

MESP Solution to Fight COVID

Fon Zhou

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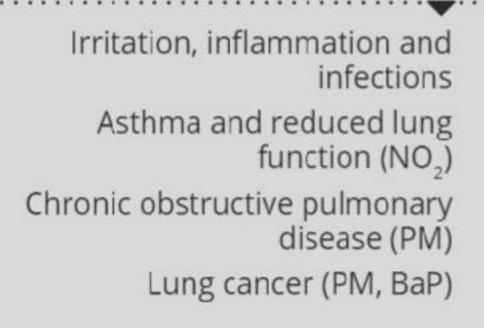
en.airquality.com

The air we breathe every day is not safe.



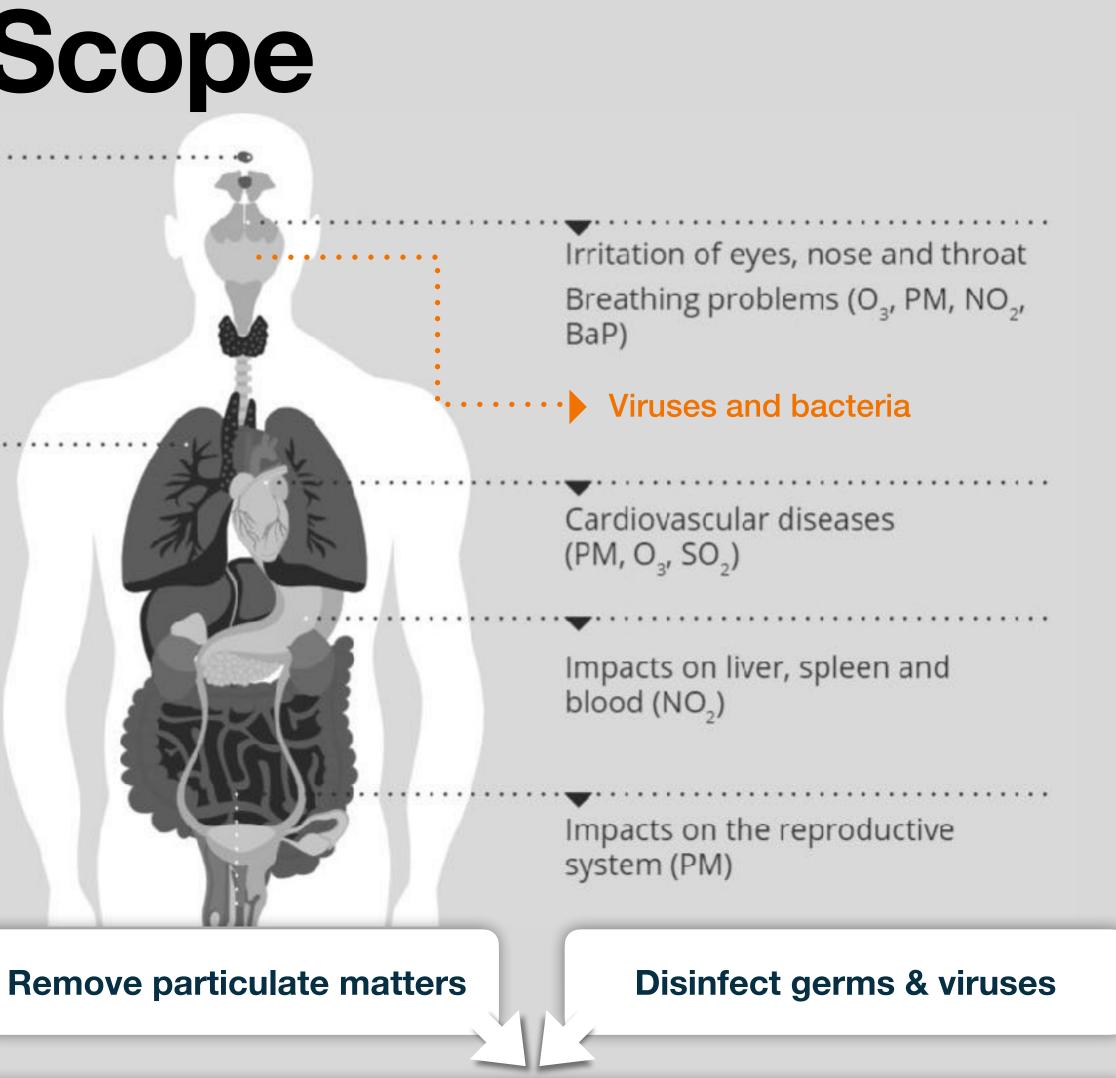
Indoor Air Clean Scope

Headache and anxiety (SO₂) Impacts on the central nervous system (PM)



Remove gaseous pollutant

- Remove the source
- Neutralisation
- Ventilation



Comprehensive Air Clean Solution



Pollutant Types in Indoor Air



Viruses / Bacteria / Fungus



Lack of fresh air



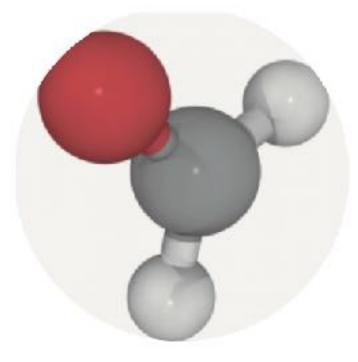


Medical gas volatilization (eg. ozone)

PM2.5 / Pollen



Air conditioner pollution



Formaldehyde / TVOC / Benzene



The Analysis of Pollution

Pollutant	
PM2.5	 Intrusion of atmospheric pollutants: nearby thermal power road surface, brakes and tire friction; chemical reactions be 2. Human-to-human activities: human and pet dander, cloth 3. Central air conditioning ventilation system: Dust particles microorganisms use dust particles as carriers to rapidly rep provide suitable environment for bacteria and other microor on the fins, filters and pipes of the central air-conditioning e
Viruses / Bacteria / Fungus	Human or animals: they can release a large number of micr PM2.5 carries a large number of bacteria and other microor Human-to-human activities: The dander produced by huma Indoor environment: Carpets, wallpapers, sofas, mattresses fungi.
Ozone	Intrusion of atmospheric pollutants: Unlike the upper atmos pollutants such as nitrogen oxides (NOX) released by vehicl with sunlight. Ozone pollution is severe when there is plenty Corona discharge: unqualified copiers, laser printers, negat
NO ₂	Natural-made air pollutant, the main source of man-made r ships)
SO ₂	Natural-made air pollutant, home heating, power generation The use of high chimneys in power stations cause widespre The increasing use of high-sulfur coal in many developing c
Positive Ion	Natural-made air pollutant, air conditioning systems, electro

Source

ver generation, combustion and other industrial activities; smog, sandstorms; car engines, road traffic erosion on the between air pollutants in the air which forms secondary particles.

othing; fuel and fumes of canteens and restaurants.

es in the indoor air accumulate on the fins, filters and pipes of the central AC evaporator. Bacteria and other eproduce and grow in the central AC system. The suitable temperature and humidity in the central air conditioner organisms growth. Outdoor air pollutants enter the room through open windows and doors, subsequently accumulate evaporator.

croorganisms into the air through breathing, coughing,...etc.

organisms.

nan metabolism becomes a source of nutrients for the survival and reproduction of bacteria and fungi.

es, beddings and other upholstered furniture, kitchens and bathrooms can be possible places for living bacteria and

ospheric ozone layer, ground-level ozone is a major component of photochemical smog. It is formed by the reaction of cles and industrial plants, plus volatile organic compounds (VOCs) released by vehicles, solvents and industrial plants ty sunshine.

ative ion generators, electrostatic and plasma devices.

release of nitrogen dioxide is the combustion process (heating, power generation, and engines of motor vehicles and

on and motor vehicles burn fossil fuels containing sulfur.

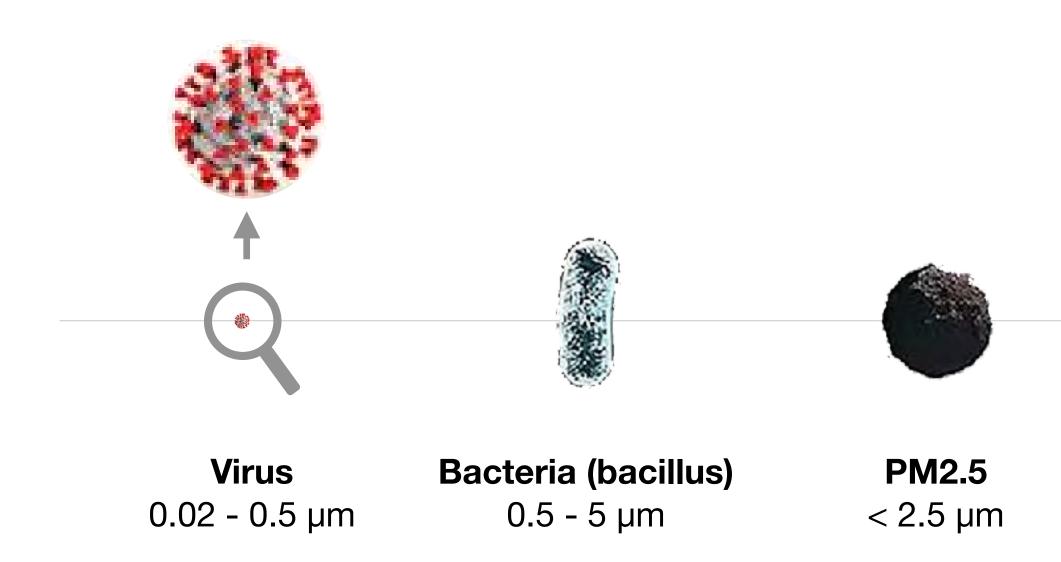
read release of sulfur dioxide, causing pollution to the population far from the source of production. countries.

