

Filtertest Kurzfassung

SmokeSolution hat einen Partikel- und Gastest von SmokePoint – SP140 ausführen lassen. Der Test wurde von Mottlau Consulting in Zusammenarbeit mit LugtTek A/S ausgeführt.

Der Test wurde mit der folgenden Absicht ausgeführt:

- Um festzustellen, welche Wirkung das Rauchen in der Kabine auf die Umgebung hat
- Um festzustellen, ob Personen in der Nähe passivem Rauchen ausgesetzt werden
- Eine Prüfung der, in den beigelegten Testkriterien erwähnten, Forderungen
- Die Wirkung der montierten Filter während des Rauchens und nach dem Rauchen zu prüfen
- Zu prüfen, ob die Kabine die Ansprüche des Gesetzes erfüllt

Konklusion:

- Die Rauchkabine erfüllt die Forderung, die im Dänischen Gesetz über rauchlose Umgebungen erwähnt ist.
- Niemand wird passivem Rauchen ausgesetzt.
- Die Kabine ist mit ausreichender Leistungsfähigkeit in Bezug auf das Filtrieren ausgerüstet.
- Die Forderungen nach Abschirmung der 3 Seiten und mit einer Decke sind erfüllt.
- Die Luft des Raumes enthält weniger Partikel nach einer Betriebsperiode als vorher.
- Das Niveau von Gasen ist dasselbe oder geringer nach dem Rauchen im Raum.

Eine Kopie des Originalberichtes liegt bei.

Particle- and gas test of SmokePoint – SP140



The test was carried out by:
Mottlau Consulting
in cooperation with:
LugtTek A/S

Test date d. 9 March 2007

Summary of original test report

Copy of original report can be required at SmokeSolution ApS, Cordozasvinget 6, DK-2680 Solrød strand.

Purpose

- To determinate which effect smoking in a cabin has on the surroundings
- To determinate if a person close to the cabin is exposed of passive smoking
- To test against the specifications in the enclosed test
- To determinate the effect of installed filters during and after smoking
- To determinate if the cabin comprehends the law

Setup

The smoke cabin consists of:

- Shielding in 3 sides and a roof
- Particle filter for visible particles. Filter class G4; standard DS/EN/ISO 779-2003
- Particle filter which filtrates 99,95 % of the particles. Filter class H13; standard DS/EN/ISO 1822
- Carbon filter which filtrates the gas from the smoke
- Ventilator with energy saving automatics and shift between standby and running mode

Measurement

- Measurement is done in room; 2 m from doorway (to the cabin) and 1,5 m from the floor
- Measurement is done before entrance to first filter (particle load)
- Measurement is done after the Hepa filter (leaks and filtrating rate) and just after exhaust

Smoking

- Half is smoked in 1,5 m height in the cabin. Cigarettes is mounted in a board and placed in vertical position for self burning.
- Half is placed in 2,0 m height. Cigarettes is mounted in a board and placed in vertical position for self burning.

Measurement equipment

- Particle measurement: laser particle counter (0,5 µm og 5,0 µm)

Gas measurement

- Gas collect devices; Adsorptions tubes with adsorbents, where a flow of approximately 50 ml/min is sucked through in 20 min.

Analysis methods

- Adsorptions tubes with adsorbents, where a flow of approximately 50 ml/min is sucked through in 20 min.
- Analysis with thermo desorption
- Gas chromatography with mass spectrometry's determinations (CC/MS)

