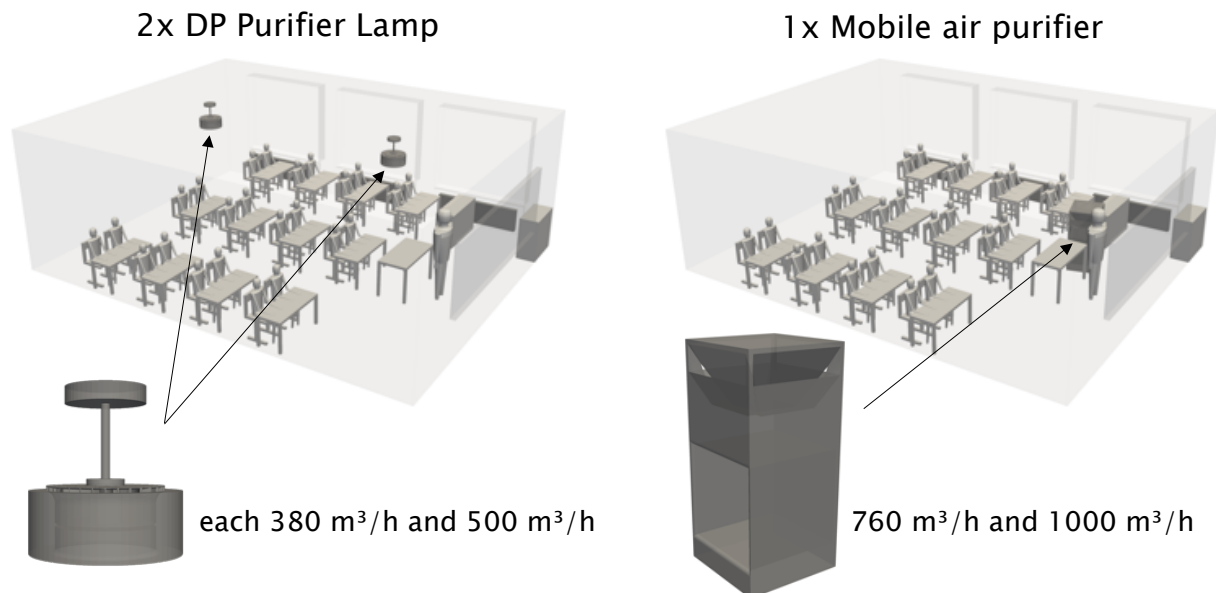


Classroom air purifier DP Purifier Lamp and Mobile Air Purifier

Description

- Comparison of the DP Purifier Lamp with a mobile air purifier
- Classroom with 24 students and one teacher (Floor space: 60m², Height: 3.0m)
- Heat load 2500 W
- Temperature of the enclosing surfaces 20°C
- Recirculation air volume flow 760 m³/h und 1000 m³/h
- Pollutant source homogeneously distributed in the room
- Ideal airborne particles
- Separation efficiency 100 %

Model



Definitions

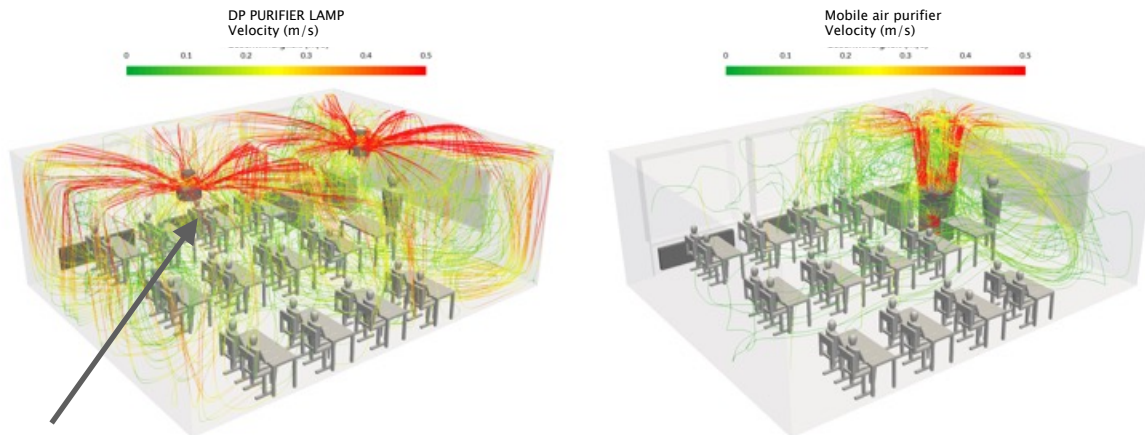
$$\text{Draft risk} = (34 - t) \cdot (v - 0,05)^{0,62} \cdot (0,37 \cdot v \cdot Tu + 3,14)$$

