

Test Report

Spatial Impact of the Air Purification Unit AC 50 Arpack GmbH

Client: Mark Arinstein Maschinen und Anlagen GmbH
Gewerbestraße 5a
15366 Hoppegarten

Contractor: SGS INSTITUT FRESENIUS GmbH
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Scope of the report: 7 pages

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1 Task and procedure

Through numerous studies by various institutes and research institutions, it is now considered certain that the aerosol-induced transmission of the coronavirus indoors plays an essential role in the current pandemic. The reason for this is that we release aerosols with our exhaled air and when we speak. In infected people, these aerosols are contaminated with viruses at different concentration levels and can be absorbed by other people in the room..

By using air purification units, the risk of infection is reduced as these units decrease the concentration of aerosols or sterilize the air. In which dimension these effects occur depends on the interior and the placement of the air purification unit, as well as on the quality of the air purification unit.

Against this background, SGS Institut Fresenius GmbH was commissioned to investigate the spatial effect of the AC 50 air purifier from Arpack GmbH. The test parameter was the achievement of a Log-1 reduction of the aerosol concentration within a period of 30 min. The test was carried out at the Hotel Bristol Berlin, Kurfürstendamm 27 in 10719 Berlin.

2 General information on the project process

2.1 Client

Mark Arinstein Maschinen und Anlagen GmbH
Gewerbestraße 5a
15366 Hoppegarten

Contact person:

Mr. Reich, Tel. No. 030 8095200-55

2.2 Place of investigation

Hotel Bristol
Zimmer 537
Kurfürstendamm 27
10719 Berlin

2.3 Implementing personell

Mr. Dipl. Ing. Wolfgang Schreier

2.4 Investigation period

20.01.2022

2.5 Reporting

SGS INSTITUT FRESENIUS GmbH
Im Paesch 1a
54340 Longuich

3 Test program and applied measuring instruments

3.1 Description of the test program

The test was realized under real conditions in room number 537 in the Hotel Bristol Berlin. The examination room has a volume of about 42 m³ with the dimensions W * L * H 4.31 * 3.51 * 2.77m.

At the beginning of the measurements, the background concentration of the particle number was measured at 2 measuring points in the room. Subsequently, the aerosol number concentration was enriched to about 10 times the background concentration by means of an aerosol generator. After reaching this concentration and complete air mixing, the aerosol dosing was switched off and the air purifier was put into operation. During the operation of the air purifier, a continuous measurement of the aerosol concentration was carried out at 2 measuring points in the room. On the basis of the decay curve determined in this way, the effectiveness of the air purifier in the room can be evaluated.

3.2 Measuring instruments

As part of the study, the following measuring instruments were used:

Parameter: Aerosol concentration
 Measurement method: Laser optical measurement technique
 Gauge: AQGuard (Palas)
 Measuring range: The aerosol spectrometer operates with a volume flow of 1.4 l/min and simultaneously measures the particle number concentration in the size range from 0.18 to 100 µm with high temporal resolution

Test aerosol: DEHS
 Aerosol generator: Palas PAG 1000
 Volume flow: Approx. 3 l/min
 Aerosol size: 0,02 – 6 µm

Parameter: Non-directional room-air velocity
 Measurement method: Thermal anemometer
 Gauge: Testo 400 with turbulence intensity probe
 Measuring range: 0,05 – 5 m/s

Parameter: Humidity and temperature
 Measurement method: Humidity: capacitive sensor
 Temperature: NiCr-Ni Thermocouple
 Gauge: Testo 400
 Measuring range: Humidity: 5 – 95%
 Temperature: -40 bis 150 °C

4 Test item

The air purifiers examined were the following models:

Manufacturer: Arpack GmbH
 Type: AC50
 Volume flow: 300 m³/h
 Purification principle: Filtration by photocatalytically activated quartz glass element in connection with UV-A radiation

