ISO 16890: A GUIDELINE TO THE NEW STANDARD FOR AIR FILTRATION

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Systematic ventilation.

ISO 16890: the new standard for the classification of air filters

ISO 16890 REPLACES EN 779

For more than 20 years, EN 779 has been the most commonly applied method to classify air filters. At the beginning of 2017, ISO 16890 came into force, completely revolutionising the approach of inspecting and categorising filters. After a country-specific transitional period, EN 779 was replaced by ISO 16890 and the known filter classes from G1 bis F9 became invalid.

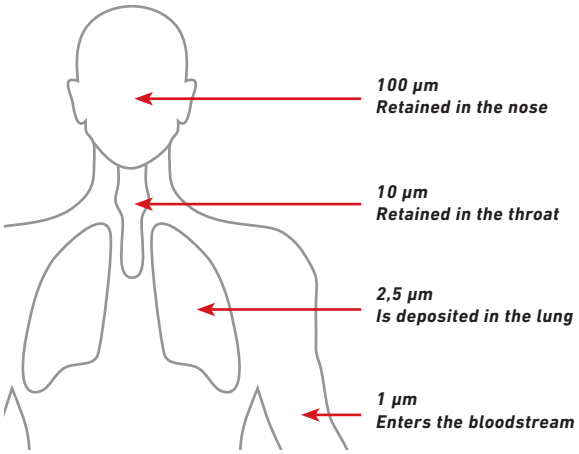
This guideline will help you to update your knowledge of the new standard ISO 16890.

PARTICLES UNDER THE MICROSCOPE

If public institutions such as the World Health Organisation talk about air pollution, usually the terms PM10, PM2.5 and PM1 are mentioned, which refer to particulate matter with a size of less than 10 µm, 2.5 µm and 1 µm. There is a good reason for this. The human organism is adapted to ward off particles with a size of more than 10 µm from entering the body. However, smaller particles can overcome our barriers and can penetrate into the body at different depths, depending on the size.

HEALTH EFFECTS CAUSED BY PARTICULATE MATTER

According to the World Health Organisation, air pollution constitutes the greatest environmental hazard to human health, causing more than three million cases of early death per year worldwide. And the list of health issues which can be attributed to particulate matter is getting increasingly longer, ranging from cardiovascular diseases and pulmonary diseases to cancer and respiratory diseases during childhood.



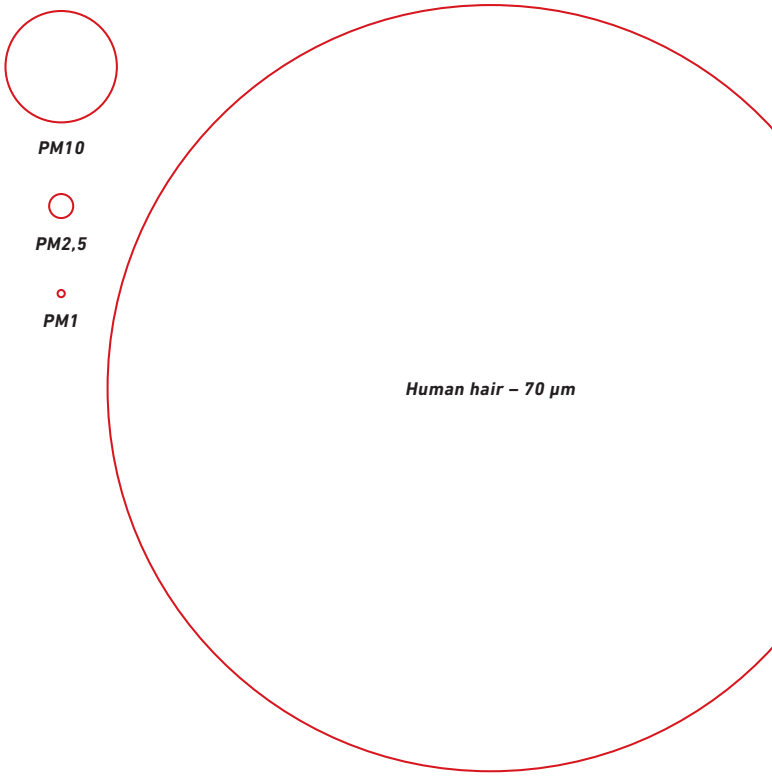
Particles occur in various sizes, many of them are invisible to the eye. With the new ISO 16890 standard, the capability of a filter to retain particles from the entire spectrum of sizes is tested.

