



# Air filtration in the engineering control of airborne pathogens

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# AIRBORNE TRANSMISSION OF AEROSOLS

Typical size range:  
0,2  $\mu\text{m}$  to  $>5 \mu\text{m}$

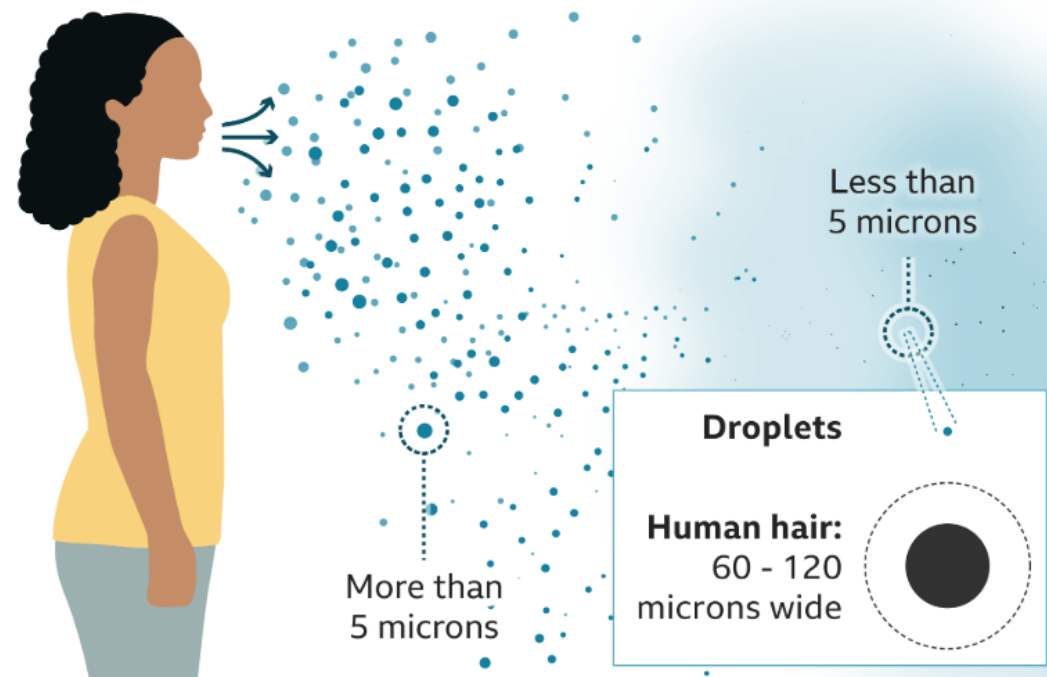
## The difference between droplet and airborne transmission

