OVER

The Leading Technologies for a Sustainable Tomorrow

AirManagement

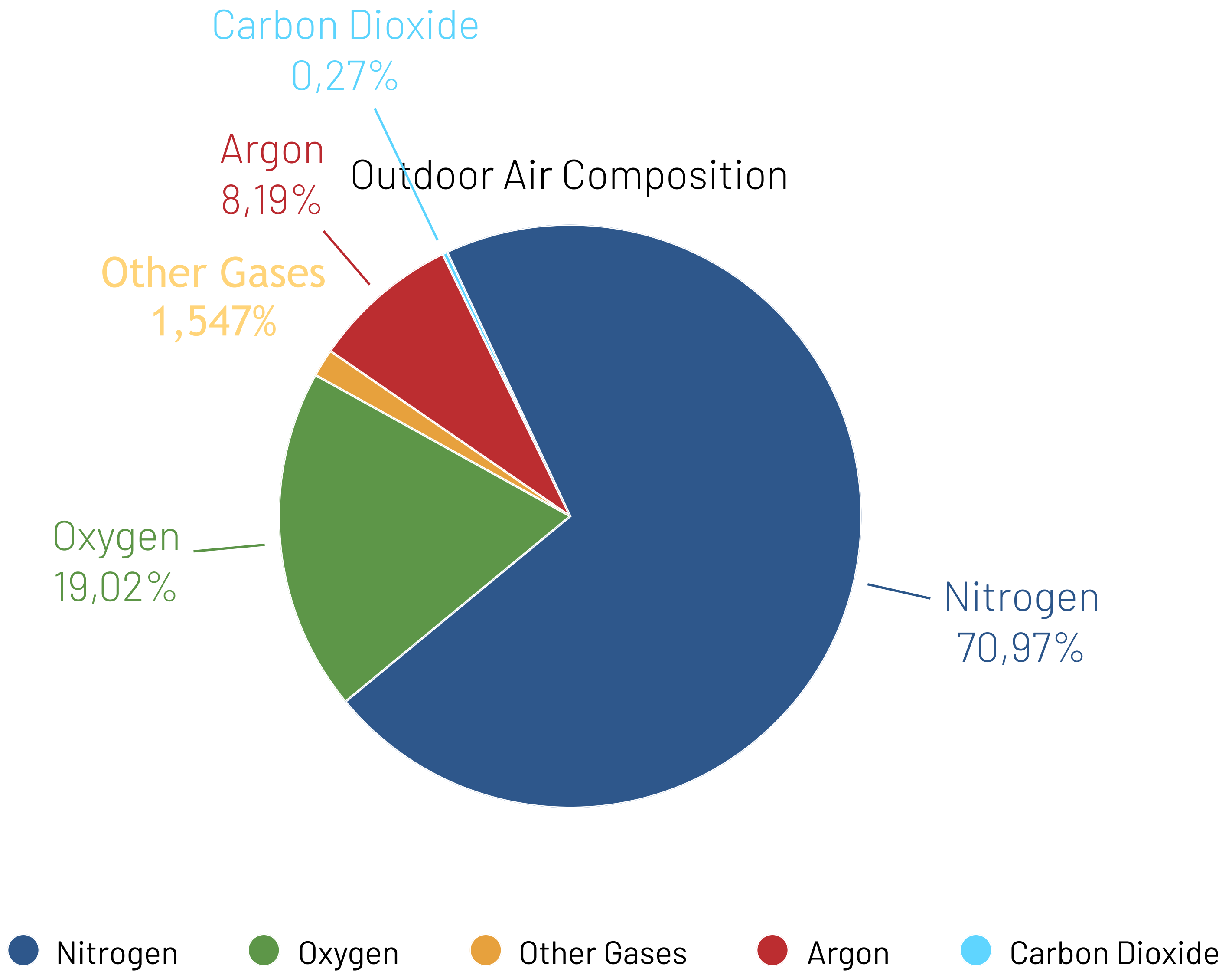
All you need to know about indoor pollution and strategies to manage them to have the correct Indoor air composition

AGENDA

- Air pollution
- Effect of pollution on Health
- Standard, Regulations & Guidelines against Air Pollution
- Strategies to manage Indoor air quality
- CrossField®

Air Pollution

Air pollution is the presence in the air of one or more substances at a concentration or for a duration above their natural levels, with the potential to produce an adverse effect



