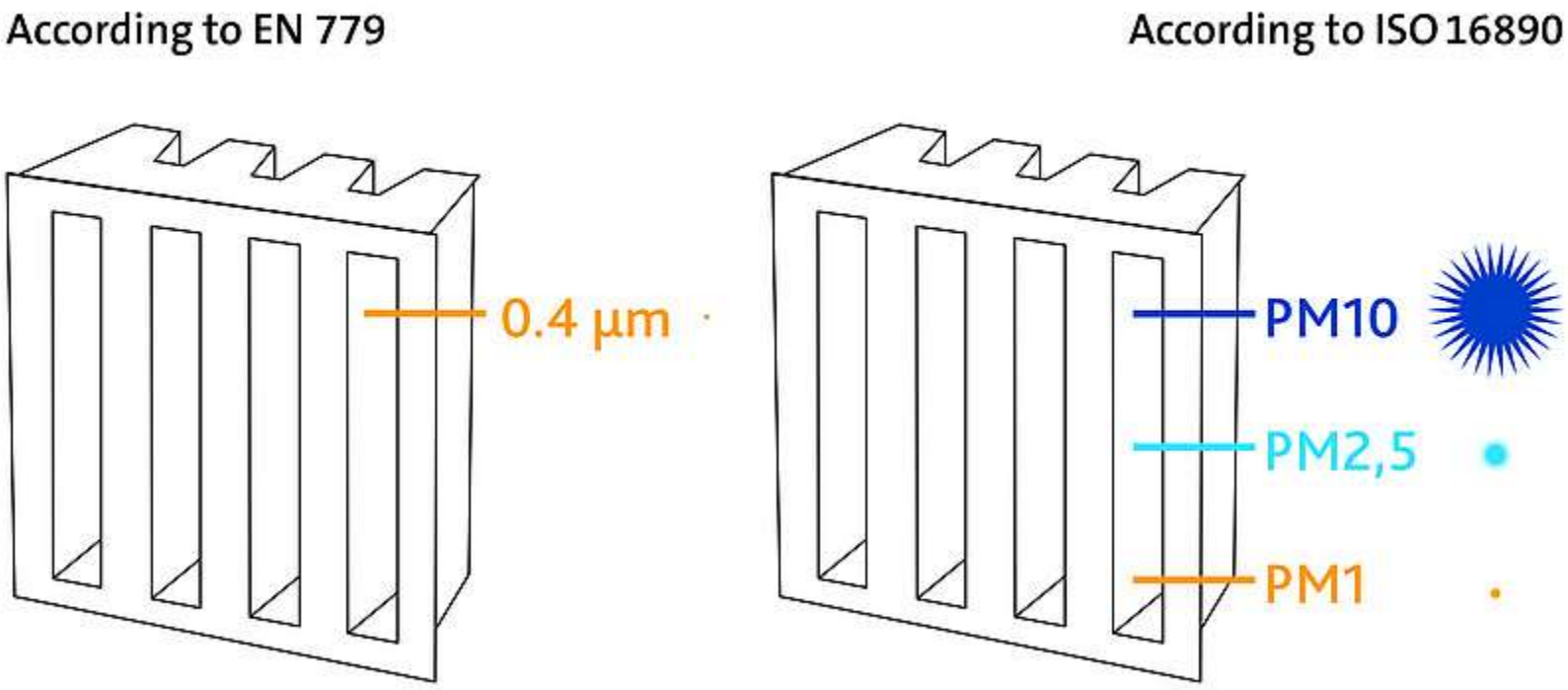
ISO 16890 has replaced EN 779

For a long time, EN 779 was used as the most commonly applied method for classifying air filters, thus simplifying filter selection. EN 779 was last revised in 2012. The test method behind it was conceived some 40 years ago and tests the collection efficiency of air filters based on a uniform particle size of 0.4 µm using ASHRAE dust. Since the introduction of the EN 779 standard, air quality in Germany and other industrialized nations has improved. Coarse production dusts and industrial exhaust gases have decreased significantly as a result of compliance with emission limits. However, nitrogen dioxide and particulate matter in the atmosphere exceed the specified EU limits. Because minute particles in the air can affect human health, new target values for air pollution control have been defined. Therefore, filter systems in room air conditioning (HVAC) systems should ensure effective separation of fine dust. The replacement of the previous industry standard EN 779 by ISO 16890 has led to a radical change in the assessment of air filters.



Comparison of EN 779 and ISO 16890

EN 779:2012	EN ISO 16890 – Range of currently measured average separation efficiencies		
FILTERCLASS	**ePM_1**	**$ePM_{2,5}$**	**ePM_{10}**
M 5	5 – 35 %	10 – 45 %	40 – 70 %
M 6	10 – 40 %	20 – 50 %	60 – 80 %
F 7	40 – 65 %	65 – 75 %	80 – 90 %
F 8	65 – 90 %	75 – 95 %	90 – 100 %
F 9	80 – 90 %	85 – 95 %	90 – 100 %

ISO 16890 Group classification

- ISO ePM1 : **ePM1 min ≥ 50%** (viruses, nanoparticles, exhaust gasses)
- ISO ePM2,5 : **ePM2,5 min ≥ 50%** (bacteria, fungal and mold spores, pollen, toner dust)
- ISO ePM10 : **ePM10 ≥ 50%** (pollen, desert dust)
- ISO Coarse : **ePM10 ≤ 50%** (sand, hair)

With the introduction of the new ISO16890 standard, actual operating conditions will be more effectively taken into account. Instead of considering only the particle size 0.4 microns (EN779:2012), as previously, a broad range between 0.3 microns and 10 microns will be used to determine separation efficiencies for particulate matter fractions PM10, PM2,5 and PM1 (ISO 16890). In order for an air filter to be rated to PM1 or any of the other PM sizes it will need to demonstrate a minimum efficiency of 50% and this will be recorded incrementally to the closest 5% – so an air filter performing at 66% to PM1 particles will be rated at ePM1 65%.