romagnetic pollution

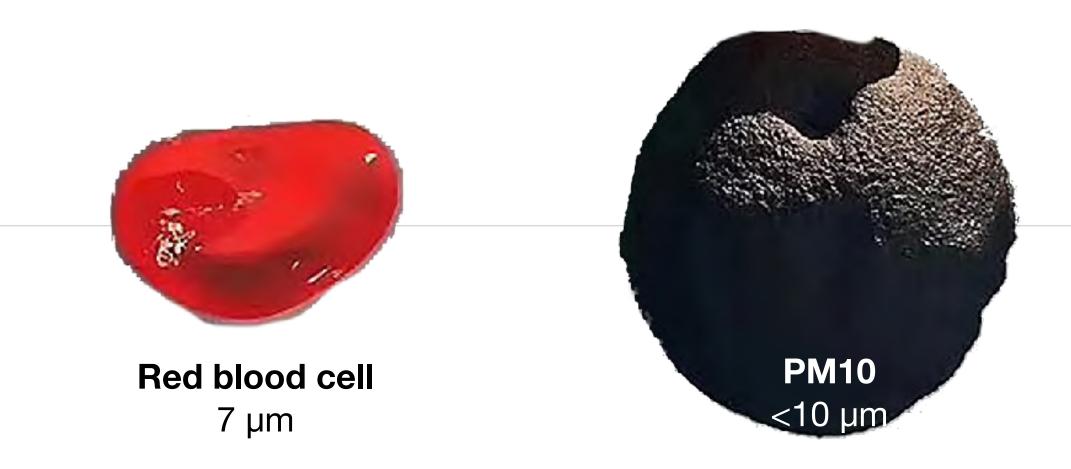




Air Pollutant Dimensions



The dimension of COVID-19 virus is 0.1 microns in diameter, which is similar to the H1N1 virus. Viruses do not exist along in the air. It is always carried and transmitted by **aerosol**. The diameter of the aerosol is 0.3-10 microns. It means air clean is a critical requirement.



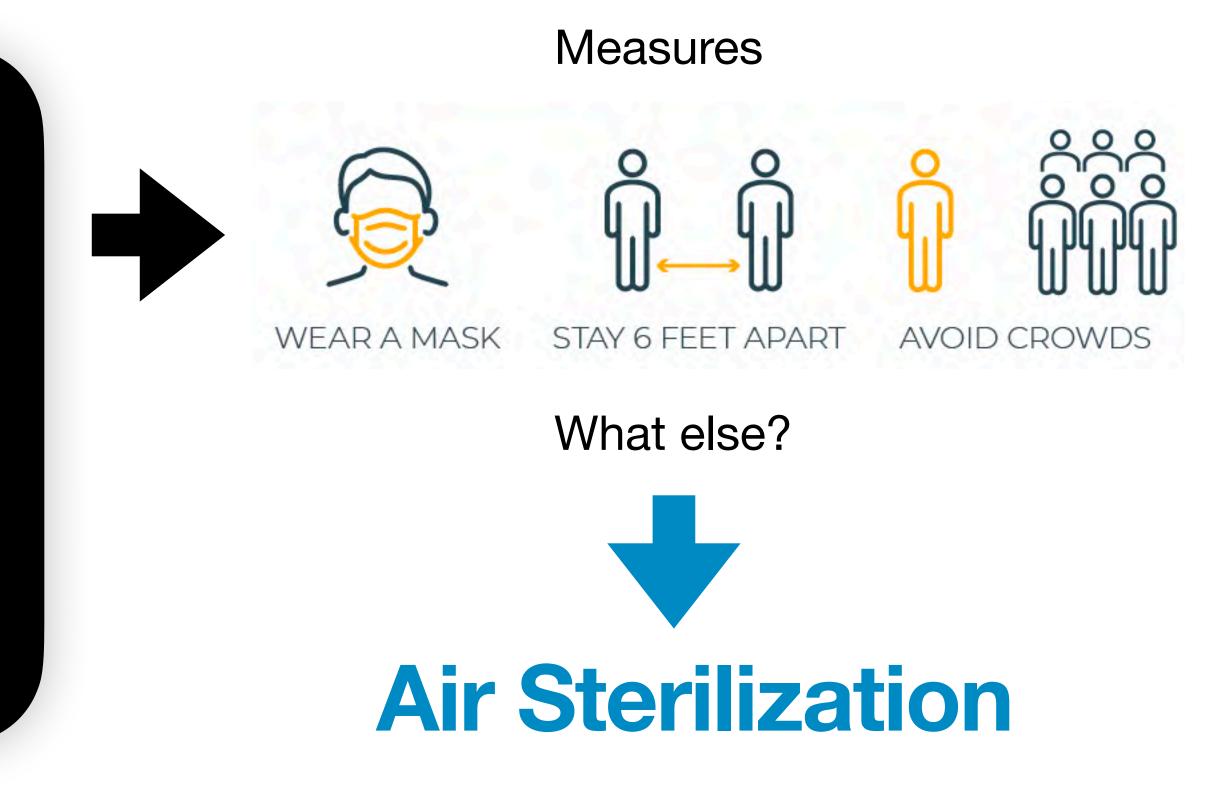


SARS-CoV-2 and Potential Airborne Transmission

The principal mode by which people are infected with SARS-CoV-2 (the virus that causes COVID-19) is through exposure to respiratory droplets carrying infectious virus.

Infections with respiratory viruses are principally transmitted through three modes:
Contact transmission
Droplet transmission
Airborne transmission

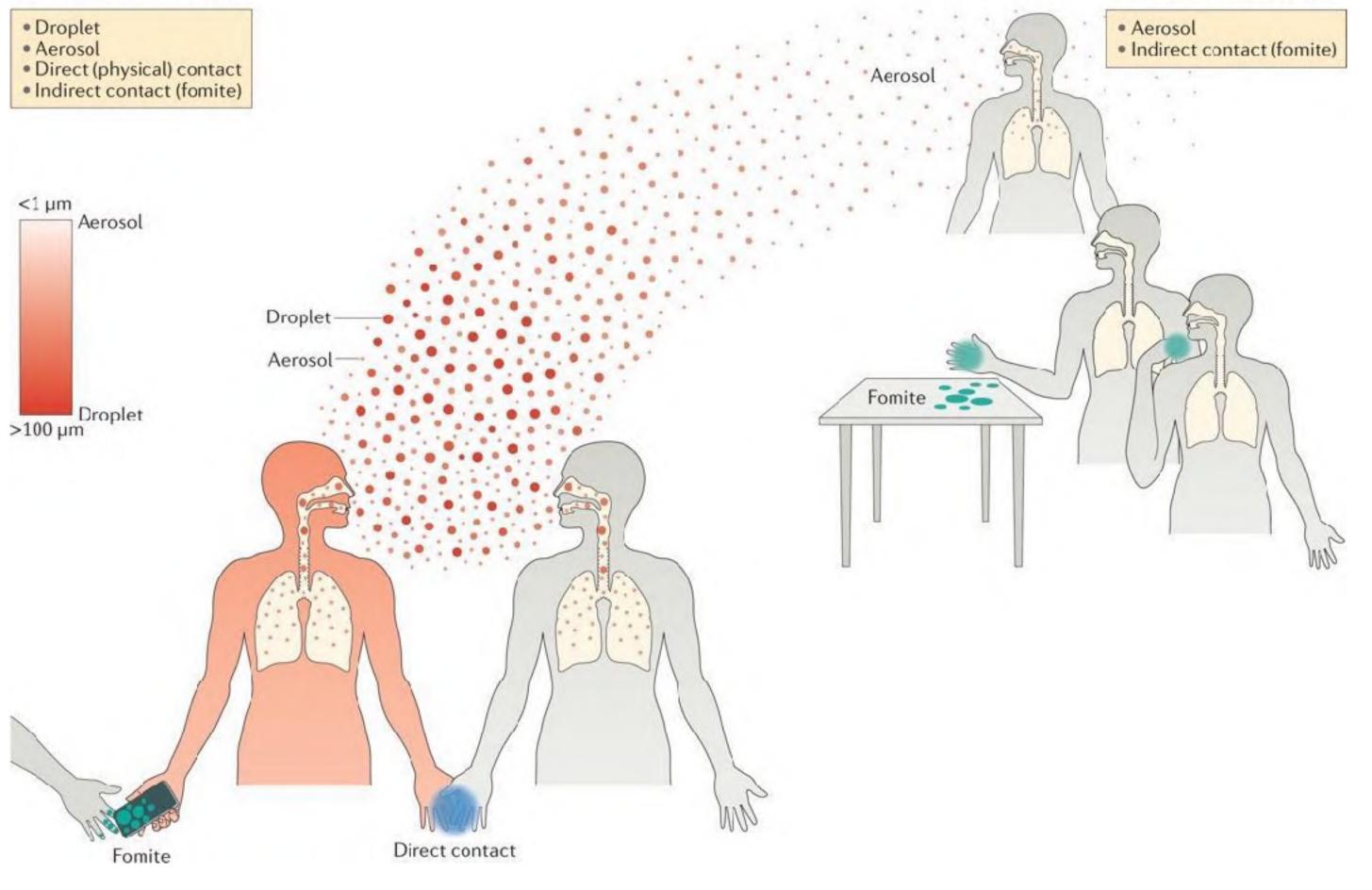
https://www.cdc.gov/coronavirus/2019-ncov/more/scientific-brief-sars-cov-2.html



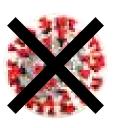


Air Sterilization For COVID-19

Short-range transmission



www.nature.com



Long-range transmission

Requirements

- Capture air particles and aerosol to eliminate hidden viruses
- Inactivate viruses and bacteria
- Can work along with people
- No much maintenance cost





The Summary of Indoor Air Clean Technology



Ways to Improve Indoor Air Quality

Pollutant sources control

- Establish smoking & eating area, preventing the spread of contamination.
- Purify air conditioning air, isolate infected persons, reduce cross-infection.
- Do not use toxic materials.