Test room

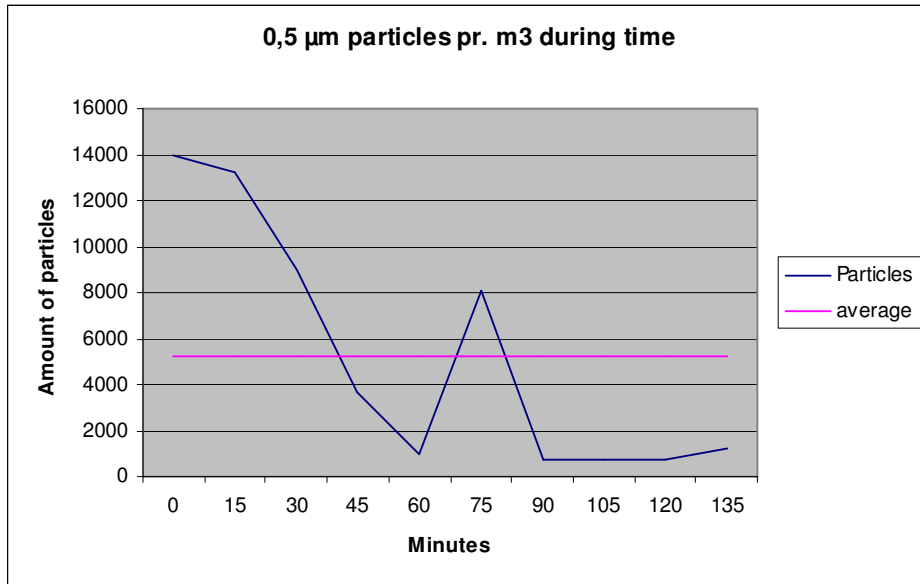
- Traditional meeting room 65 m², 2,5 m from floor to roof.
- Surroundings; ordinary office activities
- No ventilation

Test during normally smoking

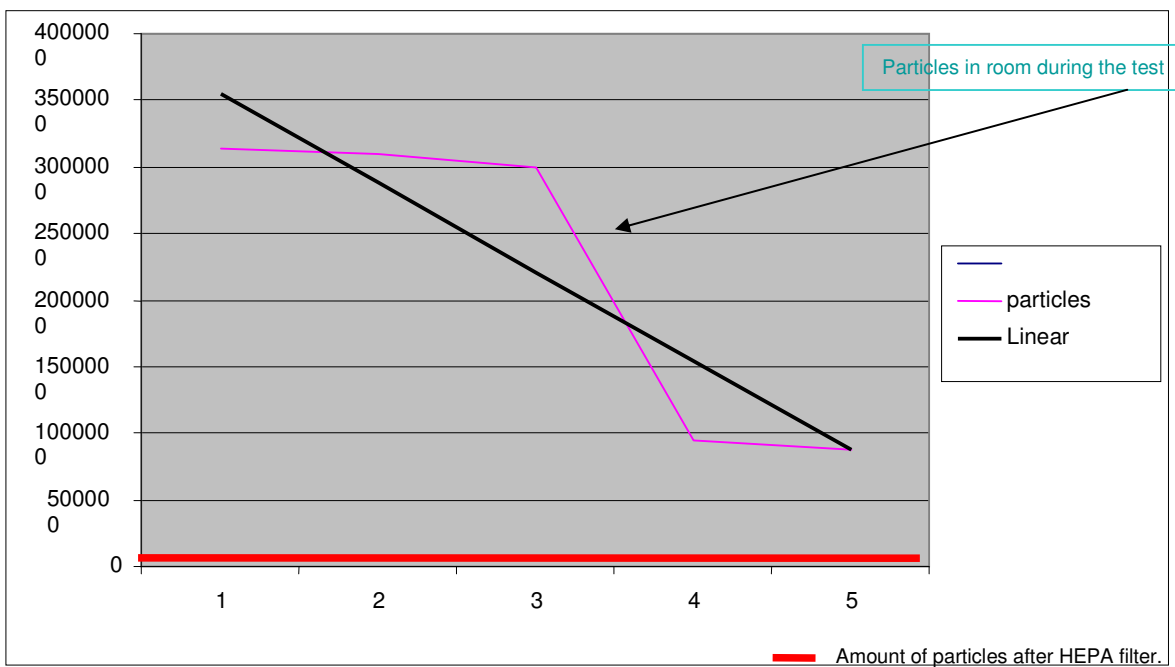
Position for making air samples is fixed. Burning position for cigarettes is moved vertical during time, due to the burning of the cigarette - the horizontal position is fixed. Burning of cigarettes is done smoothly during the test period. Entrance to the filter is very short, why only few or none particles are mixed with the surrounding air (room air).

