AiroDoctor

STUDIES AND REPORTS

THE SCIENTIFIC PROOF

Photocatalytic UV-LED Air Purifier

Removes viruses, bacteria and harmful gases from the air.

Photocatalytic Titanium Pro UV LED Filter System

www.airodoctor.com

The AiroDoctor air purifier with photocatalytic functionality completely breaks down harmful substances, gases, viruses and pathogenic bacteria instead of the simple collection of contaminants, used in conventional air cleaners. Furthermore, only harmful particles are decomposed by touching the photocatalytic titanium dioxide. It does not only work extremely efficiently, but it is safe as it produces no ozone or other chemical substances that could be harmful for the human body. Due to the fine pored structure of the photocatalytic system, there is an excellent filtration level of particles up to PM2.5 classifications with a diameter of less than 0.1µm

The AiroDoctor with UV LED photocatalytic system offers a durable and reliable air purification with high efficiency and a real elimination of harmful substances compared to conventional air purifiers that only run on a filter basis.

Test Reports:

1. **Korea Institute of Civil Engineering and Building Technology – South Korea**
   99,9% Elimination of Human Corona Virus (HCoV-19 / SARS-CoV-2)
   99,9% Elimination of Virus & Bacteria
   E.coli, Salmonella, Rota-Virus, Noro Virus (Murine), Bacteriophage MS-2, Influenza A
2. **The Kitasato Institute of Medical Research - Japan**
   99,9% Elimination of Virus & Bacteria
   E.coli, MRSA, Influenza A

Certifications:

1. **KC Electrical Certification**
2. **KC Safety Certification**
3. **Korea Electronics & Technology Institute**
   Ozone / Formaldehyde / Ammonia / Ethylene oxide / Acetic acid / Toluene
4. **CE Declaration of Conformity**

Test Report: Korea Institute of Civil Engineering and Building Technology (KICT)

www.kict.re.kr

KICT KOREA INSTITUTE of CIVIL ENGINEERING and BUILDING TECHNOLOGY

nst National Research Council of Science & Technology

Ministry of Science and ICT

The *Korea Institute of Civil Engineering and Building Technology* (KICT) is a Science & Technology government research institute. Since 1983, the institute has continuously operated to solve national and social issues, to create favorable, safe and high-quality environments in Korea. The KICT is a member of the research institute of the *National Research Council of Science & Technology* which operates together with the Ministry of Science and ICT.

Anti-viral Performance Assessment

AiroDoctor KICT

실험방법	광촉매 소재		균 · 바이러스		UV 조사 및 측정 시간									분석방법	바이러스 제거율
	종류	농도	종류	농도	0.25m	0.5m	0.75m	1.0h	1.25h	1.5h	2.0h	3.0h	4.0h		
Coating	P-25	–	Bacteriophage Qβ	1×10^7 pfu/ml		◎		○			○	○	○	Plaque Assay	99.99%
	P-25 NP400		Bacteriophage MS-2	2×10^4 pfu/ml		○		○		◎	○			Pour Plate Method	99.8%
			E. coli			○		○		◎	○			Spreading Plate Method	99% ↑
			Salmonella			○		○		◎	○			Spreading Plate Method	99% ↑
			Norovirus(Murine)			○		○		◎	○			Plaque Assay	99% ↑
	P-25		Rotavirus			○		○		◎	○			Plaque Assay	99% ↑
			Influenza	6.7×10^6 $TCID_{50}$/ml									◎	$TCID_{50}$	99.99%
Suspension	P-25	0.0005%	Bacteriophage Qβ	5×10^7 pfu/ml	○	○		◎						Plaque Assay	99.99%
			E. coli		○	○		◎						Spreading Plate Method	99.99%
	P-25 NP400	0.1%	Bacteriophage MS-2	2×10^4 pfu/ml	○	○		◎	○					Pour Plate Method	99.9%
			E. coli	2×10^4 cfu/ml	○	○		◎	○					Spreading Plate Method	99% ↑
			Salmonella		○	○		◎	○					Spreading Plate Method	99% ↑
			Norovirus(Murine)		○	○		◎	○					Plaque Assay	99% ↑
			Rotavirus		○	○		◎	○					Plaque Assay	99% ↑
	P-25	0.1%	HCoV	2×10^4 pfu/ml	○	○	○	◎						RT-qPCR	99% ↑
	P-25	0.05%	HCoV	2×10^4 pfu/ml								◎		RT-qPCR, $TCID_{50}$	99.96%

Fig. 1: Antiviral and antimicrobial performance evaluation of photocatalytic materials

Test condition ISO 16000-36:2018, Indoor air — Standard method for assessing the reduction rate of culturable airborne bacteria by air purifiers using a test chamber

