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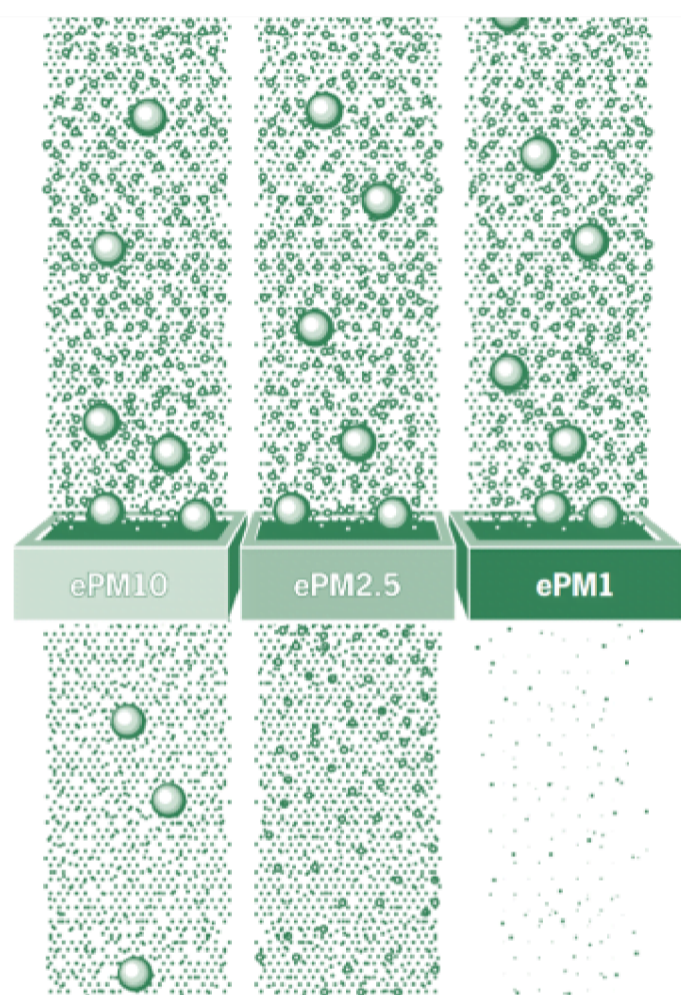
THE INTERNATIONAL TEST STANDARD ISO 16890 FOR AIR FILTERS FOR GENERAL VENTILATION

ISO 16890 is an international test standard for air filters that **has replaced EN 779**. ISO 16890 classifies air filters based on particulate matter (PM), which makes it possible to directly see connections to our health and air pollutants. The standard also makes it possible to plan indoor air quality (IAQ) in a completely different way than before.

WHY ISO 16890 IS VALUABLE

Air filters need to be evaluated to ensure that they will meet the objective of removing the contaminants of concern (CoC) for a specific application or to meet the demands specific to the user. The standard offers the following:

- Provides simple comparisons to select the best air filters to protect your equipment and employees from the harmful contaminants present in all air we breathe.
- Ensures air filters will retain the rated efficiency from time of installation to time of removal.
- Optimizes air filter selection and specification for longest service life and lowest energy consumption.
- Provides an internationally-recognized format allowing users to standardize their filter selections globally.



PARTICLE CAPTURE EFFICIENCY CLASSIFICATION OF AIR FILTER

For an air filter to be classified in any of the three PM classes, the air filter must achieve a minimum particle removal efficiency of 50%. Similar to ASHRAE 52.2 with Appendix J, the ISO16890 testing procedure incorporates steps to account for any static charge present. In the case of ISO16890, the calculated efficiency with and without a charge is averaged to arrive at a final value. The filter is then assigned a percentage linked to the PM group within which the filter can classify itself. The percentage is rounded down to an even 5%. Below are the different filter classes that a filter can be assigned (30 different classes and coarse).



