



Plasmacluster Ions

**Verifications of Effectiveness from
Various Outside Organizations**

August 7, 2003

Air Conditioning Systems Division

Car Manufacturer

Indoor Mold Fungi Inactivation Test Using Plasmacluster Ion Air Conditioner

Corporate Profile

One of major Japanese car manufacturers whose vision is "Enrich People's Life". They contribute to global society through creation of attractive cars, efforts to protect environment and pursuit of safety.

Background of the Technology Application

While they are searching for new features to improve air quality of inside the cars, they approved high performance of air conditioner with Plasmacluster Ion as results of experiment.

Measurement Location
Indoor of automobiles

Measurement Method

Assuming daily shopping or commuting is 30 minutes one way, operated ion generator 15 minutes. As total, operated ion generator 30 minutes per day for roundtrip. After that, measured settling microbes in 10cm x 10cm area on dashboard. Repeated the process for 1 month and compared the results of Plasmacluster ON/OFF.

Measured Microbes
Fungi, molds

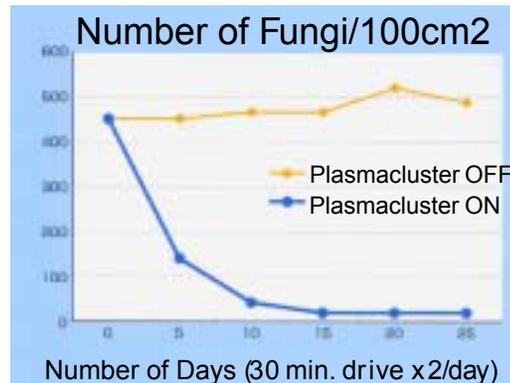
Tested Model
Plasmacluster Ion Air Conditioner for automobiles



Plasmacluster Ion A/C Indicator



Maintain number of indoor fungi below 1/10



Dialysis Center

Settling Microbes Inactivation Test Using Plasmacluster Ion Air Purifier

Facility Profile

Outpatient dialysis center which is capable of simultaneous dialysis to 120 patients. Utilizing state-of-the-art health care technology, they focus on rehabilitation with measures for complication circulatory organs, digestive system, fairing, etc.,

Background of the Testing

While they are searching for counter-measure for airborne fungi in CAPD room, they tried FU-80BCD and competitor's air purifier. Good results of Plasmacluster ions were verified.

Measurement Location

Patients' room (large room)

Measurement Method

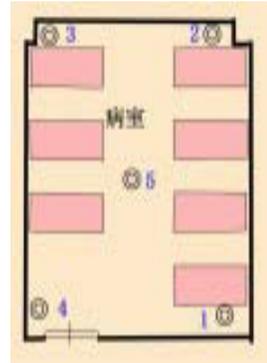
Installed FU-80BCD in peritoneal dialysis room to run 24hours. For comparison, installed electrostatic precipitation air purifier of competitor. Room door was opened, air conditioned. Number of settling microbes on agar before/after air purifier operation were measured after the microbes were cultured for 1 week.

Measured Microbes

Airborne settling microbes

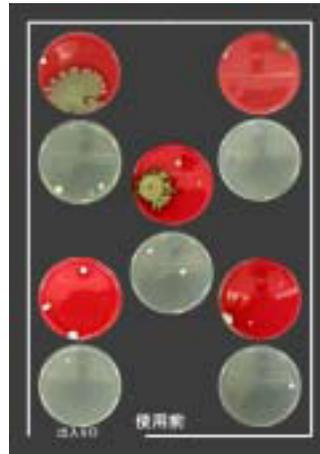
Tested Model

Plasmacluster Ion Air Purifier FU-80BCD



Location: Patient room
 4 corners and center
 Patients: 5-6 patients
 (No movements restricted)
 Measured Time: From 10:00am-10:30am
 Room Door: Opened
 Air Conditioning: Low (temp. 25 deg.C)
 Humidifier: ON (humid. 40%)
 Air Ventilation: ON (air flow:350m3/h)
 Window: Closed
 Room Capacity: 96m3

Before Use



SHARP (FU80BCD)



Competitor's Model



	Blood Agar			Sabouraud Agar		Total
	G + C	G + B	G - B	others	Fungus	
Before Using A/P	6	10	0	1	7	24
SHARP's A/P	1	1	1	0	1	4
Competitor's A/P	2	6	3	1	2	14

The results were announced at Japanese Association Of Dialysis Physicians on June 21, 2003

Sanitary Service

E.Coli Bacteria Inactivation Test Using Plasmacluster Ion Air Purifier

Corporate Profile

Specializes in sanitary services for toilets and kitchens. Installs revolution of toilets, "Calmic Unit" (sanitizer) in toilets of famous companies. Offers rentals to more than 70,000 public organizations, companies and hospitals.

