



When Samsung's cutting-edge technology designs the air you breath

Imagination *lives*

Breathe fresh, pure and healthy air with revolutionary air sterilization products from Virus Zero featuring Samsung's award winning SPI technology.



The Virus Zero Portable Air Sterilizer uses award-winning Samsung's S-Plasma Ion Technology to sterilize rooms up to 231 square feet without the need for any replacement filters. The included car adapter allows you to keep the air in your car clean on your daily commutes and vacation road trips. Samsung's new S-Plasma ion technology is capable of:

- Eliminating allergens, fungi, bacteria, and mold
- Neutralizing active oxygen radicals
- Quickly eliminating airborne viruses
- Filterless air sterilization

Type	Portable
Coverage	231 sq. ft.
Filter	Not applicable
Energy Consumptions	4 watts
Noise Level	29 dba
Life Cycle	10 years
Warranty	1 year
Size	2.5" x 6.3"
Input Voltage	AC 110V, DC 13V (Vehicle)
Included	Home Power Adapter Automobile Power Adapter



The Virus Zero Wall/Ceiling Air Sterilizer uses award-winning Samsung's S-Plasma ion Technology to sterilize rooms up to 1,166 square feet without the need for any replacement filters. This model is perfect for mounting onto the ceiling to provide clean air to large living areas without creating an eye sore. Samsung's new S-Plasma ion technology is capable of:

- Eliminating allergens, fungi, bacteria, and mold
- Neutralizing active oxygen radicals
- Quickly eliminating airborne viruses
- Filterless air sterilization

Type	Wall and Ceiling Mount
Coverage	1,166 sq. ft.
Filter	Not applicable
Energy Consumptions	16 watts
Noise Level	29 dba
Life Cycle	10 years
Warranty	1 year
Size	15.7" x 15.7" x 3"
Input Voltage	AC 110V
Included	Home Power Adapter Remote Control Wall Mount Kit



**Imagine your world with only clean, pure and healthy air.**

Virus Zero introduces Samsung's unique cutting edge SPi technology in its air sterilization family of products.



## Why is SPi Needed?

### SPi protects us from harmful air contaminants

Harmful air contaminants are in the air we breathe. Many of us suffer from respiratory related diseases caused by many factors: viruses, mold, allergens, bacteria and pollutants like smoke and smog. Virus Zero and Samsung's SPi technology neutralizes these contaminants providing us with clean, healthy air.

## Harmful air contaminants

### Biological contaminants

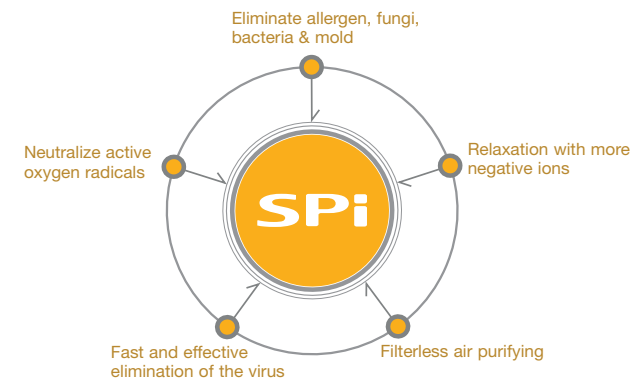
Every year, large numbers of the world's population suffer from allergies, asthma, rhinitis and other respiratory diseases. Airborne biological contaminants such as MRSA, Influenza virus and Corona virus also threaten our quality of life.

### OH-radical

OH-radical is one of the most reactive oxygen species. The oxidation products of OH-radical when combined with Volatile Organic Compounds (VOC) irritants in the air around us can produce irritants which may be responsible for reported eye and airway complaints, potent contact allergens and even asthma.

## SPi - helps keep you safe from air contaminants

Virus Zero products featuring SPi technology create improved indoor air quality by eliminating biological contaminants and by neutralizing the OH - radicals. The unique environment-friendly technology of SPi surpasses that of previous air purifiers. While purifiers simply filter the inducted air, SPi emits active hydrogen and oxygen ions into the air inhibiting infection by airborne viruses and destroying airborne bacteria, fungi and allergens for a much cleaner, healthier environment.