Test Report: Korea Institute of Civil Engineering and Building Technology (KICT)

www.kict.re.kr

KICT KOREA INSTITUTE of CIVIL ENGINEERING and BUILDING TECHNOLOGY

nst National Research Council of Science & Technology

Ministry of Science and ICT

99,9% Elimination of Human Corona Virus

(HCoV / later renamed to SARS-CoV-2)

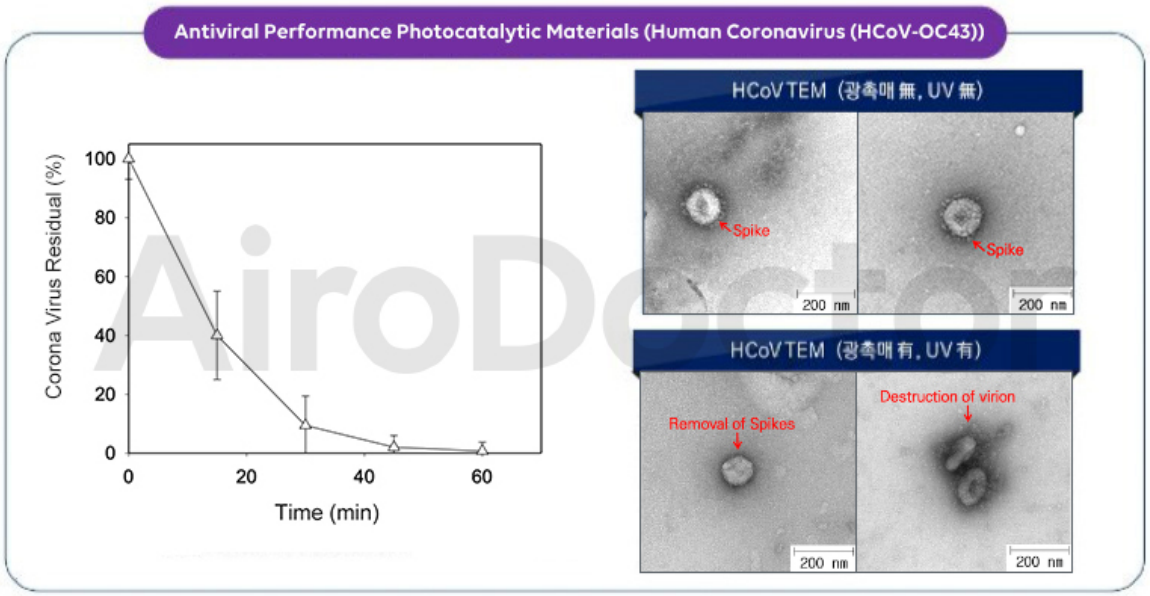


Fig. 2: Antiviral performance evaluation of photocatalytic materials using the Human Corona Virus HCoV-OC43

Test Report: Korean Institute of Civil Engineering and Building Technology (KICT)

www.kict.re.kr

KICT KOREA INSTITUTE of CIVIL ENGINEERING and BUILDING TECHNOLOGY

nst National Research Council of Science & Technology

Ministry of Science and ICT

99,9% Elimination of *E.coli*, Salmonella, Rota-Virus, Noro-Virus, Bacteriophage MS-2, Influenza A

