www.apctec.co.kr / www.airdoctor.kr

# AIR PROFESSIONAL COMPANY

AN ECO-CONSCIOUS MATERIAL SPECIALIST SPECIALIST DEVELOPMENT COMPANY APC Tech Co., Ltd. is creating future growth engines through innovation, and all our staff members are working harmoniously with the goal of value Creation with Ardent and Passion for stable growth. The photocatalyst new material technology developed and possessed by APC Tech for the first time in the world is closely related to human's living environment. The air quality improvement solution and air purifier sterilizer developed using this innovative technology can improve the quality of life in the living environment from viruses, fine dust and various polluted air.

We will grow into a company trusted by customers and all stakeholders by continuously creating value in the rapidly changing business environment as a material specialist that can contribute to our lives through constant challenges and talent development.

#### THE WORLD'S FIRST PHOSPHORS PHOTOCATALYST BEAD MATERIAL TECHNOLOGY

#### CORE TECHNOLOGIES

66

Development of photoluminescent photocatalyst and various related materials

PAPC

#### PERFORMANCE TEST Virus / Bacteria removal /

Volatile organic compound / Various atmospheric components, such as fine dust / Removal of contaminants and improvement of atmospheric (air) quality

#### APPLIED PRODUCTS

Products that apply photoluminescent photocatalyst beads

# AIR PROFESSIONAL COMPANY

## 2021

06 IS014001 Environmental Management System Certification

- 06 Commendation from the Director of Public Procurement Service (Exemplary Entrepreneur)
- 06 Designated as a small and medium-sized company for talent development

#### 2020

- 07 MBN Brand Award (Health field)
- 10 Investment agreement with Chungju City
- 10 Awarded the Best Entrepreneur Award in Chungju
- 10 Selected as a first-class venture company in Chungcheongbuk-do
- 12 Commendation from the Minister of SMEs and Startups Technological Innovation Meritor
- 12 Commendation from the Minister of SMEs and Startups Startup Activation Sector

## 2019

- 02 Participated in overseas promotions in connection with Lotte in Ho Chi Minh City, Vietnam
- 04 Participated in Hanoi International Trade Expo, Vietnam
- 04 Participated in OKTA World Representative Competition Excellent Product Consultation
- 05 Participated in Vietnam Ho Chi Minh International Premium Consumer Goods Exhibition
- 07 Designated as a promising export small and medium enterprise (Small and Medium Venture Business Administration)
- 11 Selected as a pilot purchase of a technological innovation prototype by the Public Procurement Service
- 11 Participated in Shanghai International Import Expo, China
- 12 Certified as a family-friendly company
- 12 Technical innovation prototype supply contract with Public Procurement Service
- 12 Korea Social Contribution Grand Prize (manager category)





Chung

**APC Tech Co., Ltd.** is the only company in the world that has succeeded in developing and actually commercializing photoluminescent photocatalysts. In particular, APC Tech's

photocatalyst was proven to have a removal result of 99.899% in the Covid19 removal test. In a test conducted by the Korea Research Institute of Chemical Technology, it also removed 99% of influenza A, F-coronavirus, and rhinovirus, and excellent performance in the removal of fine dust, deodorization and volatile organic compounds

has been proven in the tests of accredited certification agencies. To promote public health, we have launched an air purifying sterilizer product with excellent performance using photoluminescent photocatalyst materials. We plan to release products in various living environments and construction fields in the future.

#### 2018

- 02 Patent application Industrial control system, secure communication device with encryption module 03 Photocatalyst coating technology (concluded a technical advisory agreement for industrial-education-
- al cooperation with Seoul National University) 04 Patent application - Security communication device to strengthen the security of industrial control system
- 06 ISO9001 quality management system certification
- 07 Selected as an Inno-Biz company Inno-Biz
- 08 Patent acquisition, photoluminescent photocatalyst bead type
- 10 Succeeded in development of encryption module for IoT section
- Succeeded in the development of smart point of failure expression device (purchase conditional assignment, 3-year contract)
- 10 Participated in Hong Kong 2018 Mobile Electronics Exhibition (Excellent Product Selection)
- 11 Participated in Mega Show 2018 Season Exhibition
- 11 Participated in Jakarta, Indonesia Premium Consumer Goods Exhibition
- 12 Received the 2018 Chungbuk Small and Medium Business Award Director of Chungbuk Regional Small and Medium Venture Business Administration
- 12 2018 Korea Small and Medium Enterprises Association Awarded Grand Prize in Innovation Product Category Awarded Grand Prize in Innovation Product Category

