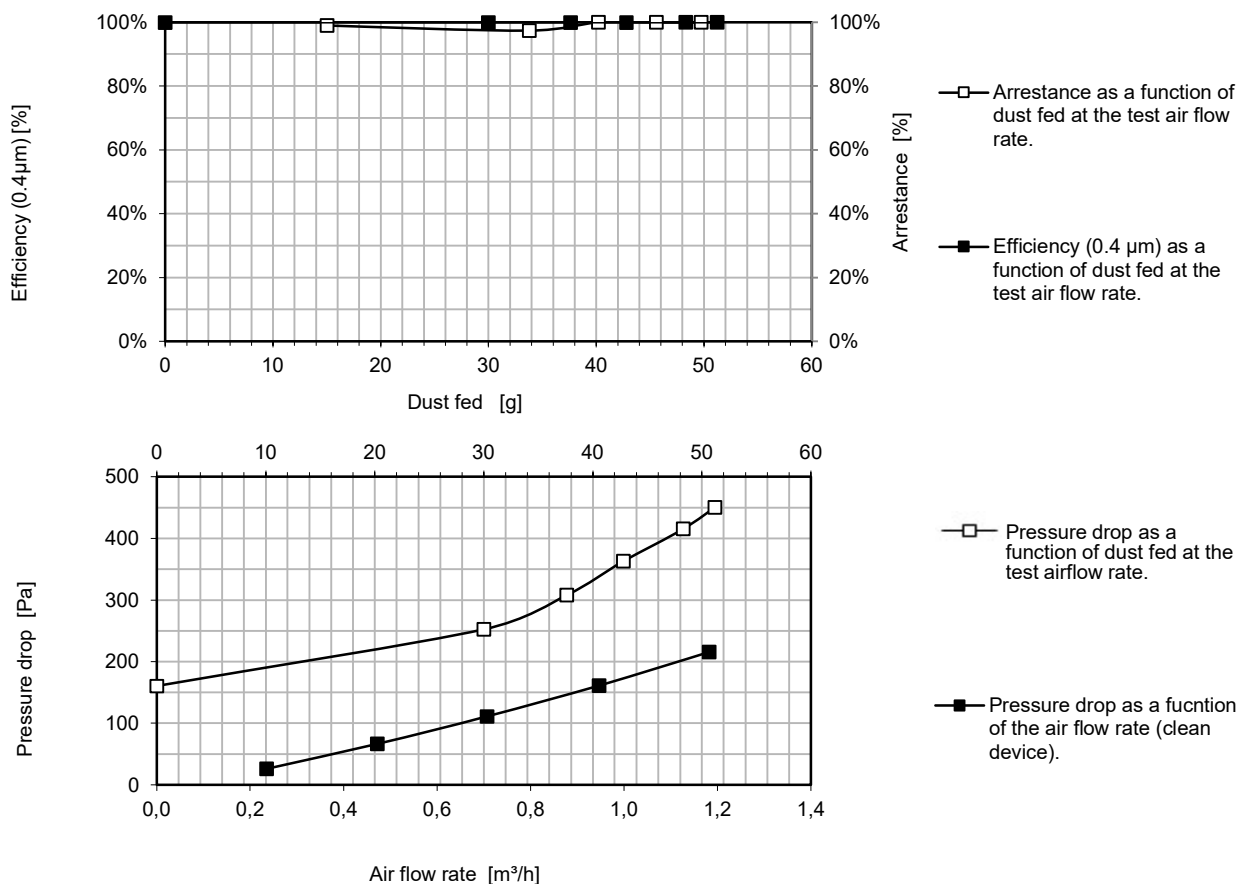
Initial pressure drop:
160PaInitial arrestance:
99 %Initial efficiency (0.4µm):
100,0 ± 0,0%Test dust capacity:
29g / 41g / 51gUntreated / discharged
efficiency of mediaFinal test pressure drop:
250Pa / 350Pa /
450PaAverage arrestance:

> 99 %Average efficiency (0.4µm):

100,0 ± 0,0% / 100,0 ± 0,0% /
100,0 ± 0,0%Filter class:
F9
Energy class:
D / 3264 kWh

