

Performance Test On a Portable Room Air Cleaner



Model Jafanda JF1500

TEST REPORT ECA 230602-RL6

Mainleus, July 12th, 2023

According ECARF Criteria for allergy-friendly Air Purifiers
(January 2023)

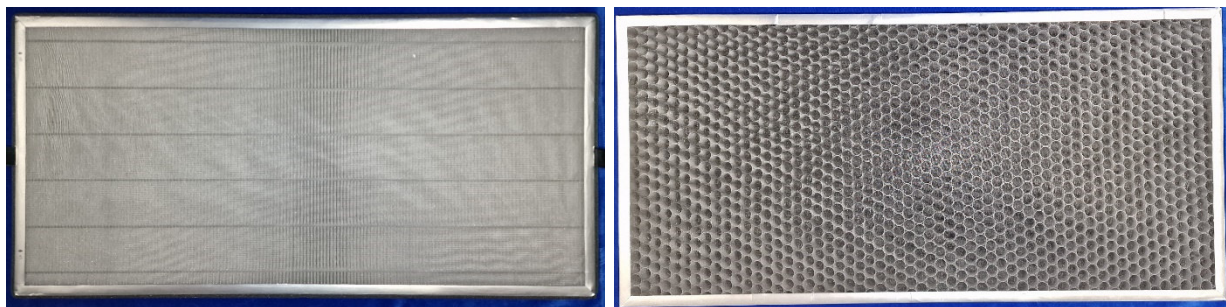
initiated by:

ECARF Institute GmbH

1. Objectives and Test Set-up

On a portable room air cleaner with installed filter system the particle filtration performance against Potassium Chloride Particles and other ECARF criteria had to be tested according to the test procedure below. The general test procedure of this one-pass efficiency test follows state of the art techniques and methods described e.g. in ISO 11155 or EN1822.

- a) Test requested by: ECARF Institute GmbH
b) Test specimen / Construction: Air purifier for home application (see pictures)
The installed filter element system consists of a pre filter grid and a filter element with pleated filter media and a honeycomb like adsorber media layer, Filter 1928B



- c) Model/Parts ID: Jafanda JF1500
d) Flow Direction: Air inlet on the front and back side of the device, air outlet on the left and right side of the purifier (see picture of device)
e) Label/Identification: No Label
f) Dimensions Total: ca. 400 x 400 x 885 mm (L-B-H)
g) Samples were received on: June 13th, 2023
h) Test has been performed on: July 11th to 12th, 2023



Test Procedure

| No. | Test | fiatec-No.: ECA 230602- | RL6 |
|-----|---|-------------------------|-----|
| 1 | Conditioning in Climate Chamber | | x |
| 2a | Efficiency Test Room Air Cleaner, SMPS, 0,05 - 0,5 µm, highest blower level | | x |
| 2b | Efficiency Test Room Air Cleaner, OPC, 0,5 - 5 µm, highest blower level | | x |
| 3 | Odor test following VDA 270 | | x |
| 4 | Temperature Diff. In-/Outlet | | x |
| 5 | Ozone Test Room Air Cleaner | | |

Test Conditions (Efficiency test)

| | |
|----------------------|---|
| Air Flow: | Air purifier internal blower ca. 1100 m ³ /h on highest air blower level, with filter element |
| Temperature: | 24 ± 1 °C |
| Relative Humidity: | ca. 50 % |
| Test Aerosol: | KCl, 10 % Solution |
| Particle Size Range: | 0,05 – 0,52 µm with SMPS and 0,5 – 5,0 µm with OPC |
| Particle Counter: | SMPS (Scanning Mobility Particle Sizer, TSI Inc.) and OPC (Optical Particle Counter, TSI Inc.) |

Preconditioning of installed filter elements

24 hours in a climate chamber with 50 °C and 95 % humidity

Airflow

The air flow was measured with an anemometer in an adapted air outlet tube with 235 mm diameter. This measurement principle has an accuracy ca. ± 5 %.