## How Does SPi Work?

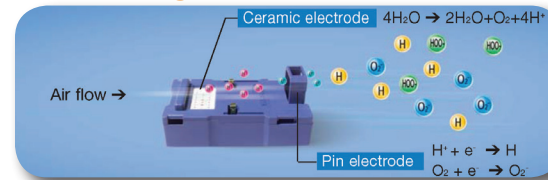
### Effective sterilization

Virus Zero featuring SPi technology generates and actively releases active hydrogen and oxygen ions which reduce/eliminate biological contaminants and harmful active oxygen in the air. The process of eliminating these harmful substances is completely safe and harmless to the human body.

## How are H and O<sup>2-</sup> Created?

- **Ceramic electrode (+ electrode):** The SPi micro plasma discharger splits water molecules in the air and forms positively charged active hydrogen (H<sup>+</sup>).
- **Pin electrode (- electrode):** The SPi high-voltage electric discharger emits electrons which react with H<sup>+</sup> and O<sub>2</sub> to form active hydrogen (H) and oxygen ion (O<sub>2</sub><sup>-</sup>).
- **Newly generated active hydrogen (H) and the oxygen ions (O<sub>2</sub><sup>-</sup>) forms hydroperoxy radical (HOO<sup>-</sup>).**

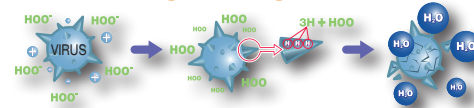
### H and O<sup>2-</sup> generation



## How does Virus Zero and SPi eliminate harmful air contaminants?

Active hydrogen atoms and oxygen ion form Hydroperoxy radicals (HOO<sup>-</sup>) which surround the positively charged biological contaminants, and then react with three hydrogen elements of its protein structure, forming water vapor. Also, the active hydrogen (H) combines with OH-radical to form water vapor, thus neutralizing harmful OH-radical.

### Eliminating biological contaminants



### Neutralizing OH-radical





## Effectiveness of the SPi

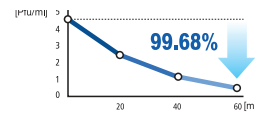
### Health Effects from Biological Contaminants

Samsung's SPi technology found in all Virus Zero products, is certified by many academic research organizations for its effective reduction and up 99.9% elimination (in lab tests) of the biological contaminants and OH-radical. The patented SPi technology helps provide a healthier air environment safe from harmful irritants and contaminants that pollute the air we breathe.

## Inactivation of biological contaminants

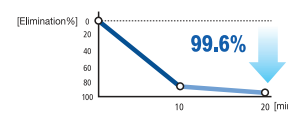
### INFLUENZA VIRUS

Airborne Influenza Virus, which is the most common virus, was eliminated up to 99.6% by the SPi device.



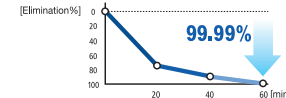
### CORONA VIRUS

Corona Virus, which is equally serious as SARS, was eliminated by SPi up to 99.6% within 20 minutes.



### MRSA

Methicillin-Resistant Staphylococcus Aureus, which is tough to eliminate even with the antibiotics, was eliminated 99.99% with the SPi device.



### ALLERGEN

Efficiently eliminates the allergens such as the mites, dust and animal hair which cause rhinitis, asthma, fever and rash etc.



## SUPERIOR PERFORMANCE

### BACTERIA TEST RESULT (STAPHYLOCOCCUS AUREUS)

#### SPI



2.4 x 10<sup>6</sup>cfu/300L air      7.3 x 10<sup>4</sup>cfu/300L air

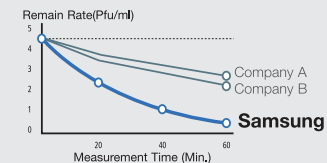
#### Conventional



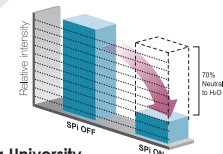
2.4 x 10<sup>6</sup>cfu/300L air      3.0 x 10<sup>6</sup>cfu/300L air

- Chamber size: 900(W)x500(D)x600(H)
- Air Suction rate: 300 Liter air/3 mins
- Tested by Samsung

### VIRUS TEST RESULT (INFLUENZA)



- Department of Biotechnology in Yonsei University
- Temperature: 25°C
- Relative Humidity: 51~60%,
- Chamber size: 1m<sup>3</sup>



Hiroshima University  
 Temperature: 24°C  
 Relative Humidity: 50%  
 Measurement Method: LIF(Laser Induced Fluorescence)

## Inactivation of biological contaminants

OH-radical can cause aging and skin diseases. Hiroshima University's test verified that the active oxygen concentration level decreased significantly by the SPi-generated active hydrogen atom (H) which reacts with the active oxygen (OH-radical) to form a water molecule.