## 2017

- 01 Embedded water management system with patent and security functions
- 05 Succeeded in 300 million won crowdfunding public offering
  - 06 Patent registration, distributed hydrological control system and method

#### 2015 ~ 2016

- 12 Signed industry-academic cooperation agreement with 3 universities including Kumoh University of Technology
- 12 Korea Herald Best Brand Award

#### 2014

- 01 Established APC Tech Co., Ltd.
- 03 Reported as a software business operator in Chungju Agricultural Complex
- 06 Patent registration, intelligent water management remote control automation system
- 09 Venture business certification, establishment of corporate research institute

# **Photocatalyst Material Features and Utilizations**

#### Air purification effect

Removal of harmful substances such as nitrogen oxides, sulfur oxides, and formaldehyde in the air.

> Self-cleaning effect Cleaning dirt, oil, and fine dust attached to the surface.

#### Sterilization and deodorization effect Decomposes and removes

odors such as acetaldehyde and ammonia while sterilizing and preventing decay.

#### Water purification effect

Decomposes and removes harmful organic compounds in wastewater.

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# Photocatalyst Basic Principle

**Photocatalyst** is a substance that catalyzes a catalytic reaction to sunlight and ultraviolet rays, and because it is similar to the principle of photosynthesis in plants, it reacts with harmful substances in the air and changes them into harmless substances.

In general, photocatalytic technology uses the same UV lamp light as solar UV light as an energy source to oxidize and decompose viruses, bacteria, pollutants, and odors in the air.

# Photocatalytic principle that decomposes without filtering

Antifouling effect

surface

Decomposes and removes

organic substances such

as cigarette smoke and oil residues attached to the

When the light source touches the light source, it reacts without change, and by strong oxidation, decomposition and removal power is generated, and it decomposes and annihilates harmful pollutants such as various viruses and bacteria and various odors, and it converts harmful chemical organic compounds into new harmless substances (air)

# What is APC Tech's Photocatalyst?

Usually, photocatalysts have the disadvantage of always needing light like photosynthesis in plants, but photoluminescent photocatalysts have the property of retaining light by themselves, so they react for a long time even when light is blocked.

It shows a purification/sterilization effect that is more than twice that of existing photocatalysts, and AP Tech is the only company in the world that succeeded in commercializing it using the original photoluminescent photocatalyst



# World's first World's only

Domestic patent registration PCT (overseas) application



Photoluminescent Photocatalyst Beads

# The photoluminescent photocatalyst increases the photolysis effect by about 2 times compared to the conventional photocatalyst.

The photocatalyst has a self-cleaning effect even in the dark without a light source (light) because the material itself accumulates and holds light while receiving a light source.





## Photoluminescent Photocatalyst Effects of the Material

# Decomposition and Removal of Extreme/Ultra Fine Dust

It decomposes and removes fine dust that cannot be filtered by general filters from ultra-fine dust of  $2.5\mu$ m or less to ultra-fine dust of 1µm or less.

# Sterilization and Removal of Virus/Bacterial

It is excellent in removing harmful organic substances from various viruses of 0.3 micro or less, such as COVID19, F-coronavirus, influenza A, rhinovirus, mold spores. Staphylococcus aureus, and various bacteria.

#### Decomposition of volatile organic compoùnds

By decomposing volatile substances such as formaldehyde, acetaldehyde, toluene, and benzene, which are the causes of sick house syndrome, it blocks the causes of various diseases such as atopy in advance.

#### Excellent deodorizing effect

You can feel the excellent deodorizing effect in places with strong odors or a lot of air pollution such as cigarette smoke or smoke.