### Droplet transmission

Coughs and sneezes can spread droplets of saliva and mucus

### Airborne transmission

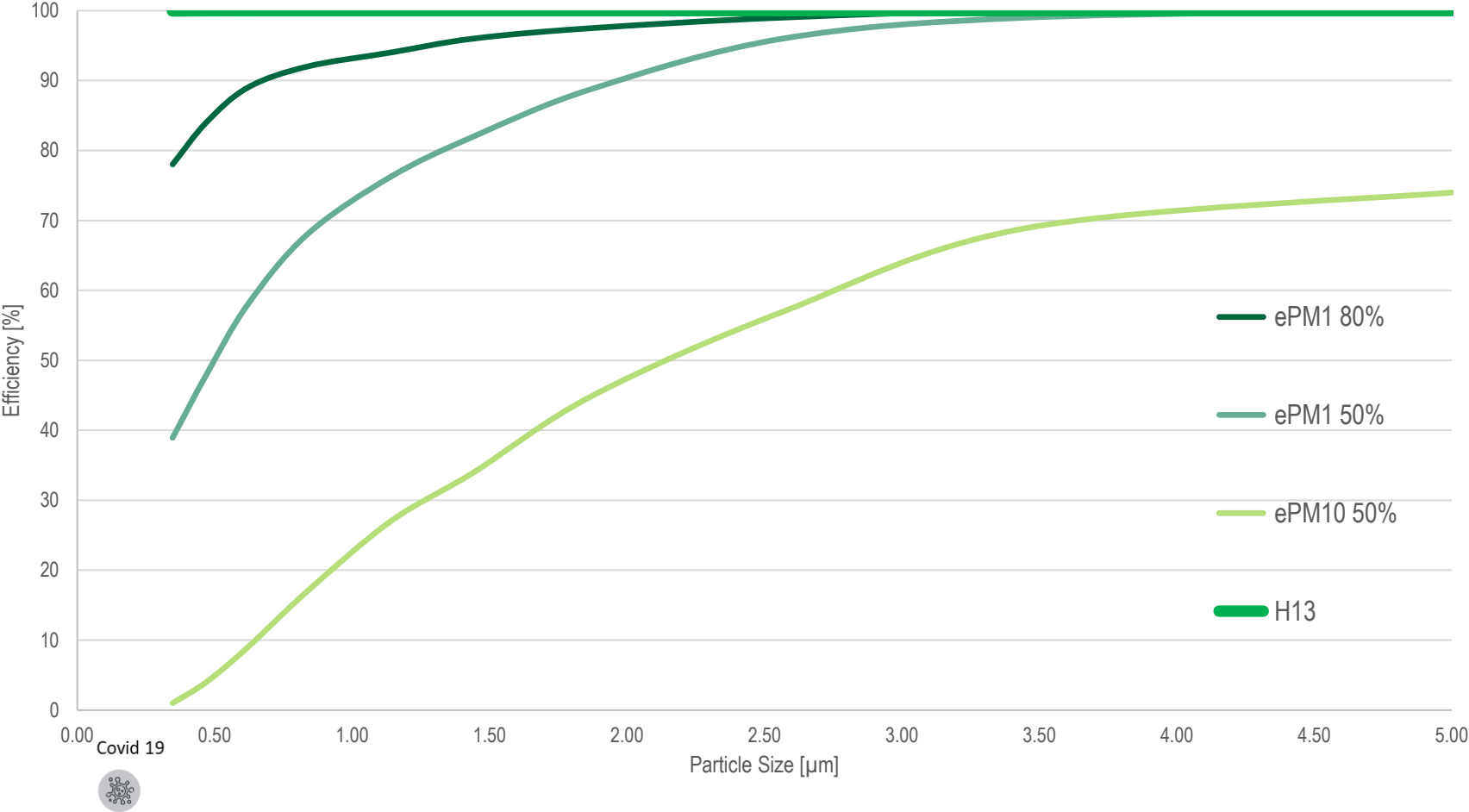
Tiny particles, possibly produced by talking, are suspended in the air for longer and travel further