t: Temperatur in °C, v: Velocity in m/s, Tu: Turbulence level in %

Draught risk in % dissatisfied due to drafts, see DIN EN ISO 7730

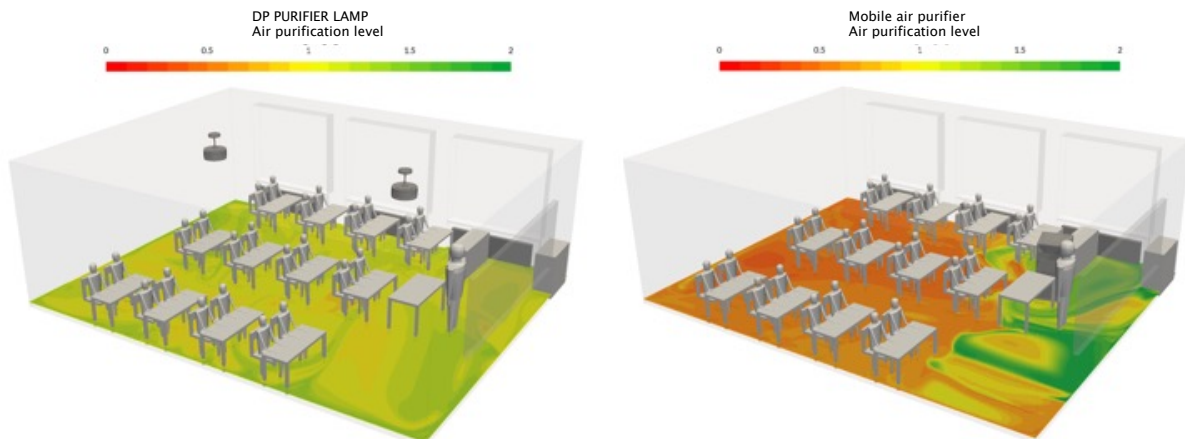
- Air purification level = $\frac{\text{Konzentration in der Exhaust air}}{\text{Room concentration}}$
 - The degree of air purification is the measure of the efficiency of air exchange
 - Air purification level 0: = no effective effect of air purification, Areas undersupplied with "purified air"
 - Air purification level 1: = effective effect of air exchange, in comparison, like ideal mixed ventilation
 - Air purification level 1.5: = 50% higher effective effect of air exchange compared to design air exchange
- Ideal mixed ventilation: The average age of the air in the room and the average concentration of the substances in the air are the same at each point in the room.

