

# AiroDoctor

Next-generation medical grade air purifier  
effectively removing Human Coronavirus



WAD -M20

# Background



## Photocatalytic Filter Technology Proves Effective Against Viruses & Bacteria

Since 2016, the state Korea Institute of Civil Engineering and Building Technology (KICT) has been developing special photocatalytic filter systems. Based on a chemical reaction triggered by UV light and with the help of released negative ions and radicals, these systems purify the air by demonstrably decomposing and neutralizing up to 99.99% of toxins, viruses and bacteria. With AiroDoctor, this filter technology is now also available globally.

During intensive test phases, the effectiveness and application advantages of the photocatalytic filter technology were finally proven. Japanese and South Korean institutes confirm that 99.9-99.99% of E. coli, salmonella, bacteriophages, rotaviruses, noroviruses, influenza and coronaviruses are either destroyed or rendered harmless. This concerns MERS- and SARS coronaviruses and as confirmed by the South Korean research institute KICT, the photocatalytic filter also eliminates the novel coronavirus SARS-CoV-2

Together with leading research institutes and universities in Korea the AiroDoctor was finally developed and launched in 2019, showing successful demonstrations on decomposing and neutralizing up to 99.99% of toxins, viruses and bacteria. The first generation of AiroDoctors were installed in medical emergency centers at the epicenter of Covid-19 outbreak in Daegu, Korea and showed successful results in reducing the germ load in the air. The KICT is currently promoting the development and production of photocatalytic filters. AiroDoctor is using the only air purifying technology that is approved by the Korean government to be used against Covid-19.

## The Problems

# When the air we breathe turns into **A SERIOUS RISK**

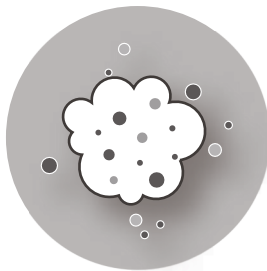
The global risk of virus and bacteria spreading through the air is rising - not only during a pandemic virus outbreak like the Covid-19. Clean air becomes more and more important as polluted air displays a true health risk for everybody. Since we spend about 90% our time in closed rooms and buildings, being constantly exposed to polluted indoor air can develop serious lung diseases or even cancer.



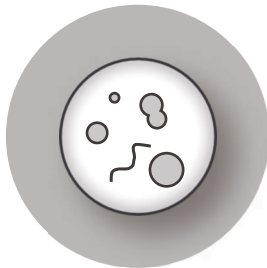
## Healthy indoor air is vital

Indoor air pollution can be 2 to 5 times higher than outside. In many rooms, we breathe in fine toxic dust, harmful gases, allergenic spores, pollen, infectious aerosols from viruses, and bacteria. Substances that over time can cause serious health problems.

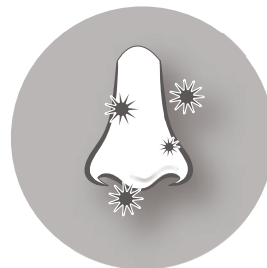
## The Problems



Fine dust, harmful gases and micro emissions from industrial environment and even from the usual house living room are a risk to our health.



Viruses and bacteria in the air can be dangerous to us. Only air purifiers that render germs harmless in the long term will remove this danger.



We spend most of our time in closed rooms. Many air conditioning systems also circulate the pollutant and allergens pathogen load.