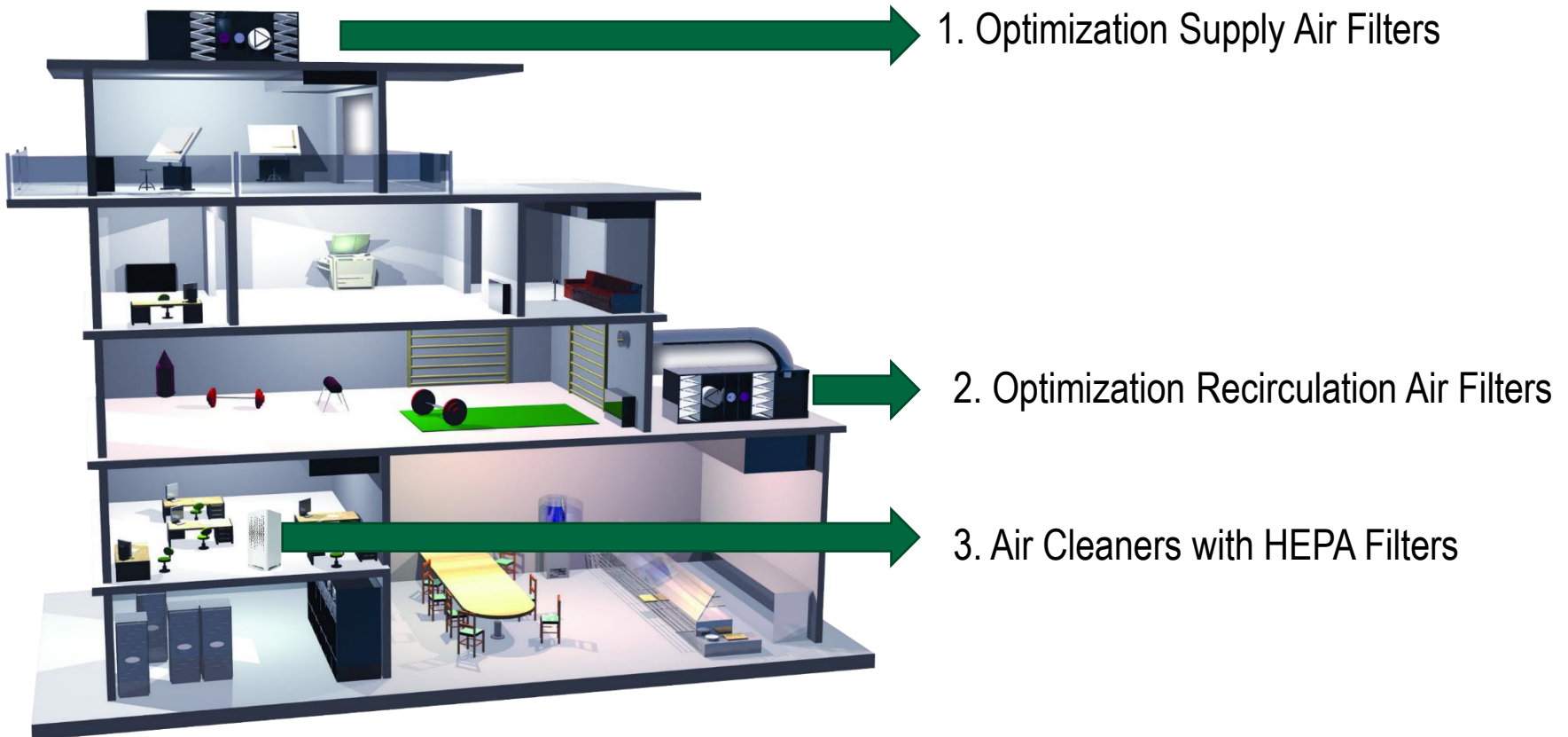
Source: WHO

BBC

# FILTER EFFICIENCIES ACC. EN ISO 16890 & EN 1822



# HOW TO OPTIMIZE THE AIR QUALITY WITH AIR FILTERS



# 1. OPTIMIZATION SUPPLY AIR FILTERS

- **REHVA** recommends to keep using the **normal ISO ePM1 filters** in the supply air, as they would provide enough protection in the unlikely event of virus-containing aerosols coming from the outside.\*
- **VDMA**: „There is no need to replace existing supply air filters with other filter types, nor to change them sooner than normal.“\*\*
- **VDI 6022** requires for hygienic reasons in general (independent of COVID 19) at least one filter stage of ISO ePM1 filters in the supply air
- **Recommended filter classes for the supply air depending on your local outdoor air quality can be found in Eurovent 4/23 and VDI 6022**

# RECOMMENDATIONS FROM EUROVENT 4/23

Outdoor air quality		Supply air quality				
		SUP 1	SUP 2	SUP 3	SUP 4	SUP 5
ODA 1	Example 1	ePM <sub>10</sub> 50% + ePM <sub>1</sub> 60%	ePM <sub>1</sub> 50%	ePM <sub>2,5</sub> 50%	ePM <sub>10</sub> 50%	ePM <sub>10</sub> 50%
	Example 2	ePM <sub>1</sub> 70%	-	-	-	-
ODA 2	Example 1	ePM <sub>1</sub> 50% + ePM <sub>1</sub> 60%	ePM <sub>10</sub> 50% + ePM <sub>1</sub> 60%	ePM <sub>1</sub> 50%	ePM <sub>2,5</sub> 50%	ePM <sub>10</sub> 50%
	Example 2	ePM <sub>1</sub> 80%	ePM <sub>1</sub> 70%	ePM <sub>2,5</sub> 70%	ePM <sub>10</sub> 80%	-
ODA 3	Example 1	ePM <sub>1</sub> 50% + ePM <sub>1</sub> 80%	ePM <sub>1</sub> 50% + ePM <sub>1</sub> 60%	ePM <sub>10</sub> 50% + ePM <sub>1</sub> 60%	ePM <sub>1</sub> 50%	ePM <sub>2,5</sub> 50%
	Example 2	ePM <sub>1</sub> 90%	ePM <sub>1</sub> 80%	ePM <sub>2,5</sub> 80%	ePM <sub>10</sub> 90%	ePM <sub>10</sub> 80%