Indoor contaminants

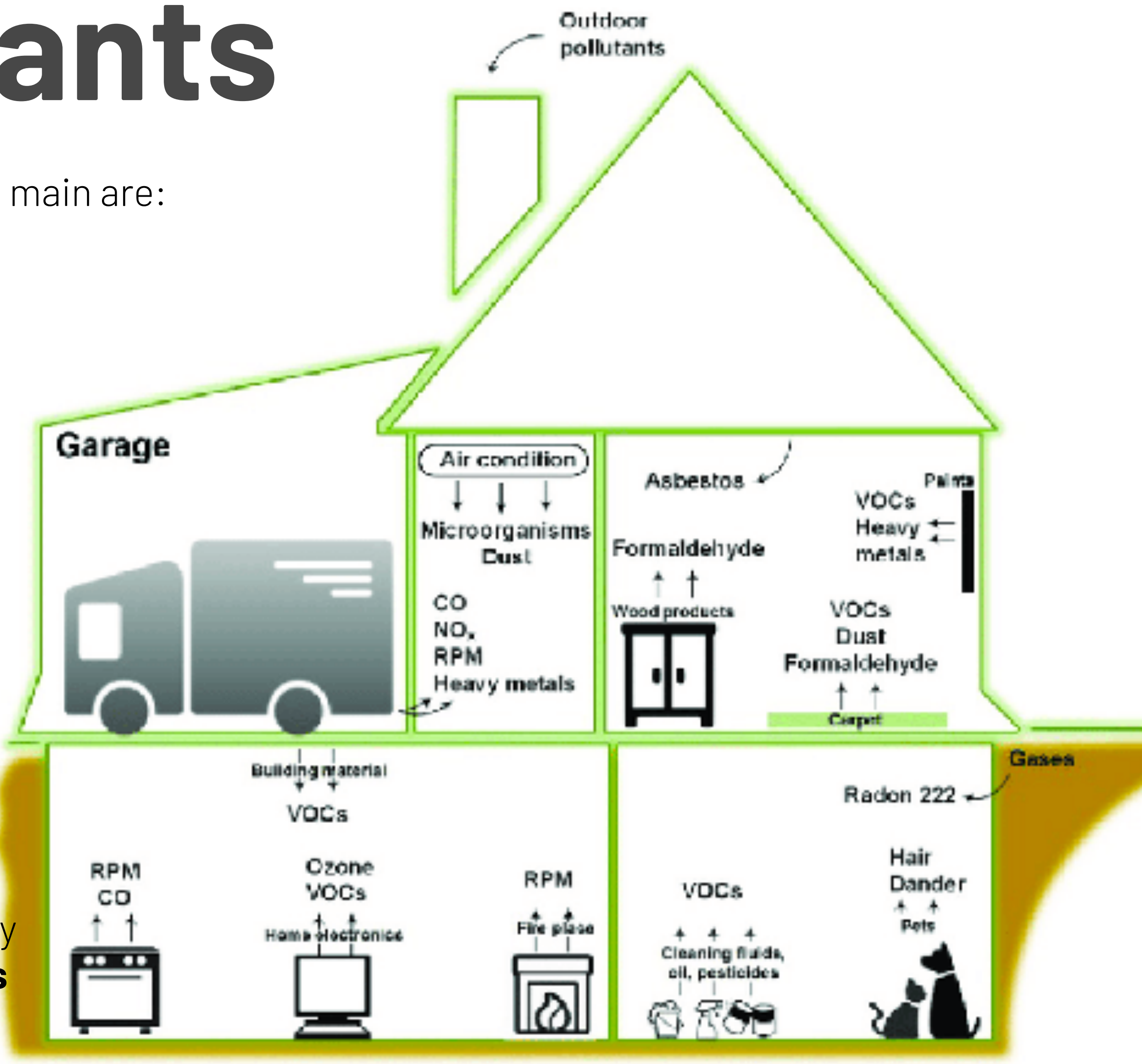
These contaminants can be physical, chemical, or biological, the main are:

- NO_x
- SO_2
- O_3
- VOCs
- PMs
- Radon
- Microorganisms

Those contaminants are common to both indoor and outdoor environments but indoor air pollution is up to **8 times** greater than that of outdoor air.