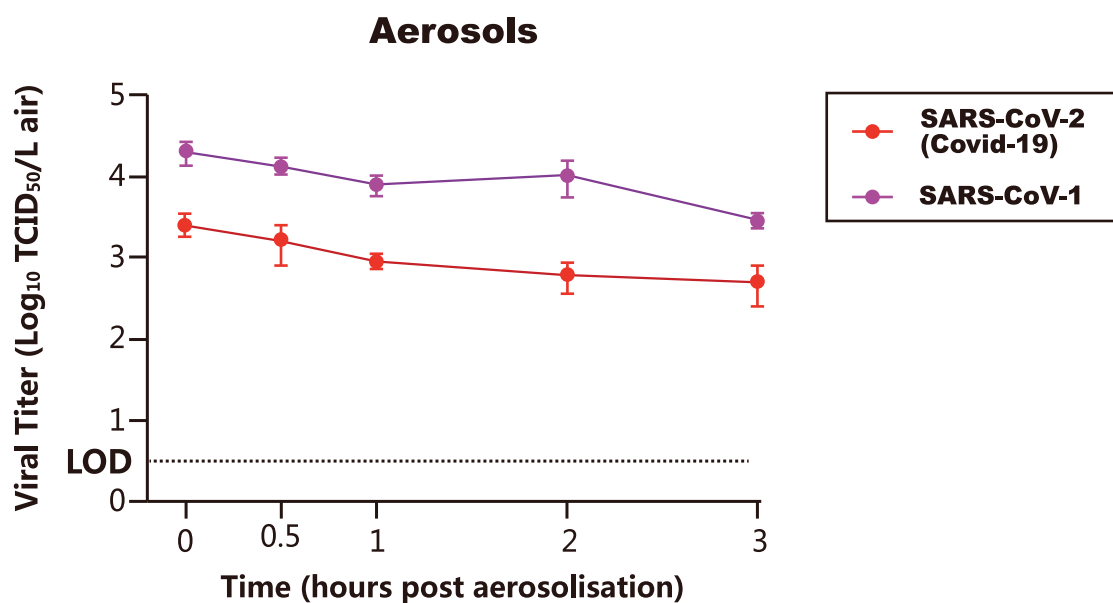


## The Problems

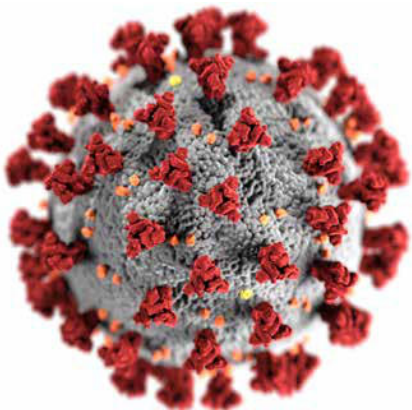
### Viability of SARS-CoV-1 and SARS-CoV-2 (Covid-19) in Aerosols

Scientists at Princeton University, the University of California-Los Angeles and the National Institutes of Health (NIH) posted online Wednesday indicated that the COVID-19 virus could remain viable in the air "up to 3 hours post aerosolization," while remaining alive on plastic and other surfaces for up to three days.

"Our results indicate that aerosol and fomite transmission of SARS-CoV-2 is plausible, as the virus can remain viable in aerosols for multiple hours and on surfaces up to days," reads the study's abstract.



### Detection and Quantification of Airborne Norovirus During Outbreaks in Healthcare Facilities



A study by the Universite Laval in Quebec, Canada shows that the viruses are actually detectable in the air. The research group has examined the air at different locations in eight health care facilities during norovirus outbreaks: The samples from the patients's room (one meter away from the patient) were 54 percent positive.

# AiroDoctor is the solution

Thanks to the innovative UV LED photocatalytic filter. The AiroDoctor is proven to remove viruses, bacteria and odors without harmful residues.

- ✓ Patented photocatalytic titanium dioxide filter
- ✓ Over 99.9 % decomposition of all harmful substances in air
- ✓ Scientifically proven to remove Human Coronavirus
- ✓ No secondary products & no ozone
- ✓ Long service life and low maintenance
- ✓ The medical grade air purifier recognized by the Korean government



Intensive tests carried out by international research institutes have demonstrated the effectiveness and benefits of photocatalytic filter technology: both Influenza and Rota-, Noro- and Coronavirus as well as E. coli, Salmonella and Bacteriophages MS-2 are either destroyed or rendered harmless.





## Filters, destroys, neutralizes

The AiroDoctor is equipped with a filter combination that combats the entire spectrum of air pollution. The pre-filter, airborne particle (HEPA) and activated carbon filter as well as the UV LED photocatalytic filter run at full power against dust particles, odors, bacteria and viruses. For clean and sustainable results, the AiroDoctor absorbs and neutralizes even the smallest particles with a diameter of  $0.1\mu\text{m}$ . This makes the AiroDoctor ideal for healthcare facilities such as hospitals, laboratories, retirement homes and medical practices.

## Fight against all viruses

Viruses are carried by the thousands of droplets released by the breath from infected individuals and move through the air in the form of aerosols. UV LED photocatalytic technology decomposes even the smallest pathogens, including viruses.

In 2020, studies at the US National Institute of Health in Hamilton, Montana, researchers have demonstrated the stability of SARS-CoV-1 and SARS-CoV-2. The coronavirus aerosols can stay in the air for an average of 2.74 hours and thus pose an increased risk of infection.

### Scientifically approved

- Korea Institute of Civil Engineering and Building Technology (KICT/CEVI)
- Kitasato Institute Medical Research Japan



Scan QR code for test reports and certifications



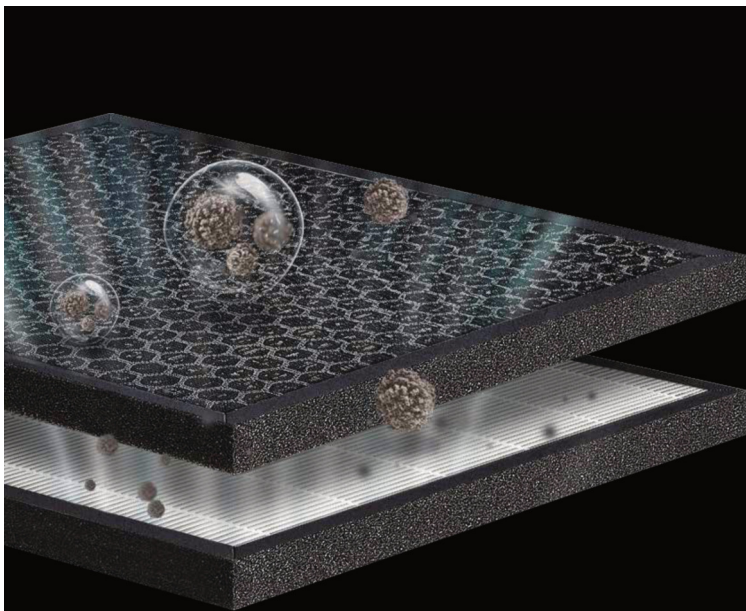
### Activated Carbon Filter

Carbon filtration works by absorption, where impurities are trapped in the pore structure. The substrate is made of carbon granules, which are extremely porous, and this causes the carbon substrate to have a very large surface area, which leads to a high absorption capacity. The carbon filter primarily cleans tobacco smoke, chemicals, odors, pollutants and organic compounds. It also absorbs and converts harmful gases such as ozone or chlorine.