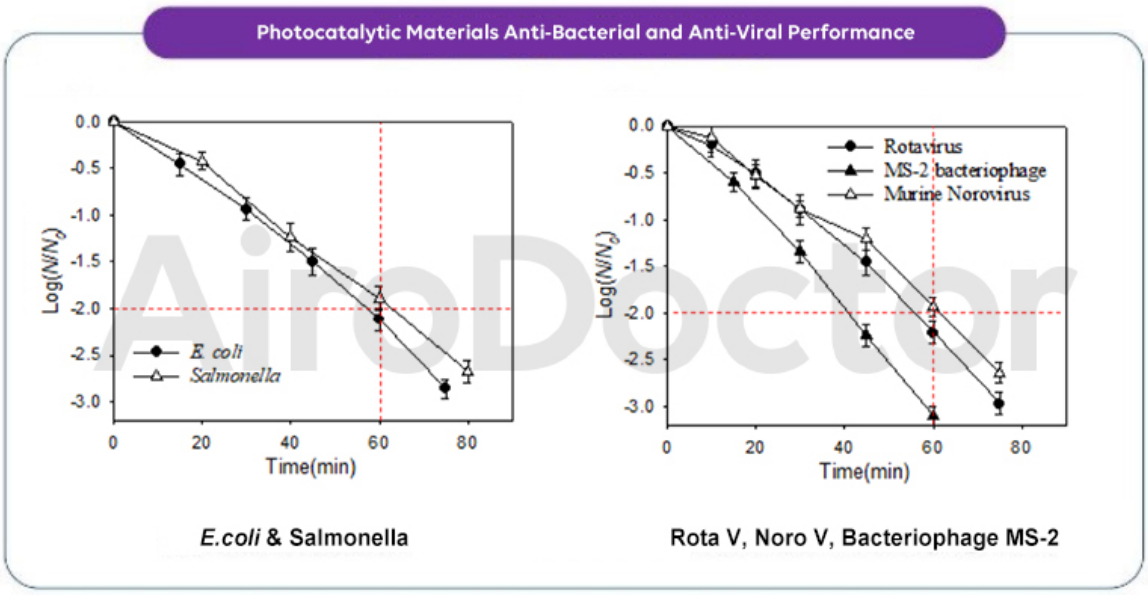


Fig. 3: Antimicrobial and antiviral performance of photocatalytic material

Test Report: Korea Institute of Civil Engineering and Building Technology (KICT)

www.kict.re.kr

Consent request to use the institute name and reports of the air filter modules with antibacterial and antiviral performance for marketing purposes

Request	Response
“AiroDoctor” is an air purifier equipped with a photocatalytic air conditioning filter module with antibacterial and antiviral performance	Confirmed
The technology was developed by the government research institute KICT and integrated in the air purifier by the AiroDoctor manufacturer	Confirmed
Consent to use images, texts and contents excerpted from the photocatalytic module research reports	Confirmed
Consent to use images, texts and contents excerpted the photocatalytic module test results (including references)	Confirmed
The photocatalytic technology used in the module with antiviral and antimicrobial performance is protected by a contract between the KICT institute and the AiroDoctor manufacturer	Confirmed
Consent to use and translate the above contents	Confirmed

한국건설기술연구원장

★ **Employees** : Kim sung Jun **Head of Research** Final decision 05/29
Gu Hyeun Bon

Co-operative

Enforce : Infrastructure Safety Research Headquarters -12265 (2020.05.29.) Received (.)

Postcode : 10223 283 Goyang Dero Ilsan seo-Gu Goyang-Si Kyounggi-Di / http://www.kict.re.kr
Tel : 042)610-8857 /Fax : 031)910-0121 / seongjun@kict.re.kr / Public

Test Report: The Kitasato Institute of Medical Research

www.kitasato-u.ac.jp

北里大学 KITASATO UNIVERSITY

学校法人 北里研究所 THE KITASATO INSTITUTE

The Kitasato Institute, Japan's first private medical research facility, was established in 1914. Together with the scientific discovery of life phenomena, the Institute takes as its mission the cultivation of preeminent researchers, educators, and other professionals in the Life Sciences and related fields and continues to play an active role in education, research, and medicine. Underlying all this is the indomitable spirit of the Institute's founder, Shibasaburo Kitasato, who devoted his life to preventive medicine and was a groundbreaker in the study of Life Sciences, never wavering in his efforts to apply medicine in a practical way to benefit society.

The Kitasato Institute, founded by Shibasabur Kitasato who also started the National Institute of Infectious Diseases, is a joint venture with the Institute of Research for Biologicals and operates the University School of Medicine.

99,9% Elimination of *E.coli*

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 ($\times 10^9$ CFU/ml)	Ultraviolet light source: OFF			Ultraviolet light source: ON		
		Concentration of *E. coli* collected upstream ($\times 10^5$ CFU/ml)	Concentration of *E. coli* collected downstream ($\times 10^5$ CFU/ml)	Elimination rate of *E. coli* (%)	Concentration of *E. coli* collected upstream ($\times 10^5$ CFU/ml)	Concentration of *E. coli* collected downstream ($\times 10^5$ 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)

THE KITASATO INSTITUTE
Medical Environment Research Center

Report from: The Kitasato Institute of Medical Research

www.kitasato-u.ac.jp

99,9% Elimination of MRSA

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 ($\times 10^9$ CFU/ml)	Ultraviolet light source: OFF			Ultraviolet light source: ON		
		Concentration of MRSA collected upstream ($\times 10^5$ CFU/ml)	Concentration of MRSA collected downstream ($\times 10^5$ CFU/ml)	Elimination rate of MRSA (%)	Concentration of MRSA collected upstream ($\times 10^5$ CFU/ml)	Concentration of MRSA collected downstream ($\times 10^5$ 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)