Table 7: examples of filter classes meeting respective ODA/SUP categories requirements

office in a big city

## 2. OPTIMIZATION RECIRCULATION AIR FILTERS

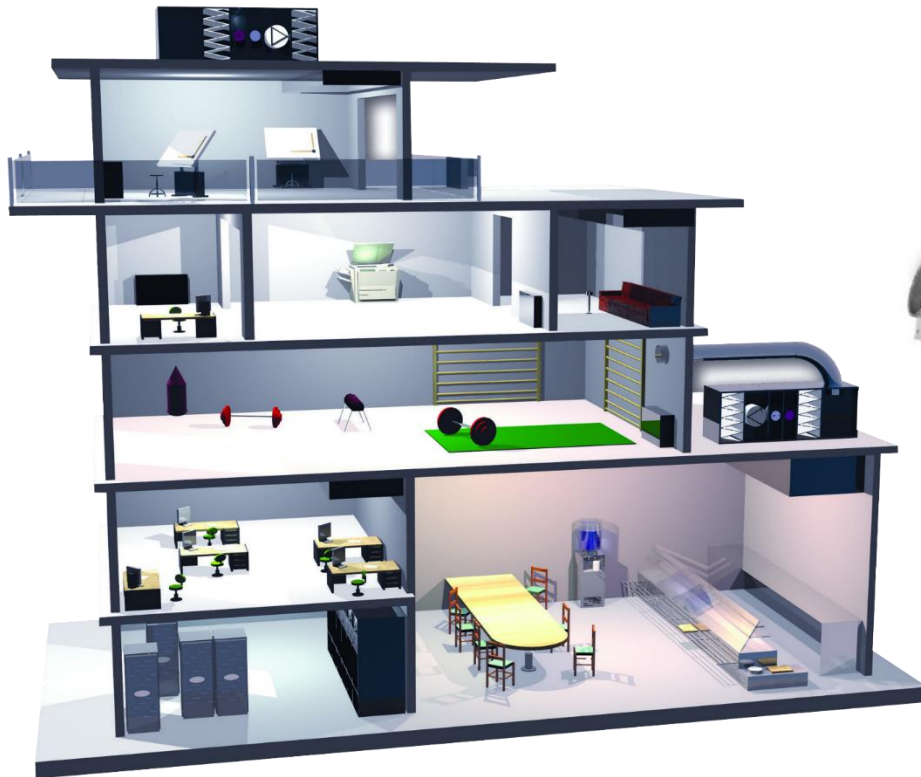
- **REHVA** recommends to turn off the recirculation air completely. If that is not possible, it is recommended to filter it with HEPA filters or at least with air filters ISO ePM1 80%.\*
- **VDMA:** „The most effective way is to operate the ventilation and air conditioning system entirely without recirculation during the epidemic. If recirculation is required, the efficiency of the filter levels used should be increased accordingly, if the system allows this “\*\*
- **Avoid unfiltered recirculation air!**
- **Filter recirculation air with HEPA filters (H13 or higher), where possible**
- **Use as a minimum ISO ePM1 80% filters in the recirculation air**
- **In case of secondary air (split units) a filter upgrade is often not possible!**

### 3. AIR CLEANERS WITH HEPA FILTERS

- **REHVA:** „Room air cleaners remove particles from the air, which provides a similar effect compared to the outdoor air ventilation. To be effective, air cleaners need to have HEPA filter efficiency, i.e., to have a HEPA filter as the last step.“\*
- **VDMA:** „Room air cleaners can be useful in specific situations. Room air cleaners effectively remove particles from the air, providing a similar effect to ventilation. To be effective in relation to COVID-19, air cleaners must have at least an effective HEPA filter.. “\*\*
- **The additional use of air cleaners with HEPA filters (H13 or higher) is recommended, whenever no sufficient quantity of outdoor air and no sufficiently filtered recirculation air or secondary air (e.g split units) can be provided!**



# 3. AIR CLEANERS WITH HEPA FILTERS



- **Mobile Air Cleaners**
- Plug-and-Play-System
- HEPA filter H14
- Offices, schools, hospitals, ...