Application field is very wide: water purification, air purification through masks and respiratory, sewage treatment, purification in sugar and gold etc...

### HEPA-filter

The HEPA (High Efficiency Particulate Air) filter has the filtering efficiency level, documented to 99.95-99.97% on particles sized down to 0.3  $\mu\text{m}$  such as; bacteria, pollen and mite droppings as well as mold spores. The particles get caught in the tightly interwoven glass fiber mats. The AiroDoctor uses H13 class HEPA filter which is traditionally used in sensitive rooms such as laboratories, operating rooms and intensive care units.



### Activated Carbon & HEPA Filter

The High Efficiency Particulate Air filter removes particles with a diameter between 0.3 $\mu\text{m}$  and 2.5 $\mu\text{m}$ . The particles get caught in the tightly woven glass fiber mats, which are folded to greatly increase the surface area. Thanks to oxidation processes, the activated carbon filter reduces and absorbs odors and harmful gases such as ozone and chlorine.



# Technical Solutions

## THE SCIENTIFIC PROOF



**Elimination** of E.coli & Salmonella



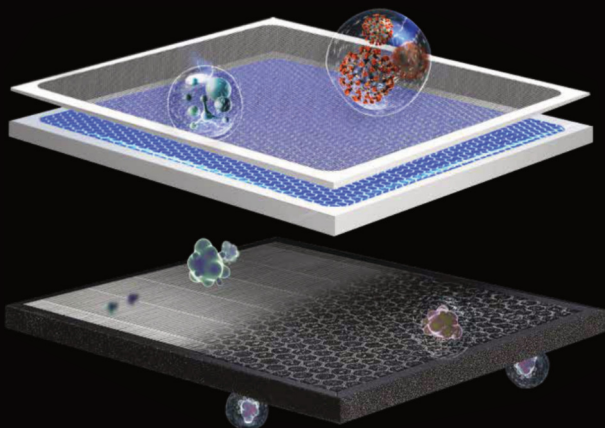
**Elimination** of Human Coronavirus



**Elimination** of Rota-, Noro-Virus & Bacteriophage MS-2

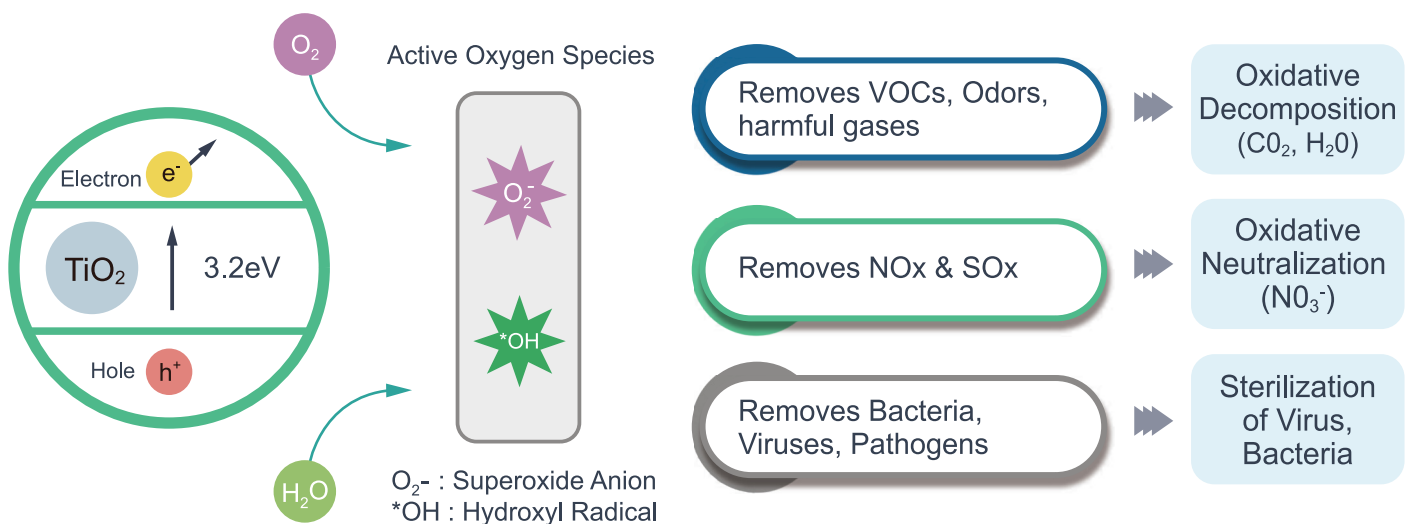
AiroDoctor is a high efficiency medical grade air purifier that is equipped with a patented UV LED solid titanium dioxide photocatalytic filter, which provides clean air that is harmless to the human body by decomposing and removing up to 99.99% of harmful substances, odor, various pathogenic bacteria and viruses in the air.