THE KITASATO INSTITUTE,
Medical Environment Research Center

99,9% Elimination of Influenza A

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 ($TCID_{50}$/ml)	Ultraviolet light source: OFF			Ultra Violet light source: ON		
		Concentration of Influenza virus A collected upstream ($TCID_{50}$/ml)	Concentration of Influenza virus A collected downstream ($TCID_{50}$/ml)	Elimination rate of Influenza virus A (%)	Concentration of Influenza virus A collected upstream ($TCID_{50}$/ml)	Concentration of Influenza virus A collected downstream ($TCID_{50}$/ml)	Elimination rate of Influenza virus A (%)
1	$1.0^{7.5}$	10^{52}	10^{48}	60.19	10^{44}	$10^{<0.5}$*	>99.987**
2	$1.0^{7.5}$	10^{48}	10^{42}	74.88	10^{52}	$10^{<0.5}$*	>99.998**
3	$1.0^{7.5}$	10^{46}	10^{43}	49.88	10^{48}	$10^{<0.5}$*	>99.995**

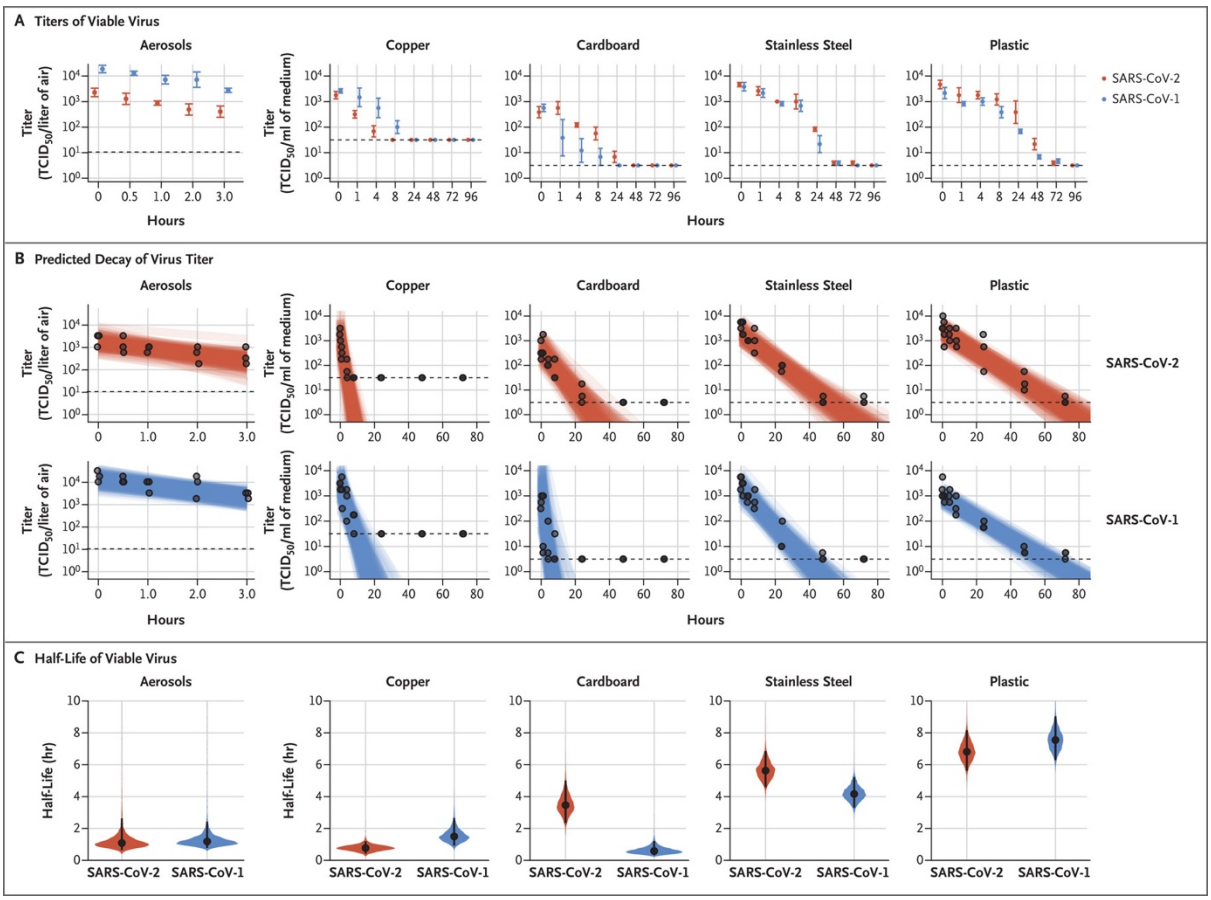
* Shown below measurable limit ($10^{<0.5}$ $TCID_{50}$/ml) because Influenza virus A was detected.
** Calculated based on the concentration of Influenza virus A collected downstream and measurable limit ($10^{<0.5}$ $TCID_{50}$/ml)

