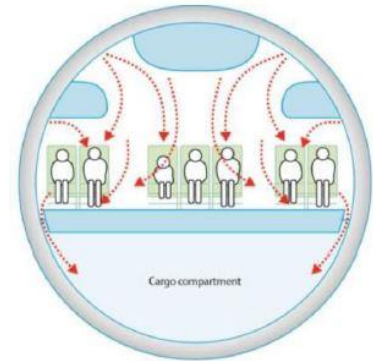


On-board Safety: Cabin Ventilation and Compulsory Use of Masks (6/2020)

In order to ensure health safety for air travel in spite of the Covid-19 pandemic, appropriate safety measures have been established in the aviation sector. These include, in particular, additional precautionary and hygiene regulations, firmly assigned seats in order to identify passengers, and procedures for handling suspected cases of infection. At airports and onboard aircraft, the obligation to wear a mouth-nose-protection also applies. Furthermore, the cabin air is cleaned by means of constant air exchange and high-quality HEPA filters.

1. Air Exchange

High-rate air turnover maintains a low virus density: half of the cabin air consists of freshly supplied outside air (complete replacement within 3 minutes), and half of re-circulated air (complete replacement within 2 to 3 minutes). The air is pumped at a speed of 1 m/s through the ceiling into the cabin and vented off below the window seats. In this way, horizontal airflows are minimized. The virologist Prof. Kekulé refers to this as quasi vertical curtains that prevent air containing infected particles from being circulated in the aircraft. Currently, the air conditioning is always in operation while passengers are on board - even while on ground.



2. HEPA Filters

Furthermore, aircraft fleets are equipped with HEPA (High-Efficiency Particulate Air) filters. Before being fed into the cabin, the re-circulated air passes through those special high-performance particulate filters. Viruses, bacteria, fungi, and dust can thus be removed from the air by 99.9 %, which corresponds to the filtration efficiency of filters in a clinical operating room. SARS-CoV-2 has a size of 60-160 nanometers. It is assumed that the virus is transmitted mainly via droplets and aerosols with which it is released by infected subjects. The HEPA filters filter the viral as well as the larger droplets and aerosols, as these are either smaller or larger than the critical penetration size of 300 nanometers (MPPS = Most Penetrating Particle Size): For larger particles, the filters function like a sieve. In the case of smaller particles, the further physical properties of the filters take effect.

3. Compulsory Use of Masks

In addition to the cabin ventilation and since social distancing is not feasible on board, passengers are required to carry their own mouth-nose cover and wear it throughout their entire stay on board (compulsory use of masks). Given the extremely clean cabin air, simple so-called community masks, which are also required in other modes of transport, provide sufficient emission protection (e.g. when coughing). The masks should not be equipped with exhalation valves.

In conclusion:

Virologists and engineers have confirmed the effectiveness of the measures as well as the air conditioning and filter technology. The Robert Koch Institute has only recently reaffirmed in a late discussion that, with the implementation of above-mentioned measures, the aviation sector represents the mode of transport with the very lowest risk of infection. Evidence of this is further provided by various scientific papers¹.

¹ CMAJ, APR 2020, Vol. 192, No. 15 (<https://www.cmaj.ca/content/192/15/E410>)
PNAS, APR 2018, Vol. 115, No. 14 (<https://www.pnas.org/content/115/14/3623>)
EID, AUG 2004, Vol. 10, No. 8 (https://wwwnc.cdc.gov/eid/article/10/8/04-0093_article)