### Photocatalytic titanium dioxide UV LED Filter

Photocatalysis is a chemical reaction triggered by light. It decomposes organic materials near or in contact with the catalyst surfaces activated by the UV light. Titanium dioxide ( $\text{TiO}_2$ ) is one of the most active catalyst, while the LEDs generate optimized light spectrum for the activation (UV-A).



## Cutting-edge technology

With the patented UV LED photocatalytic titanium dioxide filter, the AiroDoctor is able to cover the entire spectrum of harmful particles. Substances that are not filtered will be destroyed or rendered harmless: Germs, odours and hazardous gases are efficiently eliminated.

Thanks to its fine-pored structure of the titanium dioxide, the AiroDoctor not only keeps the pollutant particles (PM2.5), but also the air flow inside the device for longer. The intentionally increased time in the filter ensures a longer and more effective irradiation time for substances to be destroyed.

The photocatalytic filter is not only coated, but consists of 250 grams of solid titanium dioxide (TiO<sub>2</sub>). It is the only filter of its kind and, thanks to its large surface effect, it is particularly low-wear and durable.

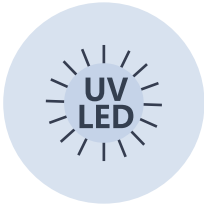


**TiO<sub>2</sub> 250g**

AiroDoctor is currently the only product developed in conjunction with the Korean government research institute for commercial use. Inside AiroDoctor the photocatalytic oxidation (PCO) filter is using 250 grams of solid titanium dioxide, which is the only filter module today that is approved by Korean government to be used against the Covid-19.

**Patent number: 10 -0550088**

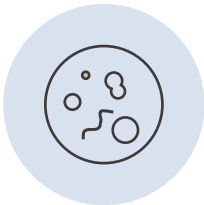
# Why AiroDoctor?



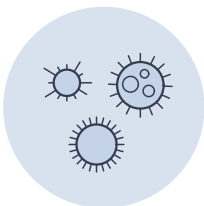
Patented UV LED photocatalytic oxidation filter  
is highly efficient and creates ozone free environment



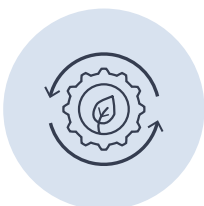
4-stage air purifier that is using solid  $\text{TiO}_2$  balls  
making it the most complete air purifying system in the market



Removes 99.9-99.99% micro dust, mold spores, bacteria and viruses,  
such as influenza, salmonella, E.coli, Rota- Noroviruses and Coronavirus



Filters and breaks down odors, toxins and VOCs into harmless substances



Long service life and low maintenance  
Room size up to  $200\text{m}^2$     CADR up to  $480\text{m}^3/\text{h}$



## Product

	Entry-level Air Purifier	Mid-level Air Purifier	Professional Air Purifier	AiroDoctor Air Purifier
<b>Prefilter</b> (Course particals; dust & hair)	○	○	○	○
<b>HEPA-filter</b> (Fine dust & pollen)	○	○	○	○
<b>Active carbon filter</b> (Smells & gases)		○	○	○
<b>UV LED/Titanium dioxide coating</b> (Bacterias, virus & harmful gases)			○	○
<b>UV LED/Solid titanium dioxide balls</b> (Bacterias, virus & harmful gases)				○

