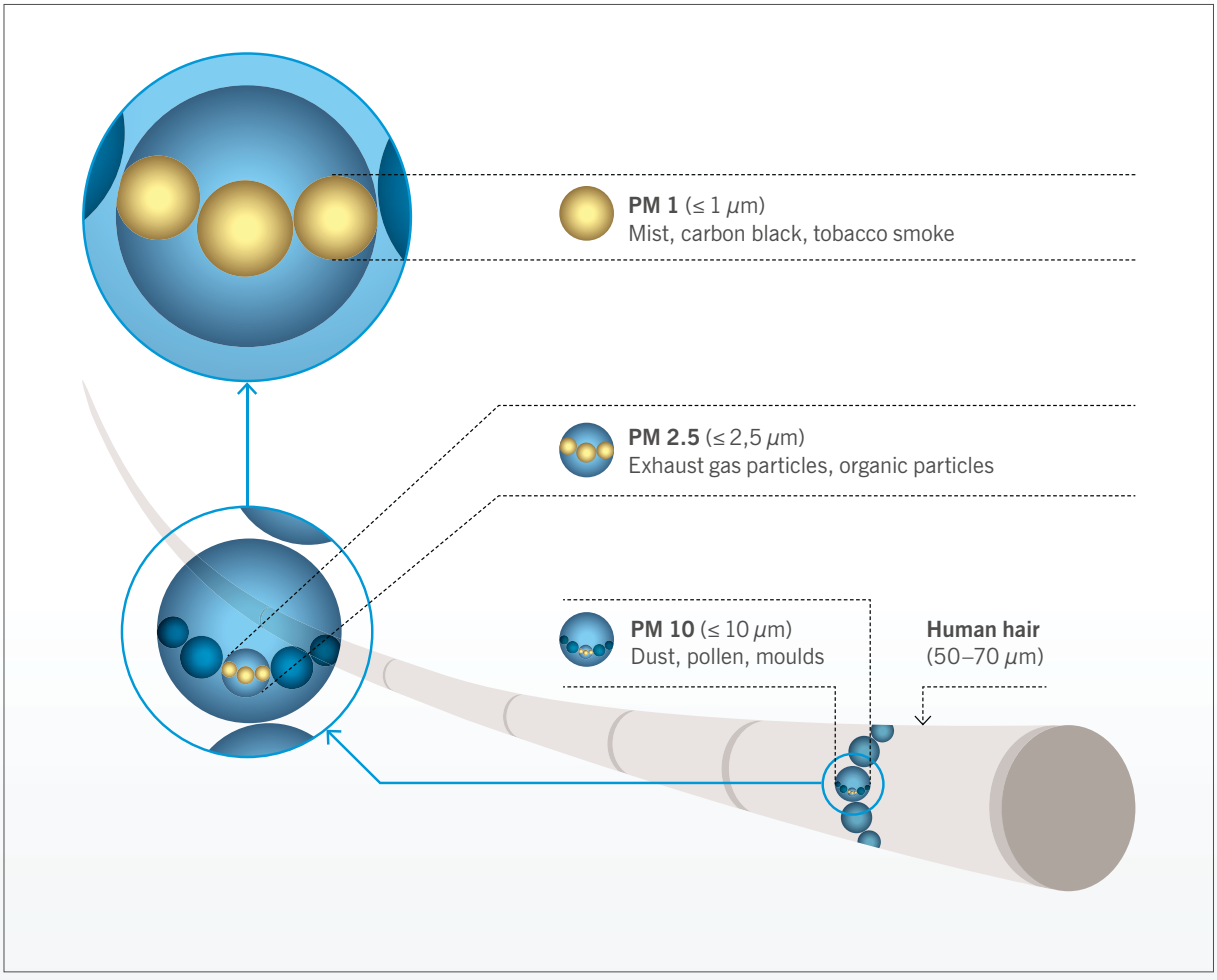
ISO 16890 – new global standard for testing and classification of filters

WHO (the World Health Organization) has initiated studies which examined effects of fine dust on human health. Results of these studies showed a clear outcome that the current polluted air, and especially small particles in the air, are harmful to health and contribute to the origin of fatal diseases of blood circulation and respiratory tract. Each of the WHO member states voted unambiguously for this new standard.

PM is derived from two English words **particulate matter**. In the Czech Republic, the terms of **particles**, suspended particles or aerosol particles are widely used, but the lay public simply uses the term of dustiness although it does not mean only "dust". All such particles hazardous to human health are classified in various PM classes, divided as follows: **PM 1** (aerodynamic diameter ≤ 1 μm), **PM 2.5** (≤ 2.5 μm) and **PM 10** (≤ 10 μm).

What does PM1 mean? It means that it is a particle with a diameter smaller than 1 micron (thousandth of millimetre).

1 μm = 0.001 mm = PM 1
2.5 μm = 0.0025 mm = PM 2.5
10 μm = 0.01 mm = PM 10



Influence of individual particles on the organism

PM 1 (≤ 1 μm)
For example, this is a size of viruses and combustion particles – they belong among the worst ones for the human organism because they can get to blood circulation and alveoli and remain deposited there.

PM 2.5 (≤ 2.5 μm)
For example, this is a size of bacteria and spores of moulds – they can get to the lower respiratory tract.

PM 10 (≤ 10 μm)
For example, this is a size of pollen and dust – they can get to the upper respiratory tract.

Fine dust with a particle size of PM 10 can enter deeper areas of human trachea through the nasal cavity. Smaller particles with a particle size of PM 2.5 can even get to bronchi and alveoli. Highly fine particles with a particle size below 0.1 μm can even get to the lung tissue and blood circulation.

The effects of fine dust on health differs depending on the size and depth of ingress of the particles. These effects range from non-harmful diseases, such as irritation and inflammations of mucosa and a localised throat inflammation to increased plaque formation in arteries, thrombophilia or changes in the nervous system regulatory function.

This shows the main difference between the old EN 779:2012 and the new ISO 16890 standards. EN 779 did not consider fine particles contained in the air and assessed a filter efficiency at the particle size of 0.4 μm.

However, this did not correspond to real requirements. ISO 16890 distinguishes three particle sizes in areas of efficiency, therefore it is closer to reality. The classification of filters according to this standard reflects the filter efficiency in real operation better.

Advantages compared to EN779
- One global international standard
- Measurement range in particle sizes from 0.3 μm to 10 μm, unlike the sizes from 0.4 μm in EN779
- Filters can be better selected according to specific requirements