Particle Size and generation

The particle size range was chosen to measure the efficiency in the most penetration particle size range. The efficiency for larger particles then in the measured range can expected to be higher.

For determination of fractional efficiencies in the particle size range of 0,05 – 0,5 µm a SMPS (Scanning Mobility Particle Sizer, TSI Inc.) and in the particle size range of 0,5 – 5,0 µm an OPC (Optical Particle Counter, TSI Inc.) were used as detectors.

The potassium chloride aerosol was generated by an atomizer AGK 2000 (PALAS GmbH). The test aerosol was not electrostatically neutralized.

Test Setup

The air purifier was installed in a chamber with an air inlet tube and aerosol injection system installed on the front side of the chamber. The outlet of the purified air was adapted to a 235 mm diameter outlet tube. The air inlet and outlet tubes of the test chamber were open to atmosphere to allow the blower of the test device to suck and blow the air without restriction from ambient air / ambient pressure. To prevent differences in the aerosol concentration of 2 sampling positions (before and after test device) due to different air flow profiles only the aerosol sampling position at the clean air side in the outlet tube was used. The upstream concentration of the test aerosol was measured without installed filter element and corrected by the higher air flow.



2. Results

2.1 Air Flow

Highest air blower level with installed filter elements: ca. 1100 m³/h

Lowest air blower level with filter element: ca. 190 m³/h

2.2 Particle Filtration

The detailed results of the efficiency test are reported in the attachment.

The fractional filter efficiency graphs were derived from a total of minimum six measurements of particle size distributions. Three measurements were taken upstream (without filter elements as described above) and three were taken downstream of the air purifier with filter elements. The figures and the tables in the attachment show the averaged values of the three efficiency measurements as well as the total scattering range for each size channel.

Summary of the Efficiency results:

| Particle Size (mobility diameter) [µm] | Complete Device at highest air speed grade [%] |
|--|--|
| 0,1 | 99,9 |
| 0,3 | 99,9 |
| 0,5 | 99,9 |
| (geometric diameter) [µm] | |
| 0,5 | 99,9 |
| 1,0 | 99,9 |
| 2,0 | 99,9 |
| 3,0 | >99,9 |
| 5,0 | >99,9 |

Comment: In an additional test we measured the particle size distribution of the room (ambient air, relative low concentration) and the outlet concentration without particle generator on and without installed filter elements.

As we did not find a noticeable difference it can be assumed that the blower motor does not produce particles due to abrasion.

Specification ECARF

Minimum Efficiency at the most penetrating particle size ($\geq 0,1 \leq 0,3 \mu\text{m}$): $\geq 85 \%$

Collection Efficiency at particle size at $0,5 \mu\text{m}$ (Bacteria, fine dust): $\geq 90 \%$

Collection Efficiency at particle size $\geq 3 \mu\text{m}$ (mold spores, pollen): $\geq 95 \%$

The specification criteria is fulfilled.



2.3 Odor Assessment following VDA 270

The air purifier was placed on the floor in a room with neutral odor and operated at the following setting modes:

Blower at maximum speed, operation time > 30 min.

A test panel of three persons evaluated the odor of outlet air of the purifier by assigning grades on a scale from one to six: one being odorless and six representing unbearable odor.

| | Grade |
|------------------|-------------------|
| Person 1 / 2 / 3 | 1 / 1 / 1 |
| Mean Value | 1 |
| | (not perceptible) |

The specification criteria is fulfilled.

2.4 Temperature difference (room temperature compared to exhaust air)

The temperature was measured with a calibrated Humidity and Temperature sensor (Vaisala HMP75).

Operating time of the blower before measurement: ca. 30 - 40 min, measured on minimum 3 positions at in-and outlet

It should be considered that the uncertainty of the temperature measurement due to different air velocities and small changes of the location in addition to the uncertainty of the sensor is estimated with 0,1 - 0,2 °C.