For coarse filters the new standard will include filters that capture less than 50% of particles in the PM10 range – these will be known as “ISO Coarse” and will detail their PM10 performance i.e. “PM Coarse 45%”.

ePM1 = 0.3 – 1µm

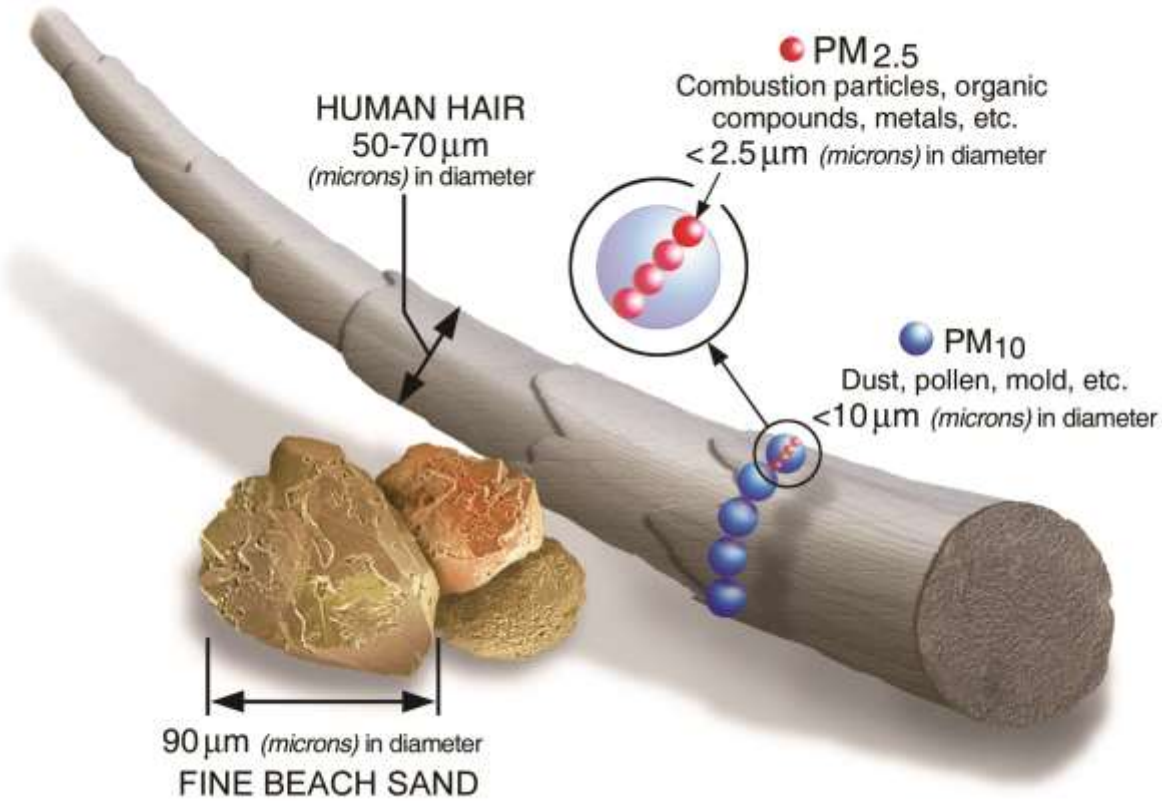
ePM2.5 = 0.3 – 2.5µm

ePM10 = 0.3 – 10.0µm

ISO Coarse = Gravimetric filter arrestance for media unable to achieve 50% efficiency at ePM10.

Particulate matter

Particulate **M**atter(PM) is the term used to describe small to very small particles in the air that remain suspended in the atmosphere for some time; i.e., do not sink immediately. The definition goes back to the “National Ambient Air Quality Standards for Particulate Matter” of the US Environmental Protection Agency (EPA). The mass concentrations PM1, PM2.5 and PM10 are commonly used as the unit of measurement for particulate matter. Dust particles with an aerodynamic diameter of 10 micrometers or less (1 µm = one-thousandth of a mm) belong to the PM10 fraction. PM2.5 stands for particles with a diameter of 2.5 micrometers or less.



Natural sources of fine dust include pollen, fungal spores and dust from erosion processes. These can usually be seen with the naked eye due to their large particle diameter of around 10 µm. Far more dangerous are the small fine dust particles around 0.3 µm, typically produced by motor vehicle traffic, industrial emissions, building heating systems and agriculture. Particulate matter occurs not only in the outdoor air, but also indoors.

The benefits of ISO 16890

The new ISO 16890 standard offers several improvements when compared to the EN779 Standard:

- One global international standard
- The ISO16890 records their performance at a particle spectrum of 0.3 up to 10 microns (versus the EN779 test which qualified fine filter performance at 0.4 microns)
- Fractional efficiencies of the filter prior to and after IPA discharge of any electrostatic properties can be seen.
- Filters can be chosen for their specific performance related to the need of the application.