## Certified Effectiveness of Samsung's SPi technology

### Tested and proven effective by many academic research organizations

Lab tests demonstrate that SPi technology can inactivate and eliminate up to 99.99% of biological contaminants and OH-radical in lab environments. Results also show that Virus Zero products and the SPi device are safe for everyday use.

## Inactivation of biological contaminants

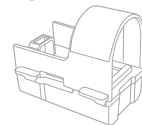
Effectiveness certified by specialized research centers

Substance	Effectiveness	Certified by
Influenza virus type A	99.7% Elimination	Kitasato Environmental Science Center
	99.6% Elimination	Yonsei University
Corona virus (Strain of SARS-Corona Virus)	99.6% Elimination	Kitasato Medical Center
Penicilium	98.4 % Elimination	
Aspergillus	96.4 % Elimination	
Cladosporium	98.9 % Elimination	
Staphylococcus aureus	99.96 % Elimination	Kitasato Environmental Science Center
Micrococcus	99.86 % Elimination	
MRSA <sup>1</sup> (Antibiotic resistant nosocomial pathogen)	99.99% Elimination	
Mold - Staphylococcus aureus/E. coli	99.99% Elimination	Korea Consuming Science Research Center
Allergen (Dust Mite, Cat/Dog Allergen)	Effectiveness Certified	Acquired BAF <sup>2)</sup> (U.K) Seal
	Effectiveness Certified	RTI <sup>3)</sup> Test (U.S.A)
Indoor contaminants	over 90% Elimination	Shanghai Ji-Kong Assessment Center for safety and health
Animal toxicity test	Non-toxic	Seoul Toxicology Laboratory
Active hydrogen atom	Active hydrogen formation verified	Hiroshima University
OH-radical	Active oxygen neutralized	

1) **MRSA**: Methicillin-resistant Staphylococcus aureus (antibiotic resistant nosocomial pathogen)

2) **BAF**: British Allergy Foundation (certification institute)

3) **RTI**: Research Triangle Institute (allergy research institute,USA)



**VIRUS ZERO™** featuring **SPi** Samsung Super Plasma Ion from **SAMSUNG**



## Safe technology for everyday use

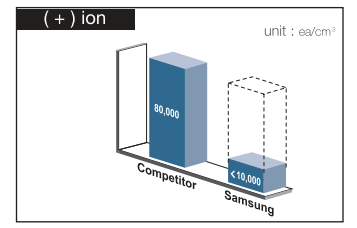
### Environmentally friendly technology - with a little piece of mind

SPI technology featured in the Virus Zero family of products is shown to be safe to the human body and Samsung's Green Management policy established it as an eco-friendly device. Safe and effective - a winning combination!

### Free from the effects of harmful positive ions

Positive ions cause discomfort and symptoms such as headaches and nausea and can make breathing more difficult.

**Measurement distance:** 1m  
**Concentration level:** (ea/cm<sup>3</sup>)



### Free from the effects of toxicity

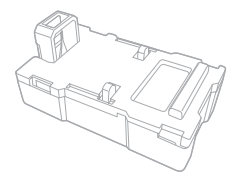
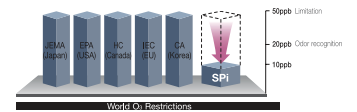
The Seoul Toxicology Laboratory has tested SPI technology showing that it's safe to the human body. There were no signs of toxic symptoms observed in animal testing and no side effects of the SPI device on respiratory organs.



\*Tested and certified by Seoul Toxicology Laboratory

### Free from the effects of ozone

Samsung's ozone regulation is much stricter than that of many organizations around the world. Samsung controls the ozone emission level less than 10ppb. Ozone odor is undetectable.