THE KITASATO INSTITUTE,
Medical Environment Research Center

Viability of SARS-CoV-1 and HCoV-19 (SARS-CoV-2) in Aerosols and on Various Surfaces

https://www.nejm.org/doi/full/10.1056/NEJMc2004973

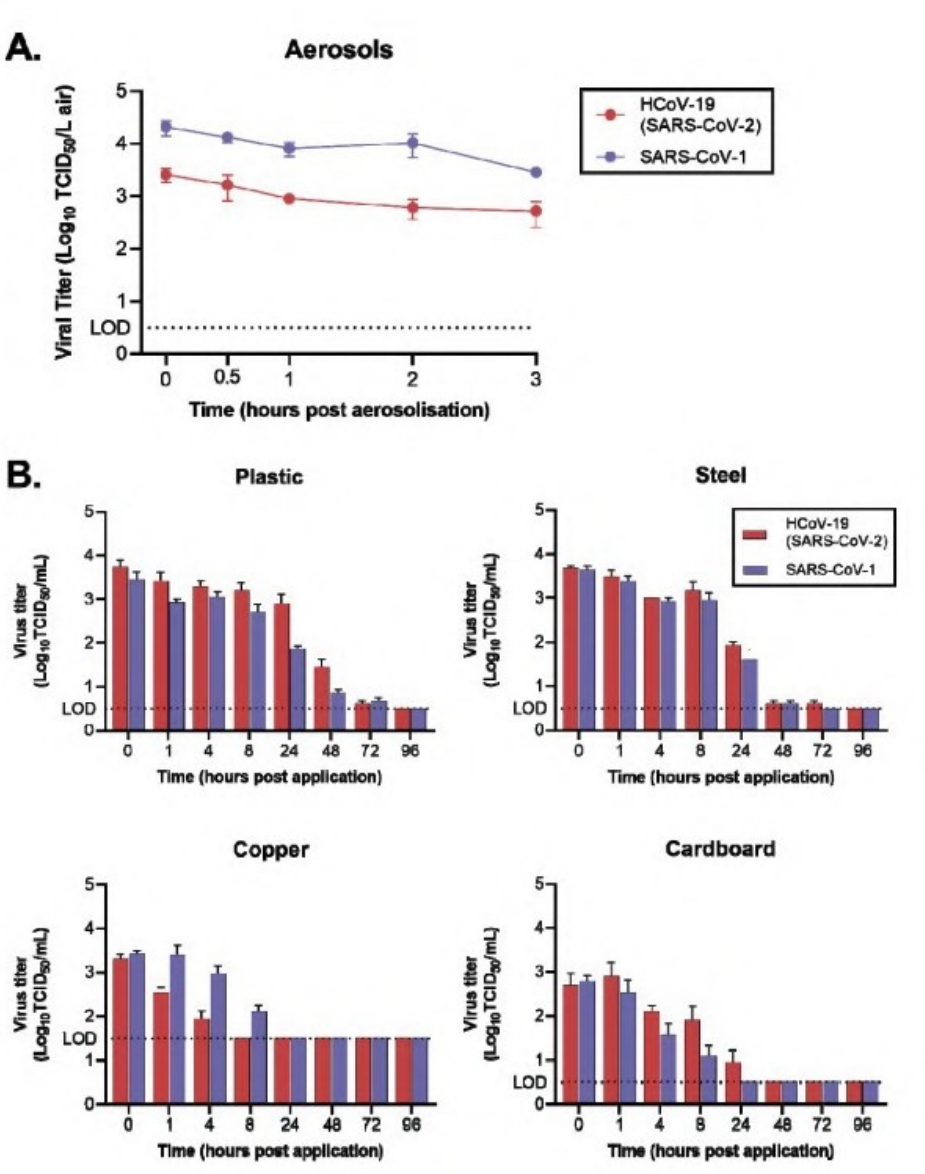
Scientists at Princeton University, the University of California-Los Angeles and the National Institutes of Health (NIH) posted online on April 16th 2020 indicating that the COVID-19 virus could remain viable in the air up to 3 hours post aerosolization, while remaining alive on plastic and other surfaces for up to three days.



Viability of SARS-CoV-1 and HCoV-19 (SARS-CoV-2) in Aerosols and on Various Surfaces

https://www.medrxiv.org/content/10.1101/2020.03.09.20033217v1.full.pdf

"Our results indicate that aerosol and fomite transmission of HCoV-19 is plausible, as the virus can remain viable in aerosols for multiple hours and on surfaces up to days," reads the study 's abstract.