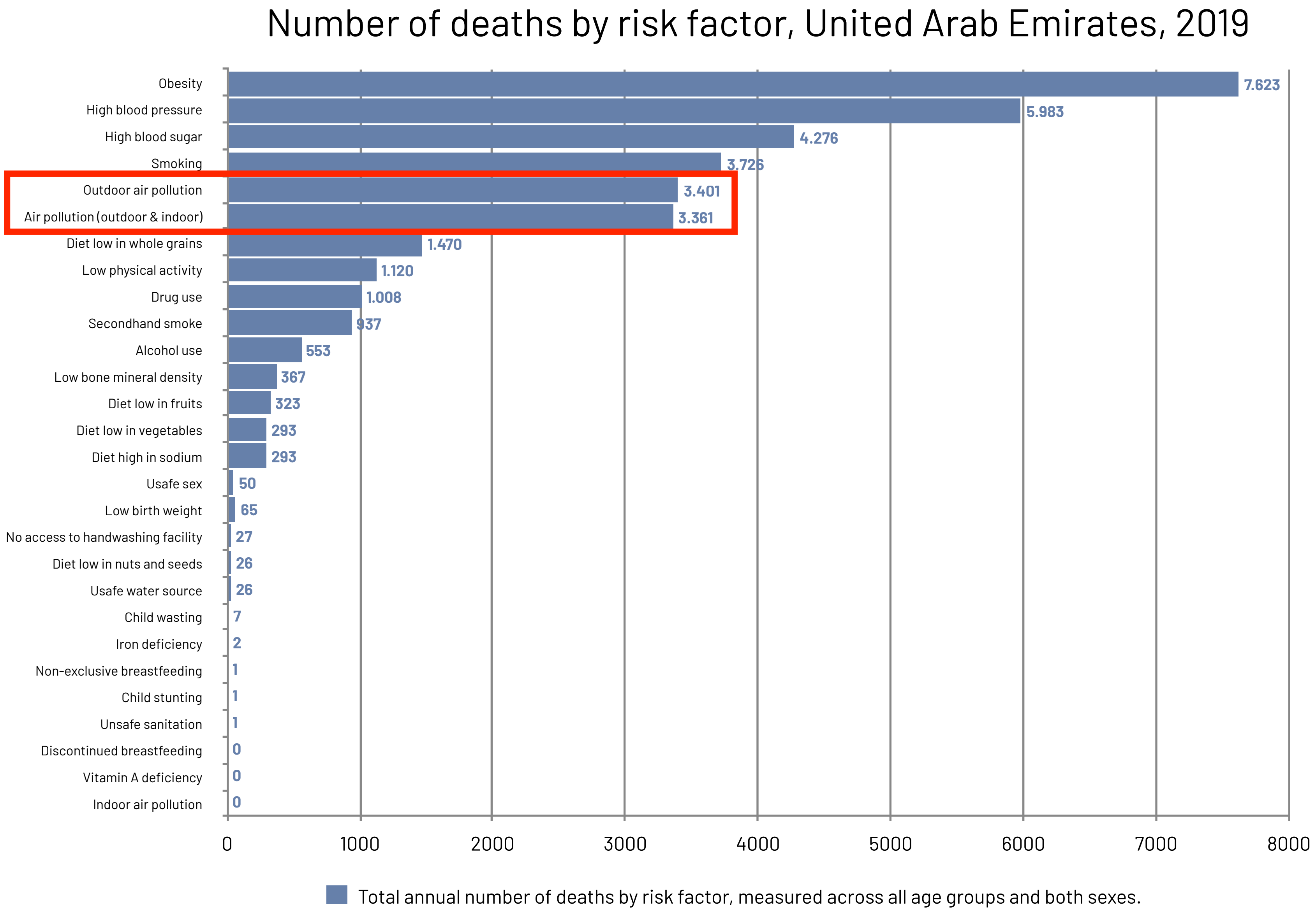
Why is indoor air quality important?

We spend, on average, **80 to 90% of our time inside**! So, although ignored for a long time, the question of indoor air quality has become one of the **main environmental public health issues** all over the world.



In 2019 **Air Pollution** was the **fifth cause of death** in UAE. The National Agenda of the UAE Vision 2030 aims to raise the air quality in a relevant manner.