(Standard AC10 : 3~5pyeong / AC20 : 7~10pyeong / AC100s : 15pyeong)

# Photoluminescent Photocatalyst Test results of bacterial decomposition and removal





[After test ]



PSEUDOMONAS AERUGINOSA

[Before test]



PSEUDOMONAS AERUGINOSA REDUCTION RATE **99.9%** 



[Before test]



[After test]



# HARMFUL SUBSTANCES DECOMPOSITION AND REMOVAL ABILITY OF PHOTOLUMINESCENT PHOTOCATALYST

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APC Airdoctor / 6



# **TEST RESULTS OF PHOTOLUMINESCENT PHOTOCATALYST**





#### Virus Removal Rate COVID-19 : 99.899% F-coronavirus: 99.773% influenza A virus: 99.995% Rhinovirus: 99.984%





#### **Bacterial Removal Rate**

Staphylococcus aureus: 99.9% Pseudomonas aeruginosa : 99.9% E. coli:99.9% Pneumococcus : 99.9% Candida: 99.9% Bacillus : 99.9%





# Volatile organic compound deodorization rate

Acetic acid : 100% Toluene: 100% Ammonia:: 95% Formaldehyde:95% Staphylococcus aureus: : 99.9%





**Airborne virus reduction rate** Airborne virus : 99.1%



## Room for children with weak immunity



From newborn babies to children who are sensitive to immunity, this space is suitable for children.



#### For cold sensitive children

Decomposition and removal of viruses such as rhinovirus, influenza, F-coronavirus, and COVID-19

#### For children with rhinitis

Decomposes and removes various fine dust, bacteria, and mold that cause rhinitis.

#### For children with atopy

Decomposes and removes VOCs such as formaldehyde, a representative of sick house syndrome, one of the causative substances of atopy.

## Living room, family's rest place



In a space where our family is always together, especially with pets, Air Doctor is essential.



#### It's OK to turn on for 24 hours

Don't worry about electricity bills even if you leave it on 24 hours a day to for clean air.

#### No worries about the pet smell

The photoluminescent photocatalyst beads has excellent performance in removing volatile organic compounds and odors.

#### Exceeding the limits of filters

The filters of general air purifiers do not filter fine particles such as viruses and bacteria, but Air Doctor decomposes and removes them all.

## Unventilated kitchen



Cooking food generates the most ultrafine dust and volatile organic compounds



**90% of female lung cancer caused from here** Decomposes all harmful volatile organic compounds such as kitchen fine dust and formaldehyde.

#### Eliminate food smells odors and rotten odors

The photoluminescent photocatalyst beads have excellent performance in removing odors from food.

# Spaces of Using APC Air Doctor

Introducing APC Air Doctors in the field



## Beauty Salon / Nail Care



Products used in beauty salons and nail salons contain about 3,000 kinds of toxic chemicals, which have a detrimental effect on the human body.

We make a much more comfortable space by decomposing and removing all harmful compounds with photoluminescent photocatalyst.

#### APC Air Doctor in Hongdae Liz Hair

#### Postpartum care center / Hospital



There is a risk of various viruses and bacteria such as droplet infection inside the hospital.

High virus levels are found in toilets and communal facilities used by many people, such as hospitals and postpartum care centers.

APC Air Doctor in Uijeongbu Onarch Dental Clinic



Taxi / Means of transportation

If you open the window to ventilate, fine dust from the road enters into the car right away, and if you close the door, you are exposed to various viruses and volatile organic compounds, putting both passengers and drivers at risk.

APC Air Doctor is installed in 200 Macaron taxis in Seoul to provide a pleasant environment.

APC Air Doctor in Macaron taxi

Office / Multi-use facility



In offices or public places, many people are exposed to one space for a long time and ventilation is poor. In order to increase work efficiency and students' concentration in study, we make the surrounding environment a clean area.

APC Air Doctor in Yeouido Yuanta Securities

#### Private institutes / Daycare



In the academy where children are in the period of hormone secretion in the growth period, various unpleasant odors can interfere with their studies. Also, you can be directly exposed to the virus, and with APC Air Doctor, odors are removed and you can rest assured from the virus.

APC Air Doctor review from Hi Eli & Soma Gifted Learning Center

Singing room / PC room / Cafe



A space that is not properly ventilated is exposed to many unknown viruses and bacteria. In particular, the risk of a place located underground such as a PC room or karaoke room is very high.

APC Air Doctor creates a clean space where ventilation is not available.

