

Information concerning the system certification of the SMOKEOASIS® filter and capture system on the basis of the test principle from the Employer's Liability Insurance Association Institute for Work Safety (in German BGIA) for non-smoker protection systems.

As the first manufacturer of an openly accessible non-smoker protection system, OASIS Innovation Systems, Meersburg, tested their SMOKElight® smoke capture module, which includes the SMOKE OASIS® filter technology, at the recognized aerodynamics laboratory of the Institute for Industrial Aerodynamics (IFI) in Aachen. The certification was carried out on 24.04.2008.



The test principle to certify non-smoker protection systems* contains a specially developed test method for the manufacturers of closed, half-open and open protection systems, which are equipped with filter technology and air circulation. The procedures, the test equipment and the target criteria were laid down by the Organisation for Technical Non-Smoker Protection Systems in cooperation with the BGIA, St. Augustin. Table 1 below gives an overview of the main points for system certification.

Table 1: Overview of the Main Points for System Certification

Peripheral Equipment	
Flow conditions in the test chamber	Laminar ground cross-flow at 2 m with 0,075 m/s ± 0,025 m/s
Test chamber ventilation volume	4 ± 0,5 times the volume flow of the protection system
Interference source to generate cross flows	“Agitation plate“ on a linear guidance mechanism with a speed of movement of about 1 m/s, simulation of person moving.
Smokers	Test stands simulating people with physical dimensions in accordance with DIN 33 402 - 2, (4 people simulated in the test)
Objects smoked / quantity during the test	Cigarettes / 8 smoked simultaneously
Length of test	1h test time with 5 re-stocks of the cigarettes
Target Criteria	
(The test is passed when the following values in the test chamber exhaust air are not exceeded.)	
Particle quantity	< 3000 1/cm ³ average over the total test time
Total Volatile Organic Compounds	< 0,100 mg/m ³ average over the total test time
Formaldehyde	< 0,028 mg/m ³ average over the total test time
Acetaldehyde	< 0,020 mg/m ³ average over the total test time
Carbon monoxide	< 1,500 ml/m ³ average over the total test time

Test Assembly in the Test Chamber

The following figures (Fig. 1 and 2) show the test assembly of the SMOKE Oasis-Technology in the test chamber. For the test, a single SMOKElight® module for 4 smokers was installed at the table and the filter tower, including the ventilator control, was adapted for the single place and test. Due to the air conditioning, it can be assumed that the air is clean in the test chamber.

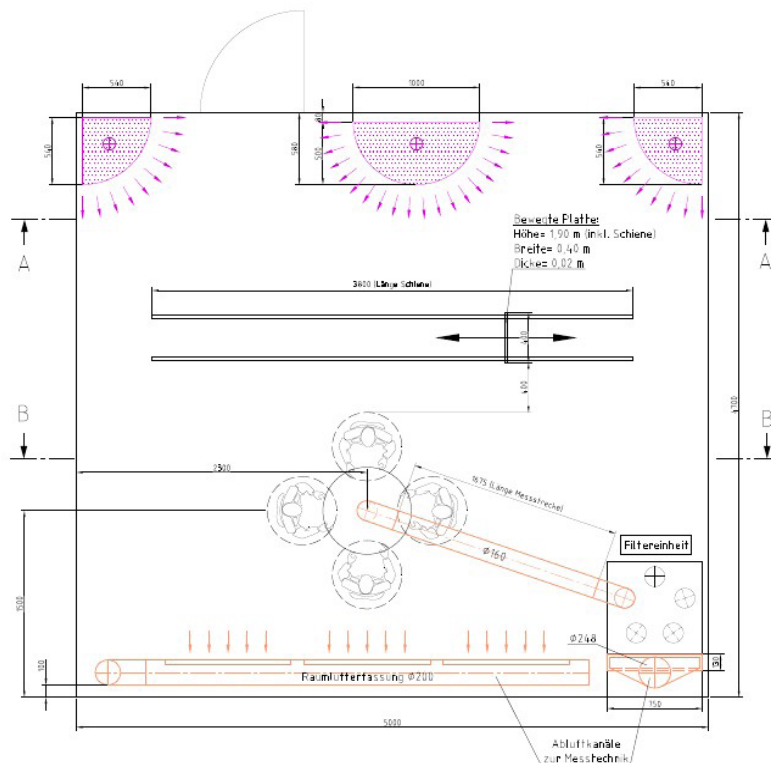


Fig. 1: Installation of the SMOKE Oasis Technology in the Test Chamber of the Aerodynamics Laboratory at the IFI Institute, Aachen.