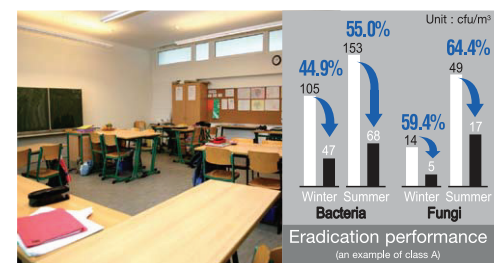
## World Recognized Technology

### A breakthrough in air sterilization technology

The most advanced environmental technology that can eliminate up to 99.99% of viruses and other air contaminants. Virus Zero with SPI technology can purify your air for healthy living.

## Educational facilities verification

Tested by Hanyang University Environmental and Industrial Medicine Laboratory



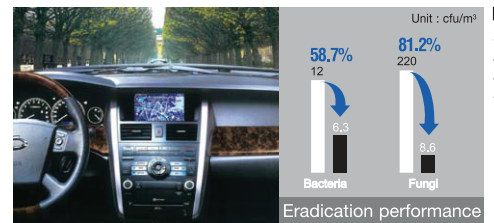
**Elimination efficiency test result**

Item	Bacteria				Fungi				
	A	B	C	D	A	B	C	D	
Room Space (m)	48	48	50	48	48	48	50	48	
Number of installed SPI	2		1		2		1		
Winter	SPI Off (cfu/m)	105	91	107	41	14	20	10	17
	SPI On (cfu/m)	47	40	61	28	5	6	5	12
Summer	SPI Off (cfu/m)	153	82	127	60.8	49	96	45	31
	SPI On (cfu/m)	68	43	61	30	17	56	23	20
Elimination Rate(%)	Winter	44.9	50.4	42.9	30.4	59.4	49.2	44.8	31.6
	Summer	55.0	50.8	47.1	46.1	64.3	52.0	49.6	42.7

- Date measurement : Winter(December, 2007), Summer(May-July, 2008)
- Place of measurement : Seoul Special School
- Measurement instrument : BioCulture (Impaction sampling method)
- Measurement Method : Measured when off, and 3 hours after on

## Car verification

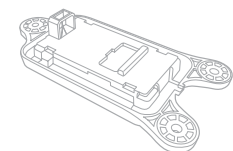
Tested by Hanyang University and EHN



### Measurement method

SPI performs superbly in airtight environments such as cars, airplanes, and elevators. Test result for the automobile indoor air showed the 81% of fungi and 58% of bacteria elimination. This fascinating test result brought agreement in supplying and installing the SPI module to a well-known European HVAC manufacturers.

- Test vehicle : 2008 SM7
- Conditions : Vent Mode, Blower (2/7)
- Air Sampler : Middle of the front seat
- Test time : Twice daily (SPI ON: 30min/ SPI OFF: 30min)



## World-known bacterial eradication performance



**SPI was installed in Renault Samsung motor**  
SPI is installed in high-end Renault Samsung automobiles to reduce toxins in its closed space.



### SPI was chosen as a part of the "Airliner cabin environment research project"

ACER (Airline Cabin Environment Research) is funded by the US government to find a way to reduce contamination in airplane cabins. Samsung's SPI technology was the only overseas solution chosen, validating its safety and effectiveness.





## Examples of Application

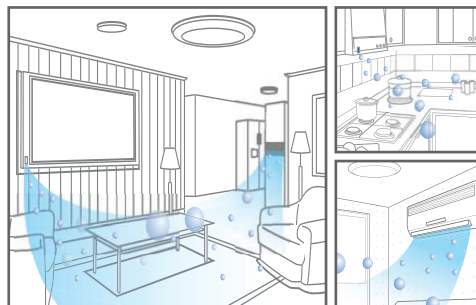
### Let your imagination run wild

Imagine a space relatively free of bacteria, mold and other contaminants. Let your new Virus Zero product with SPi technology clean the air you breathe.



### Spi in Living spaces

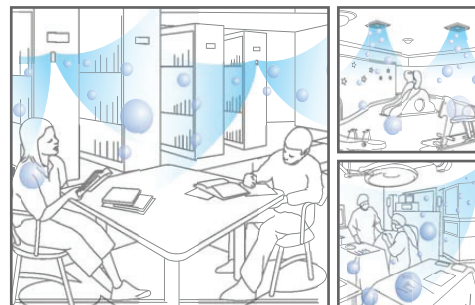
- |                 |                |
|-----------------|----------------|
| Bathroom        | Air cleaner    |
| Bedroom         | Computer       |
| Kitchen         | TV             |
| Stove hood      | Hair dryer     |
| Air conditioner | Water purifier |



The people you love and care about the most spend much of their family time indoors. Nowadays, it is known that indoor air can carry more contaminants from bacteria, mold, viruses, allergens and even contaminants from the building materials used to construct your home. Let Spi give you some piece of mind by protecting the air you breathe.

