REHVA

Air Filtration in HVAC Systems

REHVA GB 11

Task force

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Introducing Air Filtration in HVAC Systems

The scope of Guidebook 11 is to increase the awareness of the role of air filtration in improving indoor air quality. It will help designers and users to understand the background and criteria for air filtration, how to select air filters and avoid problems associated with hygiene and other considerations in the operation of air filters.

Introducing Air Filtration in HVAC Systems

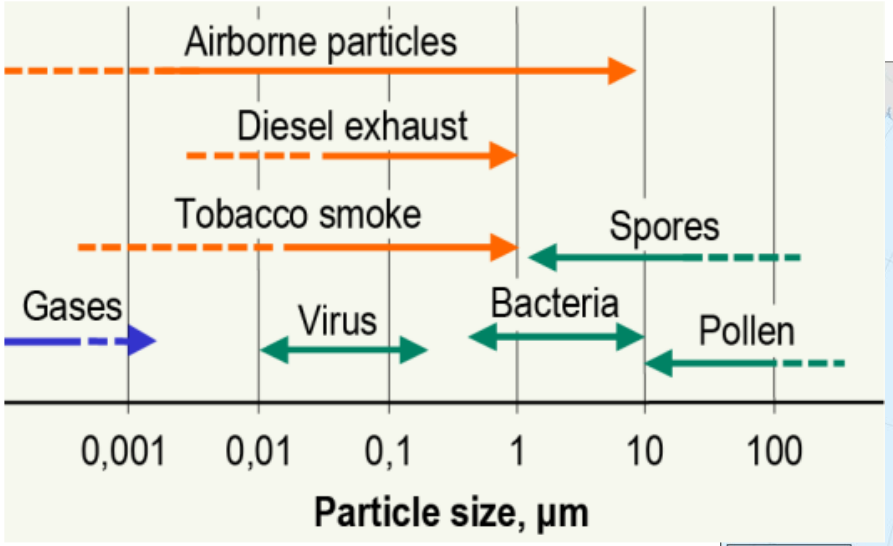
The Guidebook is mainly applicable to air filters in general ventilation systems.

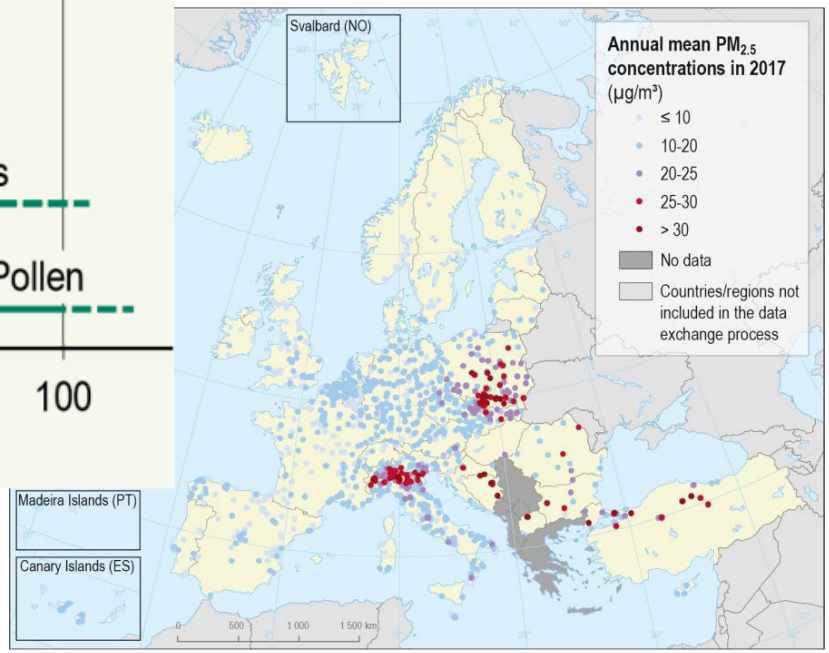
However, parts of it may also be applied to any kind of forced ventilation or when air filters are used as a part of a ventilation system in critical applications to protect people, products or the environment.

