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Testing of VOC concentration up- and down-stream of AirFree

Items tested

Air cleaner AirFree, 230 V, 50 Hz, 400 mA, 46 W, Serial # 53002309. The item arrived to SP on February 27, 2001 in good condition. The air cleaner was on for about a month before testing to get rid of any initial emissions. The test results apply only for the item tested.

Place and date of testing

The test of VOC (volatile organic compounds) concentration was carried out at SP's Energy Technology / HVAC laboratory in Borås on April 6, 2001. The air cleaner was tested in a mechanically ventilated office without any known moisture damages. One person was present during the test.

Test procedure

The air cleaner was placed on a desk. A tube (aluminum foil) was mounted after the exhaust in purpose to get a nice flow pattern. This might affect the airflow but probably to an insignificant extent. The concentration of VOCs was simultaneously measured up- and downstream (34 cm above the outlet) in the center of the tube. The volatile organic compounds (VOC) were adsorbed on Tenax tubes using pumps and a calibrated flow meter. Samples were taken at both sampling points for 60 minutes.

Analysis of the Tenax tubes was done on a gas chromatography system including both FID (flame ionization detector) and MSD (mass selective detector). Volatile compounds in the boiling point range of approx 70 to 320 °C are included in the analysis. The total VOC level was calculated from the total integrated area in the retention time window of 6 to 38 min. The amounts of individual substances as well as the total amount of volatiles are calculated as toluene.



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Results

Analysis of the sampling tubes and calculation of VOC levels in the air upstream and downstream of the Airfree unit gave the results summarised in table 1. The substances selected for quantification are chosen among the dominating compounds to represent different types of volatiles.

Table 1. Concentrations of VOCs in the air

Substance	Concentration Upstream ($\mu\text{g}/\text{m}^3$)	Concentration Downstream ($\mu\text{g}/\text{m}^3$)
Total concentration of VOCs ("TVOC")	90	90
toluene (an aromatic hydrocarbon)	6	6
2-(2-ethoxyethoxy)ethanol (a glycol ether)	13	14
α -pinene (a terpene)	2	3
nonanal (an aldehyde)	2	2

Summary

No significant changes in VOC concentrations were observed, either as single VOCs or as the total concentration. Neither could any new substance be found upstream the air cleaner.

The relative humidity of the air in the office was 23 %, the temperature was 22 °C and the atmospheric pressure was 986 mbar.

Measurement equipment


- SKC aircheck sampler, VVS2 (SP's inventory no. 200 951)
- SKC aircheck sampler, Pump 31
- Temperature and humidity meter TESTO 610 (SP's inventory no. 201 392)
- Barometer Druck DPI-260, (SP's inventory no. 201 637)

Estimated uncertainties of measurement

- VOC concentration ± 15 %
- Relative humidity ± 3 %-RH
- Dry temperature ± 1 °C

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