ePM1 (0,3 - 1,0 µm)	ePM2,5 (0,3 - 2,5 µm)	ePM10 (0,3 - 10 µm)	Coarse (coarse particles)
ePM1 95 %	ePM2,5 95 %	ePM10 95 %	Coarse 95 %
ePM1 90 %	ePM2,5 90 %	ePM10 90 %	<p>"ISO Coarse" are filters that remove less than 50% of PM10.</p> <p>They are measured in weight separation</p>
ePM1 85 %	ePM2,5 85 %	ePM10 85 %	
ePM1 80 %	ePM2,5 80 %	ePM10 80 %	
ePM1 75 %	ePM2,5 75 %	ePM10 75 %	
ePM1 70 %	ePM2,5 70 %	ePM10 70 %	
ePM1 65 %	ePM2,5 65 %	ePM10 65 %	
ePM1 60 %	ePM2,5 60 %	ePM10 60 %	
ePM1 55 %	ePM2,5 55 %	ePM10 55 %	
ePM1 50 %	ePM2,5 50 %	ePM10 50 %	Coarse 5%



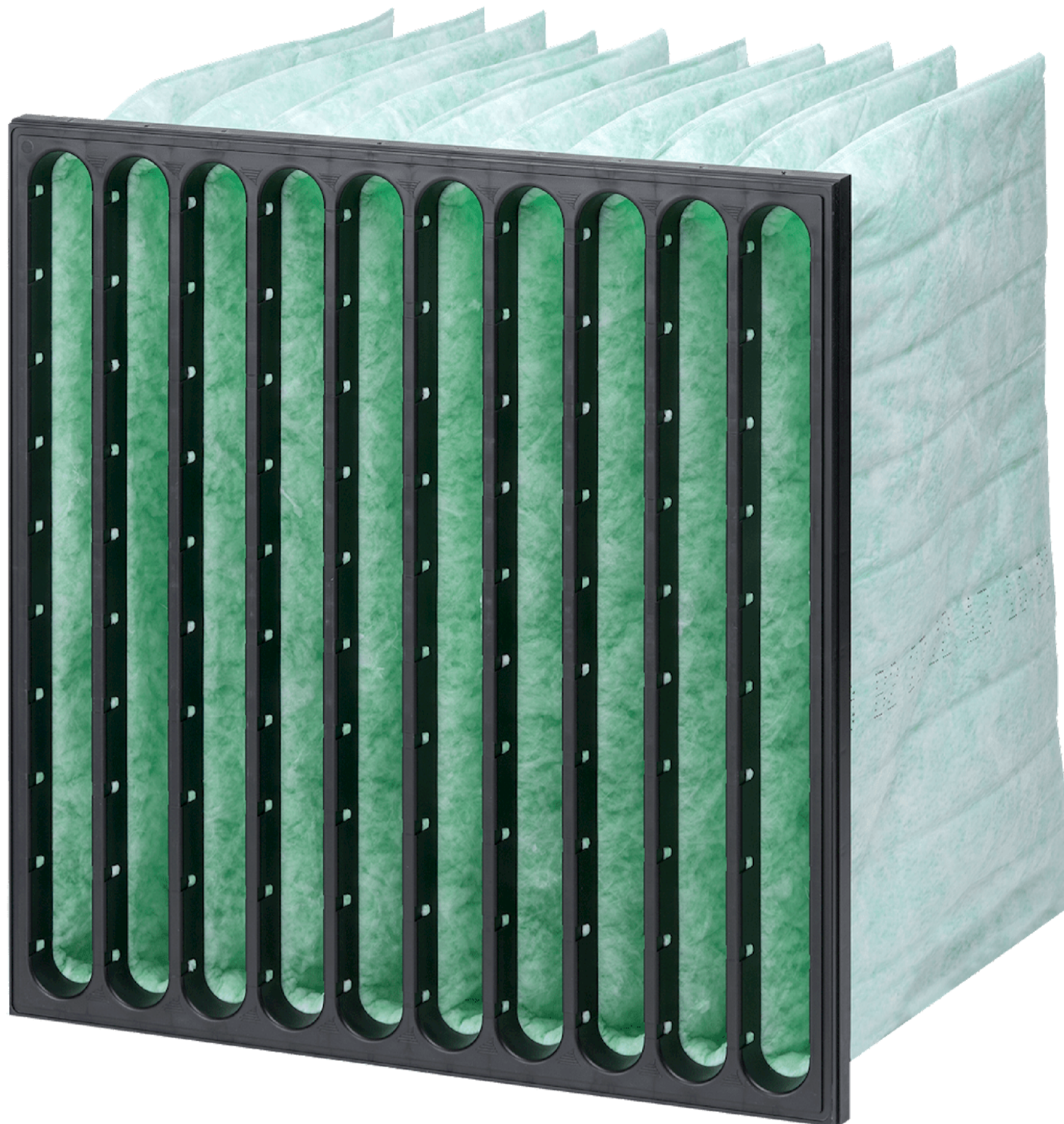
FILTERING EFFICIENCY FOR DIFFERENT FILTER CLASSES

EXAMPLE 1

- 63 % of the **PM1** fraction
- 70 % of the fraction PM 2.5
- 91 % of the PM 10 fraction

The filter can handle more than 50% separation in fraction PM1 and is therefore assigned **ePM1**, the percentage is rounded down to an even 5%. Filter class becomes: **ePM1 60 %**