Background of the Testing

Upon acceptance of Plasmacluster air purifiers, they conducted verification test.

Measurement Location and Date
Bioclean room of a medicine laboratory
(November 21-22, 2002)

Measurement Method

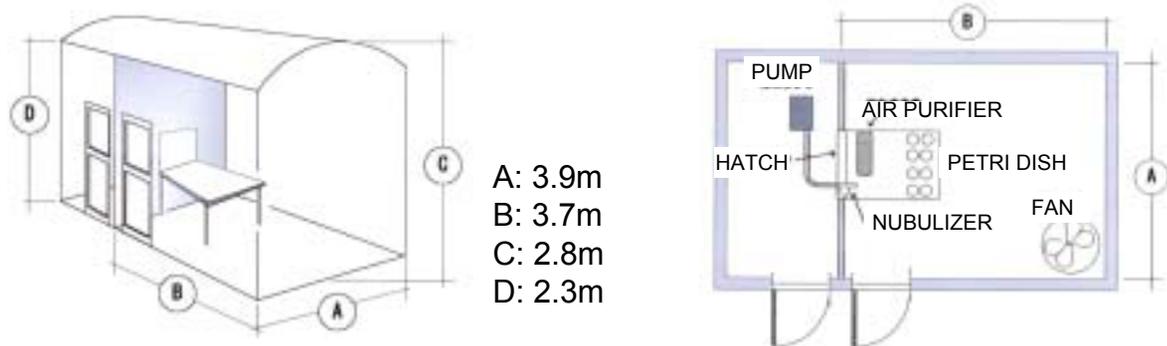
Sprayed E-Coli. in bioclean room for 40 min and circulated room air with a fan. Right after E-Coli was sprayed, took the first sample, then operated Plasmacluster ion, then took samples every 1 hour three times. Petri dish were opened for 10 min. and the microbes were cultured 24 hours in 37 deg.C. The first day with Plasmacluster ions and the second day without Plasmacluster ions.

Measured Microbes

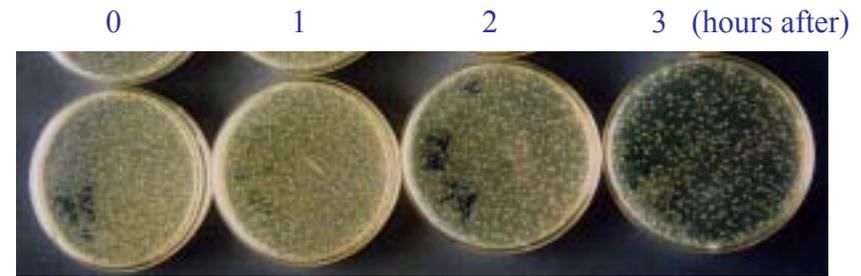
E-Coli

Tested Model

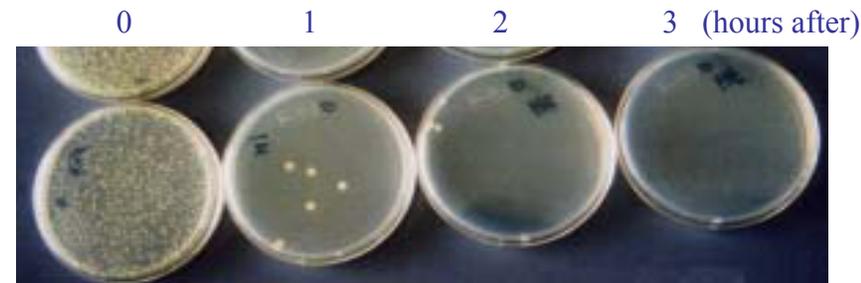
Plasmacluster Ion Air Purifier



Without
Plasmacluster
Ions



With
Plasmacluster
Ions



Results

Number of E.Coli was uncountable before operation of Plasmacluster, but the number decreased to 7 and 11 after 1hr Plasmacluster operation, to 4 and 1 after 2 hours, to 3 and 0 after 3 hours. On the contrary, number of E.Coli in the samples without Plasmacluster slightly decreases as time passes but still uncountable after 3 hours.