Ventilation increasing

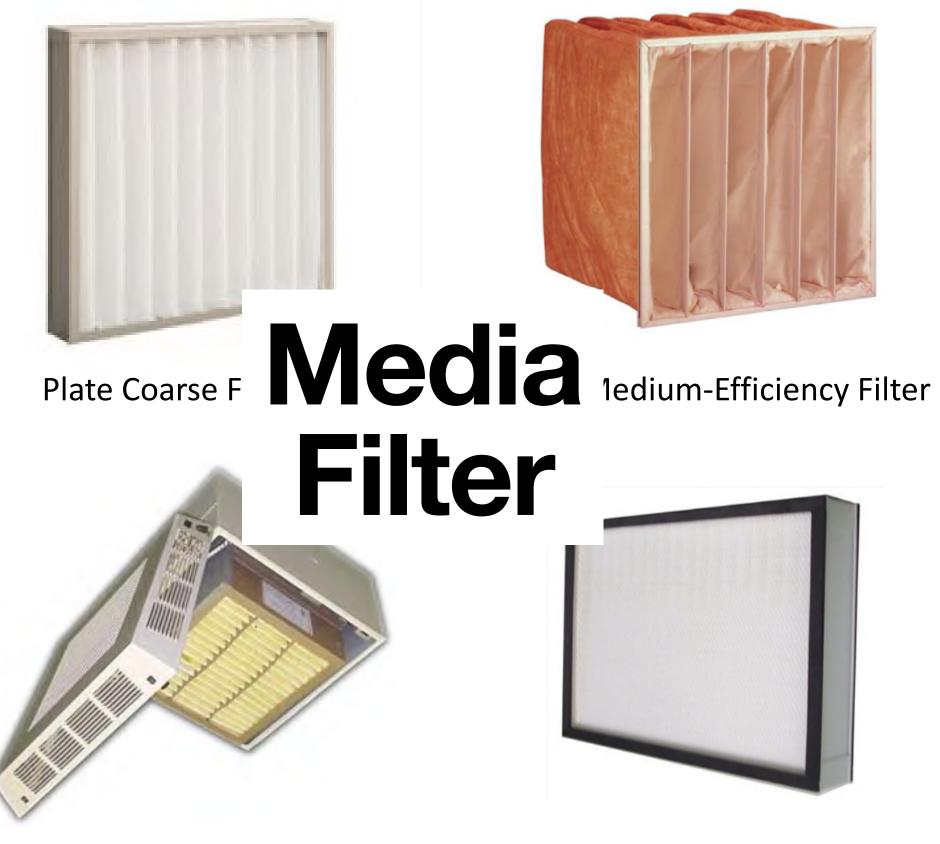
Clean Air

• Improved ventilation systems or equipment • Increase fresh air circulation in order to increase the oxygen content in the air • Reducing indoor pollutant concentrations.

Install air purifier to remove particles, virus and bacteria to provide best air quality.



Traditional Filtration Solution



Media purifier

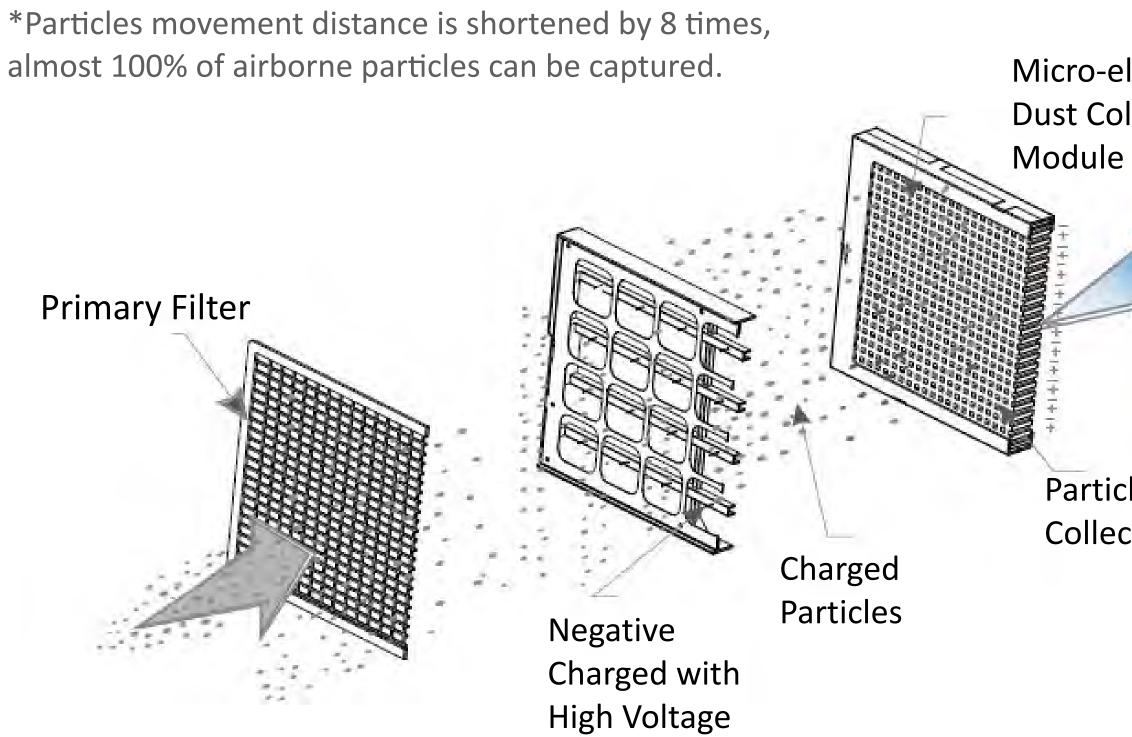
HEPA

- Need to replace constantly, not cost-efficient for long term use
- Can not sterilize the air so perhaps cause secondary pollution
- High power consumption due to its high pressure drop





AirQuality MESP (Micro-electrostatic Precipitator) is a high efficient filtration that purify the air with unique intense field dielectric.



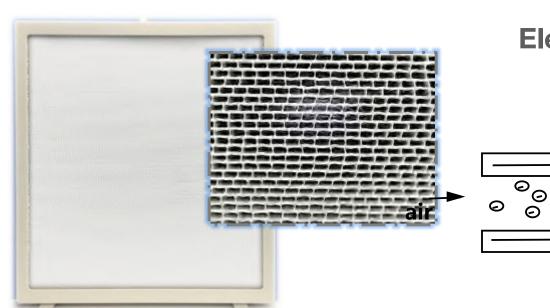


Micro-electrostatic **Dust Collection**

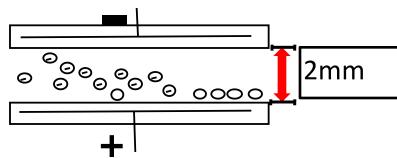
Clean Air

Particles Collected





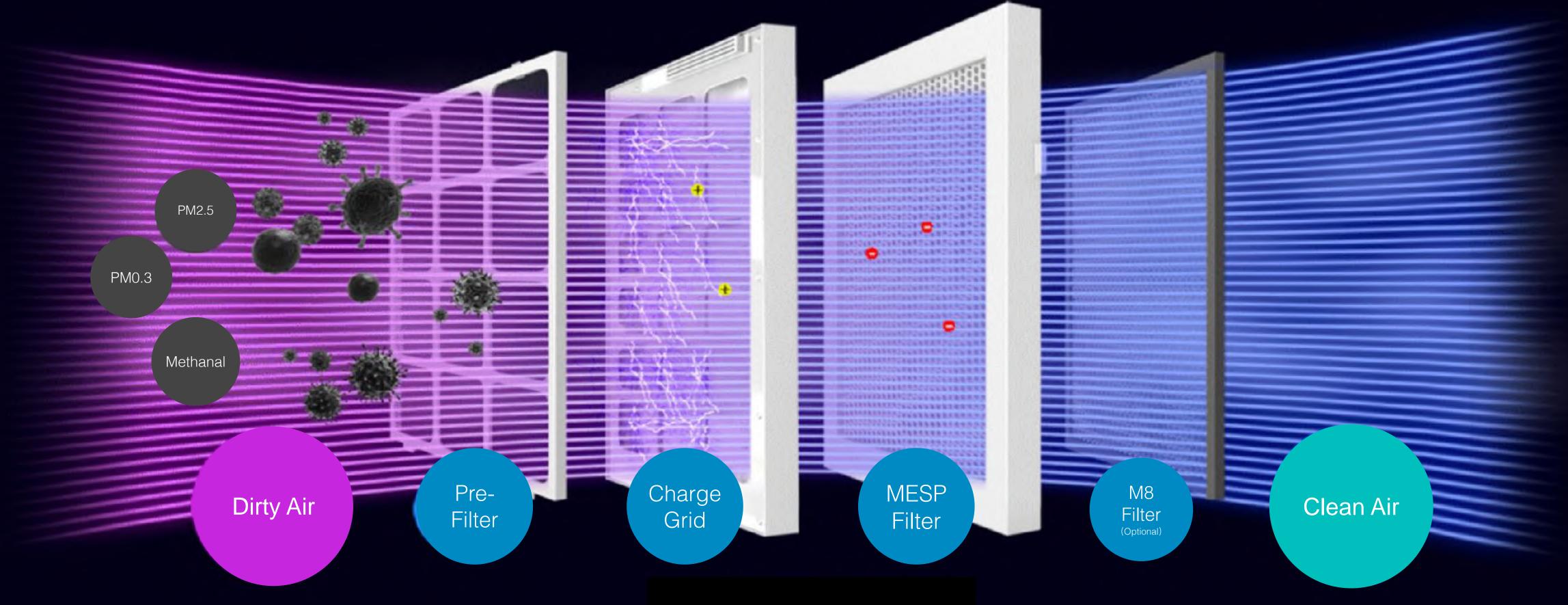
Electrode covered with insulating layer





MESP Technology

Micro-electrostatic Precipitating Technology

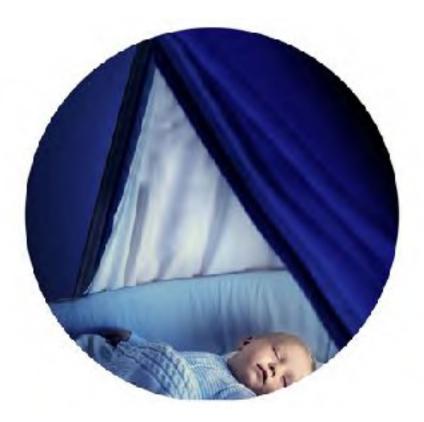




Why MESP Air Sterilizing Purifiers A new generation air purification technology

MESP Air Sterilizing urifier PM2.5 Purflication Efficacy of 99% Bacteria Viruses ling Efficacy of **Killing Efficacy of** 9.96% 99.99% of HINI and Sam-Cow-

