No.T1606028

July 28, 2016

Report No.: T1606028

Customer: Mitsubishi Electric Corporation

Test Report

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VCN16A512

1-1. Test name　　Investigation of cat allergen in the air decreasing effect of air cleaning device

1-2. Sample

Sample name　　Air cleaning Device for MSZ-JL, LN（Below is written device）

Control　　Device turned power off（Below is written device off）

Wind speed when passing through device
1 m/s

1-3. Method　　The device was attached to a chamber (1 m^3) and the equipment of one pass air flow was set up (fig. 1-1). Test material containing a target allergen was scattered with a nebulizer into the chamber in which 4 fans were put. With stirring the material in air by the fans, the air was vacuumed to pass through the device and the material in the air was caught on a glass fiber filter. Cat allergen Fel d 1 on the filter was extracted and measured by ELISA. The number of particles in the air at the front and back points of the device was also counted by two particle counters. The same procedure was followed in the case of control.

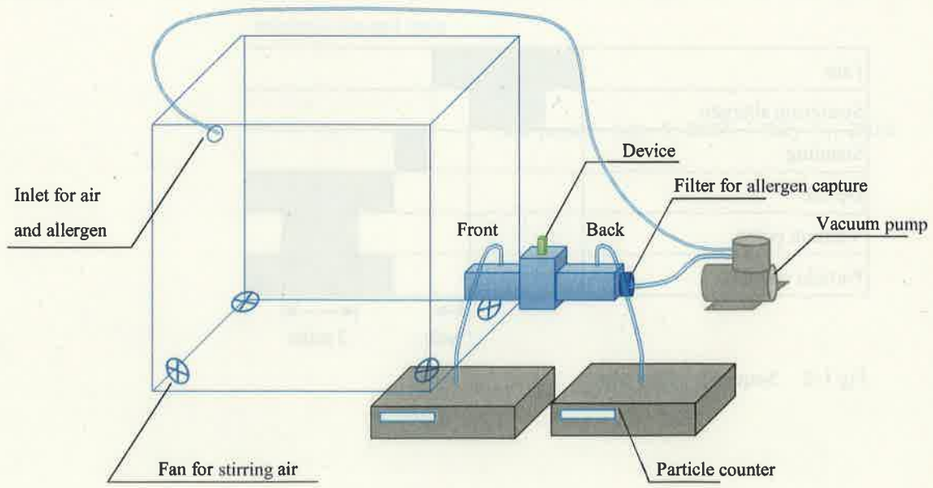

Fig 1-1.　Equipment for the test

1-4. Test condition

Target allergen	Cat allergen Fel d 1
Test material	Cat Hair and Epithelia Extract（Product No. 10104, ITEA）
Dose of material	10 μg as Fel d 1
Caught air volume	Approximately 60 L
Allergen measurement	Sandwich ELISA
Filter for allergen	Glass Fiber Filter（GA-55, ADVANTEC）
Particle counter	KC-52、RION（belongings of Mitsubishi Electric Corporation） Flow rate 0.28 L/minute Particle size ≧0.3、≧0.5、≧1、≧2、≧5 μm
Temperature	25℃
Humidity	Without artificial control（It is wrote on Appendix）
Sequence of the test	See fig. 1-2

Sequence of the test See fig. 1-2

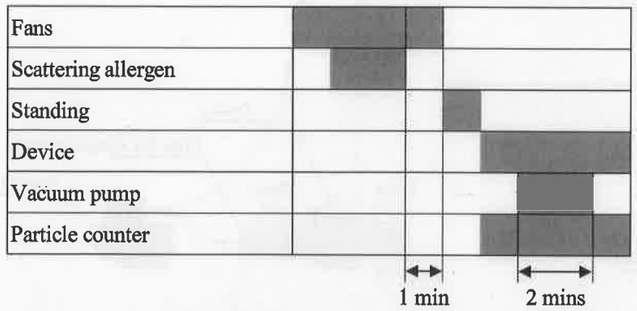

Fig 1-2. Sequence of the test

1-5. Result

Table 1-1. The number of particles in the air at the front and back points of the device

Test division	Measurement point	≧0.3 μm	≧0.5 μm	≧1.0 μm	≧2.0 μm	≧5.0 μm
Device on	Front	203,214	173,917	103,441	41,523	28
	Back	23,036	3,594	301	50	0
	Decreasing rate (%)	88.7	97.9	99.7	99.9	100.0
Device off	Front	204,297	175,326	105,003	42,713	24
	Back	197,395	159,286	88,566	32,626	18
	Decreasing rate (%)	3.4	9.1	15.7	23.6	27.1

Decreasing rate (%) = (X-Y) / Y × 100

X: Particle numbers in the front of device

Y: Particle numbers in the back of device

Table 1-2. The Amount of cat allergen, Fel d 1 in the air at the back point of the device（pg/L）

Test division	Initiatial amount	Back point
Device on	501.0	10.7
Device off	483.2	452.3

1-6. Addition The results of this test were not able to be compared with that of other experiments and tests.

Test period: July 5, 2016 – July 11, 2016

2-1. Test name　Investigation of ragweed pollen allergen in the air decreasing effect of air cleaning device

2-2. Sample

Sample name　Air cleaning Device for MSZ-JL, LN（Below is written device）

Control　Device turned power off（Below is written device off）

Wind speed when passing through device
1 m/s

2-3. Method　The device was attached to a chamber (1 m^3) and the equipment of one pass air flow was set up (fig. 2-1). Test material containing a target allergen was scattered with a nebulizer into the chamber in which 4 fans were put. With stirring the material in air by the fans, the air was vacuumed to pass through the device and the material in the air was caught on a glass fiber filter. Ragweed allergen Amb a 1 on the filter was extracted and measured by ELISA. The number of particles in the air at the front and back points of the device was also counted by two particle counters. The same procedure was followed in the case of control.