0 % / 0 %

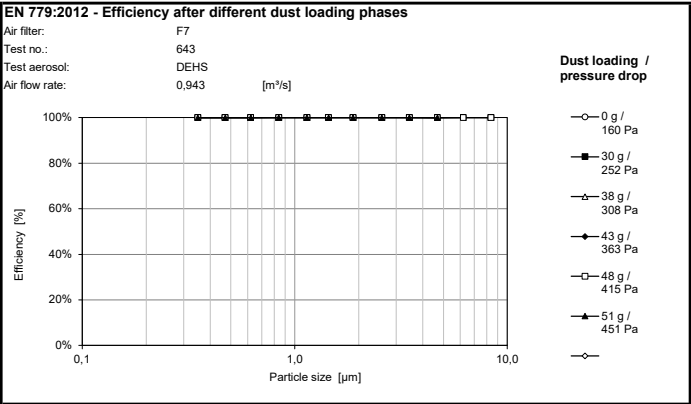
Remarks:



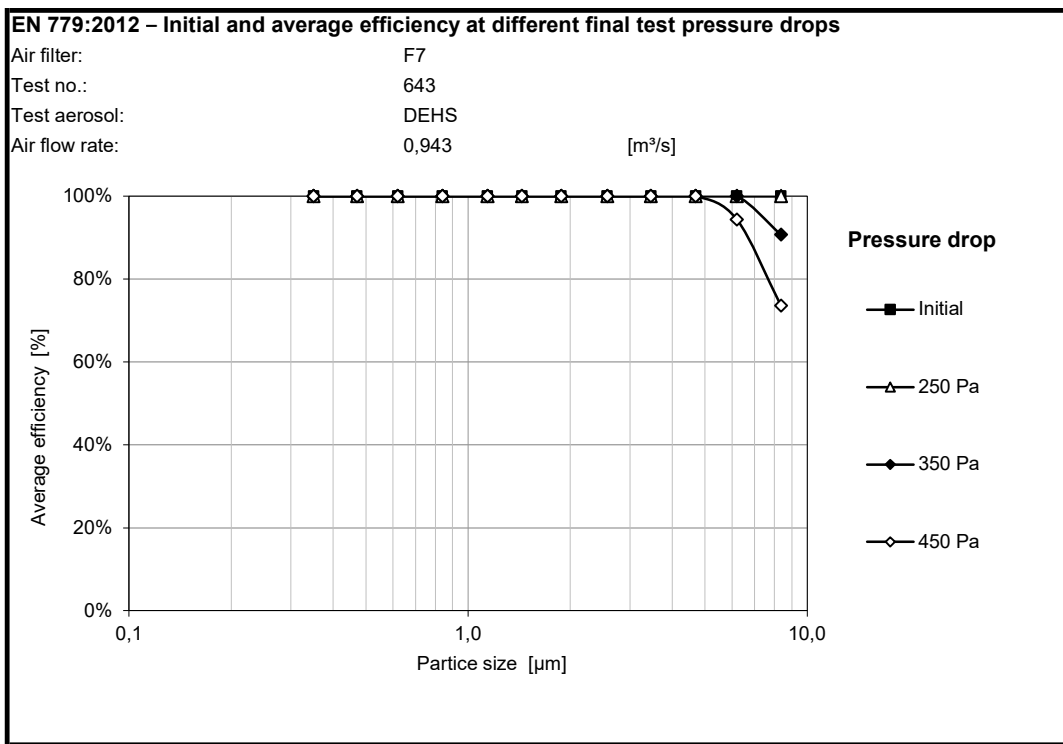
NOTE:

The performance results are only valid for the tested item and cannot by themselves be quantitatively applied to predict filter performance in service.

EN 779:2012 - Efficiency and uncertainty after different dust loading phases												
Air filter:		F7										
Test no.:		643										
Test aerosol:		DEHS										
Air flow rate:		0,943 [m³/s]										
Particle size [µm]		Efficiency [%]										
Interval	Geometric mean	Pressure drop [Pa]					Dust fed [g]					
		/										
		Pa 160	Pa 252	Pa 308	Pa 363	Pa 415	Pa 451	Pa 0	Pa 0	Pa 0	Pa 0	Pa 0
		g 0	g 30	g 38	g 43	g 48	g 51	g 0	g 0	g 0	g 0	g 0
0,30 - 0,40	0,35	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
0,40 - 0,55	0,47	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
0,55 - 0,70	0,62	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
0,70 - 1,00	0,84	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
1,00 - 1,30	1,14	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
1,30 - 1,60	1,44	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
1,60 - 2,20	1,88	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
2,20 - 3,00	2,57	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
3,00 - 4,00	3,46	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
4,00 - 5,50	4,69	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
5,50 - 7,00	6,20	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
7,00 - 10,00	8,37	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0					
NOTE:		The uncertainty of the measured efficiencies is reported on a 95 % confidence level.										