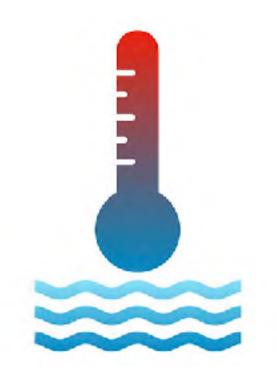




Safety



Washable Filter



High Usability







High Efficiency



Energy Saving

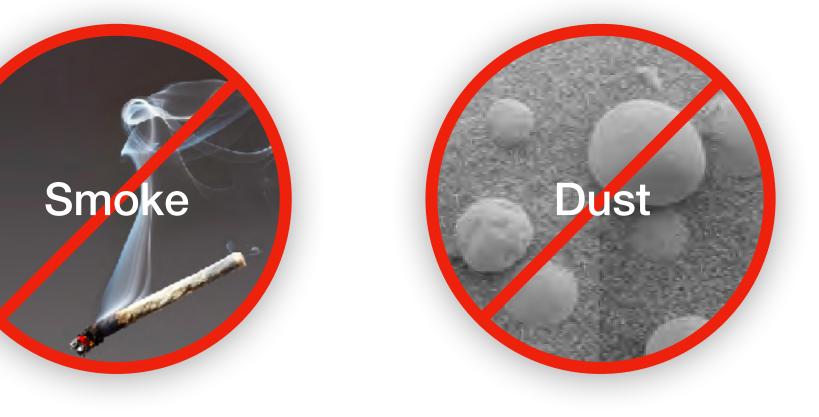


What Pollutant Can MESP Deal With?





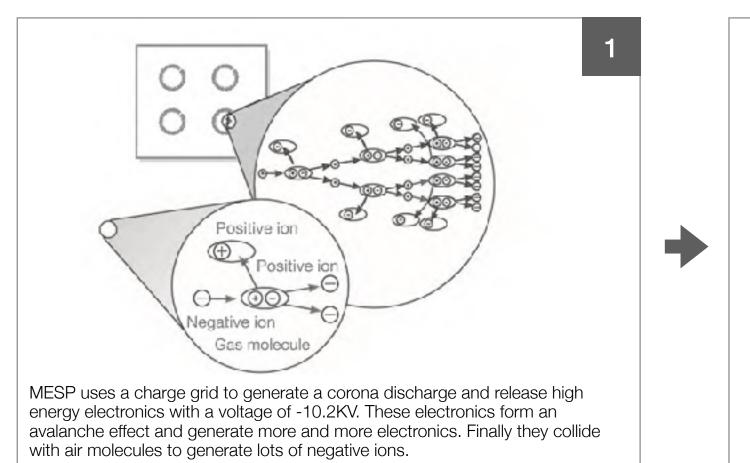


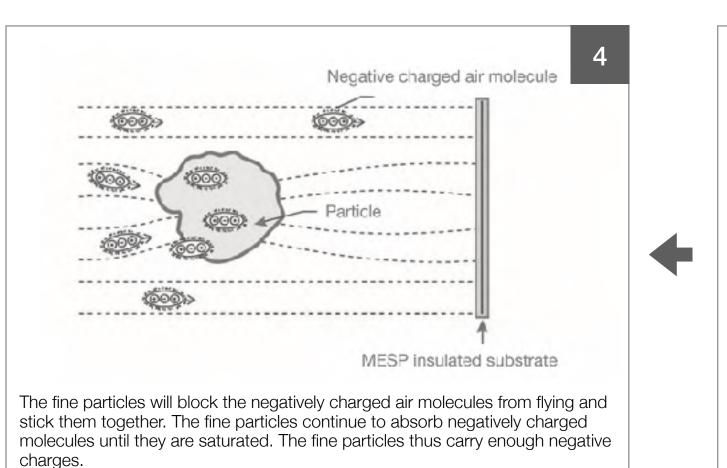


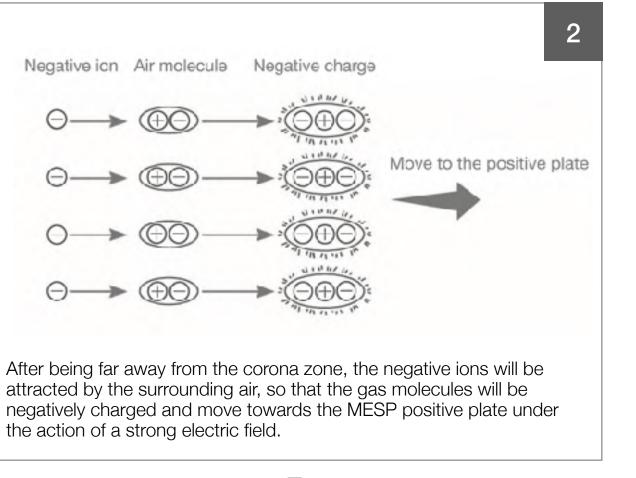


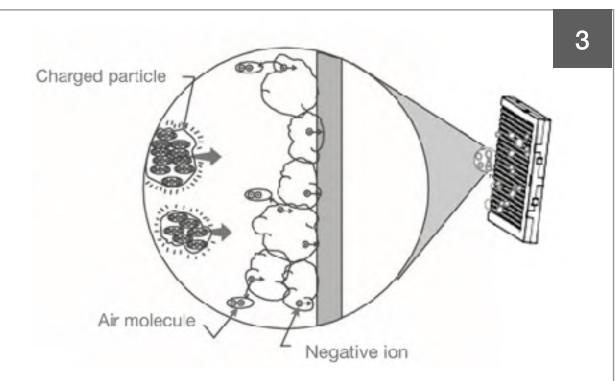


How Does MESP Work









The negatively charged fine particles move to the positive plate under the action of the dense MESP matrix electric field, and are firmly attracted by it.



Why MESP could kill virus and bacteria?



When bacteria and viruses pass through the microelectrostatic filter, due to the high-voltage electrostatic effect of up to ten thousand volts, with the tiny potential difference between the bacteria and viruses from the outside to the inside, the high voltage will instantly destroy the cell wall of bacteria and the protein shell of viruses, thereby inactivated, instantly killed.





Test Report of Virus Killing

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Report No.: SHES201002002772

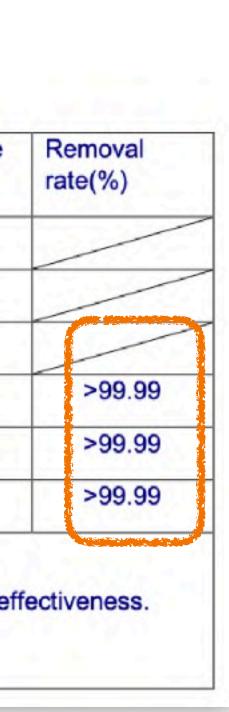
2.Refer to test standard: GB 21551.3 -2010 Annex A

Test item: air virus removal effect test

Clause	Item	Time	Test No.	Air virus concentration value TCID ₅₀ /m ³
Annex A	H1N1 (A/PR/8/34) MDCK Cell	0(CK)	1	2.44x10 ⁶
			2	1.94x10 ⁶
			3	2.44x10 ⁶
		60 min	1	<97.3*
			2	<97.3*
			3	<97.3*

Note: Natural attenuation was taken into account for the calculation of bacterial removal effectiveness.

*: Limited value of measured equipement.



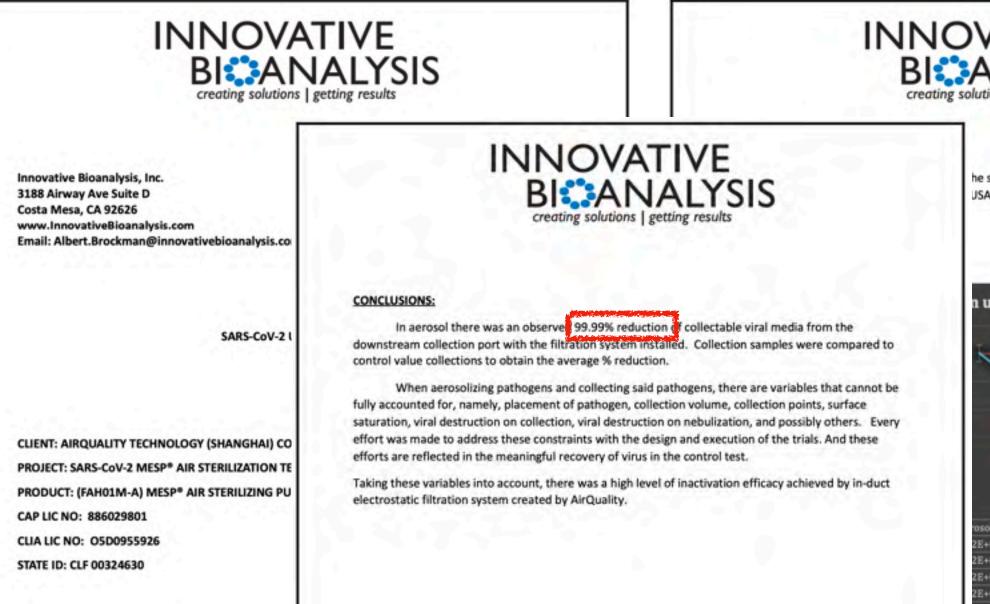
Conclusion

The test report from SGS, a well-known Swiss inspection, certification and testing organization, shows 99.99% of H1N1 virus has beed killed by KJ MESP portable air purifiers.