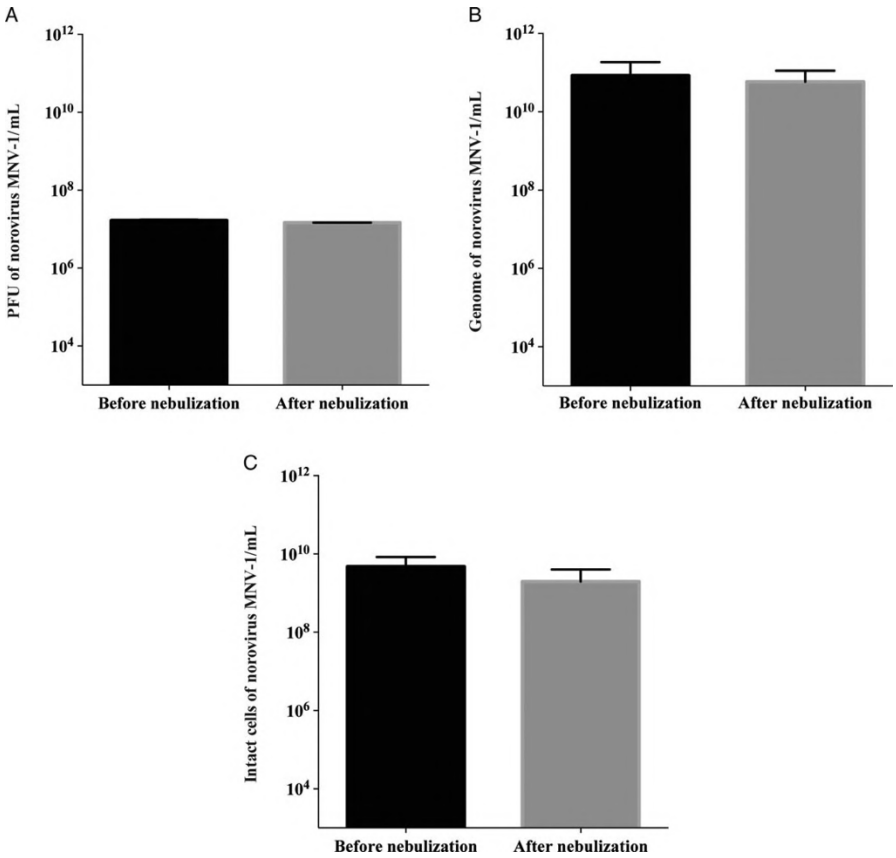
Detection and Quantification of Airborne Norovirus During Outbreaks in Healthcare Facilities

https://academic.oup.com/cid/article/61/3/299/491373

A study by the Université Laval in Québec (Clinical Infectious Diseases (2015; doi: 10.1093/cid/civ321), 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 patient 's room (one metre away from the patient) were 54 percent positive.

"Norovirus genomes were detected in 6 of 8 healthcare centers. The concentrations ranged from 1.35 × 10 1 to 2.35 × 10 3 genomes/m 3 in 47% of air samples. MNV-1 preserved its infectivity and integrity during in vitro aerosol studies." reads the study 's abstract.

"Norovirus genomes are frequently detected in the air of healthcare facilities during outbreaks, even out- side patients' rooms. In addition, in vitro models suggest that this virus may withstand aerosolization."



Certification: KC Electrical Certification

National Radio Research Agency

738E-D7EB-CF6E-8733

방송통신기자재등의 적합등록 필증

Registration of Broadcasting and Communication Equipments

상호 또는 성명 *Trade Name or Registant*	태석정공(주)
기자재명칭(제품명칭) *Equipment Name*	공기청정기
기본모델명 *Basic Model Number*	WAD-M20
파생모델명 *Series Model Number*	WAD-M21, WAD-M24, WAD-M23, WAD-M22
등록번호 *Registration No.*	R-R-TI7-WAD-M20
제조자/제조(조립)국가 *Manufacturer/Country of Origin*	태석정공(주) / 한국
등록연월일 *Date of Registration*	2020-01-29
기타 *Others*	

위 기자재는 「전파법」 제58조의2 제3항에 따라 등록되었음을 증명합니다.

It is verified that foregoing equipment has been registered under the Clause 3, Article 58-2 of Radio Waves Act.

2020년(Year) 01월(Month) 29일(Day)

국립전파연구원장 국립전파연구원장인

Director General of National Radio Research Agency

※ 적합등록 방송통신기자재는 반드시 "적합성평가표시" 를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 등록이 취소될 수 있습니다.