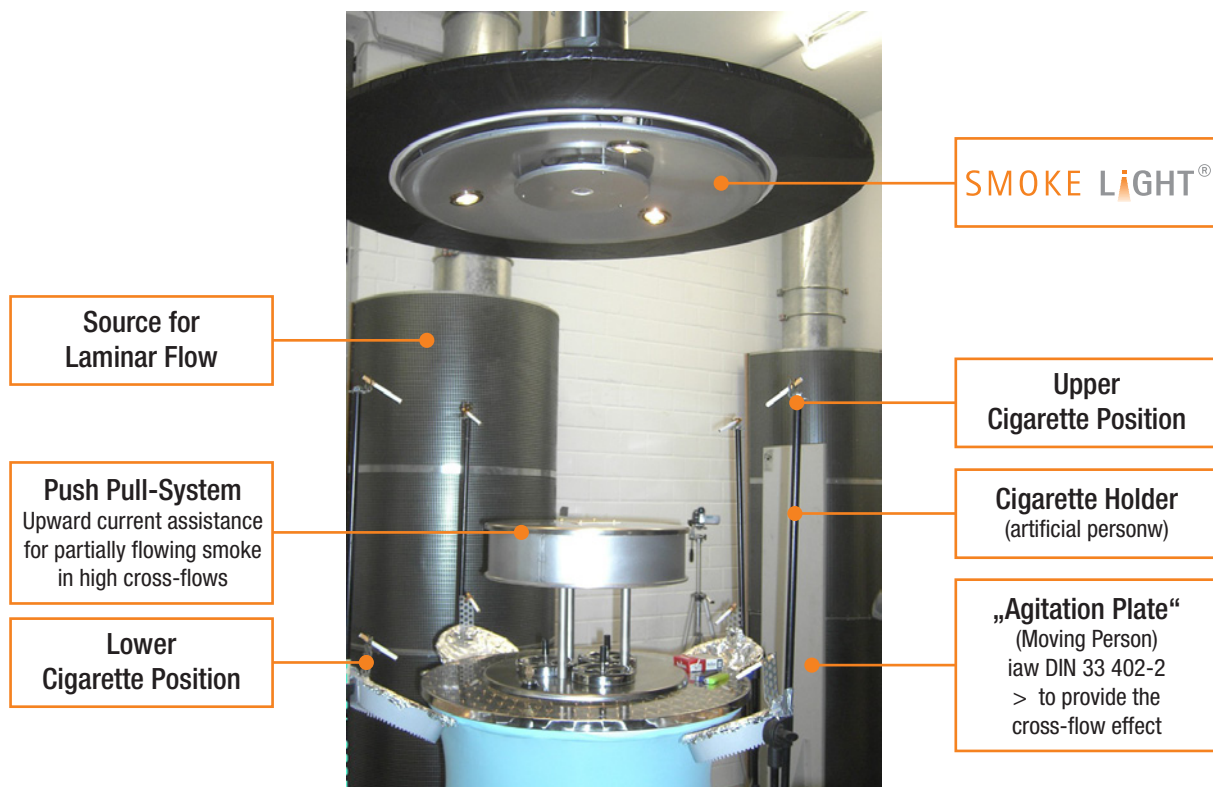


Fig. 2: Test Assembly of the SMOKELight® Capture Technology, together with the Push Pull System in the Test Chamber

Certification Test Procedure



The certification test was carried out according to the following plan:

The test started with the lighting of the first cigarettes (8 respectively) on the simulation stands and continued over the test period of 1 hour. During the test, all the cigarettes were replaced and re-lit every 12 minutes (5 cycles).

Shortly after the cigarettes were installed, the “agitation plate” was activated once per cycle. This simulated the interference caused by a person walking past. The plate moved on the linear guidance mechanism forwards and backwards three times per cycle with a time delay of 30 seconds.

To adhere to the time intervals, all “smoked” cigarettes were extinguished manually in a container of water and the holders refilled with cigarettes.