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Test Report of SARS-COV-2



CHALLENGE VIRUS: SARS-CoV-2 USA-CA1/2020

Innovative Bioanalysis, Inc. Airquality MESP* A

DISCLAIME

The Innovative Bioanalysis, Inc. ("Innovative Bioanalysis") laboratory is not certified or licensed by the United States Environmental Protection Agency and makes no equipment emissions claims pertaining to ozone or byproduct of any AIRQUALITY device. Innovative Bioanalysis makes no claims to the overall efficacy of any AIRQUALITY FAH filter. The experiment results are solely applicable to the device used in the trial. The results are only representative of the experiment design described in this report. Innovative Bioanalysis makes no claims as to the reproducibility of the experiment results given the possible variation of experiment results even with an identical test environment, viral strain, collection method, inoculation n, viral media, cell type, and culture procedure. Innovative Bioanalysis makes no claims to third parties and takes n responsibility for any consequences arising out of the use of, or reliance on, the experiment results by third parties.

Innovative Bioanalysis, Inc. Airquality MESP* Air Sterilizing Purifier (FAH01M-A)

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ions getting resu	13
	e viral test at the time-points and concentration of 6.02 X 10 ⁶
tilizing Floct	ro-Static Filtration
unzing Elecu	ro-Static Filtration
	Down Stream Collection
06	Down Stream Collection 5.41E+06 5.34E+06
06 06	5.41E+06
06 06 06	5.41E+06 5.34E+06
06 06 06 06 06	5.41E+06 5.34E+06 6.02E+02 6.02E+02 6.02E+02 6.02E+02
06 06 06 06	5.41E+06 5.34E+06 6.02E+02 6.02E+02 6.02E+02 6.02E+02
A	5.41E+06 5.34E+06 6.02E+02 6.02E+02 6.02E+02 n Point
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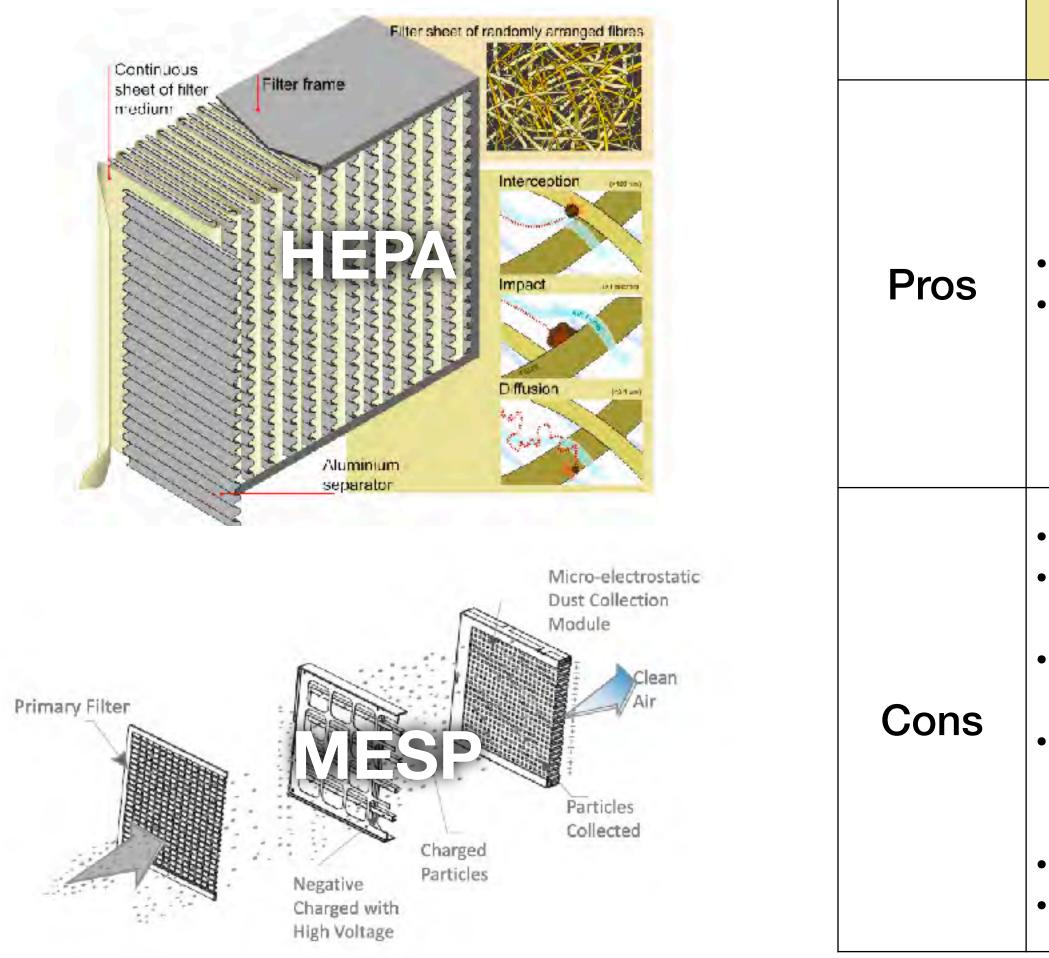


CONCLUSIONS:

Through the course of the three air flow passes conducted and average of 99.99% of SARS-COV-2 virus reduction was observed.



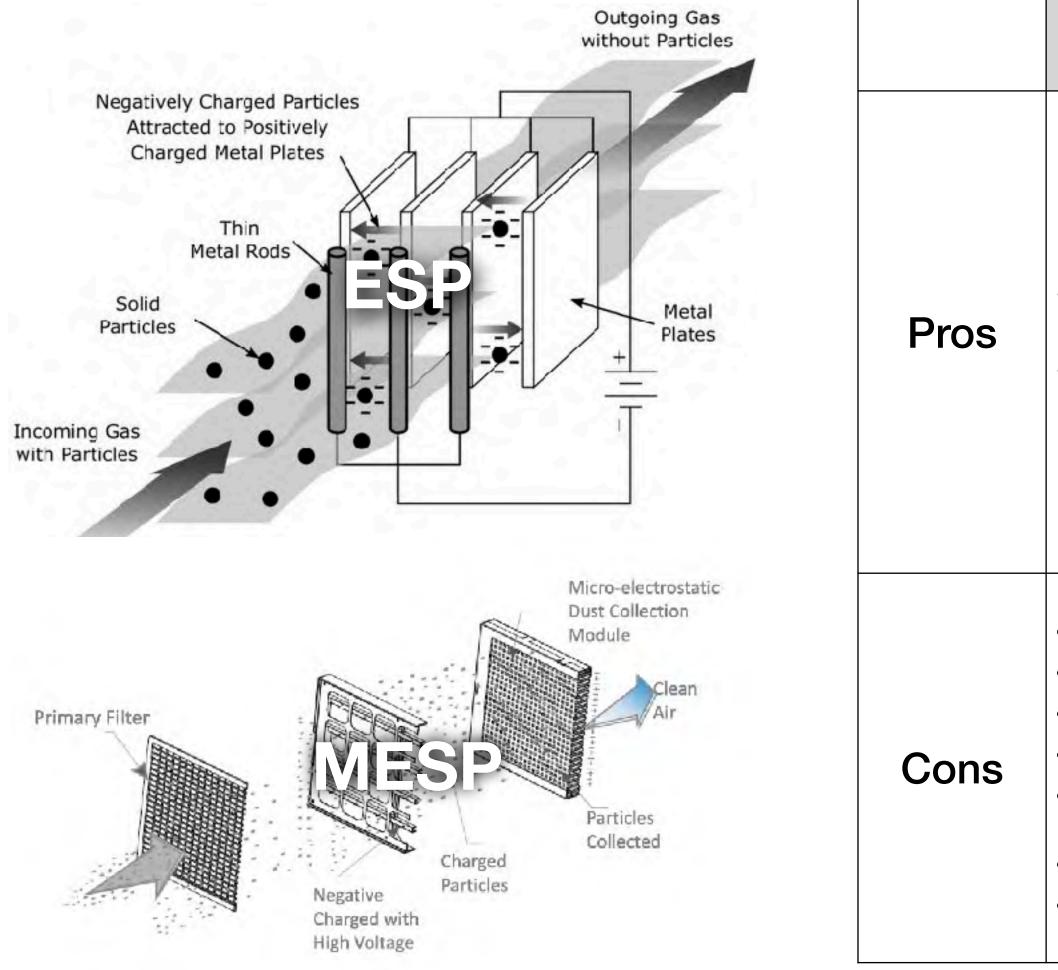
MESP VS HEPA



HEPA	MESP
Higher purification efficiencyNo need to install	 Washable and reusable Can sterilize the air Higher usability (working temperature from -15°C to 48°C and humidity up to 95%) Much lower power consumption Fire prevention Environmentally friendly
 Need to replace thus not cost-efficient Can not sterilize the air so perhaps cause secondary pollution Not applicable for low temperature and high humidity High pressure drop and limited applicability (e.g. can't be used for FCU) Inflammable Pollute the environment 	 Higher initial investment than HEPA Need to install