A noticeable difference between ambient / inlet air and outlet air was not found.

Air inlet: 23,7 °C

Air outlet: 23,7 °C

Specification ECARF

Temperature Difference: < 0,3 °C

The specification criteria is fulfilled.



2.5 Ozone Emission

An Ozone test was not performed as the device do not use any potential ozone producing components according manufacturer. (and nothing visible on in the manual or in accessible openings)

Steffan Trnetschek
(Managing Director)

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Attachment 1 to Test Report ECA 230602-RL6

Summary of Test Results for Sample

JF1500

fiatec-No.: ECA 230602-RL6

1. Particle Collection Efficiency

| | | | |
|---------------|-----|-------------------|--------------|
| Test Aerosol: | KCl | Particle Counter: | TSI OPC 3330 |
|---------------|-----|-------------------|--------------|

| Air Flow: 1100 m ³ | | |
|-------------------------------|------------------------|----------------------------|
| KCl Efficiency (OPC) | | |
| Particle Size (optical) | η_{mean}^* | Δ_{max}^{**} |
| [μm] | [%] | [%] |
| 0,62 | 99,9 | 0,0 |
| 0,84 | 99,9 | 0,0 |
| 1,14 | 99,9 | 0,1 |
| 1,44 | 99,9 | 0,0 |
| 1,88 | 99,9 | 0,1 |
| 2,57 | >99,9 | 0,1 |
| 3,46 | 99,9 | 0,1 |
| 4,69 | >99,9 | 0,0 |

| | | | |
|---------------|-----|-------------------|------|
| Test Aerosol: | KCl | Particle Counter: | SMPS |
|---------------|-----|-------------------|------|

| Air Flow: 1100 m ³ | | |
|---|------------------------|----------------------------|
| KCl Efficiency (SMPS) | | |
| Particle Size (mobility diameter) | η_{mean}^* | Δ_{max}^{**} |
| [μm] | [%] | [%] |
| 0,029 | 99,3 | 0,8 |
| 0,034 | 99,2 | 0,5 |
| 0,039 | 99,6 | 0,2 |
| 0,045 | 99,6 | 0,4 |
| 0,052 | 99,8 | 0,1 |
| 0,060 | 99,7 | 0,1 |
| 0,070 | 99,8 | 0,1 |
| 0,081 | 99,9 | 0,1 |
| 0,093 | 99,9 | 0,0 |
| 0,108 | 99,9 | 0,1 |
| 0,124 | 99,9 | 0,0 |
| 0,143 | 99,9 | 0,1 |
| 0,166 | 99,8 | 0,1 |
| 0,191 | 99,9 | 0,1 |
| 0,221 | 99,9 | 0,1 |
| 0,255 | 99,9 | 0,1 |
| 0,294 | 99,9 | 0,1 |
| 0,340 | 99,8 | 0,1 |
| 0,392 | 99,8 | 0,5 |
| 0,453 | 99,9 | 0,4 |
| 0,523 | 99,9 | 0,4 |

* η_{mean} is the average particle collection efficiency calculated from three sets of up- and downstream measurements

