Resp-Aer-Meter

Respiratory Aerosol Meter – Fastest detection of particles in breathing air in the size range of viruses like Covid-19

Identification of potentially infectious persons (superspreaders) by fast and easy measurement of solid particle content in the exhaled air

Description

Viruses such as Covid-19 or flu viruses spread as aerosols and infect other people through the respiratory tract.

Superspreaders or superemitters are people who exhale a particularly high number of pathogens. They are therefore considered to be particularly infectious. The Resp-Aer-Meter helps to identify superspreaders and initiate appropriate safety measures.
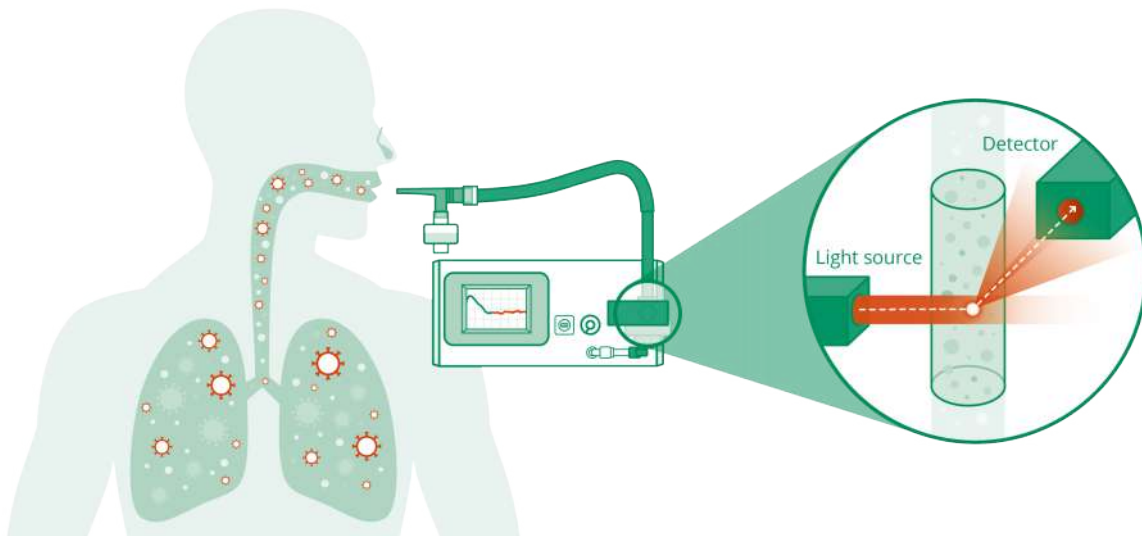
Function:

Fig. 1: Resp-Aer-Meter / How it works

To analyze the risk of infection, the test person inhales and exhales into the measuring device for approx. 30 s.

The exhaled air is sucked in by the Resp-Aer-Meter. Before the measurement, the aspirated particles are conditioned in the aerosol conditioning area in order to differentiate between pure droplets (e.g. spit or water droplets) and potentially infectious particles (bacteria, viruses = solid).

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To measure the particle size and concentration, the Resp-Aer-Meter works with the white light LED sensor of the Fidas® system, which has proven itself in environmental measurements. Even the smallest particles from 145 nm are recorded individually and their size and number are detected online.
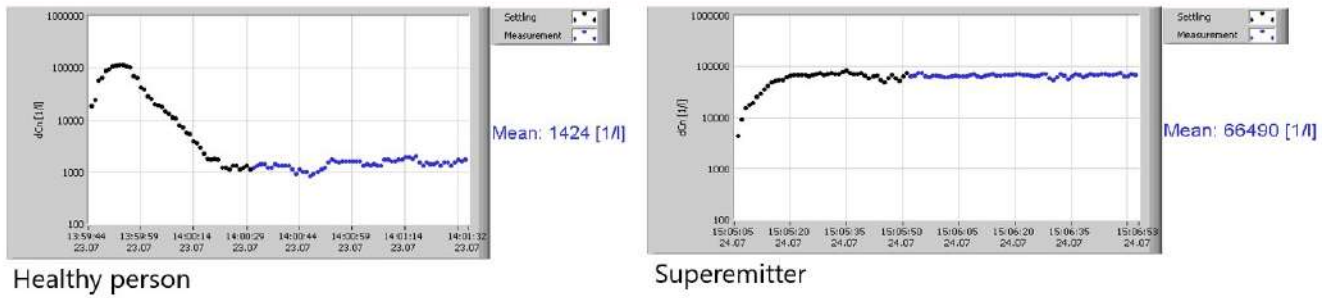

