

# FILTER TECHNICAL DEMANDS AND NORMS



## Filter technical demands:

The filter typ Staubmaster, DIN-cartridges and filter cartridges meet the demands for the separation degree for dust class M according to DIN EN 60335-2-69 Supplement AA (separation degree > 99.9%). These filters are part of numerous Gram filter units.

See the various filter types in group 4 (Filter units) under the heading "Filter material".

Dust class DIN EN 60335-2-69 supplement A	BIA application category	Application	Max. transmittance of particle [D]
	U	Dust separation with MAK-values > 1 mg/m <sup>3</sup>	5.0 %
L		Dust separation with MAK-values > 1 mg/m <sup>3</sup>	1.0 %
	S	Dust separation with MAK-values > 0.1 mg/m <sup>3</sup>	1.0 %
	G	Dust separation with MAK-values	0.5 %
M		Dust separation with MAK-values ≥ 0.1 mg/m <sup>3</sup>	0.10 %
	C	Separation of dust with MAK-values and of cancer-producing substances, except very dangerous cancer-producing substances.	0.10 %

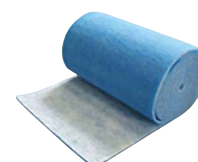
## Other filter types:



**Absolute filters HEPA/H13**  
according to DIN EN 1822



**Compact filtre F9**  
according to EN 779



**Pre-filter mat G4**  
according to EN 779

See table for european filter norms on the next page!

## ISO 16890

Filter test and classification of air filter according to ISO 16890 replaces EN 779: 2012 (see next page). ISO 16890 comes into force in January 2018. The filter tests are performed with 1µ-, 2,5µ- and 10µ-particles. The filter efficiency must be minimum 50% separation during the whole filter life.

## A comparison between EN 779 and the classes in ISO 16890

A simple translation of the classes in ISO 16890 to EN 779: 2012 ist not possible due to very different measurement and assessment methods. Currently no standard form is available. Initially we can offer you the following indicative translation form:

Class	ISO ePM1	ISO ePM2,5	ISO ePM10	ISO grov
G3	-	-	-	> 80%
G4	-	-	-	> 90%
M5	-	-	> 50%	-
M6	-	50 - 65%	> 60%	-
F7	50 - 65%	65 - 80%	> 85%	-
F8	65 - 80%	> 80%	> 90%	-
F9	> 80%	> 95%	> 95%	-

Please, note: Above form is only an example and therefore only indicative.

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Table for european filter norms:

DIN EN 779	DIN EN 779	DIN EN 60335	DIN EN 1822	ZH 1/487
Coarse dust filter With extraction degree Am (weight) Final pressure 250 [Pa]	Fine dust filter With efficiency Em = 0.4 [µm] Final pressure 450 [Pa]	Absolute filter Passage degree D Test mean paraffin oil 61% < 1 [µm]	HEPA and ULPA filter Start extraction degree A Test mean DEHS, MPPS approx. 0.1-0.2 [µm]	Dust extraction unit medium passage degree D Test mean quartz dust 90% 0.2 [µm]
50% < Am < 65% <b>G1</b> A < 65%				* See below
50% < Am < 65% <b>G2</b>				
50% < Am < 65% <b>G3</b>				
90% < Am <b>G4</b>				
	40% < Em < 60% <b>M5</b>			D < 5% <b>U</b>
	60% < Em < 80% <b>M6</b>			D < 1% <b>S</b>
	80% < Em < 90% M.E.: 35% <b>F7</b>	D < 1% <b>L</b>		D < 0.5% <b>G</b>
	90% < Em < 95% M.E.: 55% <b>F8</b>			
	95% < Em M.E.: 70% <b>F9</b>		A(intergr.) > 85% <b>E 10</b>	D < 0.1% <b>C</b>
	** See below	D < 0.1% <b>M</b>	A(intergr.) > 95% <b>E 11</b>	D < 0.05% paraffin oil 90% < 1 EM <b>K 1, K 2</b>
			A(intergr.) > 99.5% <b>E 12</b>	
			A(intergr.) > 99.95% <b>H 13</b> A(lokal) > 99.75%	
		D < 0.005% <b>H</b>	A(intergr.) > 99.995 % <b>H 14</b> A(lokal) > 99.975%	
			A(intergr.) > 99.9995% <b>U 15</b> A(lokal) > 99.9975%	
			A(intergr.) > 99.99995% <b>U 16</b> A(lokal) > 99.99975%	
			A(intergr.) > 99.999995% <b>U 17</b> A(lokal) > 99.9999%	
<b>Disposable filter</b>	<b>Disposable filter</b>	<b>Cleanable filter</b>	<b>Disposable filter</b>	<b>Cleanable filter</b>

\* Stated limits can vary very much according to material!

\*\* M.E. = Smallest efficiency, start efficiency in electro-static discharged condition

Data is subject to alterations  
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