Introducing Air Filtration in HVAC Systems

The topics covered in the Guidebook are:

- Airborne pollutants and Indoor air requirements





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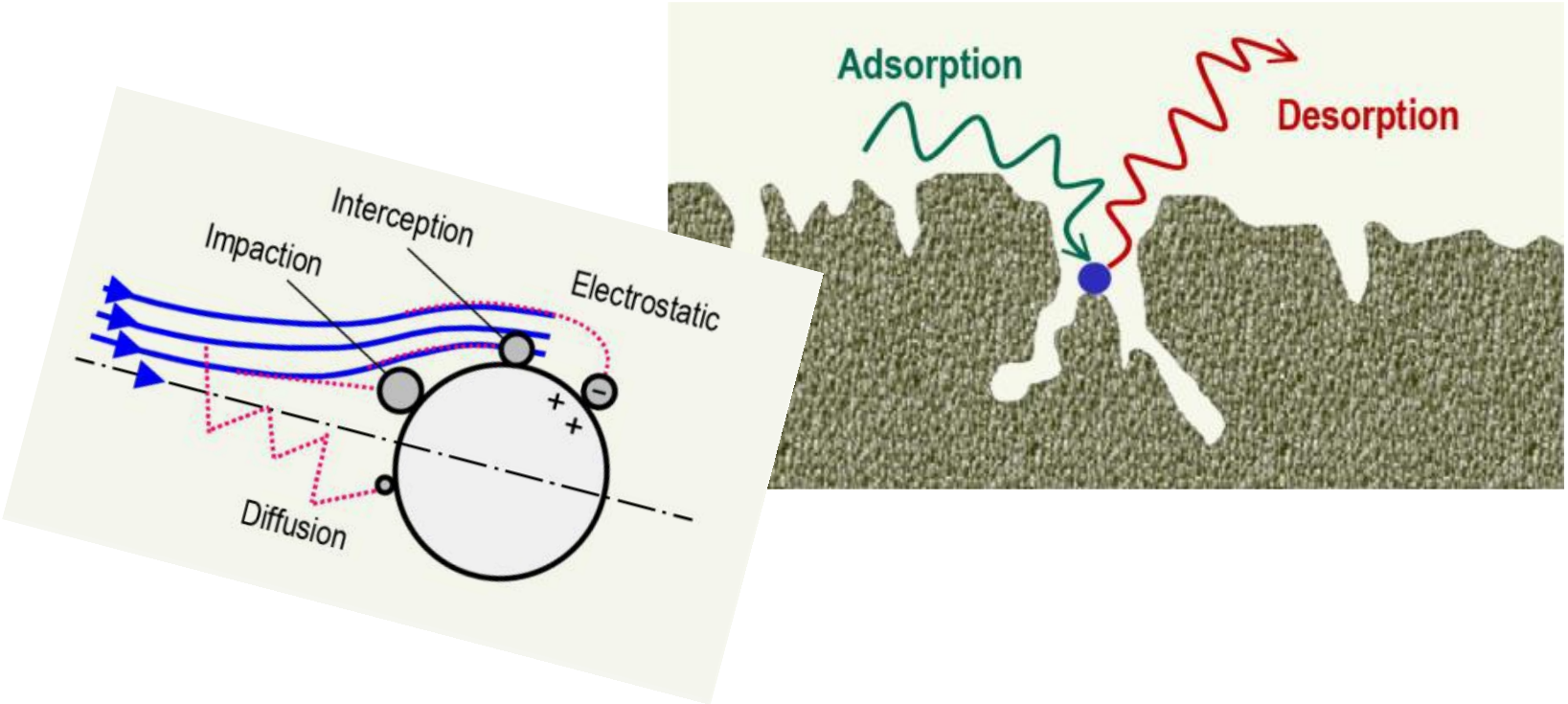
The topics covered in the Guidebook are:

- Particulate matter and Gas-phase air cleaning



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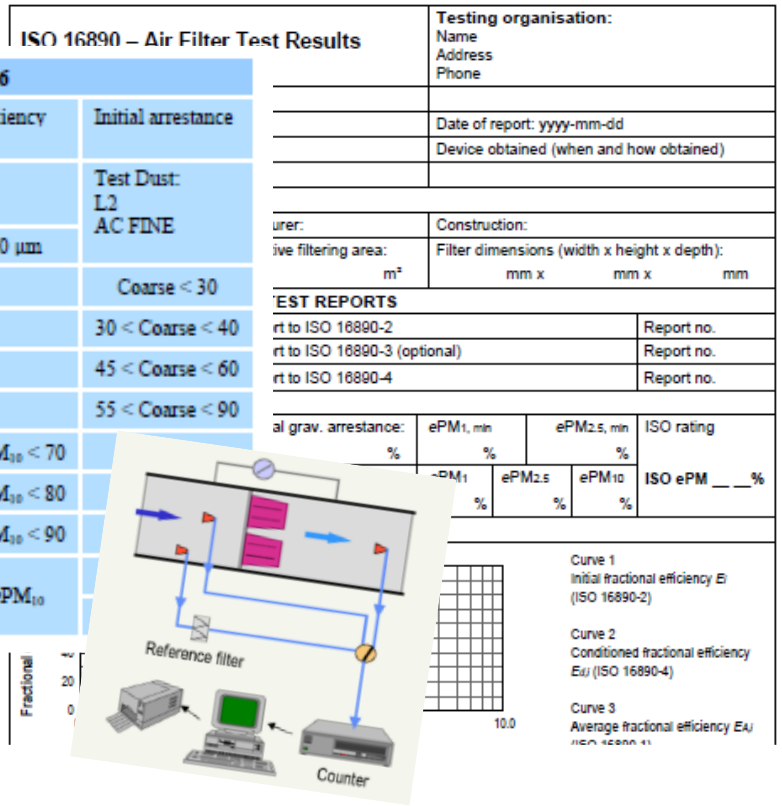
The topics covered in the Guidebook are:

- Air filters test methods

CLASS	EN 779:2012			EN ISO 16890:2016			
	Average Efficiency Minimum Efficiency		Average arrestance	Mean between new filter and discharged one Efficiency Minimum efficiency also considered			Initial arrestance
	Test Aerosol: DEHS 0.4 µm		Test Dust: L1 ASHRAE	Test Aerosols: DEHS (< 1 µm) and KCl (> 1 µm)			Test Dust: L2 AC FINE
	Average	Min		0.3–1 µm	0.3–2.5 µm	0.3–10 µm	
G1			$50 \le A_m$				Coarse < 30
G2			$65 \le A_m$				30 < Coarse < 40
G3			$80 \le A_m$				45 < Coarse < 60
G4			$90 \le A_m$				55 < Coarse < 90
M5	$40 \le E_m$			$5 < ePM_1 < 35$	$10 < ePM_{2.5} < 45$	$40 < ePM_{10} < 70$	
M6	$60 \le E_m$			$10 < ePM_1 < 40$	$20 < ePM_{2.5} < 50$	$60 < ePM_{10} < 80$	
F7	$80 \le E_m$	$35 \le E_{min}$		$40 < ePM_1 < 65$	$65 < ePM_{2.5} < 75$	$80 < ePM_{10} < 90$	
F8	$90 \le E_m$	$55 \le E_{min}$		$65 < ePM_1 < 90$	$75 < ePM_{2.5} < 95$	$90 < ePM_{10}$	
F9	$95 \le E_m$	$70 \le E_{min}$		$80 < ePM_1 < 90$	$85 < ePM_{2.5} < 95$		