Minutes states the amount of minutes from the test start with a slightly increase of average load
 Particles states the amount of particles at 0,5 µm

Particles in air before filtration



Amount of particles in the room before and after the test



Gas level in the room before and after the test.

The result of the gas test, which is measured immediately before and after the performance.

Notat

Titel	Test af rygekabine		
Klient:	SmokeSolution ApS		
Att.:	Jan Mottlau		
Kopi til:			
Af:	Anders Peter Adamsen	Version:	2
Dato:	2007-03-15	Sagsnr.:	LT 0059

1. PRØVETAGNING

Prøverne er udtaget af Jan Mottlau den 9. marts 2007 og modtaget på laboratoriet den 12. marts 2007.

2. ANALYSE OG RESULTAT

Prøverne er den 11. marts 2007 analyseret for 7 udvalgte stoffer ved termisk desorption og gaskromatografi med massespecifik bestemmelse (GC-MS). Resultaterne er korrigeret med en blindprøve.

Resultaterne er vist i tabellen.

Stof	Rumluft, før	Rumluft, efter
	µg/m ³	
Isopren (2-methyl-1,3-butadien)	5	<2
Benzen	7	7
Toluen	45	40
Pyridin	<2	<2
3-Ethenylpyridine ¹	<2	<2
D-Limonen	44	<2
Nicotin (3-1-methyl-2-pyrrolidinyl pyridin) ²	<2	<2

¹2-Ethenylpyridin er anvendt som fremstilling af standarder i stedet for 3-ethenylpyridin, som ikke er kemisk stabil.

²Nicotin er vanskelig at håndtere idet det adsorberer kraftigt til overflader på glaskolber og lignende.

Gas measuring position: 2 meter doorway (cabin), 1,5 m from floor.

Conclusion

Purpose 1: To determinate which effect smoking in a cabin has on the surroundings.

Conclusion: the level of gasses and particles in the room after burning 33 cigarettes is at the same level or lower than before the test was started.

Purpose 2: To determinate if a person close to the cabin is exposed of passive smoking

The level of gasses in the room after burning 33 cigarettes in the cabin is lower than before the test was started.

Conclusion: the level after burning 33 cigarettes in the cabin is noticeable lower than before the test was started.

Purpose 3: To test against the specifications in the enclosed test

The purpose was to determinate if the smoke cabin was able to filtrate in sufficient level and in sufficient amount of time as the test demands. The test is in reference to time shortened a bit, however the smoke intensity is increased in reference to what the producer recommend. Therefore we are convinced that the filters are pushed as hard as the test describes and the result is valid.

Conclusion: the levels of gasses in the room after burning 33 cigarettes in the cabin is at the same level or lower than before the test was started.

Purpose 4: To determinate the effect of installed filters during and after smoking

After the load of 33 cigarettes in the filters and the surrounding room we can establish, as described above, that the level of gasses in the room is at the same level or lower than before the test was started.

The level of particles after burning 33 cigarettes in the cabin is noticeable lower than before the test was started.

The level of particles in the exhaust to the room after the filters and ventilator is in level 1/3 of what it was in the air before the room was exposed for the test

Conclusion: The smoke cabin comprehend the job, as mentioned in the law of smoke free environments
 No one is exposed of passive smoking
 The cabin has the right filter capacity
 The demand of a partly closed cabin is for fill
 The air in the room has fewer particles after the run period than before
 The level of gasses is the same or lower than before smoking in the room

Measuring facts:

After Hepa filter	140	particles at 0,5 µm pr. m3
After carbon/motor/silencer	27.000	particles at 0,5 µm pr. m3
The room at start	3.100.000	particles at 0,5 µm pr. m3
After 33 cigarettes/running smoke cabin	1.249.000	particles at 0,5 µm pr. m3
Cigarette smoke contains	100.000.000.000	particles at 0,5 µm pr. m3