https://www.moccae.gov.ae/en/knowledge-and-statistics/air-quality.aspx

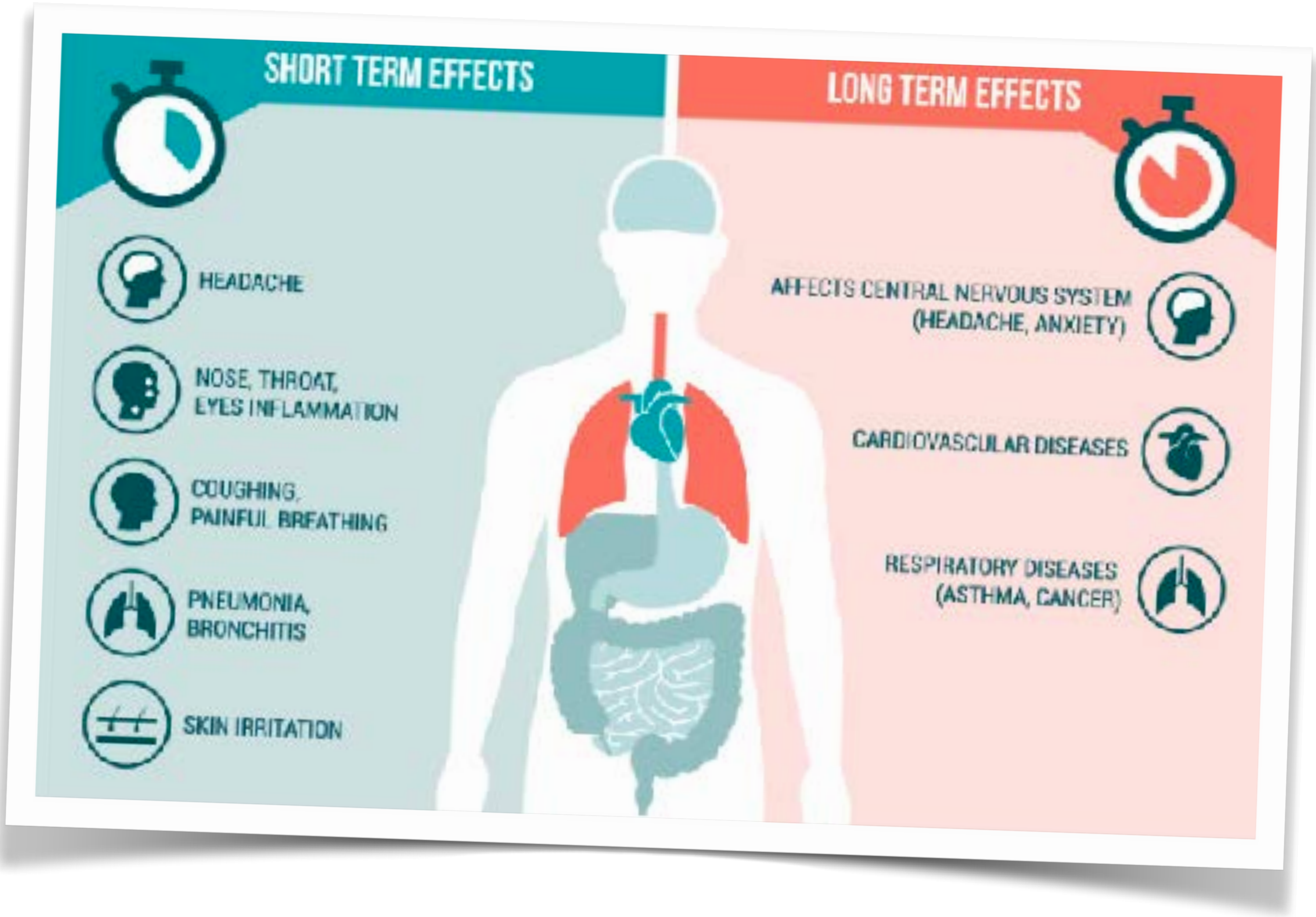


Source: IHME, Global Burden of Disease (2019)