Food Manufacturer

Settling Microbes Inactivation Test Using Plasmacluster Ion Air Purifier

Corporate Profile

Manufactures food such as pound cakes

Background of introduction

While they are searching for more effective means to remove fungi from production line, they tried a commercial use air purifier FU-80BCD, which was recommended by a sanitary management equipment dealer. They decided installation after they verified its effectiveness with specialized testing organization.

Measurement Location and Date

Food factory
March 18 & 24, 2003

Measurement Method

Put 5 petri dish with agar inside in 5 places of the factory. Took air samples before & after Plasmacluster operation. The microbes were cultured for 7 days in 30 deg.C, 80-90% humidity.

Test Organization

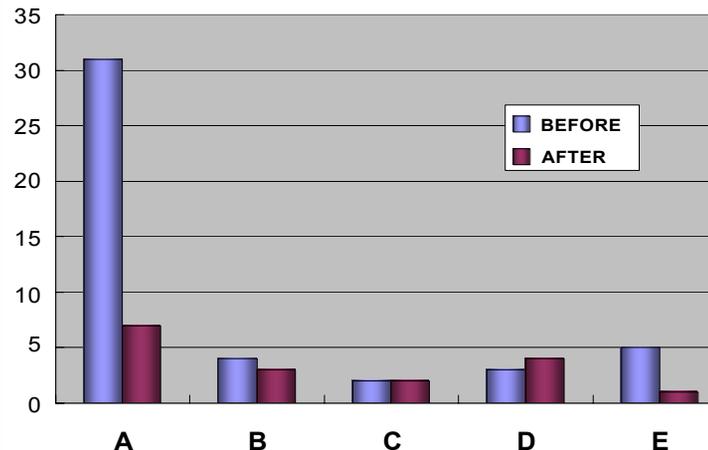
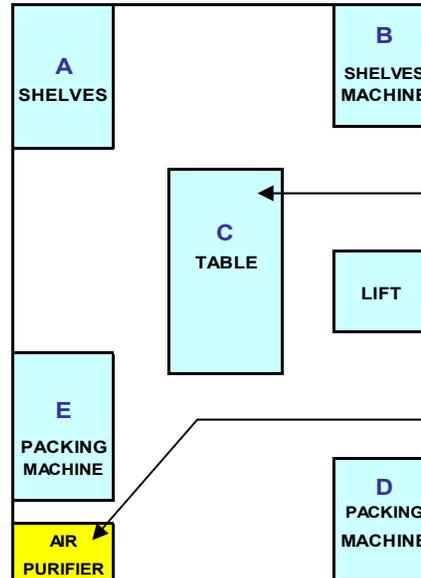
Food Packaging Laboratory of a trading company

Measured Microbes

Settling microbes

Tested Model

Plasmacluster Ion Air Purifier FU-80BCD



Compare Number of Settling Microbes

Unit: Number of settling microbes per petri dish

Nursery Home

Settling Microbes Inactivation Test Using Plasmacluster Ion Air Purifier

Facility Profile

Special elderly nursing home

Background of Installation

While they measured airborne bacteria in their facility to study effective means of removal, they compared Plasmacluster air purifier and electrostatic precipitation air purifier. They decided to install Sharp air purifier because of the good test results.

Measurement Location and Date

Patients room and hall on the second floor
April 22-23, 2003

Measurement Method

Environment Systems Div. JAMCON Corp.

Measurement Method

After 10 minutes suction of 1,000 liters air using PBI air sampler HIVAC petri, counted number of cultured bacteria.

Measured Microbes

Airborne bacteria

Tested Model

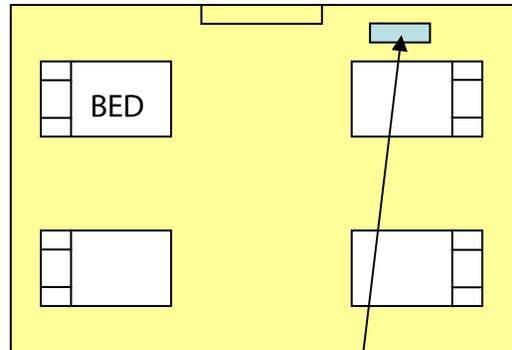
Plasmacluster Ion Air Purifier
FU-N51CX and FU-80BCD