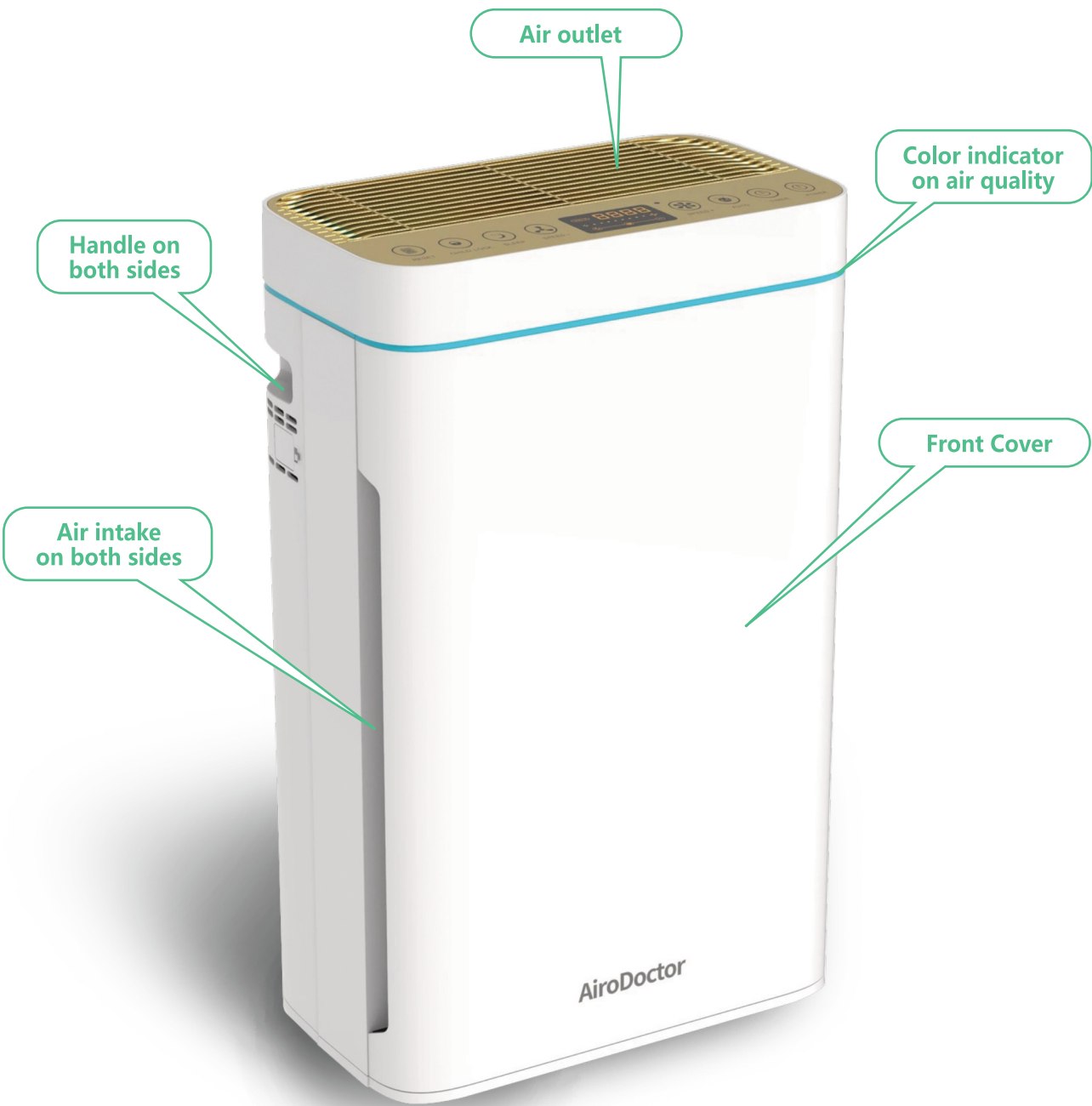
## Advantages and Features of the Photocatalytic Filter Technology

Compared to conventional filter technologies, which absorb even smallest particles to accumulate them in a filter fabric, photocatalysis destroys the accumulated toxic gases and germs without leaving any harmful residues. This prevents a renewed emission of the pollutants and pathogens, as for example during transport or maintenance. Another advantage of the patented photocatalyst technology is that it has an extremely long service life; it shows hardly any signs of wear and tear and it does not require a filter change. In addition, the AiroDoctor uses UV LEDs with a narrow-band spectrum instead of UV lamps, whose broadband spectrum has an ineffective wavelength range in the fight against viruses and bacteria.

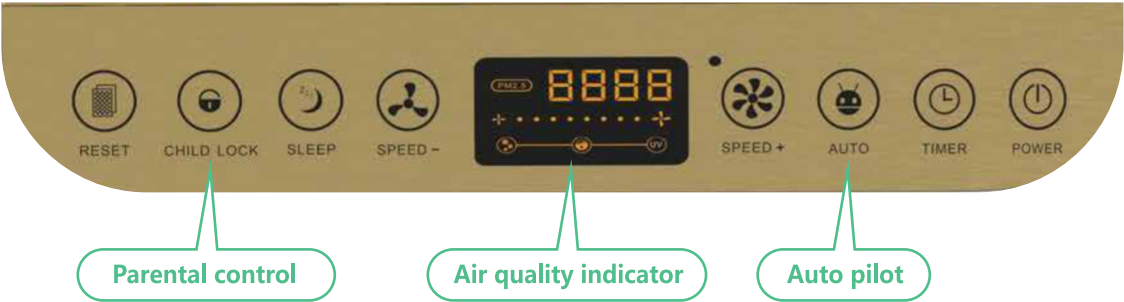


**AiroDoctor**

Product



User-friendly control panel with filter indicator



## Product



Product name	<b>AiroDoctor</b> Air Purifier
Code	WAD-M20
Max. room size	200 m <sup>2</sup>
CADR (Clean Air Delivery Rate)	480 m <sup>3</sup> /h
Noise (max.)	55 dB
Filters	Pre-filter, activated carbon + HEPA, Photocatalytic UV-LED
HEPA filter grade	H13
Fan speed	1-8 levels
Timer	12 hours(max.), adjustable in steps of 1 hour
Filter replacement warning light	Yes
Air quality level indicator	Four levels : Green (good), blue (average), yellow (bad), red (very bad)
Energy Efficiency	Class 4
Voltage	230V, 50Hz
Power consumption	85 W
Weight	11.5 kg
External dimensions	400 (W) x 230 (D) x 640 (H) mm

## Application area



### **Hospitals & Doctors**

Decrease the risk through infectious aerosols in waiting rooms and patient rooms in times of crisis and beyond. Reduce the risk of infections from MRSA, Norovirus and Human Coronavirus (Covid-19).