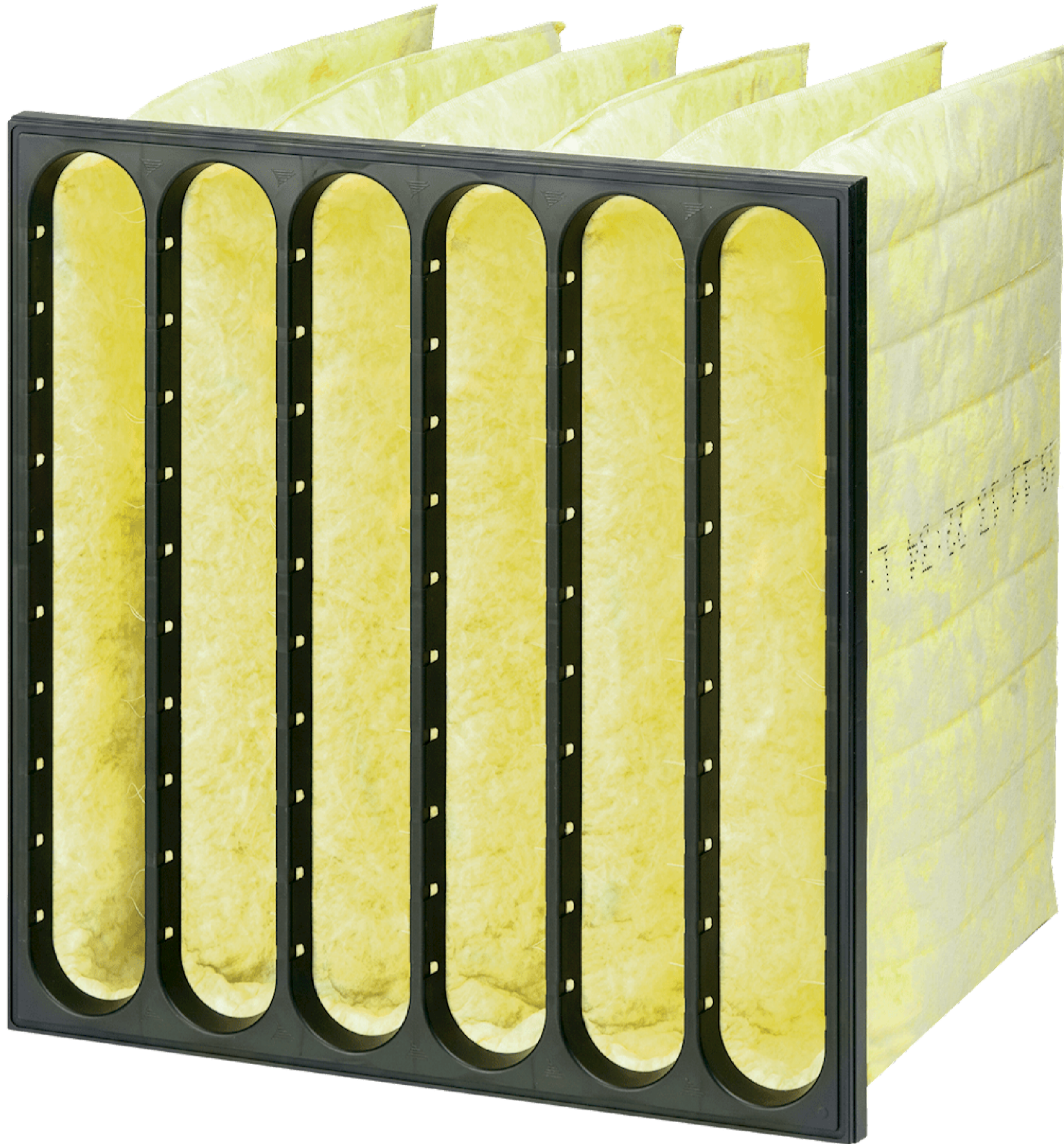


**EXAMPLE 2**

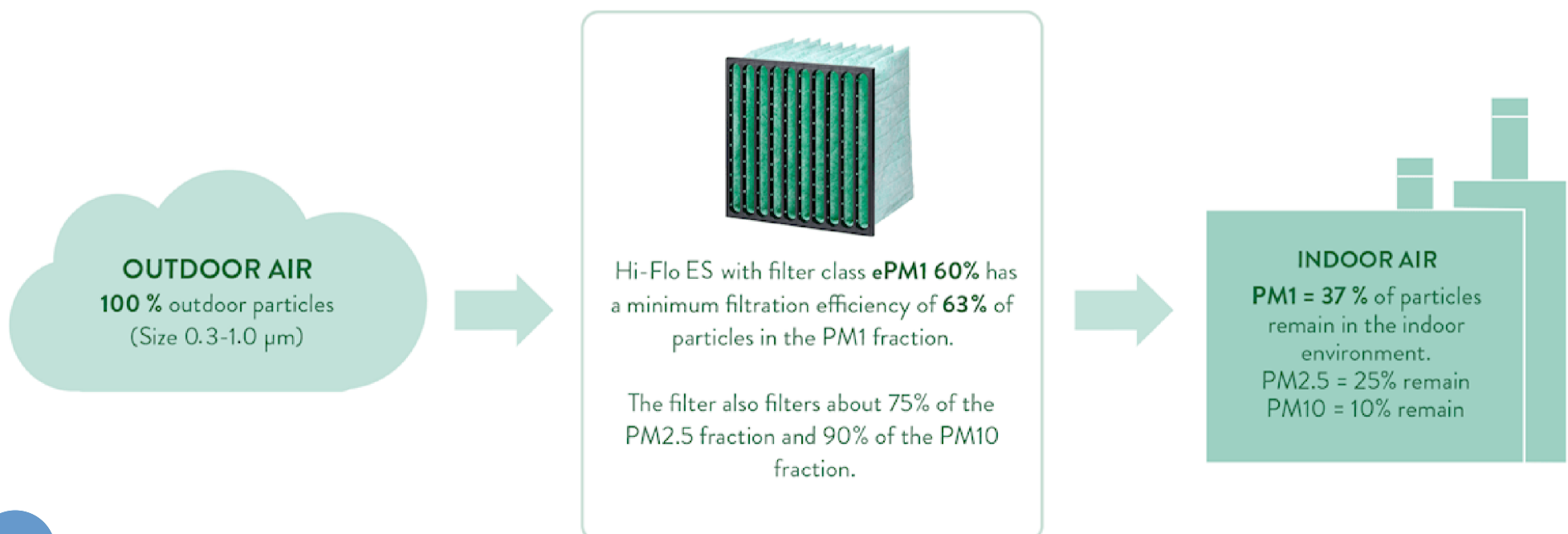
- 15 % of fraction PM1
- 26 % of the fraction PM 2.5
- **64 %** of the fraction **PM 10**

The filter can handle less than 50% separation in the PM1 and PM 2.5 fractions. It is instead awarded **ePM10**, the percentage is rounded down to an even 5%. Filter class will therefore be: **ePM10 60 %**