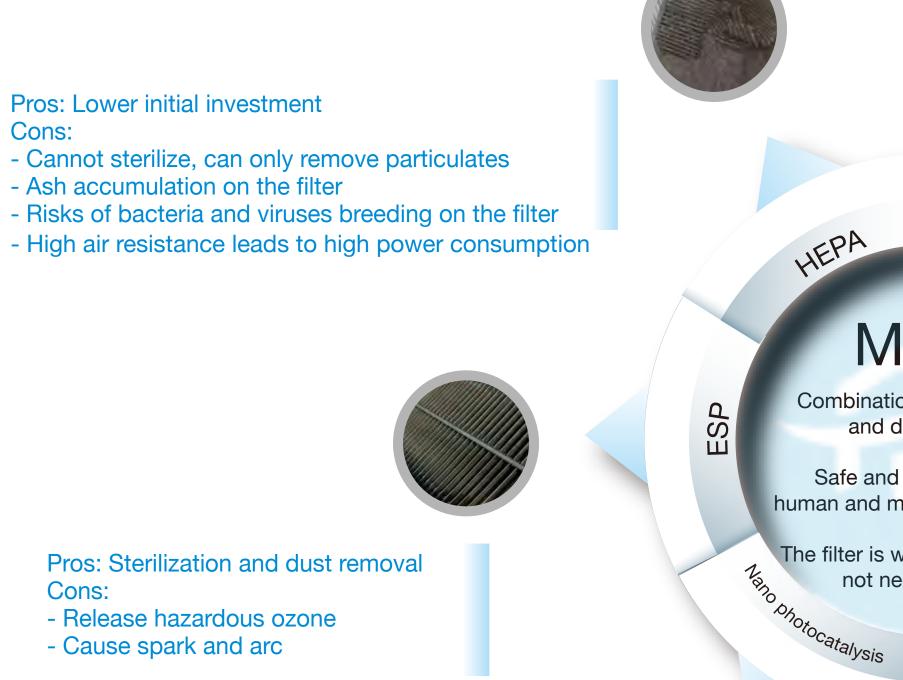
MESP VS ESP



ESP	MESP
 Even lower pressure drop than MESP Lower cost than MESP 	 Larger dust collection area thus higher dust holding capacity and higher efficiency More healthy with few ozone generation Better user experience without spark & arc Higher usability (working temperature from -15°C to 48°C and humidity up to 95%) Lower power consumption than ESP Higher robustness and low maintenance cost Higher electrical safety No efficiency loss after repeated washing(-1.3%/100 times) Smaller size, lighter weight, easier to install
 Lack of dust collection area thus lower efficiency Harmful byproducts like ozone issue Spark & arc issue High requirements for humidity and temperature The tungsten wire is easy to break thus the maintenance cost is higher Efficiency decrease after washing Larger size, heavier(all metal), not easy to install 	 A bit higher pressure drop than ESP Higher cost than ESP



MESP vs. Other Technologies



Cons:

Pros: Sterilization and dust removal Cons:

- Release hazardous ozone
- Cause spark and arc

Pros: Small and convinient



Cons: - Not effective as it does not eliminate dust, only deodorization

- Risks of strong oxidizing and UV radiation





MESP

HEPA

Combination of disinfection and dust removal

Safe and harmles due to human and machine coexistence

UVGI

The filter is washable and does not need replacing

Disinfectant rea

Pros: Can sterilize the air and Object surface Cons:

- Cannot remove particulates
- Harmful to UV rays
- The disinfection is effective only within the range of
- high intensity and long term exposure
- High cost

- Can not work around people because of its harmful radiation and ozone generation



- Pros: Can sterilize the air and Object surface Cons:
- Cannot remove particulates
- Because of its strong oxidizing and toxic properties, this method is not suitable around people



Ozone

Pros: Widely used Cons: Do not remove dust.Time-consuming, labor-intensive and toxic.



UVGI+HEPA Is Not Perfect Solution

UVGI+HEPA is a very popular solution for indoor air sterilization. It uses HEPA filter installed on air conditioning system to purify the air, the viruses and bacteria will be captured with the airborne particulates by HEPA filter, and then uses UVGI to sterilize the HÉPA filter. It works but still not a perfect solution.

- High cost with double initial and continuous investment High pressure drop HEAP filter inherently possessed results \bullet in low purification efficiency and high energy consumption of AC system
- **Not environmentally friendly** (HEPA and UVGI equipment are both \bullet consumable material)
- Long time UV irradiation may impact on the physical and \bullet chemical properties of media filter, which leads to worse purification efficiency (<u>Reference</u>)
- Particles/dust come along with air flow will quickly cover the **UV** lamp and shorten its service time (<u>Reference</u>)

MESP has fixed these issues !!!