### **Elderly Care Homes**

Eliminate unpleasant smells from incontinence and decrease the risk of MRSA, Coronavirus and Norovirus - protecting seniors and people with pre-existing conditions.



### **Retail Stores & Pharmacies**

Clean and virus-free air is essential in all public spaces with lots of traffic. AiroDoctor helps to keep your business going and provides a safe environment for you and your clients.



### **Corporate Offices**

Fight the contagion risk among coworkers while keeping the air fresh, clean and healthy. Raise productivity and overall wellbeing while reducing stress and illnesses for employees working indoors.

## Wide area of application

The AiroDoctor absorbs and neutralizes even the smallest particles with a diameter of 0.1µm. This makes the AiroDoctor particularly suitable for health care facilities such as hospitals, laboratories, retirement homes or medical practices.



### **HOSPITAL / CLINIC**

Reduction of the spread of MRSA among visitors and patients & reduction of odor pollution.



### **NURSING HOME**

Control of MRSA infections via the respiratory tract & neutralization of odor pollution caused by incontinence patients.



### **PHARMACY**

Reduction of the risk of infection for visitors and containment of fine dust pollution in public spaces.



## Application area

### Clean quietly

The AiroDoctor's maximum noise level is only 55 dB, which is why it is also suitable for quiet environments.



#### RESTAURANT

Improving indoor air quality by reducing cooking fumes, smoke and risk of infection spread among the restaurant guests.



#### INDUSTRIAL

Low health risk for workers by filtering exhaust gases, toxic gases and chemicals from the ambient air.

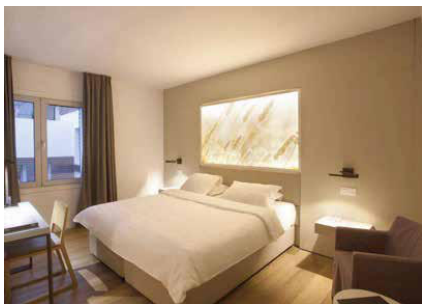


#### RESIDENTIAL

Reduction of pollen pollution especially for allergy sufferers & improved air quality for asthma patients.

### Great in the fight against air pollution

With a CADR (Clean Air Delivery Rate) of 480 m<sup>3</sup>/h, the AiroDoctor is for areas up to 200 m<sup>2</sup> and suitable for a wide range of uses.



#### HOTEL

Reducing risk of infection spread for both hotel guests and staff.  
Improving air quality and adding value to the hotel business.



#### OFFICE & WORKING SPACE

Improved concentration and healthier indoor air through the filtering of fine dust and gases in the air and reduction of sick leave due to a lower risk of infection among themselves.



#### VETERINARIES

Filter animal hair, mite and smells from the air. Making a safer and more pleasant environment for both veterinaries and clients.

## Kitasato Institute Medial Research Japan

### 99,9% Elimination of Virus & Bacteria

#### E.coli/MRSA/InfluenzaA

Table 1. Bacteria elimination effectiveness of equipment for the elimination of virus/bacteria in suspension when E. coli used as indicator

Measurement No.	Concentration of E. coli injected (x10 <sup>5</sup> CFU/ml)	Ultraviolet light source:OFF			Ultraviolet light source:ON		
		Concentration of E. coli collected upstream (x10 <sup>5</sup> CFU/ml)	Concentration of E. coli collected downstream (x10 <sup>5</sup> CFU/ml)	Elimination rate of E. coli (%)	Concentration of E. coli collected upstream (x10 <sup>5</sup> CFU/ml)	Concentration of E. coli collected downstream (x10 <sup>5</sup> CFU/ml)	Elimination rate of E. coli (%)
1	1.905	110±1.6	80±0.5	27.27	115±1.5	<0.0001*	>99.999**
2	1.905	122±2.0	72±1.0	40.98	120±2.0	<0.0001*	>99.999**
3	1.905	126±1.5	84±1.0	33.33	126±1.4	<0.0001*	>99.999**

\*Shown below measurable limit (10 CFU/ml) because E. coli was detected.

\*\*Calculated based on the concentration of E coli collected downstream and measurable limit (10 CFU/ml)

Table 2. Bacteria elimination effectiveness of equipment for the elimination of virus/bacteria in suspension when MRSA used as indicator

Measurement No.	Concentration of MRSA injected (x10 <sup>5</sup> CFU/ml)	Ultraviolet light source:OFF			Ultraviolet light source:ON		
		Concentration of MRSA collected upstream (x10 <sup>5</sup> CFU/ml)	Concentration of MRSA collected downstream (x10 <sup>5</sup> CFU/ml)	Elimination rate of MRSA (%)	Concentration of MRSA collected upstream (x10 <sup>5</sup> CFU/ml)	Concentration of MRSA collected downstream (x10 <sup>5</sup> CFU/ml)	Elimination rate of MRSA (%)
1	1.605	120±1.5	86±0.5	27.27	115±1.5	<0.0001*	>99.999**
2	1.605	1232±2.2	70±2.0	40.98	120±2.0	<0.0001*	>99.999**
3	1.605	126±1.8	80±1.0	33.33	126±1.4	<0.0001*	>99.999**