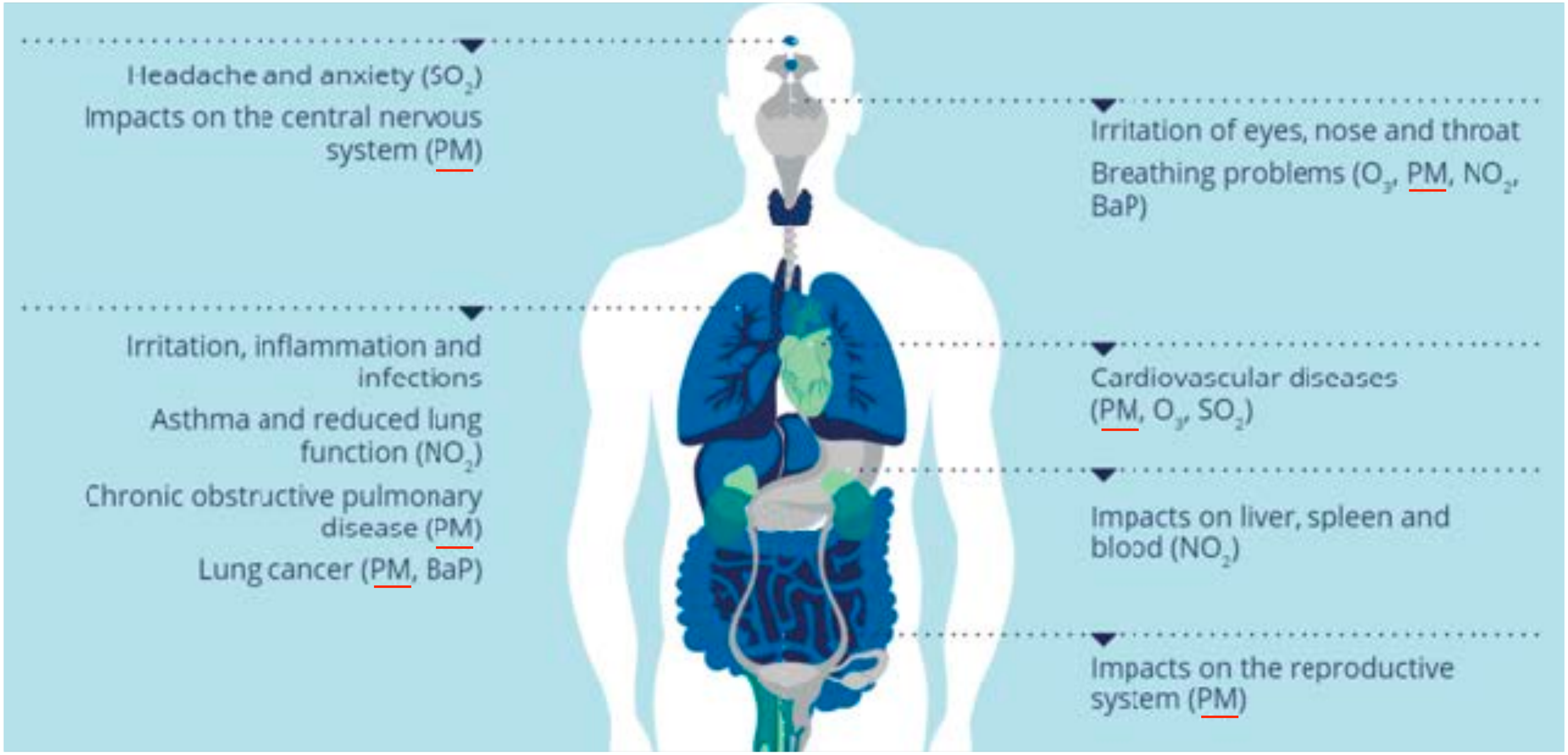
The effect of these air pollutants on humans depends on their toxicity, concentration and exposure time, and may vary from person to person.

The effects can be divided in:

- **Short term effect:** The most common effect **sick building syndrome (SBS).** people experience uncomfortable or acute health effects such as irritation of nose, eyes and throat, skin ailments, allergies, and so on. The syndrome may disappear after an affected person leaves the office or building.
- **Long terms effects:** Long-term exposure to air pollution has been **linked with an increase in risk of mortality**



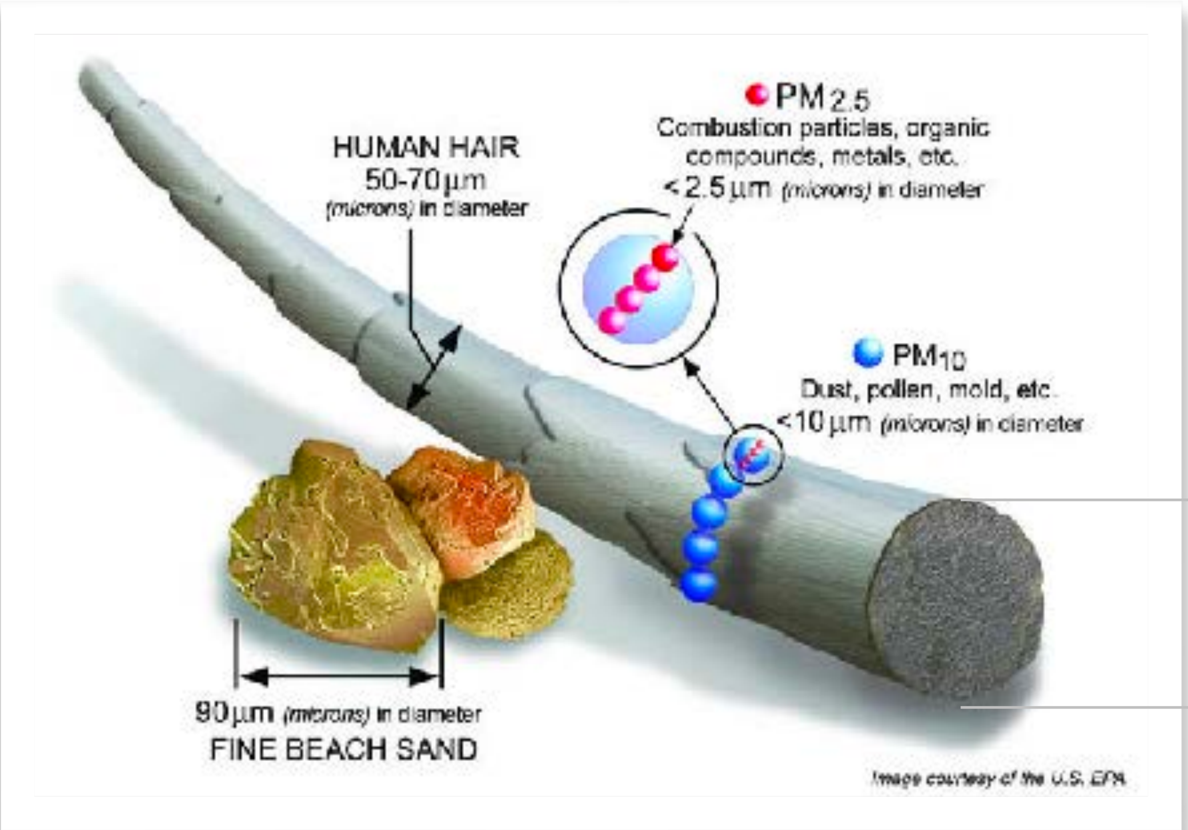
PMs DO NOT have adverse effect only on respiratory systems, they have **systemic damage**