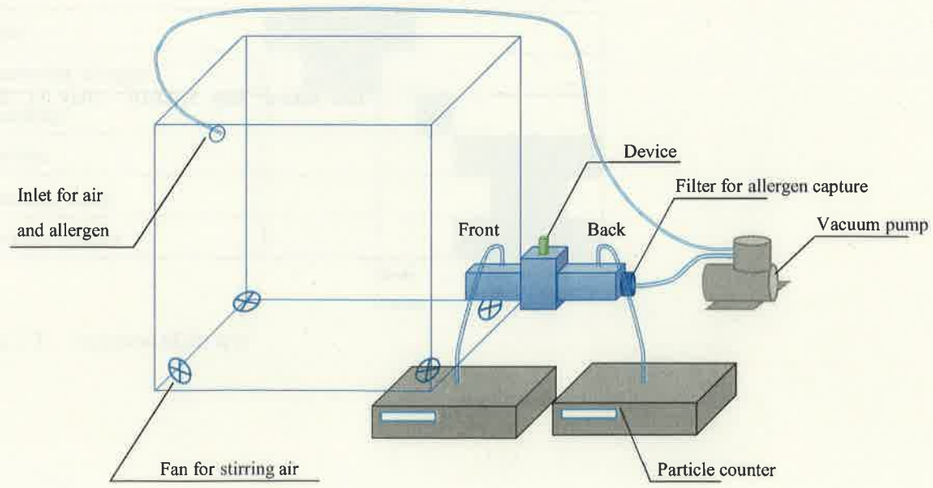

Fig 2-1.　Equipment for the test

2-4. Test condition

Target allergen	Ragweed pollen allergen Amb a 1
Test material	Ragweed Pollen Extract（Product No. 10115, ITEA）
Dose of material	10 μg as Amb a 1
Caught air volume	Approximately 60 L
Allergen measurement	Sandwich ELISA
Filter for allergen	Glass Fiber Filter（GA-55, ADVANTEC）
Particle counter	KC-52、RION（belongings of Mitsubishi Electric Corporation） Flow rate　0.28 L/minute Particle size　≧0.3、≧0.5、≧1、≧2、≧5 μm
Temperature	25℃
Humidity	Without artificial control（It is wrote on Appendix）
Sequence of the test	See fig. 2-2

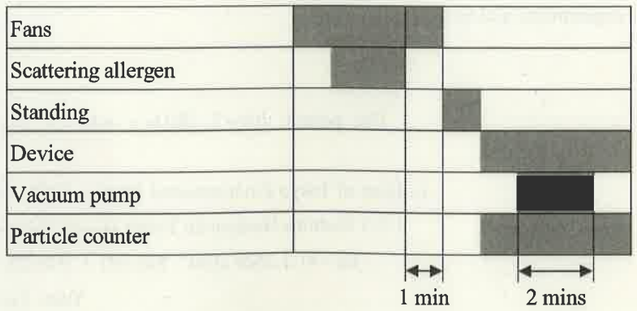

Fig 2-2.　Sequence of the test

2-5. Result

Table 2-1. The number of particles in the air at the front and back points of the device

Test division	Measurement point	≧0.3 μm	≧0.5 μm	≧1.0 μm	≧2.0 μm	≧5.0 μm
Device on	Front	200,721	163,712	88,092	29,132	16
	Back	14,129	2,087	191	26	0
	Decreasing rate (%)	93.0	98.7	99.8	99.9	100.0
Device off	Front	206,533	179,024	108,406	44,430	28
	Back	199,508	162,801	92,109	34,524	24
	Decreasing rate (%)	3.4	9.1	15.0	22.3	12.7

Decreasing rate (%) = (X-Y) / Y × 100

X: Particle numbers in the front of device

Y: Particle numbers in the back of device

Table 2-2. The Amount of Ragweed pollen allergen, Amb a 1 in the air at the back point of the device (pg/L)

Test division	Initiatial amount	Back point
Device on	480.2	<7.4*
Device off	604.8	463.3

* Below the limit of detection

2-6. Addition

The results of this test were not able to be compared with that of other experiments and tests.

Test period: July 5, 2016 – July 11, 2016

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Appendix

Table S1. The temperature and humidity in the chamber when testing

Allergen	Test devision	Beginning		End	
		Temperature (℃)	Humidity (%RH)	Temperature (℃)	Humidity (%RH)
Cat	Device on	29.2	40.0	28.9	42.8
	Device off	27.7	41.4	27.8	43.6
Ragweed pollen	Device on	27.8	42.5	27.8	44.3
	Device off	27.8	43.1	27.7	45.6

Table S2. The difference between particle counter (PC) 1 and PC2
(The average data for ten measurements)

Counter No.	≧0.3 μm	≧0.5 μm	≧1.0 μm	≧2.0 μm	≧5.0 μm
PC1	16,839	1,185	115	32	3
PC2	17,224	1,185	115	32	2
Ratio	0.98	1.00	1.00	1.01	1.87

* Ratio = PC1 / PC2

PC1: Measured at the front of the device

PC2: Measured at the back of the device