OPINION

ON THE DEVICE EFFICIENCY

OBJECTIVE AND SCOPE:

The opinion has been prepared in response to an order from **Oxygen City Sp. z o.o.** The objective of this opinion was to assess the reliability of data concerning the device efficiency. The opinion was prepared on the basis of documentation provided by the Ordering Party.

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Warszawa, 15.04.2020

In the device description provided by the Ordering Party there is information about the air flow rate of 40 000 m³/h. In the table regarding the electrostatic filters (passive-active filters) installed in the device, there is information about the air velocity of 2.4 m/s in the filter window.

Under certain assumptions, the flow rate for the system can be calculated using the simplified model (in case of the EVO-S unit under consideration). This can be calculated as the volume of liquid/gas flowing through the device in a unit of time. The declared volume factor is 40 000 m³/h. With the simplified model and certain assumptions (listed below), it is possible to try to calculate the maximum unit capacity. In this case the airflow velocity in the filter window and the unit dimensions (based on the description) will be taken into account.

Under the assumption that:

- airflow velocity in the filter window is the same for the entire filter area (2,4 m/s),
- filter surface is bypassed,
- there is no significant loss of efficiency (the filters are clean, properly operated),
- air quality is not included,

it is possible to calculate the maximum airflow through the device using the dependency:

$$unit\ width\ [m]\ x\ unit\ height\ [m]\ x\ air\ velocity\ \left[\frac{m}{s}\right] = efficiency\left[\frac{m^3}{s}\right] x\ 3600 = efficiency\left[\frac{m^3}{h}\right]$$

$$2.4\ [m]\ x\ 2.4\ [m]\ x\ 2.4\ \left[\frac{m}{x}\right] = 13.824\ \left[\frac{m^3}{s}\right] = 49\ 766\ \left[\frac{m^3}{h}\right]$$

Note that the theoretical efficiency has been calculated for a much simplified model, excluding the surface area of filters, their condition, quality of filtered air and under the simplified assumption that the flow velocity in filter window is the same over the entire area. Comparing the results of the above simplified model, the value declared by the manufacturer (40 000 m³/h) seems to be possible, but in order to determine this precisely, it would be necessary to perform station-based tests.