Products and Solutions

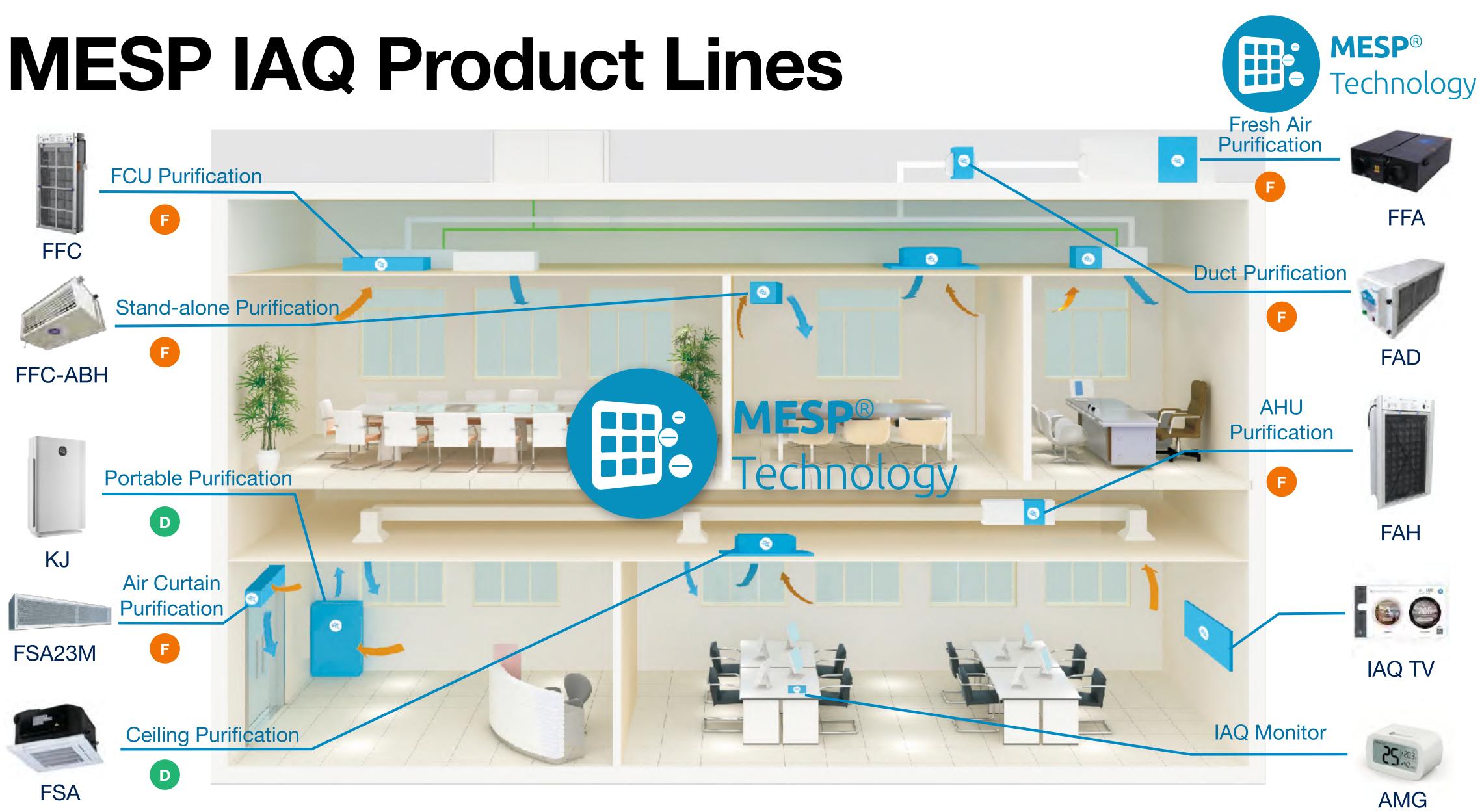




Solutions









KJ Series | Portable Air Sterilizing Purifiers



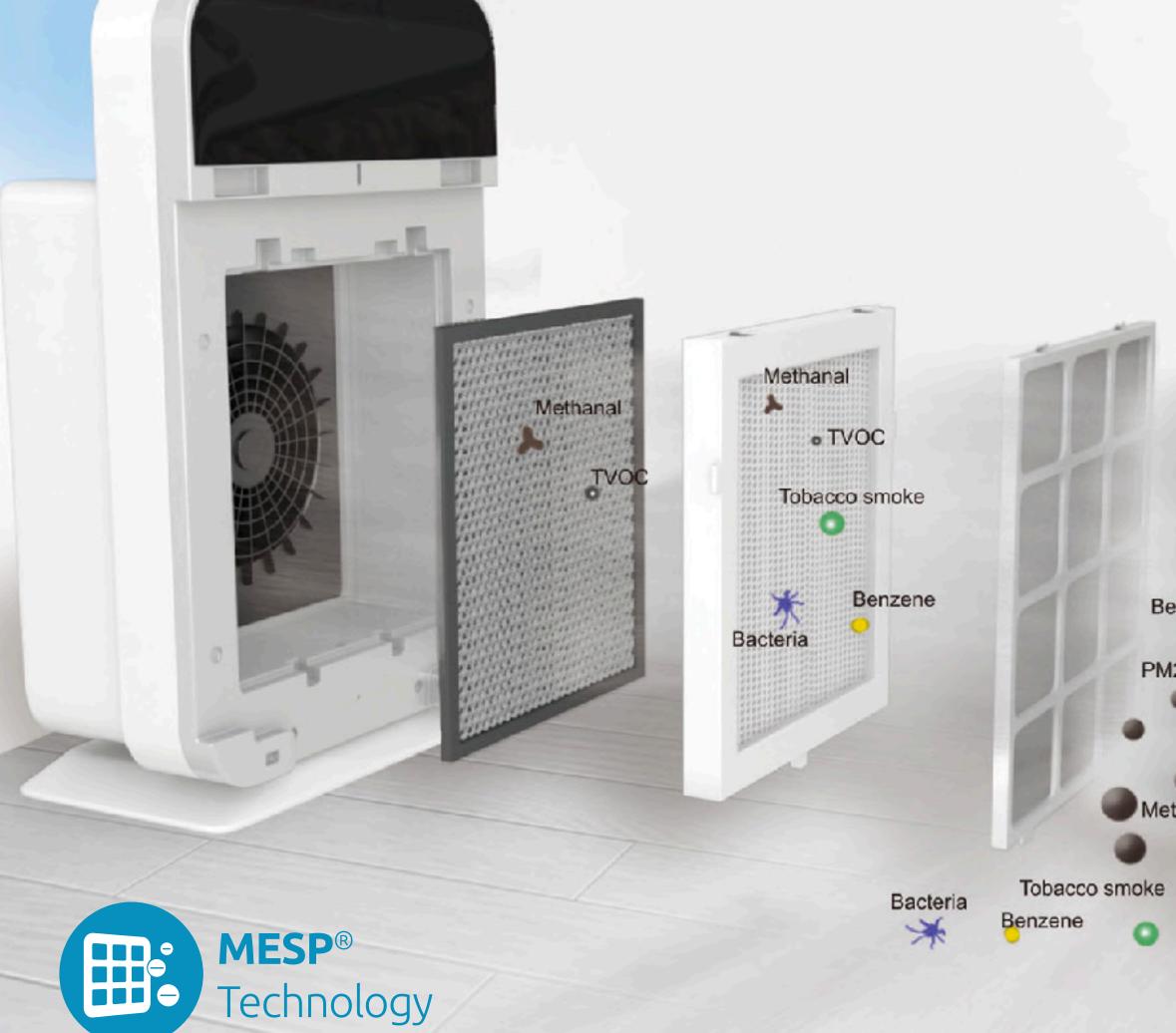


Features

- Efficient removal of PM2.5, virus, bacteria, pollen, allergen and other particulate pollutants
- Kill 99.99%+ of viruses and 99.96% of bacteria, remove 99.9% of particulates
- No material consumption, the filter is washable, no need to replace
- Release negative Ion to keep refreshing the air
- M8 methanal filter steadily adsorbs and decomposes methanal and other harmful chemical gases
- "Surface design" of front panel expands air volume at the bottom and effectively purifies sedimentary pollutants at the bottom
- Low running noise, as low as 34dB in silent mode, and even lower in sleep mode
- Built-in particle sensor, indicator light displays air quality, automatically regulate air speed, and intelligent prompt of cleaning
- Low energy consumption, safe and power-saving
- Magnetic buckle panel is easy to disassemble, assemble and clean







Bacteria Benzene PM2.5

Methanal

TVOC 0

Hair

Methanal TVOC o

0 Tobacco smoke

翻

) 太平洋保险 CPIC



IP54

VLMS

上海計量測試

SGS







RoHS



CNCF

CE

(EMC)



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FAH Series | Air Sterilizing Purifier For AHU





Features

- High-efficiently kill viruses and bacteria (Above 99.96%)
- High-efficiently remove air particles (Above MERV 14)
- Low energy consumption, safe and power-saving
- Replace traditional bag filter section of AHU, low air resistance
- One-time purification efficiency is up to over 95%
- Protect AHU and prevent filth blockage of air-conditioning system from affecting effect of refrigeration and heating
- Lifetime washing of Micro-Electrostatic filter avoids replacement and substantially cuts down cost of consumables
- PRAX intelligent power module stabilizes voltage output and ensures maximum purification efficiency
- Multiple control boxes and junction boxes are optional
- Flexible installation: Installation in air duct is acceptable









O material consumption

dust and sectoria

Remove methanal.

eco Low energy

consumption

O DODGO DI

0700

Low pressure Mulular Assembly Design





• No material consumption, the filter is washable, no need to replace



AHU Filtration

A typical air handling unit



FAH Series MESP Air Conditioning Sterilizing Purifiers for AHU



It's a large Market.

- Yearly Production: 4 mil. units (2021)
- Existing Devices: 40 mil. units





- High pressure drop
- High maintenance cost
- High power consumption
- Not environmentally friendly
- No sterilization function





- Medium efficiency
- Higher power
 consumption than MESP





Best Choice



FFC Series | Return Air Sterilizing Purifier for FCU



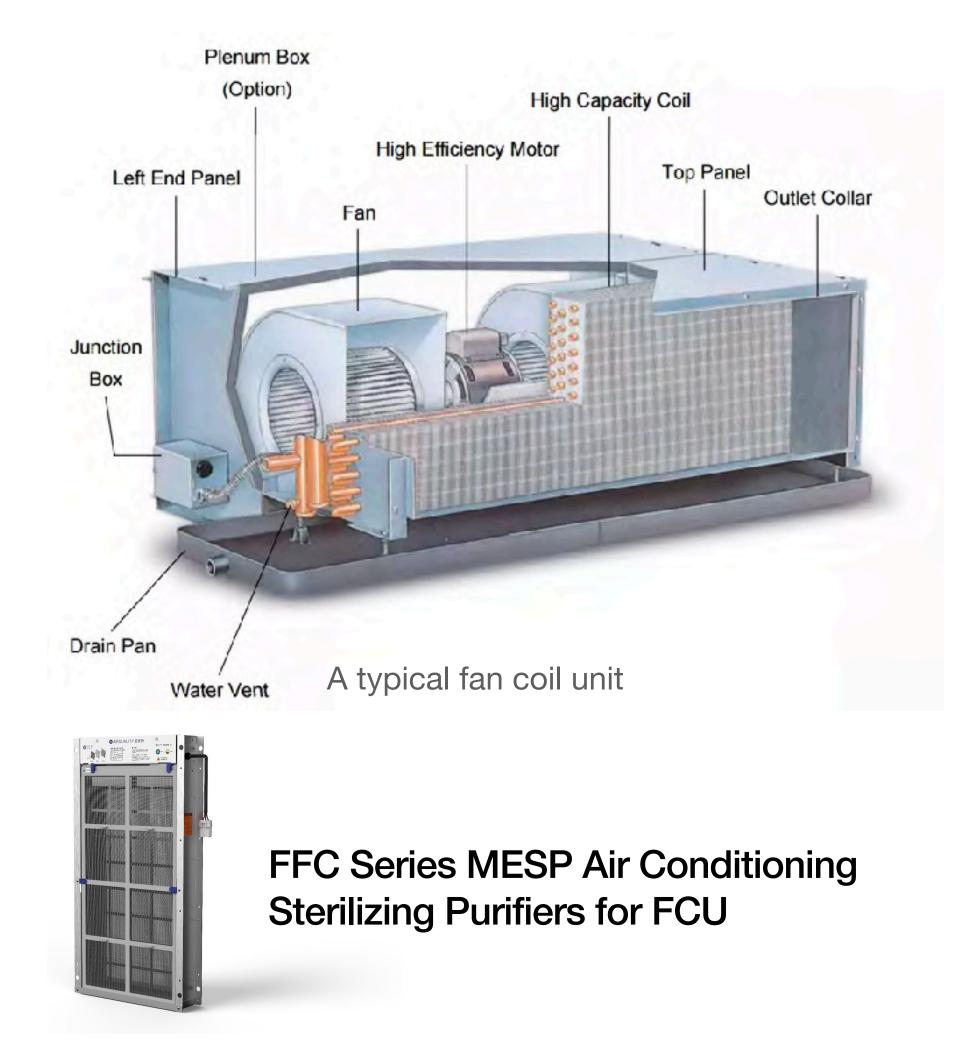


Features

- High-efficiently kill viruses and bacteria (Above 99.96%)
- High-efficiently remove air particles (Above MERV 14)
- No material consumption, the filter is washable, no need to replace
- Micro-Electrostatic technology, 0 space occupation, 0 material consumption, 0 noise and 0 ozone
- Remove 99% of PM2.5, methanal, influenza virus and other air pollutants
- Concealed in return air inlet of central air-conditioning without destroying decoration and occupying floor space
- Prevent influence on return air effect of air-conditioning with ultralow air resistance
- Clean without dead angles by three-dimensional circulation
- Reduce energy consumption, and avoid affecting effect of refrigeration and heating for filth blockage of coil
- Intelligent control, linked to fan coil, purify when air flows and stop when air stops
- Comprehensively adaptive to fan coils of internal unit, etc. of fluorine and water



MESP is Only Choice for FCU filtration





It's a HUGE Market.

- Yearly Production: 3 mil. units (2021)
- Existing Devices: **30 mil. units**





• Can not adapt to it due to its high pressure drop





- Ozone issue
- Bad user experience with arc and spark

Only

Choice



FAD Series | Air Duct Sterilizing Purifier



Features

- High-efficiently kill viruses and bacteria (Above 99.96%) • High-efficiently remove air particles (Above MERV 14) • Low efficiency loss with high speed air flow • Fit in running environment of high humidity • Run with Safer and more stable performance • More option for different air volume • Excellent one-pass particle removal rate • Repeatedly wash with no material • Can use instantly after wash • Low energy consumption with pneumatic switch • Flat module for easy installation.







