

## HEPA filtration

### Advantages

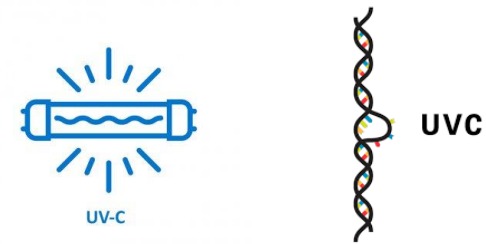
- Very effective at filtering out most particles from the air by multiple mechanisms; HEPA filters have an efficiency of 99,97% for particles of 0,3 microns
  - **It does not mean that HEPA doesn't capture below 0,3 microns**
  - HEPA is the least effective at particles near the Most penetrating particle size (MPPS) which is about 0,21 microns

### Limitations and disadvantages

- Stress on the ventilation system
- Needs powerful motors and consequently noisy fans or ventilation upgrades
- Frequent filter changes (maintenance) and associated costs
  - Filters can become clogged by filtering larger particles (hair, dust, etc.)
  - Clogged filters severely reduce air flow rate
- Filter disposal and associate costs
- Exposure risk to wide range of dangerous pathogens when changing filters

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<sup>1</sup> Except prions



## UV germicidal irradiation (UVGI)

### Advantages

- UVC at 254-265nm damages nucleic acids (DNA or RNA)
- All biological pathogens<sup>1</sup> contain DNA or RNA, **thus they are all vulnerable to UVC.**
- UVC does not discriminate between particle size; it is as effective on large particles as it is on small particles
- The **UV dose** is key. **Dose is a matter of UV intensity multiplied by exposure time.**
- **Low maintenance;** Only needs to change the lightbulb, as UVC intensity diminishes over time
- Negligible pressure drop does not impair air flow

### Limitations and disadvantages

- Needs to be specified for each application to make sure that appropriate UVC dosage is provided for disinfection; UVC dose required is not the same for all pathogens
  - For example, mold spores can be 10000x more resistant to UVC than a naked virus
- Does not remove particulates and dust; **However, it will effectively disinfect these particulates**
- Need to be careful to prevent human exposure to UVC. **Standalone units have safety features, and in-duct units minimize the risk with safety cut off switch.**