\*Shown below measurable limit (10 CFU/ml) because MRSA was detected

\*\*Calculated based on the concentration of MRSA collected downstream and measurable limit (10 CFU/ml)

Table 3. Virus elimination effectiveness of equipment for the elimination of virus/bacteria in suspension when Influenza virus A used as indicator

Measurement No.	Concentration of Influenza virus A injected (TCID <sub>50</sub> /ml)	Ultraviolet light source:OFF			Ultraviolet light source:ON		
		Concentration of Influenza virus A collected upstream (TCID <sub>50</sub> /ml)	Concentration of Influenza virus A collected downstream (TCID <sub>50</sub> /ml)	Elimination rate of Influenza virus A (%)	Concentration of Influenza virus A collected upstream (TCID <sub>50</sub> /ml)	Concentration of Influenza virus A collected downstream (TCID <sub>50</sub> /ml)	Elimination rate of Influenza virus A (%)
1	1.0 <sup>7.5</sup>	10 <sup>52</sup>	10 <sup>48</sup>	60.19	10 <sup>44</sup>	10 <sup>&lt;0.5*</sup>	>99.987**
2	1.0 <sup>7.5</sup>	10 <sup>48</sup>	10 <sup>42</sup>	74.88	10 <sup>52</sup>	10 <sup>&lt;0.5*</sup>	>99.998**
3	1.0 <sup>7.5</sup>	10 <sup>46</sup>	10 <sup>43</sup>	49.88	10 <sup>48</sup>	10 <sup>&lt;0.5*</sup>	>99.995**

\*Shown below measurable limit ( 10<sup><0.5</sup> TCID<sub>50</sub>/ml ) because Influenza virus A was detected .

\*\*Calculated based on the concentration of Influenza virus A collected downstream and measurable limit ( 10<sup><0.5</sup> TCID<sub>50</sub>/ml )

THE KITASATO INSTITUTE ,  
Medical Environment Research Center

## Korean Institute of civil Engineering and Building Technology

99,9% Elimination of Virus & Bacteria

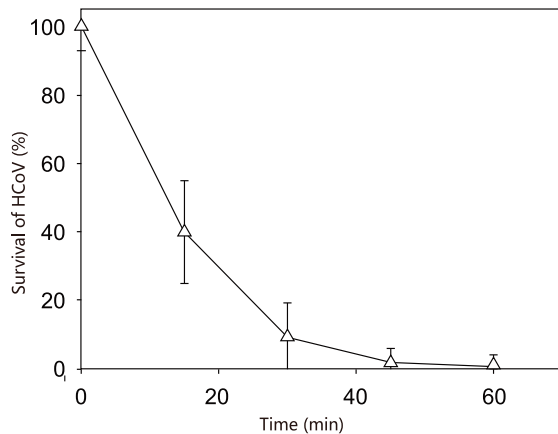
E.coli/Salmonella/Rotavirus/Norovirus  
(Murine) Bacteriophage MS-2/Influenza A

Test type	PCO material		Virus and Bacteria		UV lighting and testing									Test method	Removal rate of Virus	REMARK	
	Type	Concentration	Type	Concentration	0.25 <sup>m</sup>	0.5 <sup>m</sup>	0.75 <sup>m</sup>	1.0 <sup>h</sup>	1.25 <sup>h</sup>	1.5 <sup>h</sup>	2.0 <sup>h</sup>	3.0 <sup>h</sup>	4.0 <sup>h</sup>				
Coating	P-25 <sup>(1)</sup>	-	Bacteriophage Qβ	1x10 <sup>7</sup> pfu/ml		☉		○				○	○	○	Plaque Assay	99.99%	CEVI <sup>(13)</sup>
	P-25 <sup>(2)</sup> NP400		Bacteriophage MS-2	2x10 <sup>4</sup> pfu/ml		○		○		☉	○			Pour Plate Method	99.8%		
			E.coli			○		○		☉	○			Spreading Plate Method	99%↑		
			Salmonella			○		○		☉	○			Spreading Plate Method	99%↑		
			Norovirus(Murine)			○		○		☉	○			Plaque Assay	99%↑		
			Rotavirus			○		○		☉	○			Plaque Assay	99%↑		
	P-25	Influenza	6.7×10 <sup>6</sup> TCID <sub>50</sub> /ml									☉	TCID <sub>50</sub>	99.99%	KISTEC <sup>(4)</sup>		
Suspension	P-25	0.0005%	Bacteriophage Qβ	5x10 <sup>7</sup> pfu/ml	○	○		☉						Plaque Assay	99.99%	PIRC <sup>(5)</sup>	
			E.coli		○	○		☉						Spreading Plate Method	99.99%		
	P-25 NP400	0.1%	Bacteriophage MS-2	2x10 <sup>4</sup> pfu/ml	○	○		☉	○					Pour Plate Method	99.99%	CEVI	
			E.coli	2x10 <sup>4</sup> cfu/ml	○	○		☉	○					Soreading Plate Method	99%↑		
			Salmonella		○	○		☉	○				Soreading Plate Method	99%↑			
			Norovirus(Murine)		○	○		☉	○				Plaque Assay	99%↑			
			Rotavirus		○	○		☉	○					Plaque Assay	99%↑		
	P-25	0.1%	HCoV	2x10 <sup>4</sup> pfu/ml	○	○	○	☉						RT-qPCR	99%↑		
	P-25	0.05%	HCoV	2x10 <sup>4</sup> pfu/ml									☉	RT-qPCR.TCID <sub>50</sub>	99.96%		

