

confidentiel
Seril DECRIL



Récapitulatif des tests certifiés par des laboratoires
indépendants des modules type plasma froid

présentés par la société *seril* DECRIL

NB : ce document est strictement confidentiel

Il ne peut être cité ou faire l'objet d'une quelconque publication sans
l'accord écrit de notre société.

Le présent test porte sur les **VOCs de cigarette**
Il ne concerne pas une combinaison d'effet de traitement par Uv et plasma.

De nouveaux tests sont actuellement en cours, nous vous communiquerons
les résultats sur demande.

Test Report of the operation for Ion
Cluster to remove VOC in Cigarette

Company :



Test Products : Sayf Ion Cluster (Cabin Tube with Fan)

Test Date : June 27, 2007

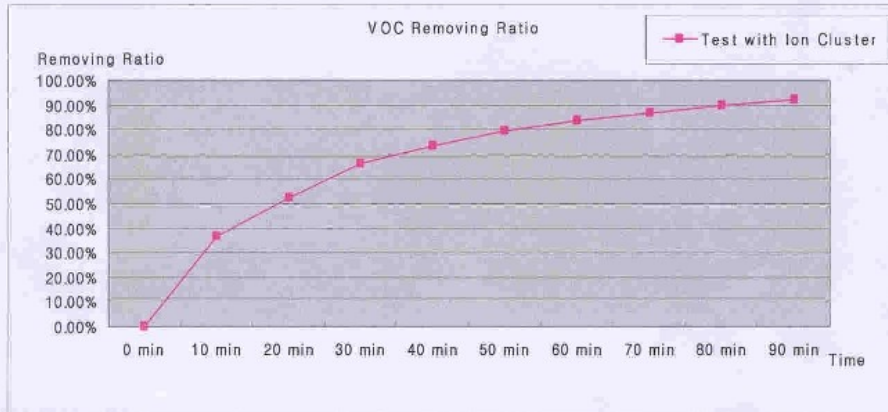
Signed :



* Efficiency Graph of VOC Removing (ppm)

	Before Ion Cluster	Switch on Ion Cluster	10 min	20 min	30 min	40 min	50 min	60 min	70 min	80 min	90 min
VOC removing Ratio after Ion Cluster	0	I/C	36.84	52.63	66.32	73.76	79.74	83.85	86.63	89.74	92.11

* Efficiency Graph of VOC Removing (ppm)



Explanation for Test

- 1) This result shows the removing efficiency for VOC in cigarette after Ion Cluster operation.
- 2) Although Measuring were carried out till 90% of removing efficiency. 98 % of VOC removing is expecting to be carried out in 100 ~ 150 minutes if calculate it with the 90 % of efficiency.
- 3) 60 % of removing efficiency took about 25 minutes, and the after then the removing was slow.
- 4) 80% of removing efficiency was carried out in 80 minutes. Also after then it was slow than before.
- 5) It took about 100 minutes to remove 90 % of removing, In better clear air, The removing efficiency was slow than polluted air

Conclusion

- 1) Ion Cluster has good efficiency to remove VOC in cigarette smoke.
- 2) After Ion Cluster operation, The smoke in chamber were almost disappeared. It is expected that Ion Cluster is good efficiency to remove airborne particles in cigarettes smoke.



Introduction

This test report is for removal of VOC in cigarette smoke by Ion Cluster. The IAQC produces negative ions, positive ions, radicals and clustered ions which react with impurities in the air, and decompose hazard chemicals. Main ingredients of cigarette consist of VOC and harmful to humans. This is the data which measured the VOC counts in cigarette smoke in every 10 minutes intervals after operate Ion Cluster.

Carried out the test as follows :

- 1) How much remove the VOC in cigarette smoke ?
- 2) How long does it takes to remove VOC in cigarette smoke ?