Certification: KC Safety Certification

Korea Product Safety Testing

전기용품 및 생활용품 안전관리법 시행규칙 [별지 제15호서식]

접수번호 : 20191212-0030

안 전 확 인 신 고 증 명 서
Confirmation Letter of Declaration

신고번호: (Application No.) XH070499-20001A
신고회사명: (Applicant) 태석정공(주)
주 소: (Address) 경기도 김포시 양촌읍 황금1로80번길 172
제 품 명: (Product) 공기청정기
기본모델명: (Basic Model) WAD-M20
파생모델명 (Series Model):

정격/안전기준상의 모델구분: (Rating) 220 V~, 60 Hz, 85 W
안전기준: (Standard) KC 60335-1(2016-10) KC 60335-2-65(2015-09)

본 확인신고는 제 조 국 명: 한국
제조업자명: 태석정공(주)
제조공장의 주소: 경기도 김포시 양촌읍 황금1로80번길 172
의 제품에만 해당함

「전기용품 및 생활용품 안전관리법 시행규칙」 제25조제1항, 같은 조 제3항, 제25조제2항 또는 제34조제2항에 따라 안전확인신고 증명서를 발급합니다.
We issue this Confirmation Letter of Declaration of the Safety Confirmation for the above appliances in accordance with Article 28(1), 28(3), 29(2) or 34(2) of the Electrical Appliances and Consumer Products Safety Control Act.

2020 년 (Year) 02 월 (Month) 20 일 (Day)

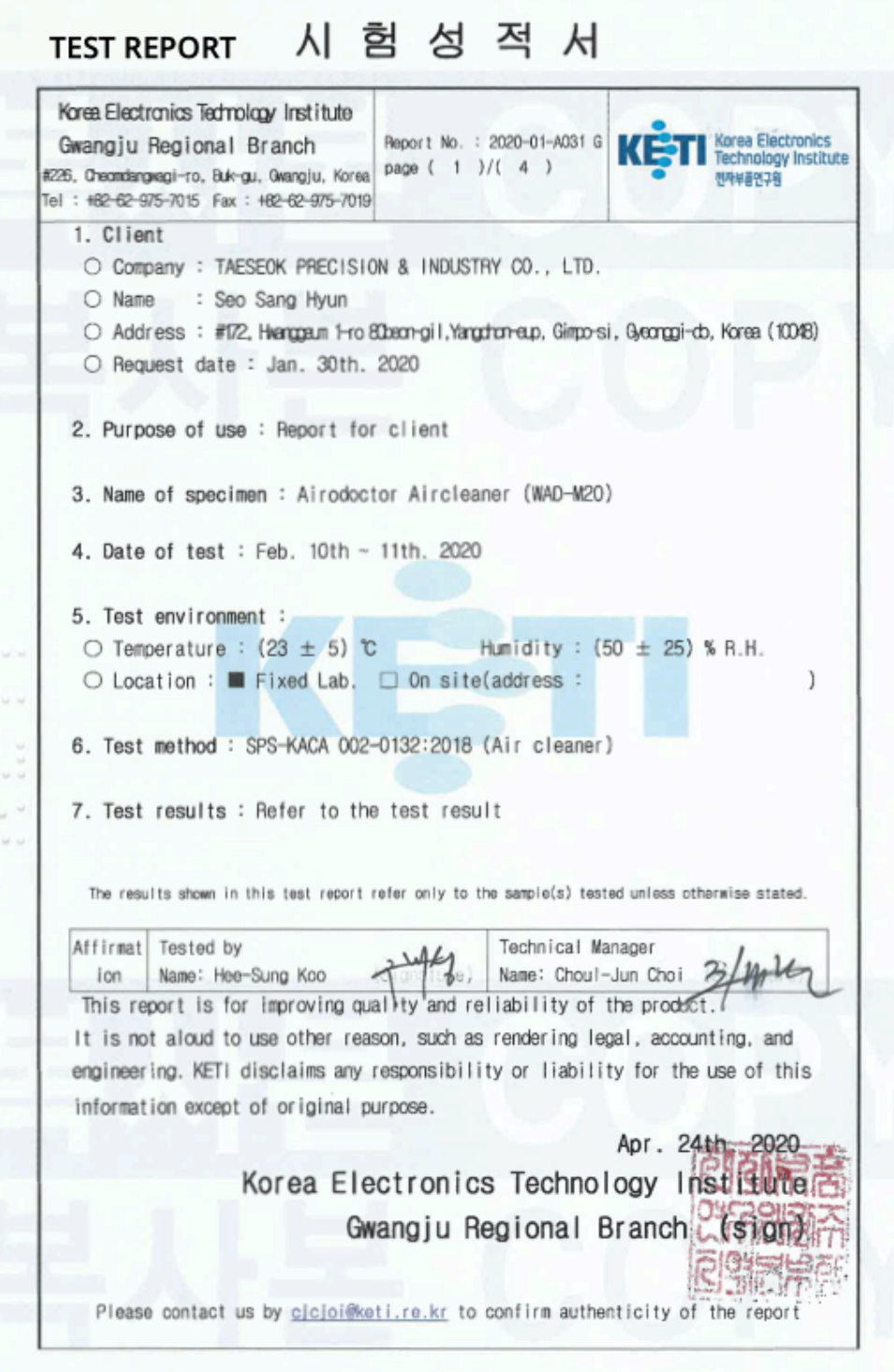
한국기계전기전자시험연구원장
Korea Testing Certification