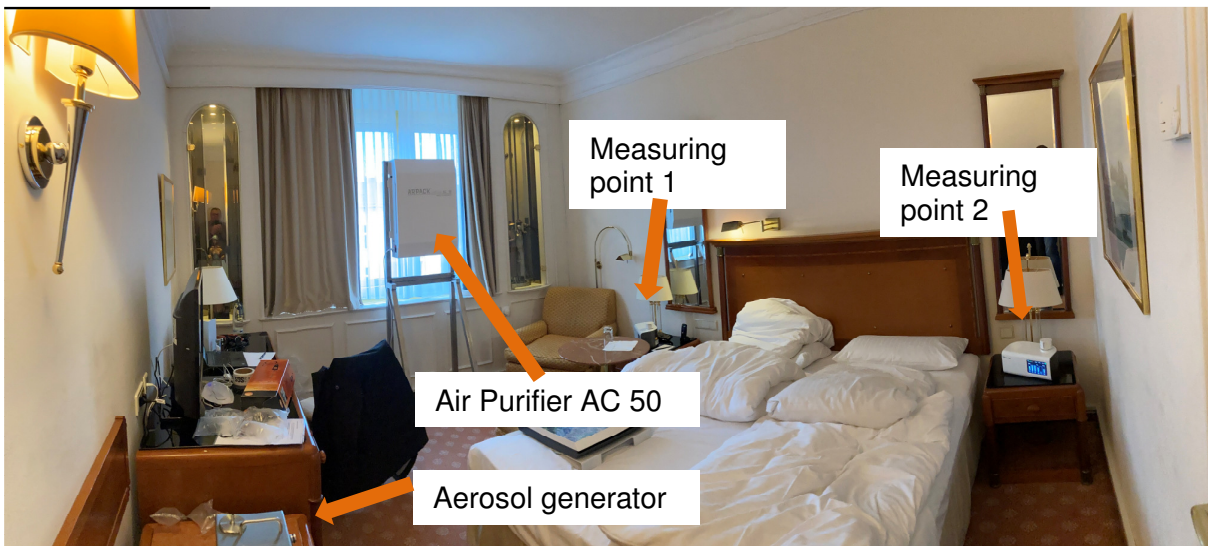


Figure 1: Measurement setup with air purifier AC 50

5 Presentation of the measurement results

Background concentration before measuring start at MP 1: 55 P/cm³

Background concentration before measuring start at MP 2: 58 P/cm³

Measuring points (MP)	Measured values start		Measured values after 30 min		Measured values after 60 min	
	C [p/cm ³]	C _{rel.} [%]	C [p/cm ³]	C _{rel.} [%]	C [p/cm ³]	C _{rel.} [%]
1	597	100	168	28,2	45	7,5
2	530	100	157	29,8	45	8,5

Tab. 1: Results AC 50 in operation with 300 m³/h in room volume 42 m³

Air purifier AC 50

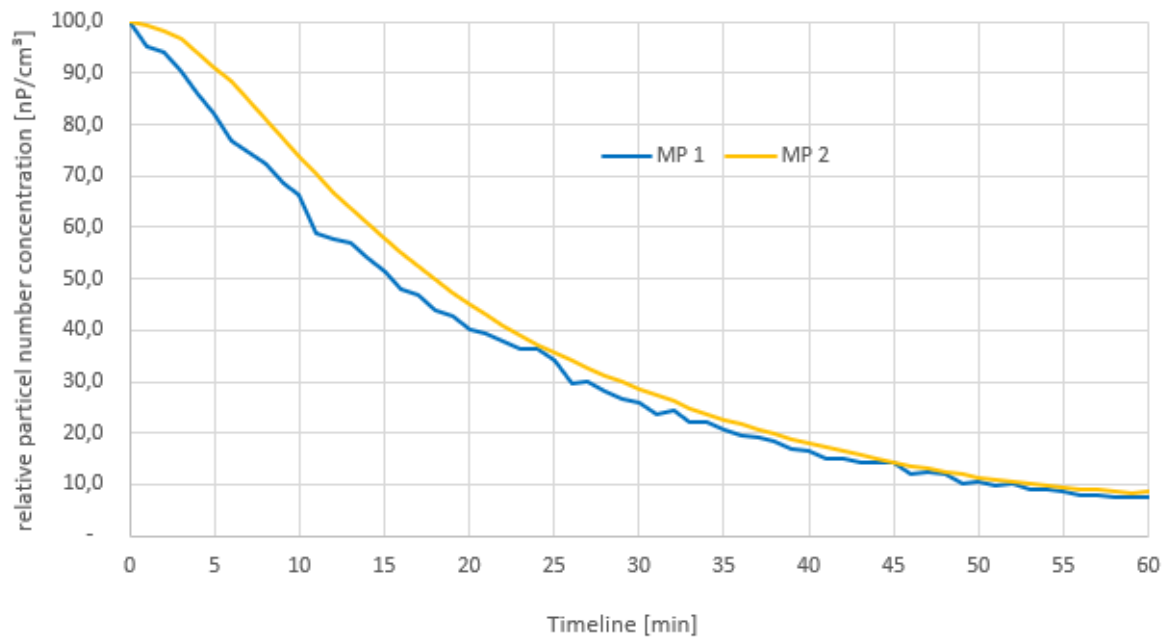




Figure 2: Decay curve AC 50 in operation with 300 m³/h in room volume 42 m³

Longuich, 02.02.2022


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