Test procedure

Test was carried out by installing a Ion Cluster in a acryl chamber (300*300*250mm) which was sealed with Velcro tape on every vents and cracks, and closed with straw form on the power cable hole. A circulating fan was also installed in the chamber to evenly distribute airborne particulate matter within the chamber and to circulate the air around the Ion Cluster. The fan had a capacity of 380 L/s and circulated the air in the chamber at a rate of 20 room volumes per hour. No filter of any kind was used in the test. Cabin tube model was used and its capacity is 50m² (Diameter 20.5 mm / Length 150 mm / Power Consumption : 3W). The chamber size was 0.3m x 0.3 m x 0.25 m giving it a total volume of 0.0225 cubic meters. The smoke of 1/4 cigarette was introduced into the chamber with a small air pump which sucked the air through a special cigarette holder. The smoke volume is equivalent to 11.1 cigarettes per cubic meter. VOC checking was taken in every 10 minutes intervals with VOC meter after introducing cigarette smoke into the chamber and then switched on SPE Ion Cluster. Testing conditions was 28.1°C / Humidity was 40.%RH, Air pressure – 1,005.3 hPa

Summarize the test conditions as follows :

- 1) Ion Cluster : Cabin Tube * 2 (Diameter 20.5 mm / Length 150 mm / Power Consumption : 3W), Actual application capacity is 50m²).
- 2) Fan : Operated by 12.5 L/s(45 CMH). Stand Spec is 90CMH / 12V, 45CMH / 5V
- 3) Chamber : Acryl chamber is 300*300*250mm / 0.0225 cubic meters
- 4) Measuring device : VOC meter / (ppbRAEplus) Measuring range : 1 ppb~100 ppm
- 5) Cigarette volume : ¼ of 1 cigarette is equivalent to 11.1 cigarettes per cubic meter (When introduce 1 cigarette into chamber it exceed 100 ppm. So it is impossible to measure)
- 6) Measuring method
 - a. Measured the VOC density of chamber back ground.
 - b. Check it in every 10 minutes.



Test Report of the operation for SPE Ion Cluster to remove airborne particulates
 Product name : Sayf IAQC / Ion Cluster (Cabin Tube with Fan)

Company : **confidentiel**
 Test Date : **Seril DECRIL**

Introduction

This test report is for removal of airborne cigarette smoke particulates by Ion cluster. The IAQC produces negative ion, positive ion, radicals and clustered ions which react with impurities in the air, and decompose hazardous chemicals. Checked the removal efficiency for airborne particles in cigarette smoke as follows :

Test procedure

Test was carried out by installing a Ion Cluster in a acrylic chamber (300*300*250mm) which was sealed with Velcro tape on every vents and cracks, and closed with straw form on the power cable hole. A circulating fan was also installed in the chamber to evenly distribute airborne particulate matter within the chamber and to circulate the air around the Ion Cluster. The fan had a capacity of 380 L/s and circulated the air in the chamber at a rate of 20 room volumes per hour. No filter of any kind was used in the test. Cabin tube model was used and its capacity is 50m2 (Diameter 20.5 mm / Length 150 mm / Power Consumption : 3W). The chamber size was 0.3m x 0.3 m x 0.25 m giving it a total volume of 0.0225 cubic meters. 1 times of smoking volume was introduced into the chamber. It's amount is same as 1/20 cigarette, which is equivalent to 2.2 cigarettes per cubic meter. Particle size measurements were carried out by LASAIR-II 310A of Particle Measuring Systems Inc. The instrument takes particle counts on 1cfm samples of air for specified particle sizes of 0.3µm(microns), 0.5µm, 1.0µm and 5.0µm. Particle counts were taken before and after introducing cigarette smoke into the chamber. The testing condition for the duration of the test were 22.0°C, 45% Relative Humidity.

Summarize the test conditions as follows :

- 1) Ion Cluster : Cabin Tube * 2 (Diameter 20.5 mm / Length 150 mm / Power Consumption : 3W), Actual application capacity is 50m2).
- 2) Fan : Operated by 12.5 L/s(45 CMH). Stand Spec is 90CMH / 12V, 45CMH / 5V
- 3) Chamber : Acryl chamber is 300*300*250mm / 0.0225 Cubic Meters
- 4) Measuring device : Particle Measuring Systems LASAIR-II 310A
 (0.3 µm – 5.0 µm Sizing Sensing Serial No. 38115 Calibration date : November 11, 2006

Test Results

Introduce cigarette smoke into chamber and measured the airborne particles count after 120 minutes of Ion cluster operation.