Patients room on 2nd Floor

Conditions: FU-N51CX

Operate 24 hours in MEDIUM fan speed

Approx.36m² (6.6m x 5.4m)

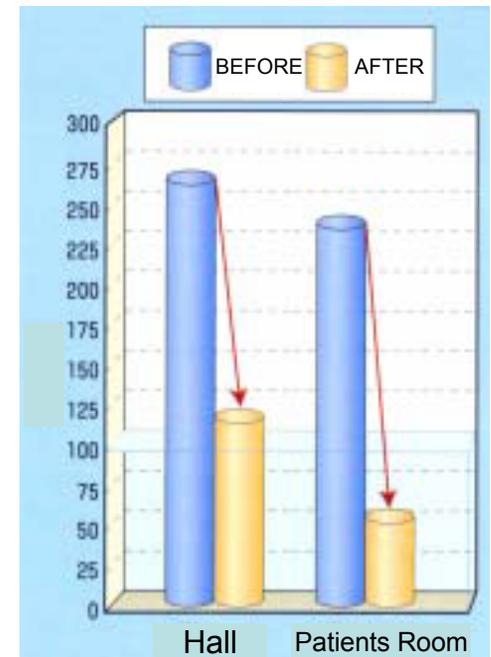


Hall on 2nd Floor

Conditions: FU-80BCD

Operate 24 hours in

MEDIUM fan speed



A/C Maintenance

Legionella Pneumophila Inactivation Test Using Plasmacluster Ion Generator

Corporate Profile

Provides maintenance service including installation of air conditioning equipments into buildings with special rooms such as bioclean rooms. For hospitals, they also conduct measurement/diagnosis of microbes, airborne dust, radiation ray, etc.

Background of the Testing

In order to provide air purifiers to their clients as a part of their business, they experimented inactivation of legionella bacteria using Plasmacluster ion generator.

Measurement Location and Date

Inside of cooling tower miniature model
May 8, 2003

Measurement Method

Circulated water with legionella bacteria inside water tower model, then sprayed the water into enclosed space of 83 litter plastic container. Increased humidity to 90% then sample 100-200 liters air using perforated plate air sampler. Compared the number of bacteria with/without Plasmacluster ions.

