

# MEASURING THE EFFICIENCY OF A TEQOYA TIP9 AIR PURIFIER IN ACTUAL HOUSING SITUATION

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Confidentiality:

Yes

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## 1 BACKGROUND

CERTAM has been asked by the company TEQOYA to evaluate the efficiency in real situation of an air purifier bearing the reference TIP9. The purifier in question is made up of a ramp of ionizers whose expected effect is the abatement of the particulate concentrations by electrostatic precipitation.

The purpose of the study is to install the equipment in a real living room and to measure with scientific means the influence of the TIP9 purifier on the particle pollution.

### 1.1 MEASURING EQUIPMENT AND EXPERIMENTAL SETUP

Particulate concentration measurements were made using a TSI P-TRAK 8525 condensation counter. This probe has the following characteristics:

- Measurement of the number of particles per cm<sup>3</sup>
- Particle size detected: 20-1000 nm, with approximately 50% detection in the 20-40 nm range and 100% in the 40-1000 nm range (0% beyond that)
- 5% accuracy

The tests are carried out in a room of 20m<sup>2</sup> with a ceiling height of 2m50. There is no forced air renewal (no VMC). The door of the room is kept closed during the tests.

The measurements are made in a horizontal plane at 1m20 from the ground. The TEQOYA TIP9 device is placed on a night table.

## 2 MEASURE OF THE SPEED OF REDUCTION OF PARTICULATE CONCENTRATION

Measurements in transitional state after "pollution" of the chamber as follows:

- opening the window for 5 minutes (the outside air was previously measured as being much denser in particles than the air in the room)
- closing the window and 10 minutes of stabilization of the density in the chamber at about 2600 particles/cm<sup>3</sup> (device off)
- start-up of the device and measurements at 30cm and 2m of the device of the evolution in time of the concentration

The results presented are the mean with its standard deviation of six consecutive measurements at 1 second intervals for decay versus time measurements in two experiments.

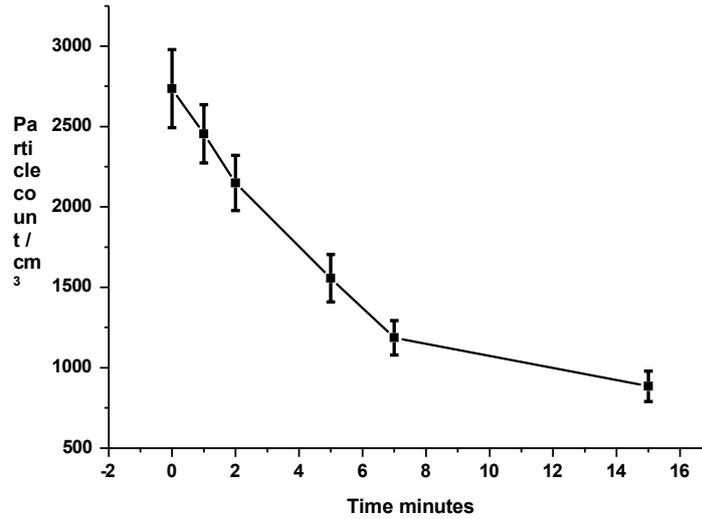


Fig. 1 - Time tracking of particulate concentrations after opening the window

A rapid decrease of the particle density is observed, and a level close to the steady state one is reached in 15 minutes (see following sections).

Figure 2 shows the particulate concentration measurements on the day of the test campaign at the following locations:

- Outdoor air (rural air) near the house
- Entrance : in the corridor at the entrance of the room
- Without : concentration measured without operation of the device
- 2m and 0.3m: concentrations measured after 2 hours of operation of the device

In addition, a spot measurement in the other rooms of the house indicates that the concentration level in the equipped room is about 5 times lower than in the other rooms.

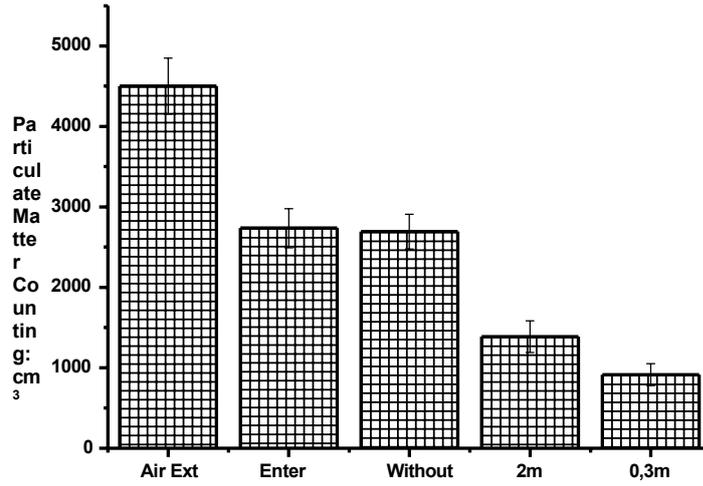


Fig. 2 - comparison of steady state particle concentrations with and without the ionizer

To evaluate the particle density distribution as a function of distance from the device, six measurements in three experiments were performed at 1-hour intervals with the device running continuously for more than 48 hours. Movements to and from the device (door opening) were avoided during these measurements.

Figure 3 reports the means and standard deviations of these measurements.

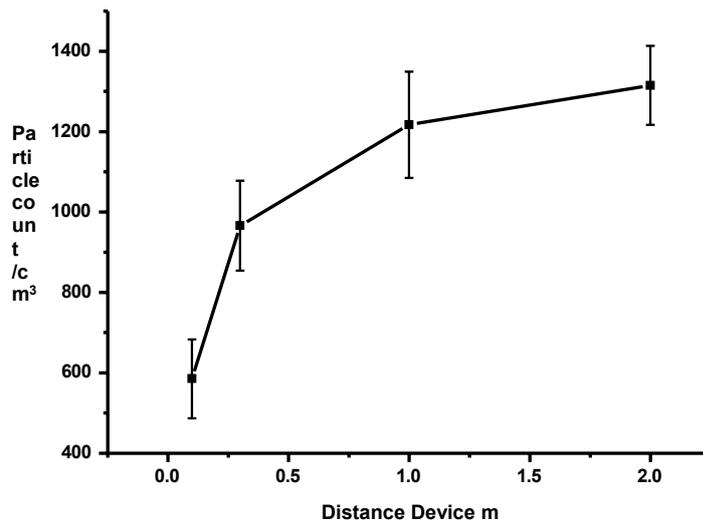


Fig. 3 - Evolution of concentrations as a function of distance from the device

## 4 CONCLUSION

In conclusion, the TEQOYA TIP9 device achieves a very significant depollution of the chamber in which it was tested.

It seems that the operating equilibrium is reached rather quickly, little difference between 15 minutes, 2 hours and 48 hours of operation at a distance of 0.5 and 2m from the device.