EN 779:2012 - Average efficiency at different final test pressure drops				
Air filter:		F7		
Test no.:		643		
Test aerosol:		DEHS		
Air flow rate:		0,943 [m³/s]		
Particle size [µm]		Average efficiency [%]		
		Final test pressure drop [Pa]		
		Pa 250	Pa 350	Pa 450
Interval	Geometric mean			
0,30 - 0,40	0,35	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
0,40 - 0,55	0,47	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
0,55 - 0,70	0,62	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
0,70 - 1,00	0,84	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
1,00 - 1,30	1,14	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
1,30 - 1,60	1,44	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
1,60 - 2,20	1,88	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
2,20 - 3,00	2,57	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
3,00 - 4,00	3,46	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
4,00 - 5,50	4,69	100,0 ± 0,0	100,0 ± 0,0	100,0 ± 0,0
5,50 - 7,00	6,20	100,0 ± 0,0	100,0 ± 0,0	94,3 ± 0,0
7,00 - 10,00	8,37	100,0 ± 0,0	90,7 ± 0,0	73,6 ± 0,0
Test dust capacity [g]		29	41	51
Filter class		-	-	F9



EN 779:2012 - Air flow rate and pressure drop after different dust loading phases

Air filter:	F7
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Test no.:	643
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Test aerosol:	DEHS
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Air flow rate:	0,943	[m ³ /s]
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Date	Dust fed	Sensyflow VT-S DN 250		Filter					
	m_{tot} [g]	q_v [m³/h]	t [°C]	φ [%]	p_a [kPa]	ρ [kg/m³]	q_v [m³/s]	Δp [Pa]	$\Delta p_{1,20}$ [Pa]
	Clean filter								
05.10.2023	0	847	19,9	49,5	99,3	1,175	0,235	26	26
05.10.2023	0	1700	19,8	49,7	99,3	1,175	0,472	67	67
05.10.2023	0	2545	19,7	49,9	99,2	1,175	0,707	111	112
05.10.2023	0	3408	19,7	49,9	99,2	1,175	0,947	161	162
05.10.2023	0	4255	19,7	49,8	99,2	1,175	1,182	216	217
	Clean filter pressure drop is proportional to $(q_v)^n$, where $n = 1,302$								
	Dust loading phase								
05.10.2023	0,0	3389	19,8	49,6	99,2	1,175	0,941	160	161
05.10.2023	30,0	3393	20,2	48,7	99,0	1,170	0,943	252	254
05.10.2023	37,6	3397	20,4	48,3	99,0	1,170	0,944	308	310
05.10.2023	42,8	3392	20,6	48,1	99,0	1,169	0,942	363	365
05.10.2023	48,3	3396	20,8	47,7	99,0	1,168	0,943	415	418
05.10.2023	51,2	3395	20,9	47,4	99,0	1,167	0,943	451	453

Symbols and units

m_{tot}	Cumulative mass of dust fed to filter, g
0	0
10	10
20	20
30	30
40	40
50	50
60	60
70	70
80	80
90	90
100	100

p_a Absolute air pressure upstream to filter, kPa

 q_v Air flow rate at filter, m^3/s

t	Temperature upstream of filter, °C
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ρ Air density upstream of filter, kg/m³

 φ Relative humidity upstream of filter, % Δp Measured filter pressure drop, Pa $\Delta p_{1,20}$ Filter pressure drop at air density 1,20 kg/m³, Pa

EN 779:2012 - Pressure drop and arrestance after different dust loading phases

Air filter: F7

Test no.: 643

Test aerosol: DEHS

Air flow rate: 0,943 [m³/s]