Monitoring and **research activities** are aimed at identifying effective actions to **reduce the exposure** of the population and to control the emission sources.

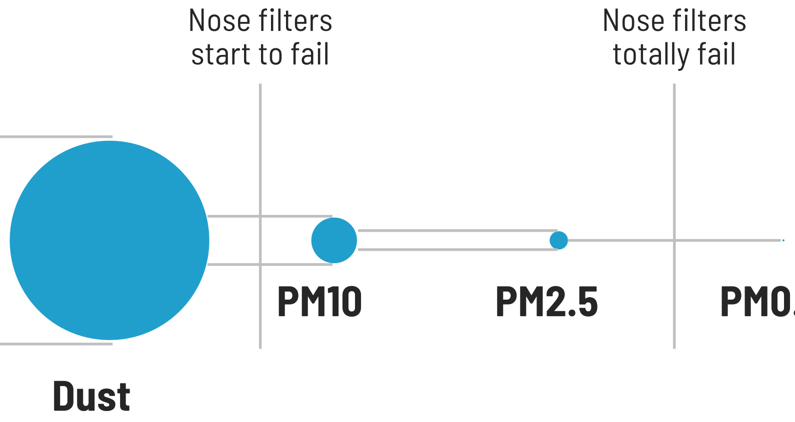
Human body has a natural barrier able to filter up to 0,5 microns with a decrease of efficacy with particle size

How big are the pollutants we breathe?