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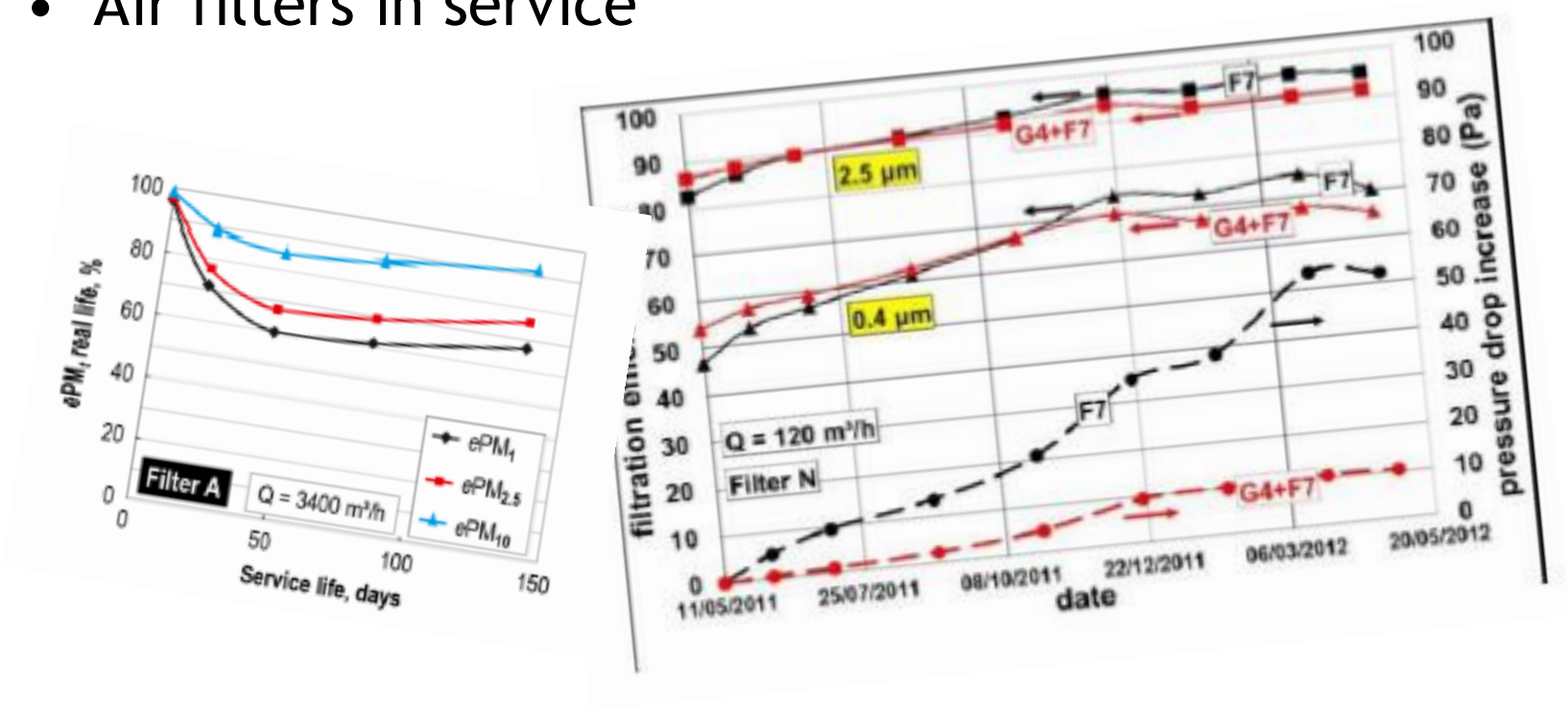
The topics covered in the Guidebook are:

- Air filters in service



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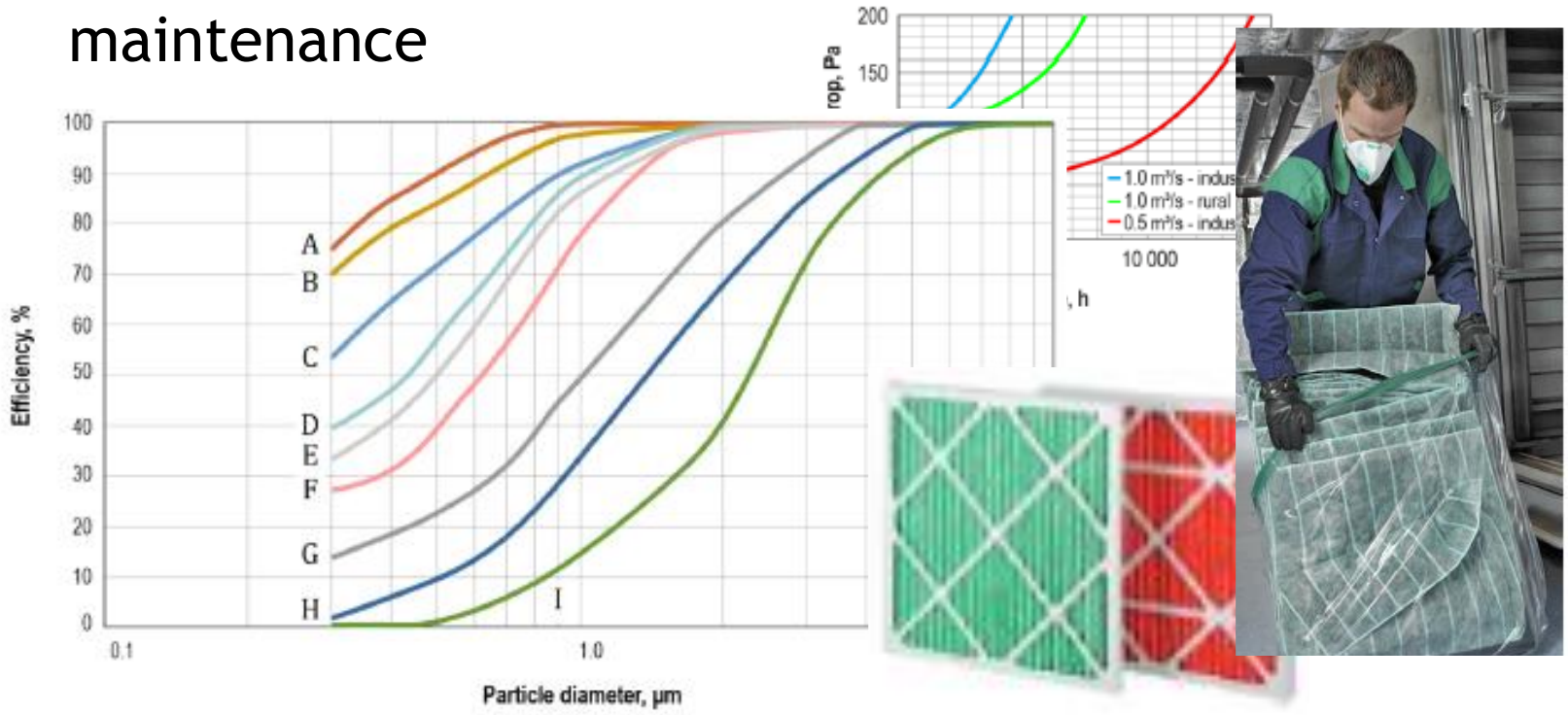
The topics covered in the Guidebook are:

- Applications and selection of air filters, maintenance



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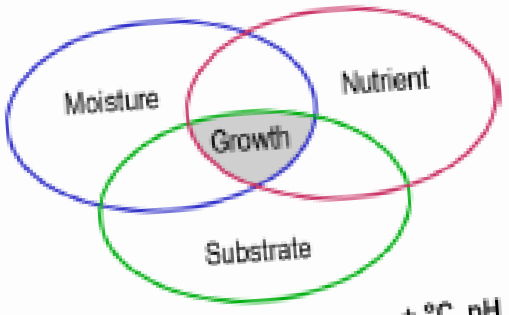
The topics covered in the Guidebook are:

- Considerations about the hygienic aspect of air filtration

9.4.1 Microorganism collection by air filters

The size range of bio-aerosols is wide. Viruses v
bacteria from 0.5 µm to 5 µm. Fungal spores and y
more than 100 µm, while the size of pollen grains
(spruce). Viruses and bacteria normally occur in co



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The topics covered in the Guidebook are:

- Energy considerations

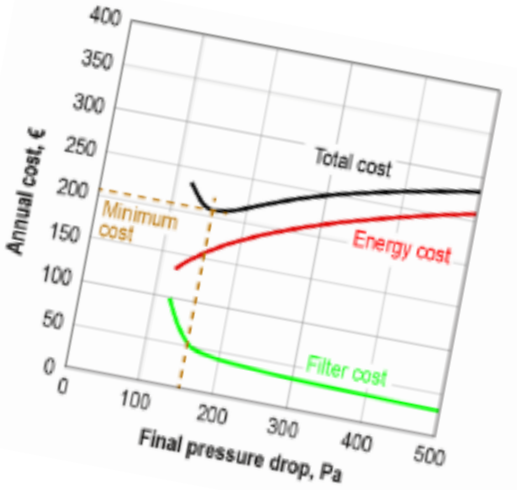
Economical final pressure drop

Air filters energy consumption, E (kWh), based on average pressure drop and constant air flow, can be calculated as:

$$E = \frac{q \cdot p_{avg} \cdot t}{\eta \cdot 1000}$$

where:

q = airflow (m^3/s)
p_{avg} = average pressure drop (Pa)
t = operating time (hours)
η = efficiency of the fan



Introducing Air Filtration in HVAC Systems

The topics covered in the Guidebook are:

- Certification of declared performances

11.1 Eurovent Certification

11.2 Eurovent energy consumption

11.3 Swedish P-marking

Introducing Air Filtration in HVAC Systems

The writing of the Guidebook finished a few weeks before the outbreak of the Covid-19 pandemic and a chapter about this topic is missing.

Nevertheless, most of the information contained in the Guidebook are applicable also to Covid-19 risk treatment once the dimension of infected particles to be captured and the allowed risk level are defined.

Introducing Air Filtration in HVAC Systems

- **REHVA GB 11:**
  Your guide to improving indoor air quality