※ 이 신고증명서는 「전기용품 및 생활용품 안전관리법」에 따른 제품의 안전성 확인에 한정된 것이며, 그 밖의 다른 법률이 적용되는 제품의 경우에는 해당 법률에 따라 추가로 인증·허가 등을 받아야 합니다.

첨부서류	1. 전기용품의 안전관리부품 및 재질목록 (List of Critical Components)(전기용품에 한정한다) 2. 기본모델·파생모델의 내용 (Descriptions of the basic and series model) 3. 안전확인신고 내용의 변경 현황 (Revisions Status)

Certification: Korea Electronics & Technology Institute

Successful filtering of Formaldehyde (HCHO), Ammonia (NH3), Ethylene oxide (C2H4O), Acetic acid (CH3COOH) and Toluene (C7H8) // Successfully tested without any detected Ozone emissions.



TEST REPORT 시 험 성 적 서

Korea Electronics Technology Institute
Gwangju Regional Branch
#225, Cheomdangwagi-ro, Buk-gu, Gwangju, Korea
Tel : +82-62-975-7015 Fax : +82-62-975-7019

Report No. : 2020-01-A031 G
page (1)/(4)

KETI Korea Electronics Technology Institute 전자부품연구원

1. Client
   - ○ Company : TAESEOK PRECISION & INDUSTRY CO., LTD.
   - ○ Name : Seo Sang Hyun
   - ○ Address : #172, Hwanggeum 1-ro 80beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea (10048)
   - ○ Request date : Jan. 30th. 2020

2. Purpose of use : Report for client

3. Name of specimen : Airodoctor Aircleaner (WAD-M20)

4. Date of test : Feb. 10th ~ 11th. 2020

5. Test environment :
   - ○ Temperature : (23 ± 5) ℃ Humidity : (50 ± 25) % R.H.
   - ○ Location : ■ Fixed Lab. □ On site(address :)

6. Test method : SPS-KACA 002-0132:2018 (Air cleaner)

7. Test results : Refer to the test result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by	Technical Manager
	Name: Hee-Sung Koo	Name: Choul-Jun Choi

This report is for improving quality and reliability of the product. It is not aloud to use other reason, such as rendering legal, accounting, and engineering. KETI disclaims any responsibility or liability for the use of this information except of original purpose.

Apr. 24th. 2020

Korea Electronics Technology Institute
Gwangju Regional Branch (sign)

Please contact us by cjcjoi@keti.re.kr to confirm authenticity of the report

Certification: CE - Declaration of Conformity

Europe Importer: ScreenSource GmbH

CE

EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer.

We hereby declare that the object of the declaration specified below in its design, construction and in the version marketed by us is in conformity with the relevant Union harmonsation legislation:

- Restriction of Hazardous Substances Directive 2011/65/EU
- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatbility (EMC) Directive 2014/30/EU
- Ecodesign Directive 2009/125/EC

Manufacturer: Taeseok Precision & Industry Co., Ltd.
#172, Hwanggeum 1-ro 80beon- gil,
Yangchon-eup, Gimpo-si,
Gyeonggi-do, 10048,
KOREA

Importer: ScreenSource GmbH
Köthener Str. 8
06779 Raguhn-Jessnitz
GERMANY

Authorized person: Eddie Kim

Description of item:

- Object of Declaration: Air Purifier
- Model Name: AiroDoctor® UV-LED Photocatalytic Air Purifier
- Model No: WAD-M20

Name of Signatory: Eddie Kim

Date of Declaration: 01/01/2020

Title of Signatory: Managing Director

Place of Declaration: Seoul, Republic of Korea

Signature: .....

136-81-22831
태석정공(주) 이봉재
경기도 김포시 양촌읍 황금1로 80번길 172
제 조 자동화기계 전자제품

AiroDoctor