ISO 16890 FOR A MORE REALISTIC TEST DESIGN

The air that we breathe is a cocktail of innumerable particle types of all shapes and sizes from countless sources. EN 779 does not take into consideration that these different particle sizes are part of the air. This standard solely takes account of the capability of a filter to merely retain one particle size, namely 0.4 µm. Therefore, the testing process of EN 779 has been criticised, since it does not present the conditions under which a filter is expectedly applied and the results from the laboratory cannot be transferred to real life.

ISO 16890 is different. The real-life conditions under which the filter is applied are simulated in a more exact fashion in the new test standard. The new classification system focuses on the actual purpose of an air filter, i.e. the removal of particulate matter.
Therefore, during the testing process, a filter is subjected to various particles of a different size, as if it was installed in your air purification unit. The size of these particles ranges from 0.3 µm to 10 µm in a series of 12 tests.

REPRESENTATION OF THE PARTICLE SIZES



Four ISO filter groups. One objective: simplicity

REPLACEMENT OF CLASSES G AND F

Under ISO 16890, four new filter groups are introduced:

- Coarse
- ePM10
- ePM2.5
- ePM1

The "e" at the beginning stands for "efficiency". In order to be categorised, the filter must at least retain 50% of the particles of the respective size. Filters which retain less than 50% of the dust of size PM10 are classified as "coarse".

However, not all products in a filter group are equal. In the product documentation and test reports, the efficiency of the filter is added next to its group.

Examples:

- ePM2.5 60% = The filter shows an efficiency of 60% at PM2.5
- ePM1 95% = The filter shows an efficiency of 95% at PM1

The efficiency is rounded to the next 5%, preventing the occurrence of products with ePM10 89%, for example.

THE CHANGEOVER TO ISO 16890

Unfortunately, direct recoding between EN 779 and the new ISO 16890 is not possible. The conditions underlying the two standards are different and cannot be transferred one-to-one, since otherwise the advantages of ISO are not utilised. There is a minimum of ISO filtration which enables a comparable air quality with your available EN 779 filters.

The following recommendations are therefore guide values which have the purpose of preventing the change-over to ISO 16890 from bringing about a substantial deterioration of the air quality.

EVIA RECOMMENDATION

Filter class EN 779	EVIA recommendation			
	ISO Coarse	ISO ePM10	ISO ePM2,5	ISO ePM1
G2	≥ 30%	–	–	–
G3	≥ 45%	–	–	–
G4	≥ 60%	–	–	–
M5	–	≥ 50%	–	–
M6	–	–	≥ 50%	–
F7	–	–	–	≥ 50%
F8	–	–	–	≥ 70%
F9	–	–	–	≥ 80%

EUROVENT RECOMMENDATION 4/23 (2017) – ORIENTATION GUIDE DIN EN 779 – DIN EN ISO 16890 OF VDMA

In compliance with DIN EN 779	In compliance with DIN EN ISO 16890			
	ISO Coarse	ISO ePM10	ISO ePM2,5	ISO ePM1
G2	**30% – 50%**	–	–	–
G3	**45% – 65%**	–	–	–
G4	**60% – 85%**	–	–	–
M5	**80% – 95%**	**40% – 70%**	10% – 45%	5% – 35%
M6	> 90%	**45% – 80%**	**20% – 50%**	10% – 40%
F7	> 95%	80% – 90%	**50% – 75%**	**40% – 65%**
F8	> 95%	90% – 100%	75% – 95%	**65% – 90%**
F9	> 95%	90% – 100%	85% – 95%	**80% – 90%**

M5 to F9 following Eurovent Recommendation 4/23 (2017); the information is to be meant as an orientation guide and is supplied without liability.

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