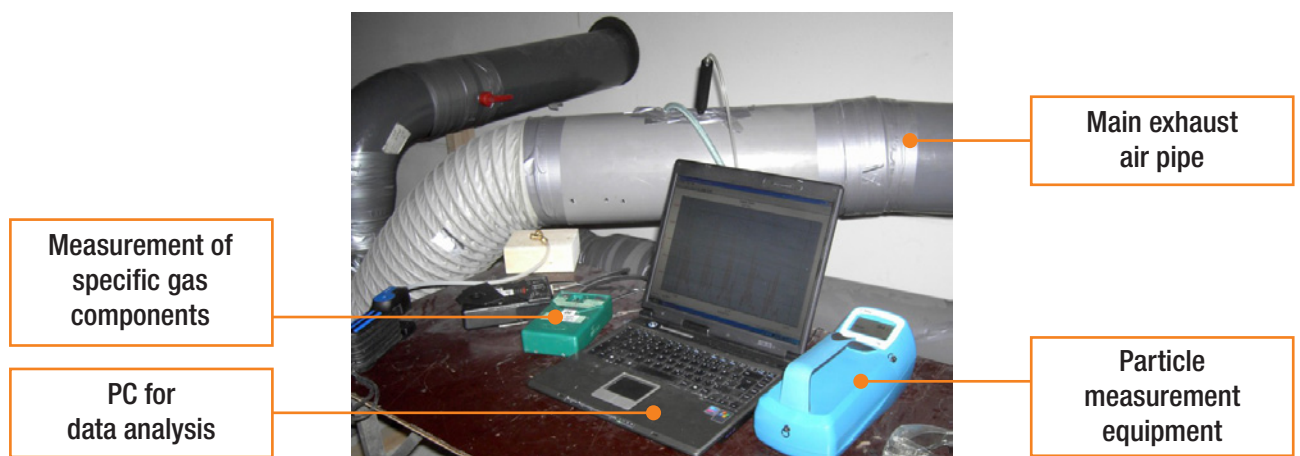


Fig. 3: Test Start when Cigarettes are lit






Fig. 4: Visual Smoke Capture during the Certification Test

The measurement equipment to detect particle and gas quantities was connected to the main pipe of the chamber exhaust air system. Online particle and gas measurements were carried out at the test points throughout the test period, as well as samples taken using various types of test tubes. Figure 5 shows the measuring equipment in the exhaust air pipe.



Test Results

The following test results were determined after the certification test:

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 The permissible quantity of particles in the chamber exhaust air of $< 3000 \text{ 1/cm}^3$ as average value was well below with a value of 1597 1/cm^3 .
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 The permissible limit for carbon monoxide content ($\text{CO} = < 1,50 \text{ ppm}$) was also not exceeded with a value of $0,57 \text{ ppm}$.
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 After the results of the gas analysis, the values obtained for formaldehyde and nicotin in concentrations of $0,024 \text{ mg/m}^3$ and $0,003 \text{ mg/m}^3$ are below the limits.

Figures 6 and 7 below show the values over time for the particle and carbon monoxide measurement equipment. The peak values indicating the influence of the plate as well as the resting phases can be identified.

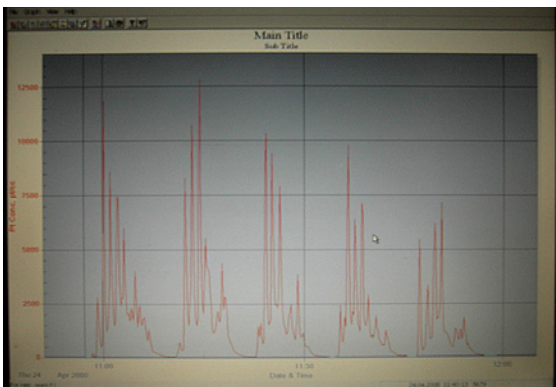


Fig. 6: Particle Values during the Test Period

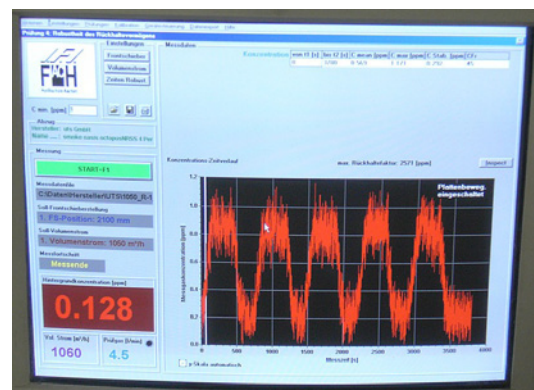


Fig. 7: CO Values during the Test Period

*)): The official test results for the gas components TVOC and acetaldehyde were not yet available for inclusion in this info-report.

Conclusion

As the first manufacturer of an open non-smoker protection system, Oasis Innovation Systems, Meersburg, had its SMOKEOASIS® filter and smoke capture technology tested in May 2008 at the aerodynamics laboratory of the IFI Institute in Aachen on the basis of the BGIA test principles for non-smoker protection systems (GS- BGIA-M14).

Most of the values obtained were well below the permissible limits, thus verifying a particularly efficient and high-quality capture and filter technology.

The SMOKE OASIS technology for smoke filtration and capture was awarded the design and dangerous substance certification by the IFI Institute, Aachen, in accordance with the EU Guidelines and on the basis of the extremely strict test criteria of the BGIA.

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