FILTRATION OF THE DIFFERENT PM FRACTIONS OF THE OUTDOOR AIR

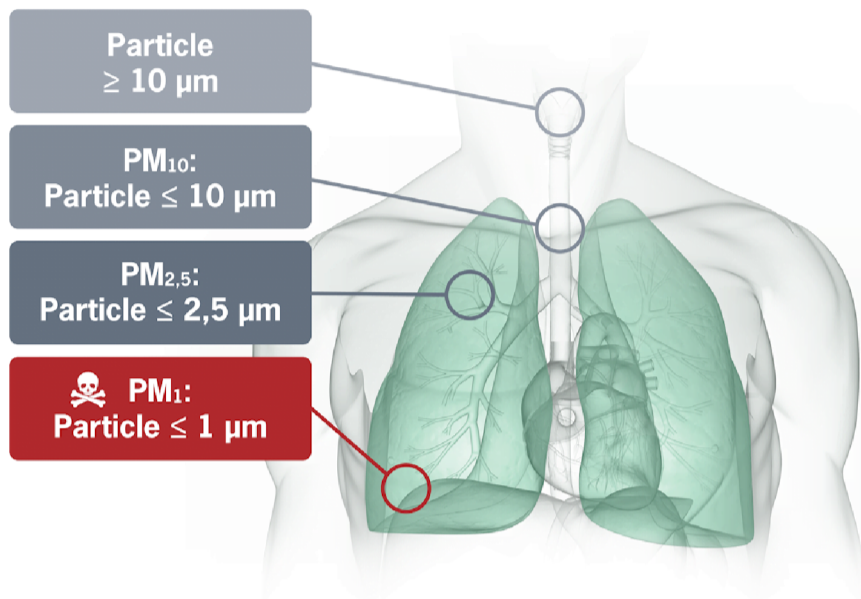


Particles are also generated inside buildings, so it is not possible to control the quality of the indoor air with calculations of the concentrations of only the outdoor air.

The WHO database contains information on outdoor air pollution and concentrations at various locations around the world. Measurements can be followed in real-time and are measured according to particulate matter (PM). But just knowing the particle content in the outdoor air is not enough to choose the right filter, you also need to take into account which indoor environment is to be protected.

Energy consumption is another important aspect, however, we must never compromise on air quality to save energy "People Matter 1st."

READ MORE ABOUT PARTICULATE MATTER (PM)



FOCUS ON PM1 TO PROTECT OUR HEALTH

PM1 is the most important and relevant particle fraction in the filtration process to create a healthy and good indoor environment (IAQ, indoor air quality) where people and processes are optimally protected. It is the smallest particles that are the most dangerous to humans because the human body lacks sufficient protection against these extremely small and harmful particles. They enter our body through the respiratory system, we inhale them, and they end up deep in the lungs and continue flowing in the bloodstream. Studies carried out by Lars Ekberg at CIT (Chalmers Industriteknik) show that an air filter with at least PM1 60% is required to filter out dangerous particles from the outdoor air, see the report: [Importance of ventilation filters for particle concentrations in indoor air](#). See also our information brochure [PM1 - small particles a health risk](#) and [PM1 - The importance of indoor air quality](#).

BOTH FILTER CLASS AND AIRFLOW AFFECT IAQ

In addition to filters with a high filter class, it is also important to have a sufficient amount of air to achieve good indoor air quality. If you have inadequate airflows, even the cleanest supply of air will not be able to affect the overall indoor air quality.

DOCUMENTS

- [Importance of ventilation filters for particle concentrations in indoor air](#)
- [PM1 - Small particles a health risk](#)
- [PM1 - The importance of indoor air quality](#)



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WHY CAMFIL

For more than half a century, [Camfil](#) has helped people breathe cleaner air. As a leading manufacturer of premium clean air solutions, we provide [commercial](#) and [industrial](#) systems for air filtration and air pollution control that improve worker and equipment productivity, minimize energy use, and benefit human health and the environment. The best solutions for our customers are best for our planet, too.

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