APC Air Doctor in BreadOn & Cafe

Portable Photoluminescent Photocatalyst Air Purifier

# AIR DOCTOR Air Tumbler





Patented technology of photoluminescent Photocatalyst



Low noise sleep mode



Removing fine dust



Easy control



6

Eliminate new car syndrome

Removing virus

## What is Photoluminescent Photocatalyst Technology?

This technology oxidizes and decomposes harmful viruses, bacteria, pollutants, and odors in the air by generating substances with strong oxidizing power by reacting even in sunlight (UV lamp), visible light, and dark places.

General photocatalysts are effective only in the presence of light, but photoluminescent photocatalysts decompose and remove about twice as much harmful substances as normal photocatalysts by capturing light by the light source.







The portable air tumbler can be used in various spaces such as the interior of a car, a reading room to study, or a place to work. This is an air purifier with photoluminescent photocatalyst source technology that removes harmful substances and odors in the air and has confirmed the reduction of Feline (cat) coronavirus, rhinovirus, and type A influenza including volatile organic compounds.



<Korea Research Institute of Chemical Technology - Virus Inactivation (Removal) Test Results>

Institute>

tion and Living Environment>

% These figures are based on laboratory measurements and may differ depending on the actual environment.

It is portable to use anywhere, anytime, and can be operated with an auxiliary battery (capacity of 10,000 mAh or more).

# **PRODUCT DESIGN**



[In a Cafe]

[In a restaurant]

[In a car]

Model	Air Tumbler Air Tumbler M	AC-10	AC-20	AC-100S / 100D	AC-400
Usage	Portable	Small	Small-Medium	Medium	Large (Multi-use facility)
Area	10 m <sup>2</sup>	15 m²	30 m <sup>2</sup>	50 m² / 100 m²	330 m²
					mart integrated ol function

# Photoluminescent Photocatalyst Air Purifier AIR DOCTOR AC-10 / AC-10N

may



Patented technology

of Photoluminescent

Photocatalyst

IIII



Removing fine dust



Removing virus

5

Low noise sleep

mode



Easy control



**Breathe Fresh and Clean Air!** 

#### What is Photoluminescent Photocatalyst Technology?

This is a technology that oxidizes and decomposes harmful viruses, bacteria, pollutants, and odors in the air by generating substances with strong oxidizing power by reacting even in sunlight (UV lamp), visible light, and dark places.

A general photocatalyst is effective only in the presence of light, but a photoluminescent photocatalyst absorbs light by a light source and decomposes and removes about twice as much harmful substances as a general photocatalyst. APC



What is Air Doctor AC-10?

The simple design allows to create a natural look in any space on the office desk, next to the bed, in the children's room, or in the car. This is an air purifier with photoluminescent photocatalyst original technology that removes harmful substances and odors in the air and reduces Feline (cat) coronavirus, rhinovirus, and type A influenza including volatile organic compounds.



<Korea Research Institute of Chemical Technology - Virus Inactivation (Removal) Test Results>

Institute>

<Korea Institute of Construction and Living Environment>

% These figures are based on laboratory measurements and may differ depending on the actual environment.

**PRODUCT DESIGN** 

With a stylish design in 4 colors, it goes well with the interior design and can be operated with an auxiliary battery (capacity of 10,000 mAh or more).





Model	Air Tumbler Air Tumbler M	AC-10	AC-20	AC-100S / 100D	AC-400
Usage	Portable	Small	Small-Medium	Medium	Large (Multi-use facility)
Area	10 m <sup>2</sup>	15 m²	30 m²	50 m² / 100 m²	330 m²
					mart integrated ol function



# Photoluminescent Photocatalyst Air Purifier AIR DOCTOR AC-20



Patented technology of Photoluminescent Photocatalyst



Removing fine dust





Removing virus



Easy control

Low noise sleep

mode

This is a technology that oxidizes and decomposes harmful viruses, bacteria, pollutants, and odors in the air by generating substances with strong oxidizing power by reacting even in sunlight (UV lamp), visible light, and dark places.

> XA general photocatalyst is effective only in the presence of light, but a photoluminescent photocatalyst absorbs light by a light source and decomposes and removes about twice as much harmful substances as a general photocatalyst.





Through the natural convection phenomenon caused by the heat of the UV lamp, it circulates air without a fan What is or filter without noise and changes it to water and harmless air such as nitrogen, and it is good for health by Air Doctor AC-20? decomposing and removing 99.9% of harmful substances and viruses.