** Δ_{max} represents the full scattering range of single values for each size channel

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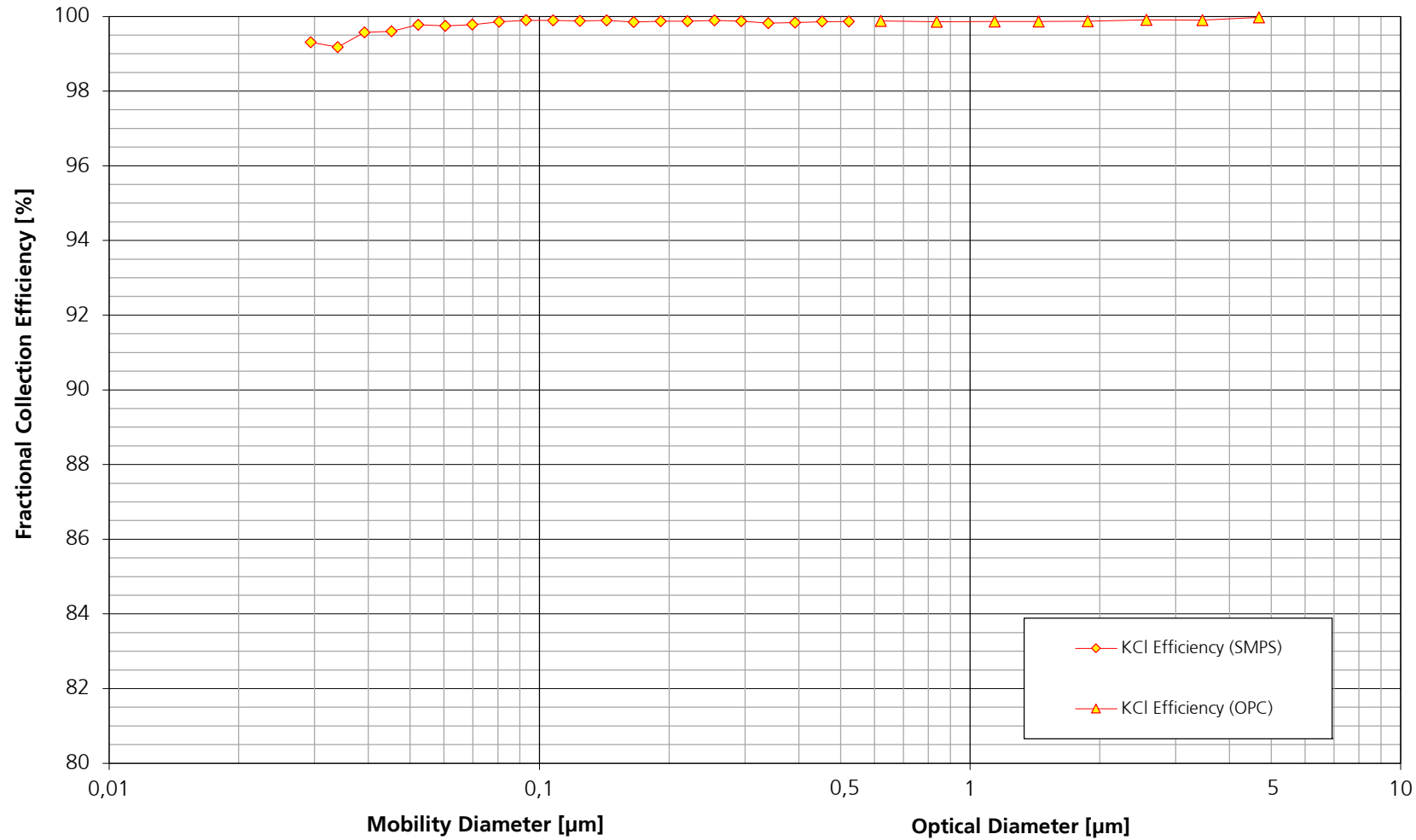
Summary of Test Results for Sample

JF1500

fiatec-No.: ECA 230602-RL6

| Particle Size | Efficiency [%] |
|------------------------------|-----------------------|
| [μm] (mobility) | KCI Efficiency (SMPS) |
| 0,1 | 99,9 |
| 0,3 | 99,9 |
| 0,5 | 99,9 |
| [μm] (optical) | KCI Efficiency (OPC) |
| 0,5 | 99,9 |
| 1,0 | 99,9 |
| 2,0 | 99,9 |
| 3,0 | >99,9 |
| 5,0 | >99,9 |

Particle Collection Efficiencies



Customer:
ECARF Institute
GmbH

Date:
11.07.2023

Sample:
JF1500

fiatec-No.:
ECA 230602-RL6

Air Flow [m³/h]:
1100

Particle Counters:
OPC 3330
SMPS