

## CUSTOMER INFORMATION

micronAir®

### CABIN AIR FILTER PROTECTION GUIDELINES AGAINST COVID-19 HEALTH THREATS

Although conditions are changing on a daily basis, some aspects will apply no matter how the current pandemic develops. To begin with, the WHO has declared this coronavirus<sup>1</sup> a pandemic, meaning that it is present on all continents. Whatever the final outcome, its consequences are expected to leave a lasting imprint on almost all aspects of life worldwide.

Second, the mode of transmission has been confirmed as primarily through close human contact via respiratory droplets generated by breathing and, much more intensively, by sneezing and coughing. As a result, traveling with other people in vehicles presents an especially potent risk. It is strongly recommended to take active measures to prevent the spread of infection inside vehicles. One effective method is to install a high-efficiency cabin air filter.

#### Understanding coronaviruses

Coronaviruses like SARS CoV-2 got their name from the crown-like spikes on their surface. “Corona” is borrowed from the Latin word for garland or crown. These viruses are spherical particles of around 120 nm in diameter and exist as aerosol droplets. Although there are optimistic rumors in circulation about them dying as soon as the weather gets warmer or more humid, this is not true. The proof of that is their current proliferation in the warm and humid climates of Asia and South America, and the hot and dry Middle East. The inconvenient truth is that coronaviruses are very stable across a wide band of what we would regard as normal living conditions. Significant reduction in virus activity is only seen in extreme conditions, with temperatures above 38 °C and relative humidity in excess of 95 %.

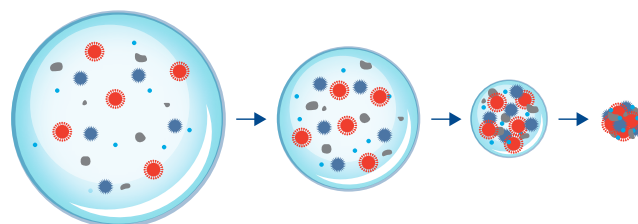
#### Passing on the infection

Coronaviruses are present in droplets emitted by infected people when they breathe, cough or sneeze. Many different studies showed, that the dimension of these aerosol particles varies widely depending on the size of the person, and can have a diameter of anything from 0.05 µm to 16 µm.

#### The coronavirus on surfaces

- The tiniest particles remain suspended in the air for a long time and are easily inhaled, while larger particles settle on surfaces and are passed on through touch.
- The current COVID-19 virus seems to be behaving like other virus types and may stay volatile on surfaces for anything from a few hours to several days.
- Viruses that have settled on surfaces can be stirred up to create new aerosols by the wind, by wiping or simply as a result of the vibrations caused by a vehicle in motion.
- Even in relatively stable environments, the cycle of settling and renewed disturbance will continue for as long as the microbial virus droplets remain active.
- The virus seems to survive longest on plastic surfaces – anything from 7–72 hours.
- In enclosed spaces such as vehicle interiors, air should be either directly emitted into the environment or filtered by a high-efficiency particulate air (HEPA) filter before recirculation.

<sup>1</sup> A reliable general overview of the current COVID-19 virus can be found here: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus>