<Korea Research Institute of Chemical Technology - Virus Inactivation (Removal) Test Results>

<FITI Test Research Institute>

tion and Living Environment> % These figures are based on laboratory measurements and may differ depending on the actual environment.

# **PRODUCT DESIGN**



4 stages according to the pollution state of the air .

Model	Air Tumbler Air Tumbler M	AC-10	AC-20	AC-100S / 100D	AC-400
Usage	Portable	Small	Small-Medium	Medium	Large (Multi-use facility)
Area	10 m <sup>2</sup>	15 m²	30 m²	50 m² / 100 m²	330 m²
					mart integrated ol function



#### What is Photoluminescent Photocatalyst Technology?

This is a technology that oxidizes and decomposes harmful viruses, bacteria, pollutants, and odors in the air by generating substances with strong oxidizing power by reacting even in sunlight (UV lamp), visible light, and dark places.

A general photocatalyst is effective only in the presence of light, but a photoluminescent photocatalyst absorbs light by a light source and decomposes and removes about twice as much harmful substances as a general photocatalyst.

Photoluminescent Photocatalyst technology to decompose and remove viruses and bacteria



# Photoluminescent Photocatalyst Air Purifier AIR DOCTOR AC-100 series



Patented technology of Photoluminescent Photocatalyst



Removing fine dust



**Removing virus** 



Removing volatile organic compounds (VOCs) and odors



Selective use of IoT function

#### What is Air Doctor AC-100?

Photoluminescent Photocatalyst, a semi-permanent material that reduces viruses, sterilizes, decomposes and removes various organic substances, and converts polluted air harmful to the human body into new air, is applied. It is an air purifying sterilizer suitable for use in any indoor space, such as a medium-sized space with IoT-based smart integrated management function.



<Korea Research Institute of Chemical Technology - Virus Inactivation (Removal) Test Results>

<FITI Test Research Institute>

tion and Living Environment> % These figures are based on laboratory measurements and may differ depending on the actual environment.



[Good] [Normal] [Bad] [Very bad]

Model	Air Tumbler Air Tumbler M	AC-10	AC-20	AC-100S / 100D	AC-400
Usage	Portable	Small	Small-Medium	Medium	Large (Multi-use facility)
Area	10 m <sup>2</sup>	15 m²	30 m <sup>2</sup>	50 m² / 100 m²	330 m²
					mart integrated ol function



# Photoluminescent Photocatalyst Air Purifier AIR DOCTOR AC-400







Removing fine dust



Removing virus



Removing volatile organic compounds (VOCs) and odors



Selective use of IoT function



#### What is Photoluminescent Photocatalyst Technology?

TThis is a technology that oxidizes and decomposes harmful viruses, bacteria, pollutants, and odors in the air by generating substances with strong oxidizing power by reacting even in sunlight (UV lamp), visible light, and dark places.

※ A general photocatalyst is effective only in the presence of light, but a photoluminescent photocatalyst absorbs light by a light source and decomposes and removes about twice as much harmful substances as a general photocatalyst.

# What is Air Doctor AC-400?

It is an air purifying sterilizer optimized for a large space as a product suitable for multi-use facilities and large areas. Photoluminescent Photocatalyst source technology is applied, which is a semi-permanent material that reduces viruses, sterilizes, decomposes and removes various organic substances, and converts polluted air harmful to the human body into new air, and IoT-based smart integrated management function has been.



Institute>

% These figures are based on laboratory measurements and may differ depending on the actual environment.

**PRODUCT DESIGN** With a friendly and cute design, it is suitable for any place and is an easy air purifier for up to 330m<sup>3</sup>.



It is displayed in 4 colors according to the air pollution status. The IoT function can also check the pollution level and operate.



Model	Air Tumbler Air Tumbler M	AC-10	AC-20	AC-100S / 100D	AC-400
Usage	Portable	Small	Small-Medium	Medium	Large (Multi-use facility)
Area	10 m <sup>2</sup>	15 m²	30 m²	50 m² / 100 m²	330 m²
					mart integrated ol function

<sup>&</sup>lt;Korea Institute of Construction and Living Environment>



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