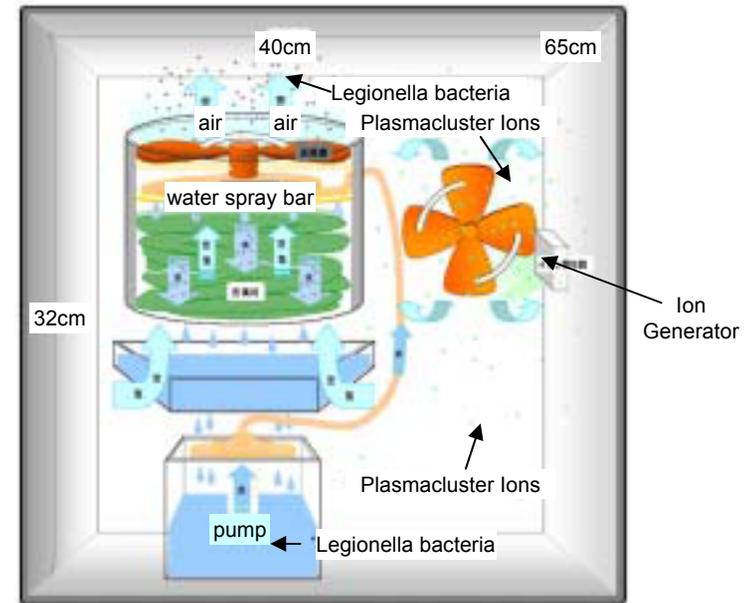
Measured Microbes

Legionella pneumophila

Tested Model

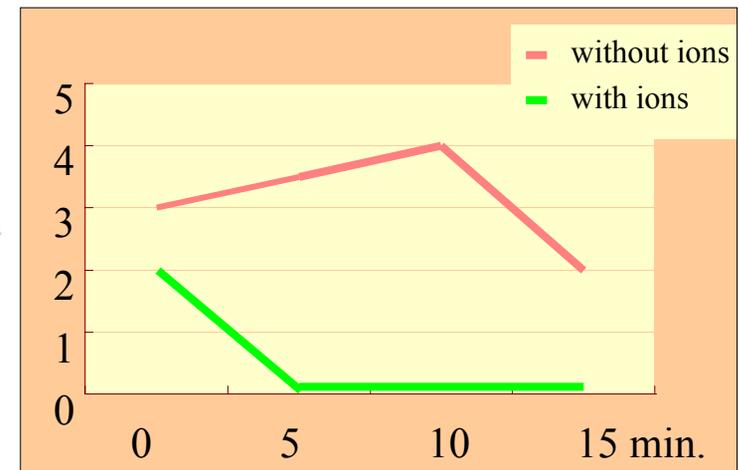
Plasmacluster Ion generator

Cooling Tower Model



Time-Lapse Change

Number of Airborne Legionella Pneumophila during Operation of Cooling Tower



Airborne Fungi Inactivation Test Using Plasmacluster Ion Air Purifier

Corporate Profile

Founded in 1954 as manufacturer of medicines for medical use such as infection medicines, external medicines. Established solid status especially in gynecology field for hormone drug, antibiotic, and diagnostic products. The started over-the-counter trading for their stock in 1995.

Background of the Testing

To verify effects of Plasmacluster ions, conducted testing in unpacking room of medicine factory.

Measurement Location and Date

Unpacking room of materials
 May 28, 2003 (without Plasmacluster)
 June 3-4, 2003 (with Plasmacluster)

Measurement Method

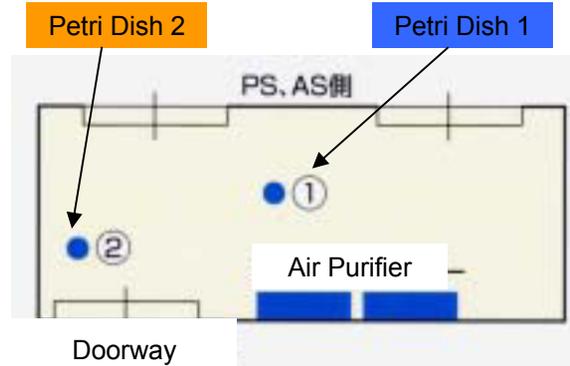
Put a petri dish in the center of the room and the other near the doorway. Took samples during unpacking, 30 min. after, and 60 min. after for 3 conditions; 1 unit with ions, 2 units with ions, 1 unit with fan only. Counted number of cultured fungi.

Measured Microbes

Airborne fungi

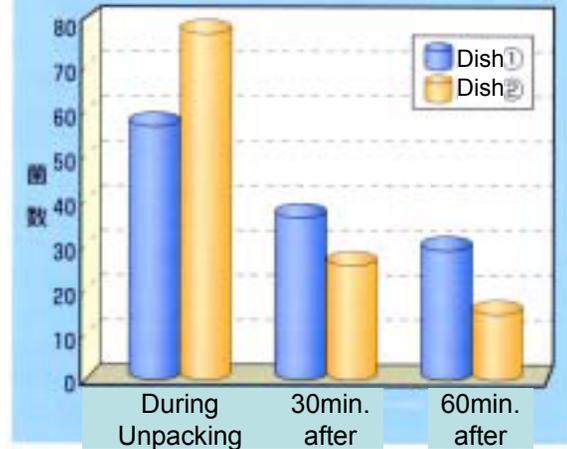
Tested Model

Plasmacluster Ion Air Purifier



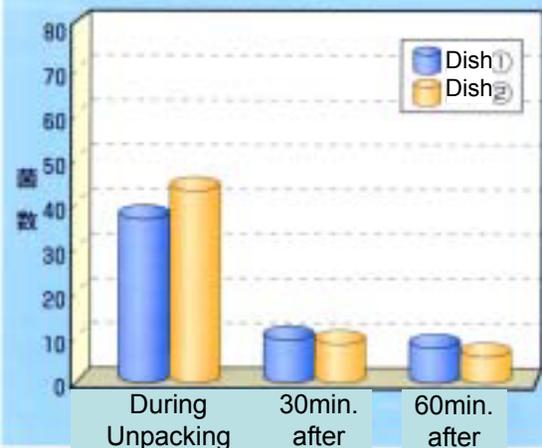
Air Purifier 1 unit without ions (Fan Only)

Tested: May 28 Measured: June 5



Air Purifier 1 unit with ions generated

Tested: June 3 Measured: June 11



Air Purifier 2 units with ions generated

Tested: June 4 Measured: June 12