### Spi in Public spaces

- |              |                  |
|--------------|------------------|
| School       | Hotel room       |
| Auditorium   | Department store |
| Fitness club | Museum           |
| Theater      | Airport lounge   |
| Hospital     | Aquarium         |
| Restaurant   |                  |



The air in public places is more prone to higher levels of contamination due to the sheer numbers of people that pass through these areas. Virus Zero featuring Spi technology helps ensure you're breathing easier by reducing toxins around you.

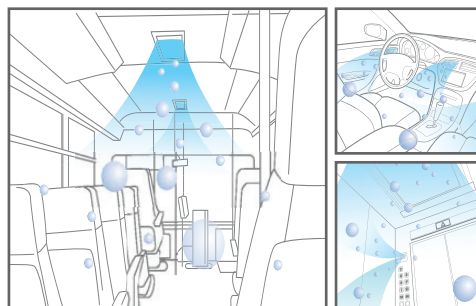






### SPI in Transportations

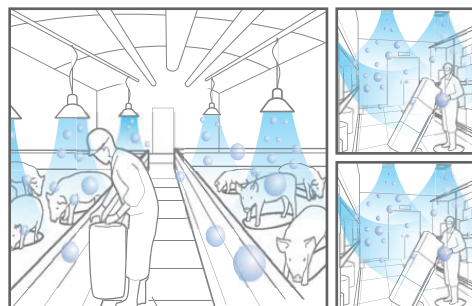
- |                  |           |
|------------------|-----------|
| Automobile       | Air plane |
| Business vehicle | Cruise    |
| Cable car        | Yacht     |
| Ambulance        | Bus       |
| Subway           | Container |
| Train            | Elevator  |



Tight cramped spaces can be contamination hazard zones. Airplanes, minivans, buses and elevators, to name a few, can present air quality challenges. Virus Zero with Spi technology is a proven solution for providing comfortable and healthy indoor environments.

### SPI in Agriculture facilities

- |               |                            |
|---------------|----------------------------|
| Poultry farm  | Food storage warehouse     |
| Swinery       | Organic farming facilities |
| Greenhouse    |                            |
| Flower garden |                            |
| Mushroom farm |                            |



Damp and dark places are most ideal for bacteria and viruses to multiply. Installing Virus Zero with Spi technology in places like animal stalls, storehouses and greenhouses will help create a clean, safe environment.







## World Wide Patents and Certifications

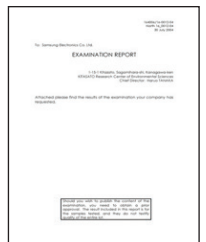
SPI is a unique and effective technology that is certified all around the world. Patents granted from many countries and the certifications obtained from academic research centers prove the effectiveness of Samsung's SPI technology. **Patent** - SPI technology was granted with a patent for generation of active hydrogen (H) from many different countries; 29 patents were granted in Korea alone and 42 worldwide and from counties and continents including China (13), U.S (12), Japan (10) and Europe (7).

**Certifications** - SPI technology was certified by many academic research centers around the world for its ability to eliminate all different kinds of air contaminants and viruses.

\*Based on data from May, 2008



**Elimination of Allergens**  
Acquired BAF (U.K)  
Seal



**Elimination of Influenza virus**  
Kitasato Environmental  
Science Center



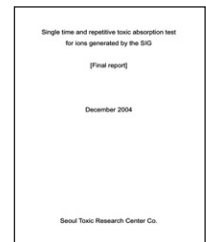
**Elimination of Allergens**  
Kitasato Medical  
Center



**Elimination of Mold, S.aureus/E. coli**  
Korea Consuming  
Science  
Research Center



**Elimination of MRSA**  
Kitasato Environmental  
Science Center



**Animal toxicity test**  
Seoul Toxicology  
Laboratory



**Elimination of Indoor contaminants**  
Shanghai Ji-Kong  
Assessment Center for  
safety and health



**Elimination of S.aureus**  
Kitasato Environmental  
Science Center



**Active hydrogen atom (OH-radical)**  
Hiroshima University