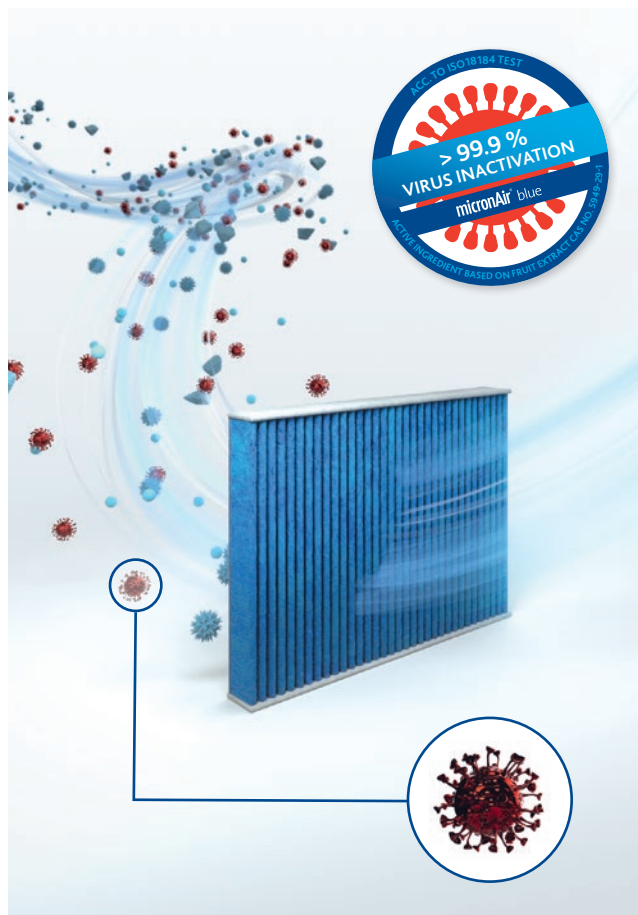


Evaporation of a liquid expelled droplet to a droplet-nucleus

However, even the largest droplets will reduce in size to below 1.0 µm almost immediately through evaporation, forming what are called “droplet nuclei”. These tiny particles can be easily absorbed by breathing and directly enter the lung’s alveoli, thus passing on the infection.

### COVID-19 and cabin air filtration

The current COVID-19 coronavirus is passed between humans in the form of aerosol particles. Although the size of these particles can vary widely depending on the person, they mostly fall within the range of 0.05 µm to 16 µm. However, the majority have been shown to be between 1.0–4.0 µm and all include a high proportion of submicron aerosol particles. Because these can be easily inhaled and absorbed by the lungs, it makes them particularly dangerous to human health. Inside vehicles, even the largest emitted virus particles will evaporate to submicron size in less than a second. This makes it vital that cabin air filters are effective right down to the 0.05 µm particle size.



*micronAir® blue with antiviral surface protection by means of a functional filter layer based on fruit extract (active ingredient CAS-Nr. 5949-29-1) for use in air handling/air conditioning systems. Safe bacteriostatic and fungistatic surface protection against a multitude of gram-positive and gram-negative bacteria, yeast and fungi as well as proven antiviral properties (Influenzavirus H1N1 and Coronavirus HCoV 229E) according to ISO 18184.*

Join us in fighting the spread of COVID-19 to protect your customers. Contact your regular micronAir® partner or email

@ [IAM@freudenberg-filter.com](mailto:IAM@freudenberg-filter.com)

### Particle behavior inside the vehicle

Contaminated particles inside a vehicle cabin rarely pass directly into the air filtration system. Initially, they are much more likely to settle on and around the air vents or on the upholstery and other surfaces. They remain actively infectious in such places for anything from a few hours to several days. At the same time, even if they are not passed on by touching, they will become airborne again in regular cycles as a result of wind disturbance, changing humidity levels, wiping or simply the vibration of the vehicle. In terms of air purity, it is vital that the cabin air filters are capable of separating submicron particles. Even if the infected droplets emitted by the vehicle occupants are in the larger size range, the effects of evaporation mean that the droplet sizes that eventually reach the air filter will be much smaller. For this reason, it is preferable to use the vehicle’s fresh air HVAC mode to ensure that the cabin is supplied with plentiful fresh air. This will dilute the particle concentration and reduce stress on the filter as well as rapidly evacuating virus droplets. If recirculation mode is preferred, it is essential to use the most efficient cabin air filter available to minimize the risk of transmitting the infection. In all cases, cabin air filters should currently be changed even more often than usual to ensure maximum filter efficiency and thus protection against viruses.

### micronAir® testing update

We are currently conducting further tests on our filters at several institutes in China and Europe to validate the positive anti-virus effect against various virus types (incl. coronaviruses like COVID-19). Initial results have been extremely encouraging. We will release details as soon as the scientific evidence has been clearly established and peer reviewed.

**5 micronAir® recommendations for best possible COVID-19 protection:**

1. Use “fresh air mode” when driving whenever possible
2. Install high-efficiency cabin air filters
3. Install cabin air filters with the highest possible micro-fiber content
4. Focus on stable lifetime efficiencies to avoid efficiency degradation during use
5. Install micronAir® blue cabin air filters with natural fruit extracts – these have already been shown to inactivate virtually 100 % of viruses on the surface of the filtration media (e.g. ISO18184 test showed > 99.9 % virus reduction rate for the H1N1 and HCoV-229E virus)

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