Results: Streamlines | 760 m³/h Recirculating air

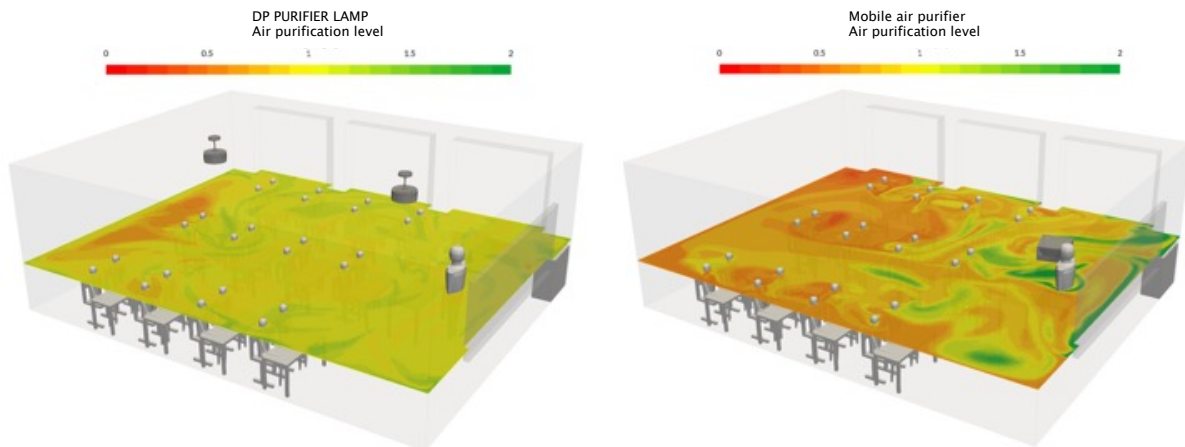


Basically, a very nice mixing. High velocities occur where beams combine. This limits the volume flow per lamp. With a higher volume flow, there is a risk that the combined beams will penetrate into the occupied zone, where there will be complaints about drafts. If a higher volume flow is required, the use

Air purification level | 1000 m³/h Recirculating air | 0,1m Heigh

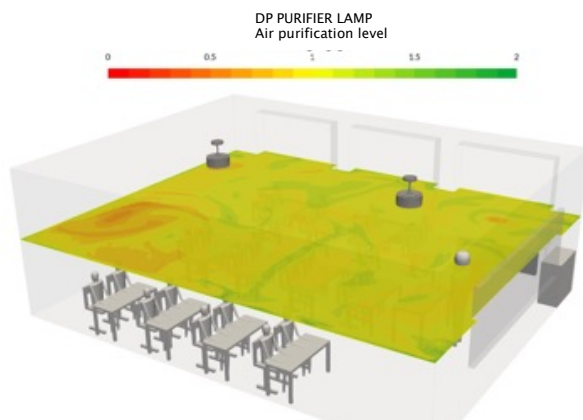


Air purification level | 1000 m³/h Recirculating air | 1m Heigh

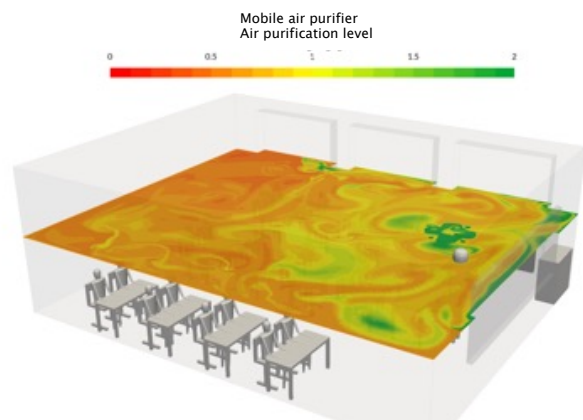


With two lamps, a very homogeneous air purification can be achieved in the breathing height of the students.

Air purification level | 1000 m³/h Recirculating air | 1.6m Height



Even at the breathing height of the teacher, there is a very homogeneous air purification effect.



Even when standing 50 centimeters away from the mobile air purifier, the teacher is **not** within the zone of clean, breathable air.

Conclusion

- There is a tension between high air purification and low air velocity, so a compromise must be found.
- Uniform air introduction over the room area results in higher air purification, with the same design volume flow.
- DP Purifier Lamp
 - better more homogeneous air filtration in the occupied zone
 - higher average air purification level at breathing height
 - no space obstruction due to the place of installation of the device
- Mobile air purifier
 - lower risk of drafts
 - locally large differences in the air purification effect