Date	Δp_1 [Pa]	Δm [g]	m_{tot} [g]	Δp_2 [Pa]	m_1 [g]	m_2 [g]	Δm_{ff} [g]	m_d [g]	A [%]
05.10.2023	159	30,0	30,0	252	7265,4	7265,7	0,3		99,00
05.10.2023	253	7,6	37,6	308	7265,7	7265,9	0,2		97,38
05.10.2023	307	5,2	42,8	363	7265,9	7265,9	0,0		100,00
05.10.2023	359	5,4	48,3	415	7265,9	7265,9	0,0		100,00
05.10.2023	409	2,9	51,2	451	7265,9	7265,9	0,0		100,00
05.10.2023									
05.10.2023									
05.10.2023									
05.10.2023									
05.10.2023									

Mass of tested device

Initial mass of tested device: 6991,1 g

Final mass of tested device: 7033,8 g

Symbols and units

A	Arrestance, %
m_d	Dust in duct after device, g
m_{tot}	Cumulative mass of dust fed to filter, g
m_1	Mass of final filter before dust increment, g
m_2	Mass of final filter after dust increment, g
Δm	Dust increment, g
Δm_{ff}	Mass gain of final filter, g
Δp_1	Pressure drop before dust increment, Pa
Δp_2	Pressure drop after dust increment, Pa

EN 779:2012 - Efficiency and pressure drop of untreated filter material					
Air filter:		F7			
Test no.:		643			
Test aerosol:		DEHS			
Air flow rate:		0,943	[m³/s]		
Media velocity:		[m/s]			
Size of material sample:		[m²]			
Particle size [µm]		Sample 1	Sample 2	Sample 3	Average
Interval	Geometric mean	Efficiency [%]			
		Pressure drop			
		Pa	Pa	Pa	Pa
0,30 - 0,40	0,35				
0,40 - 0,55	0,47				
0,55 - 0,70	0,62				
0,70 - 1,00	0,84				
1,00 - 1,30	1,14				
1,30 - 1,60	1,44				
1,60 - 2,20	1,88				
2,20 - 3,00	2,57				
3,00 - 4,00	3,46				
4,00 - 5,50	4,69				
5,50 - 7,00	6,20				
7,00 - 10,00	8,37				
NOTE:		The uncertainty of the measured efficiencies is reported on a 95 % confidence level.			

EN 779:2012 - Efficiency and pressure drop of discharged filter material					
Air filter:		0			
Test no.:		0			
Test aerosol:		0			
Air flow rate:		0,000	[m³/s]		
Media velocity:		[m/s]			
Size of material sample:		[m²]			
Particle size [µm]		Sample 1	Sample 2	Sample 3	Average
		Efficiency [%]			
		Pressure drop			
Interval	Geometric mean	Pa	Pa	Pa	Pa
0,30 - 0,40	0,35				
0,40 - 0,55	0,47				
0,55 - 0,70	0,62				
0,70 - 1,00	0,84				
1,00 - 1,30	1,14				
1,30 - 1,60	1,44				
1,60 - 2,20	1,88				
2,20 - 3,00	2,57				
3,00 - 4,00	3,46				
4,00 - 5,50	4,69				
5,50 - 7,00	6,20				
7,00 - 10,00	8,37				
NOTE:		The uncertainty of the measured efficiencies is reported on a 95 % confidence level.			

Test dust capacity and average arrestance											
Air filter:		F7									
Test no.:		643									
Test aerosol:		DEHS									
Air flow rate:		0,943 [m³/s]									
Symbol	Loading point										
	Pressure drop [Pa]										
Δp	160,4	252,4	307,9	362,9	415,2	450,5					
	Dust loading [g]										
m_{tot}	0,0	30,0	37,6	42,8	48,3	51,2					
	Dust passing device [g]										
$\Sigma(\Delta m_{ff} + m_d)$	-	0,3	0,5	0,5	0,5	0,5					
	Average arrestance [%]										
A_m	-	99,0%	97,4%	100,0%	100,0%	100,0%					
	Average efficiency [%]										
E_m	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%					
	Test dust capacity [g]										
DHC	-	29,7	37,1	42,3	47,8	50,7					

	Interpolation Pressure drop [Pa]					
	Δp	-	150	200	250	350
	Test dust capacity [g]					
DHC@Pa	-	16,0	22,7	29,4	41,1	50,7
	Average arrestance [%]					
$A_m@Pa$	-	102,0%	100,5%	99,1%	99,4%	100,0%
	Average efficiency [%]					
$E_m@Pa$	-	100,0%	100,0%	100,0%	100,0%	100,0%