Fig. 2: Resp-Aer-Meter / Comparison of aerosols in exhaled air over time

People with low (normal) particle emissions in their exhaled air pose only a low risk of infection for their environment. The so-called superspreaders may exhale up to 100 times more particles due to the virus attack and are therefore a high risk of infection for their environment.
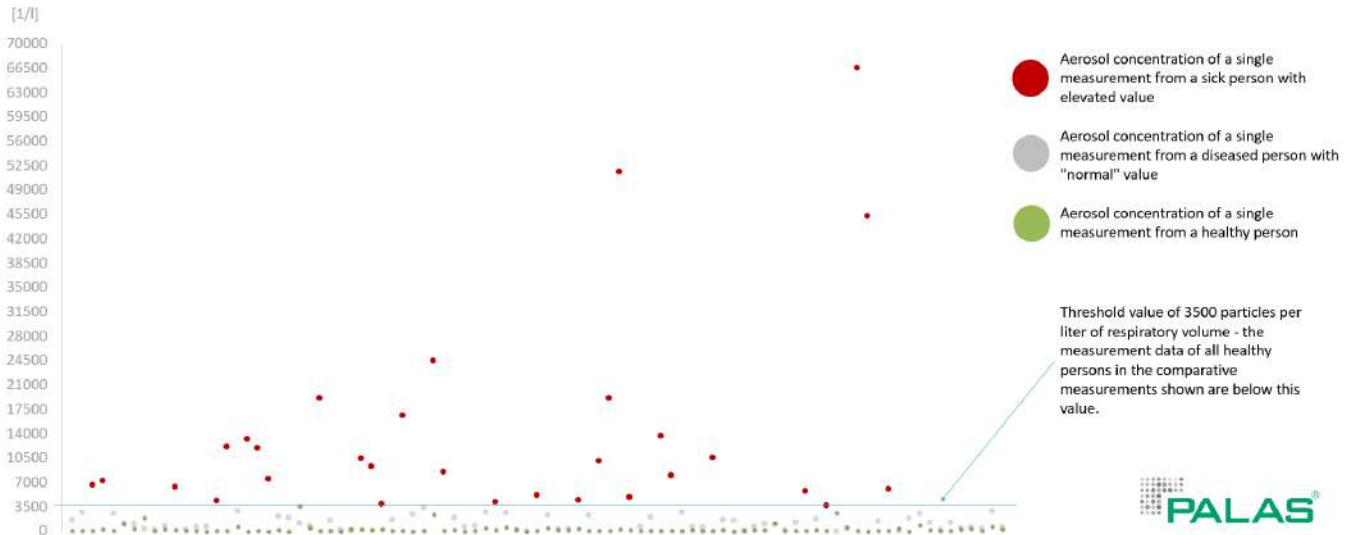

Fig. 3: Comparison of aerosol concentrations of persons suffering from respiratory infections with measured data of healthy persons

In addition, many of the exhaled particles are smaller than usual in normal air. In the case of Covid-19 it is about especially small viruses (approx. 150 to 400 nm) of superemitters. Accordingly, they can be distributed more easily in the area.

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Aerosols in exhaled air (distribution)
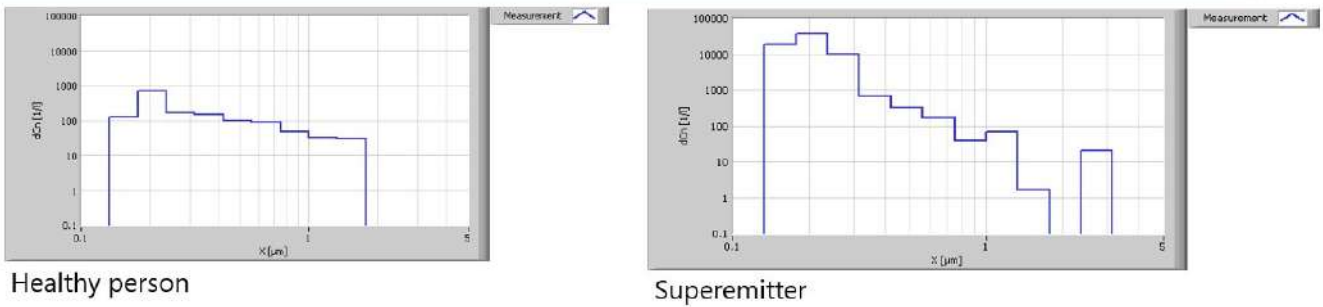

Healthy person

Superemitter

Fig. 4: Resp-Aer-Meter / Comparison of aerosols in exhaled air (distribution)

More about the spread of virus-carrying aerosols by superspreaders can be found here [1] .

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[1] Exhaled aerosol increases with COVID-19 infection, age, and obesity: https://www.pnas.org/content/118/8/e2021830118

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Benefits

- So-called "superemitters" can be identified in 30s thanks to a high number of particles

- Fast differentiation between infectious and less infectious Covid-19 carriers

- Measurement of the aerosol concentration and aerosol size in exhaled air

- Detection of particles from 145 nm to 10 μm

- Highest resolution, especially in the virus size range from approx. 145 nm to 1 μm

- Immediate evaluation and documentation of the measurement result

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Datasheet

Parameter	Description
Measurement range (size)	0.145 -10 μm
Measuring principle	Optical light-scattering
Measurement range (number C_N)	0 – 20,000 particles/cm³
Volume flow	9.5 l/min
Data acquisition	Digital, 20 MHz processor, 256 raw data channels
Power consumption	Approx. 200 W
User interface	Touchscreen, 800 • 480 pixel, 7" (17.78 cm)

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Applications

Detection of potential superemitters (Covid-19, flu virus)

- in industry, e.g. meat processing, automotive, chemistry

- in airports, train stations, public buildings

- at events such as trade fairs and seminars

- in hospitals and nursing homes