FSA Series | Ceiling Mounted Air Sterilizing Purifier (Stand Alone)





Features

- High-efficiently kill viruses and bacteria (Above 99.96%)
- High-efficiently remove air particles (Above 90%)
- Ceiling Mount without floor occupation, run immediately after installation, easy to maintain.
- Simple embeding design fits in all occations
- Run independently in big air volume with fan component, no need to pneumatically linked with Central AC system.
- Repeatly large air circulation through big air inlet in center, flanked by four long and narrow air outlets.
- Long Maintenance cycle, high removal rates for both particles and methanol.
- 0 material waste, 0 ozone and 0 noise, stable performance endorsed by several authorative certificates.
- Low energy consumption, huge amount of negative ion brings pleasant feeling for end
- Several control methods are optional: Self-control, remote control



FFA Series | Fresh Air Sterilizing Purifier



- MESP technology can purify PM2.5 efficiently and also kill bacterial.
- Smart link with Fresh Air Purification system and automatically.
- Switch on and off by detecting actual pollution status.
- Innovative MESP technology need no replacement.
- Thin body design for comfortable and quite experience and easy installation.
- With realtime status indication and prompt for filter cleaning.
- High static pressure and low energy consumption with long distance 360° air delivery.
- Prax solid-state power can generate "ecological" onion.
- Easy to wash and maintain, can put back and use immediately after wash.



Features

• High-Repeatedly washable filter lasts up to 35000 hours and has big adsorption area and dust-holding capacity.

• Heat recovery fresh air purification system.







Top Projects



Beijing Winter Olympics Organizing Committee Office, 2022



Beijing New Airport, 2019



Qingdao Shanghe Summit, 2018



Man-made Island of Hong Kong-Zhuhai-Macao Bridge, 2017

See more projects at https://en.airquality.com/projects.shtml



Xizi Hotel, G20 Summit in Hangzhou, 2016



Xi'an Greenland Plaza, 2015

Yanxihu Hotel, Beijing APEC, 2014

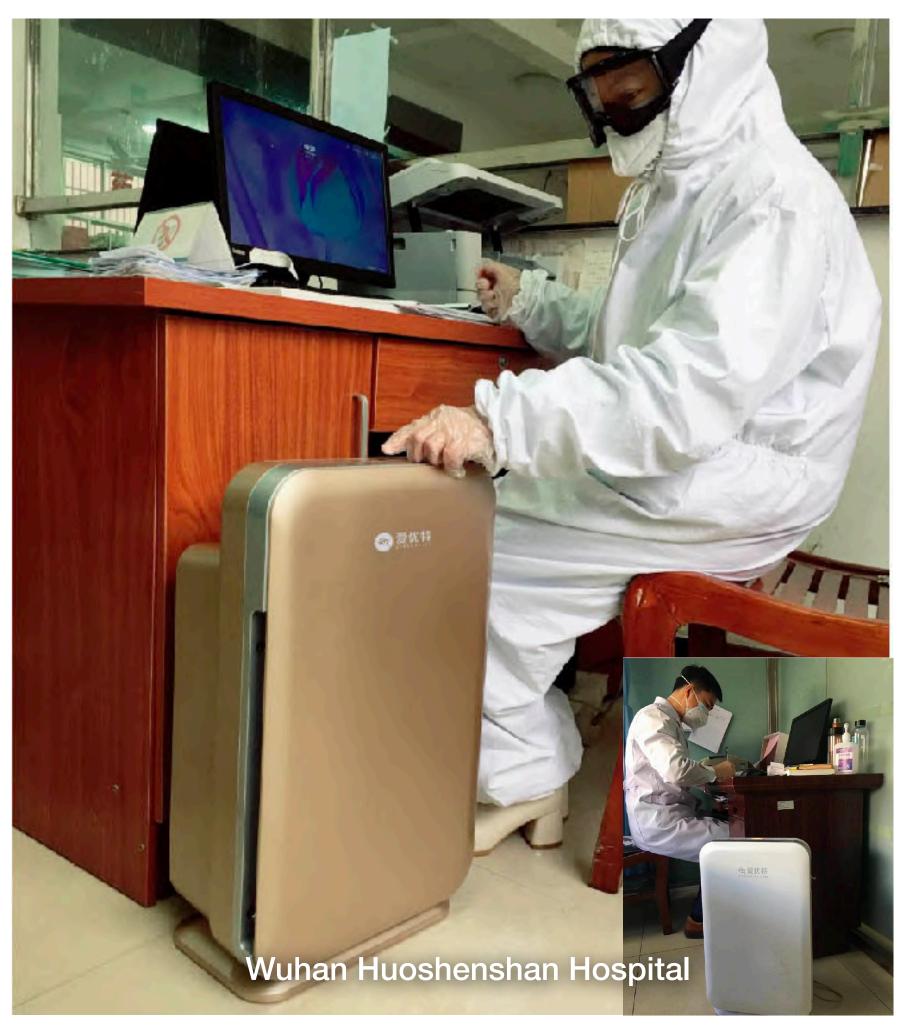
Shanghai Disney, 2013







AQT Donations for Hospitals to Fight COVID













More Hospitals with AQT Donation

Xi'an Public Health Center

Junxian People's Hospital, Hebi City, Henan Province

Central Hospital of Lankao County, Henan Province

Xianfeng Traditional Chinese Medicine Hospital of Hubei Province

Enshi Xianfeng People's Hospital of Hubei Province Qingping Town Health Center, Xianfeng County, Hubei Province

Xianfeng Traditional Chinese Medicine Hospital of Hubei Province

Shirun Nephropathy Hospital, Xianfeng County, Hubei Province

Hospital of Gaoleshan Town, Xianfeng County, Hubei Province

Maternal and Child Health Hospital of Xianfeng County, Hubei Province

Central Hospital of Pingbaying Town, Xianfeng County, Hubei Province

Jindong Township Health Center, Xianfeng County, Hubei Province

Central Hospital of Qujiang Town, Xianfeng County, Hubei Province

Hospital of Chaoyangsi Town, Xianfeng County, Hubei Province

Hospital of Daluba District Work Committee, Xianfeng County, Hubei Province

Hospital of Zhongbao Town, Xianfeng County, Hubei Province

Tangya Town Health Center, Xianfeng County, Hubei Province

Beijing Ditan Hospital, Capital Medical University Vulcan Mountain Command Center

Wuhan University People's Hospital

Hubei Provincial Hospital of Traditional Chinese Medicine Suizhou Central Hospital

Hongshan Gymnasium Square Cabin Hospital

Wuhan Staff Sanatorium

Wuhan First People's Hospital

Jinan Seventh People's Hospital

Jinan Traditional Chinese Medicine Hospital of Jinan City

Zaozhuang Municipal Hospital

Jingmen Second People's Hospital

Yellowstone Nonferrous Hospital

Shanghai Long March Hospital

Shanghai Oriental Hepatobiliary Hospital Guanggu District, Tongji Medical College, Huazhong University of Science and Technology, Wuhan Sichuan Academy of Medical Sciences Jinchuan Staff Hospital of Gansu Province Shangrao Second People's Hospital People's Hospital of Guangxin District Wuhan Xiehe Hospital Hongshan Square Cabin Hospital Fangcai Hospital of Wuchang District Thunder Mountain Command Shangrao People's Hospital Shangrao Second People's Hospital Shangrao Municipal Hospital People's Hospital of Guangxin District Maternal and Child Health Hospital of Guangxin District Medical Team of Zhongshan Hospital Affiliated to Fudan University (East Hospital of People's Hospital of Wuhan University) Xiaogan People's Hospital Yichang Central Hospital Yichang First People's Hospital Hong'an County Traditional Chinese Medicine Hospital Suining Hospital of Traditional Chinese Medicine Linyi People's Hospital of Shandong Province Shenzhen Second Hospital The University of Hong Kong Shenzhen Hospital People's Hospital of Jiangsu Province People's Hospital Wuhan Taikang Hospital Guanggu District, Hubei Maternal and Child Health Hospital



AirQuality Technology



About Us



exhaust systems for residential and commercial clients all around the world.



AQT Group

IAQ

<text>







Industrial Waste Gas Purification







History

1982

Herver-9 company established, mainly engaged in electronics, power supply, transformer products

2006

Herver-9 is a high-voltage electrostatic purifier for the municipal project in Madrid, Spain. With a wind capacity of 3.6 million m3/h, it is the world's largest single electrostatic purification system.

2012

Herver-9 built Prax factory in Wuxi to produce electronic components, including power module for purifier.

1996

Herver-9 Group was established and set up Electrostatic Air **Purification Department** with brands AirQuality/Calidaddelaire.

2011

Herver-9 jointly established AirQuality Air Technology (Shanghai) Co., Ltd. with Super Merit Holdings Limited in China. Herver-9 set up a joint venture in Hong Kong to operate electrostatic air purification of municipal projects.

2015

AirQuality China launched Micro-Electrostatic precipitator products, realizing large-scale application of brand-new Micro-Electrostatic precipitator technologies.

2017

The company officially launched the service of "Turn Air Conditioner into air purifier instantly", opening up a new blue sea in air purification industry.

2014

AirQuality Air Technology (Shanghai) Co., Ltd. increased its capital and established air purification R&D Center and assembly workshop in Shanghai.

2016

AirQuality developed systematic indoor air solution for Central Air Conditioning System.

2019

Airquality roll out new"Auto-wash" Series of kitchen Exhaust System







TOP 10 China Air Filtration Brand

Little Giant



Certifications



Überwachungs-Verein

Heating and Venulation and Analyzing and Testing Center Air Conditioning Laboratory







Low Voltage Directive



Shanghai key Laboratory. of Computer Software Testing & Evaluating



Shangha, Municipal Center For Disease Control & Prevention Shanghai Institutes Of Preventivo Modicine



CCTEG China Coal Research Institute





Building Energy and Environment Testing Center of CABR

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