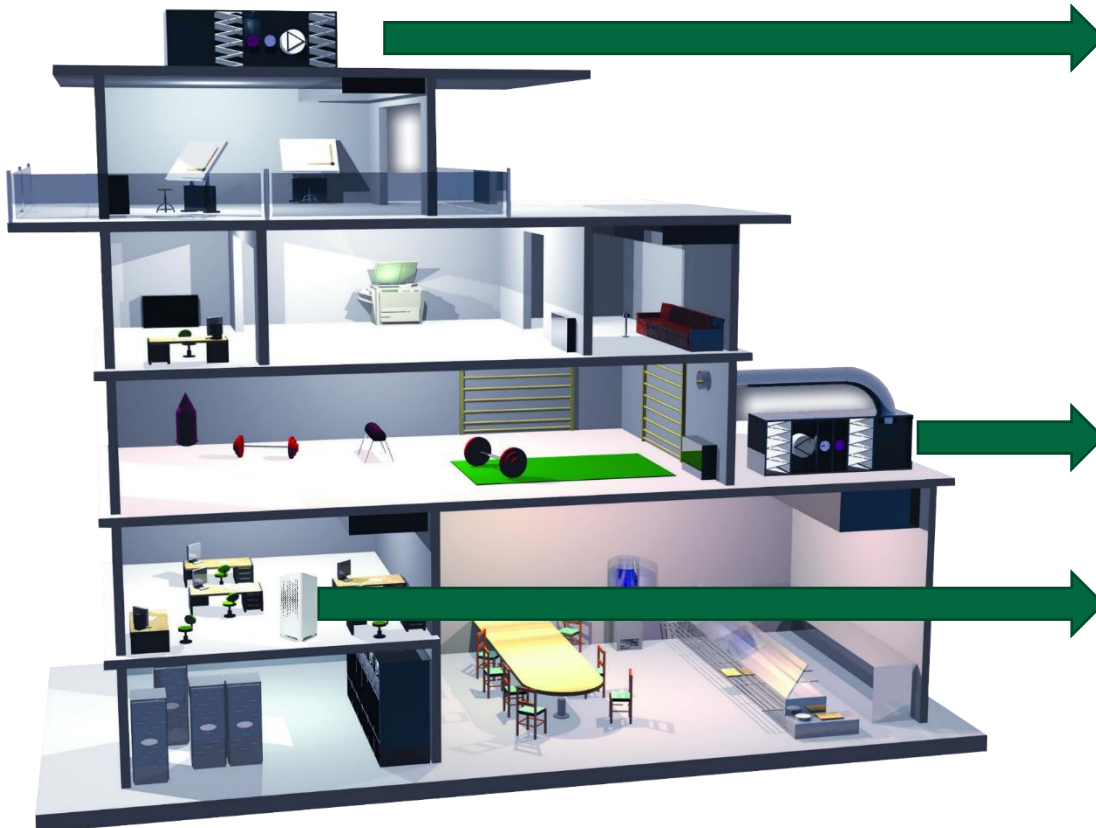


- **Concealed Air Cleaners**
- Hidden in the false ceiling
- Molecular and HEPA H14 filters
- Hospitals, production areas, offices...



- **Industrial Air Cleaners**
- Mobile or stationary
- Variable filter configurations
- Industrial production, fitness centers, ..

# SUMMARY: SOLUTIONS TO CLEAN AIR



Supply air: ePM1 filters (min. ePM1 50%, better ePM1 70% / ePM1 80%)



Upgrade recirculation air filters (HEPA/min. ePM1 80%)

HEPA Air Cleaners, wherever sufficient ventilation is difficult



# TKANK YOU

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