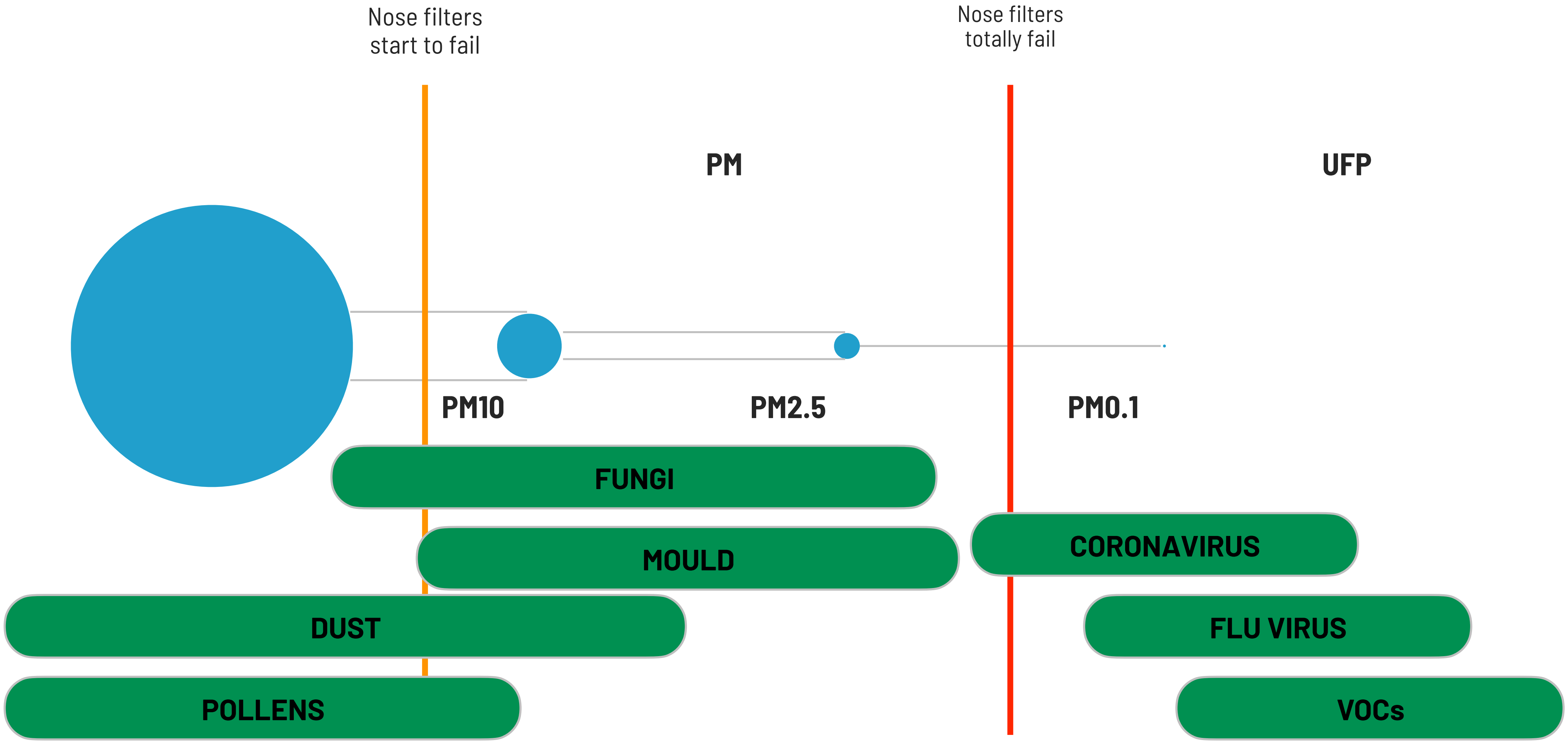


Despite this, PM10 and PM2.5 particles are small enough to penetrate the human filter.

High PM concentration in the air involves high PM penetration in the human body.



How big are the pollutants we breathe?



Research paper

Sources, characteristics, toxicity, and control of ultrafine particles: An overview

Andrea L. Moreno-Ríos, Leidy P. Tejeda-Benítez, Ciro F. Bustillo-Lecompte

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https://doi.org/10.1016/j.jsf.2021.101147   Get rights and content

5. Conclusions

According to the findings reported in the literature, the importance of continuing to carry out studies about UFPs is highlighted because they have been related to various conditions in people's health that contribute to the rise in morbidity and mortality rates worldwide. Among the main toxicological mechanisms associated with UFPs is the oxidative stress generated from reactive oxygen species associated with contaminants such as metals, PAHs, and BC. In this sense, the main effects found include respiratory problems such as asthma and chronic obstructive pulmonary disease, pulmonary fibrosis, neurodegenerative diseases, cardiovascular diseases, DNA changes generated from epigenetic changes, and genotoxic, mutagenic and carcinogenic activity.

Finally, despite the findings reported in this article and that there are multiple mechanisms for the measurement and control of atmospheric UFPs, it is necessary to continue in the study of the different effects of particulate material in order to obtain sufficient evidence that leads to the establishment of new public policies and measures for effective pollution prevention and control.

Annals of Work Exposures and Health, 2017, Vol. 61, No. 7, 749–758
doi: 10.1093/annweh/wxx049
Advance Access publication 7 July 2017
Review

BOHS The Chartered Society for Worker Health Protection

OXFORD

Review

Workplace Measurements of Ultrafine Particles—A Literature Review

Anna-Kaisa Viitanen[1,*], Sanni Uuksulainen[1], Antti J. Koivisto[1,2], Kaarle Hämeri[3], and Timo Kauppinen[1]

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Submitted 7 March 2016; revised 16 May 2017; editorial decision 29 May 2017; revised version accepted 8 June 2017