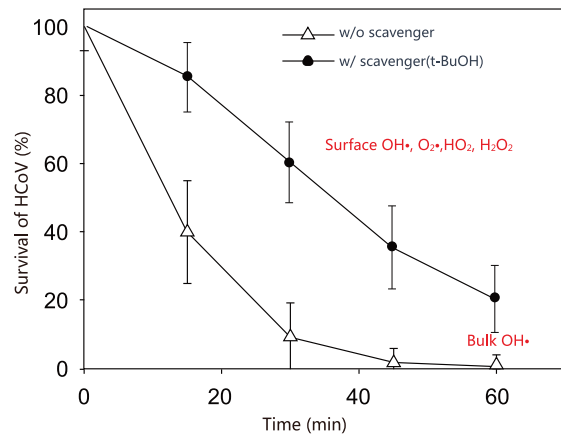
## Korean Institute of Civil Engineering and Building Technology

### 99,9% Elimination of Human Corona Virus (HCoV)

#### Photocatalytic material performed on bacteria and viruses

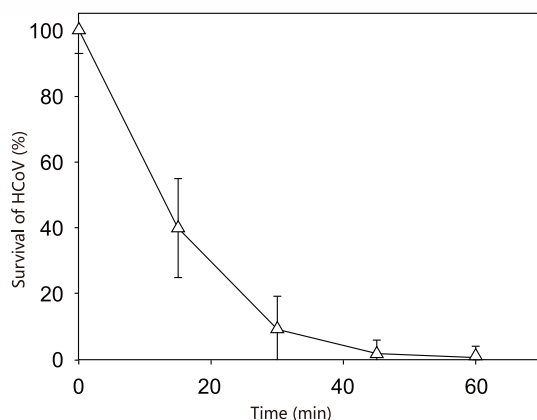


Virus inactivated Kinetics by photocatalytic material  
(E.coli & Salmonella)



Virus removal performance assessment results by UV  
(Rota V, NoroV, BacteriophageMS-2)

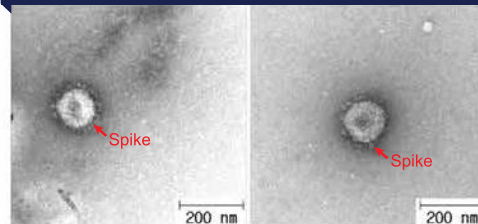
#### Evaluation of anti-viral performance of photocatalytic material (Human Corona Virus (HCoV-OC43\*))



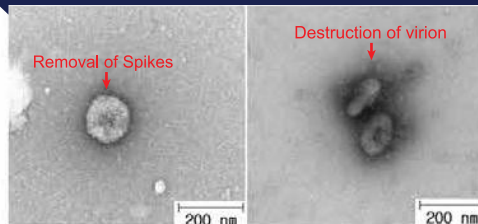
Antiviral performance by photocatalytic activity

\* OC43 is one of seven known coronaviruses to infect humans, including HCoV-229E, HCoV-NL63, HCoV-HKU1, MERS-CoV, the original SARS-CoV (or SARS-CoV-1), and SARS-CoV-2 (Covid-19)

#### HCoV TEM (without photocatalyst, without UV)



#### HCoV TEM (with photocatalyst, with UV)





# Certifications



KC Safety



KCE/W Certificate



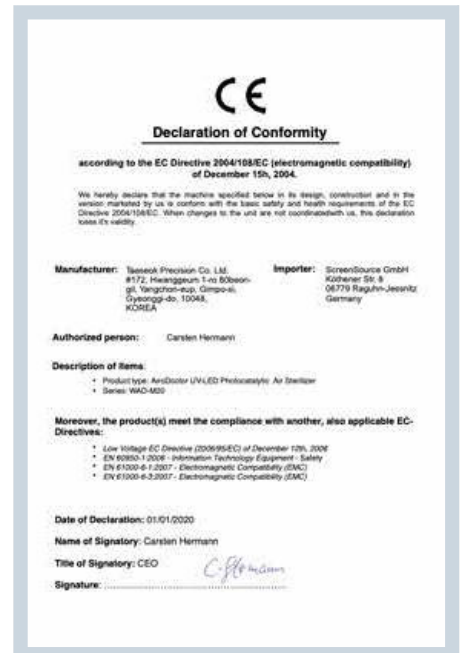
Harmful gases



OZONE



Patents



CE

# AiroDoctor



Scan QR code for test reports and certifications

## Australian Distributor

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[www.airodoctor.com](http://www.airodoctor.com)