Particle Size (microns)	Back Ground Count	Particle Count after cigarette smoke introduction	Count after Ion counter operation during 120 minutes	Removal Ratio (%)
0.3	29,461	1,246,109	2,176	99.83 %
0.5	3963	307,364	257	99.92 %
1.0	51	4,831	4	99.92 %
5.0	0	0	0	

* Note : These results are expressed as particles per 2.83 liters air. (0.1 ft³ = 2.83 liter)

Signed :

Test Report of the operation for Ion
Cluster to remove VOC in Cigarette

Company :



Test Products : Sayf Ion Cluster (Cabin Tube with Fan)

Test Date : June 27, 2007

Signed :



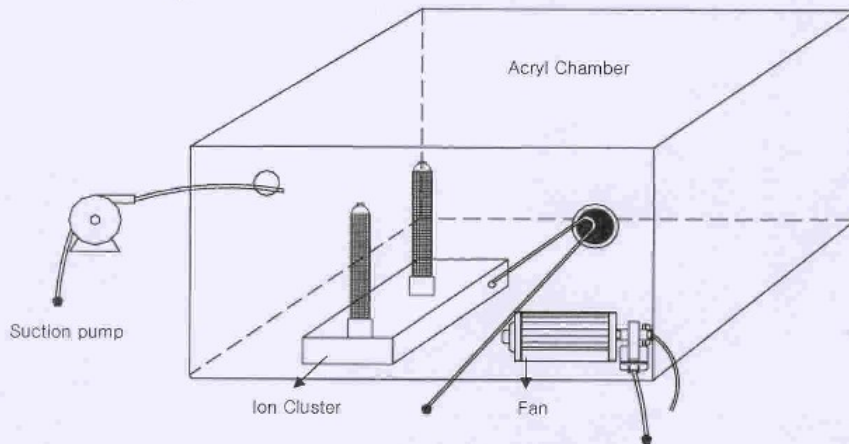


Figure 1. Testing Diagram for VOC removing efficiency

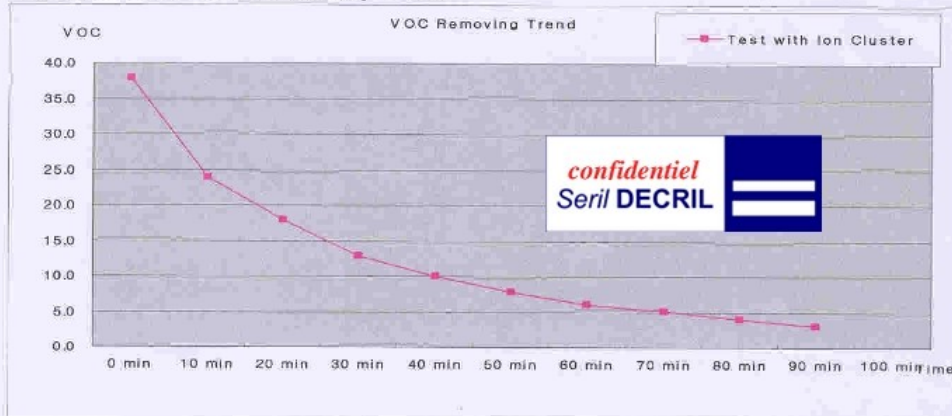
Test Results

Ion Cluster has good efficiency to remove 90 % of VOC in cigarette smoke. And the smoke in chamber were almost disappeared in 25 minutes by visual check.

* VOC Measuring (PPM)

	Back Ground	Before Ion Cluster	Switch on I/C	10 min	20 min	30 min	40 min	50 min	60 min	70 min	80 min	90 min
VOC Count after Ion Cluster	0.150	38.0	I/C	24.0	18.0	12.0	10.0	7.7	6.1	5.1	3.9	3.0

* Variation Graph of VOC Density (PPM)





**Samsung Electronics' tests show
ion cluster remove
98% of VOC and
99% of airborne particulates.**