

Returns in different volume flows for various filter combinations



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1. Introduction

In this study the purpose is to ascertain the yields that will apply at the different flows for SFE filter combinations.

The measurements take place in the laboratory of Euromate. We conduct a number tests for several sets of filters that would explain how the efficiencies relate to different intake air flow.

In this report, we first give a detailed description of the test setup where we perform our measurements. After that the collected data, charts and conclusions.

2. The arrangement

The arrangement where we will perform our measurements consists of an SFE 25 and a fan. This fan, with a maximum power of 7.5 kW, is through a tube in connection with the SFE 25. Furthermore, this fan connected to a frequency converter type Yaskawa Varispeed 616PC5. This inverter allows us to have the fan running at different speeds.



Measuring arrangement



Fan

On the other side of the SFE 25 is also a tube. This tube is also connected to a rectangular wooden sheath. This wooden box will be the place for the measurements for determining the volumetric flow rate. In order to determine the volumetric flow, we use an anemometer of the type Testo 452. Once we have determined the air velocity and the surface of the tunnel, then we can thus easily calculate the volumetric flow rate for the different frequencies (5-55 Hz).



Airspeed measuring equipment

Furthermore, we can now perform efficiency measurements for different filter combinations. We do this with a particle meter of the type Royco 330 Portable.



Particle measurement equipment

We put above the fan a plastic bag in which we measure the particles after the air purifier. Thus, we obtain a more accurate value. If they are known then we can turn the efficiencies found against the volume flow in a graph.



Arrangement efficiency

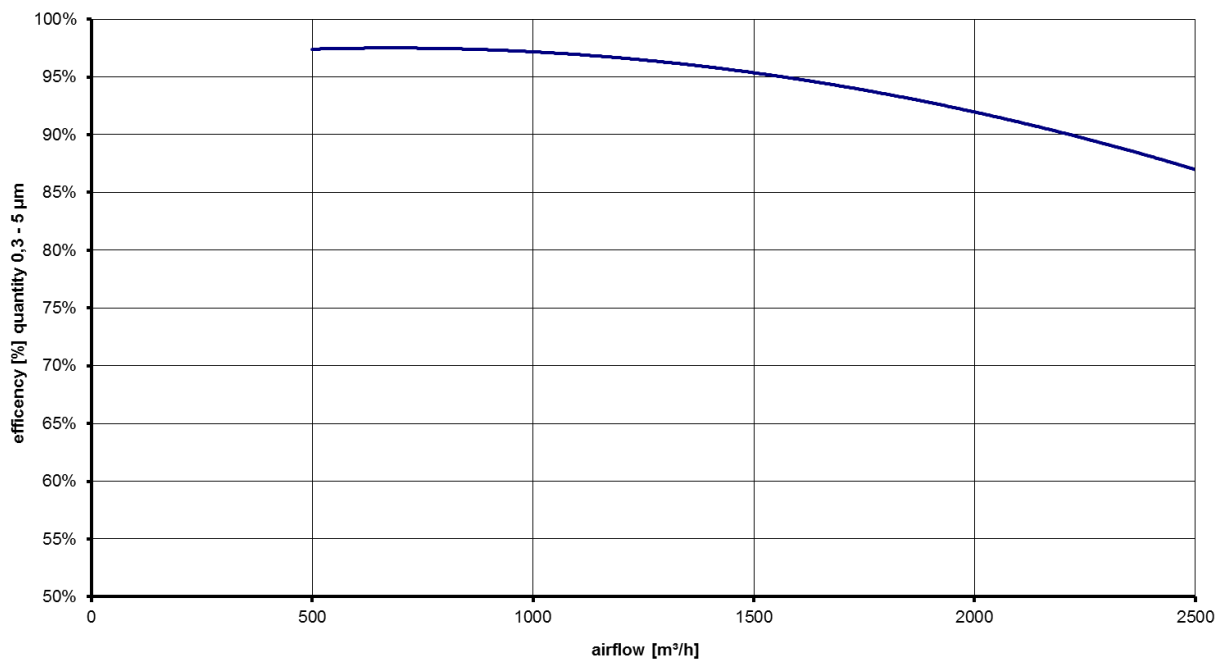
3. Efficiency determination

The efficiencies at different flow rates, we can determine as follows: We measure with the aid of a particle meter the number of particles before and after the filters above the fan. The diameter of the measured particles ranges in size from 0.3 μm to 5 μm . Each measurement takes 30 seconds. We measure the efficiency at flow rates of 500, 1000, 1500, 2000 and 2500 m^3/h . In order to obtain a reliable value for the number of exhaled particles, we place a plastic bag above the fan, so that the discharged air is not mixed directly with the ambient air, whereby the measurement result will be inaccurate. The efficiency, we can calculate as follows:

$$\frac{\text{Quantity of particles before filter set} - \text{quantity of particles after filter set}}{\text{Quantity of particles before filter set}} \times 100\%$$

4. Measurement data

SAF + FIS + FCS + SAF



SOD + FIS + FCS + SAF