Abstract

Workers are exposed to ultrafine particles (UFP) in a number of occupations. In order to summarize the current knowledge regarding occupational exposure to UFP (excluding engineered nanoparticles), we gathered information on UFP concentrations from published research articles. The aim of our study was to create a basis for future epidemiological studies that treat UFP as an exposure factor. The literature search found 72 publications regarding UFP measurements in work environments. These articles covered 314 measurement results and tabled concentrations. Mean concentrations were compared to typical urban UFP concentration level, which was considered non-occupational background concentration. Mean concentrations higher than the typical urban UFP concentration were reported in 240 workplace measurements. The results showed that workers' exposure to UFP may be significantly higher than their non-occupational exposure to background concentration alone. Mean concentrations of over 100 times the typical urban UFP concentration were reported in welding and metal industry. However, according to the results of the review, measurements of the UFP in work environments are, to date, too limited and reported too heterogeneous to allow us to draw general conclusions about workers' exposure. Harmonization of measurement strategies is essential if we are to generate more reliable and comparable data in the future.

Ambient ultrafine particle concentrations and incidence of childhood cancers

Eric Lavigne [1], Isac Lima [2], Marianne Hatzopoulou [3], Keith Van Ryswyk [4], Aaron van Donkelaar [5], Randall V Martin [5], Hong Chen [6], David M Stieb [7], Eric Crighton [8], Richard T Burnett [9], Scott Weichenthal [10]

Affiliations + expand

PMID: 32979813 DOI: 10.1016/j.envint.2020.106135

Free article

Abstract

Background: Ambient air pollution has been associated with childhood cancer. However, little is known about the possible impact of ambient ultrafine particles (<0.1 µm) (UFPs) on childhood cancer incidence.

Objective: This study aimed to evaluate the association between prenatal and childhood exposure to UFPs and development of childhood cancer.

Methods: We conducted a population-based cohort study of within-city spatiotemporal variations in ambient UFPs across the City of Toronto, Canada using 653,702 singleton live births occurring between April 1, 1998 and March 31, 2017. Incident cases of 13 subtypes of paediatric cancers among children up to age 14 were ascertained using a cancer registry. Associations between ambient air pollutant concentrations and childhood cancer incidence were estimated using random-effects Cox proportional hazards models. We investigated both single- and multi-pollutant models accounting for co-exposures to $PM_{2.5}$ and NO_2.

Results: A total of 1,066 childhood cancers were identified. We found that first trimester exposure to UFPs (Hazard Ratio (HR) per 10,000/cm^3 increase = 1.13, 95% CI: 1.03-1.22) was associated with overall cancer incidence diagnosed before 6 years of age after adjusting for $PM_{2.5}$, NO_2, and for personal and neighborhood-level covariates. Association between UFPs and overall cancer incidence exhibited a linear shape. No statistically significant associations were found for specific cancer subtypes.

Conclusion: Ambient UFPs may represent a previously unrecognized risk factor in the aetiology of cancers in children. Our findings reinforce the importance of conducting further research on the effects of UFPs given their high prevalence of exposure in urban areas.

Keywords: Cancer; Children; Perinatal exposure; Ultrafine particle.

Association between Airport-Related Ultrafine Particles and Risk of Malignant Brain Cancer: A Multiethnic Cohort Study

Anna H Wu [1], Scott Fruin [2], Timothy V Larson [3], Chiu-Chen Tseng [2], Jun Wu [4], Juan Yang [5], Jennifer Jain [6], Salma Shariff-Marco [5], Pushkar P Inamdar [5], Veronica W Setiawan [2], Jacqueline Porcel [2], Daniel O Stram [2], Loic Le Marchand [7], Beate Ritz [8], Iona Cheng [5]

Affiliations + expand

PMID: 34167950 DOI: 10.1158/0008-5472.CAN-21-1138

Abstract

Ultrafine particles (UFP; diameter less than or equal to 100 nm) may reach the brain via systemic circulation or the olfactory tract and have been implicated in the risk of brain tumors. The effects of airport-related UFP on the risk of brain tumors are not known. Here we determined the association between airport-related UFP and risk of incident malignant brain cancer ($n = 155$) and meningioma ($n = 420$) diagnosed during 16.4 years of follow-up among 75,936 men and women residing in Los Angeles County from the Multiethnic Cohort study. UFP exposure from aircrafts was estimated for participants who lived within a 53 km x 43 km grid area around the Los Angeles International Airport (LAX) from date of cohort entry (1993-1996) through December 31, 2013. Cox proportional hazards models were used to estimate the effects of time-varying, airport-related UFP exposure on risk of malignant brain cancer and meningioma, adjusting for sex, race/ethnicity, education, and neighborhood socioeconomic status. Malignant brain cancer risk in all subjects combined increased 12% [95% confidence interval (CI), 0.98-1.27] per interquartile range (IQR) of airport-related UFP exposure (~6,700 particles/cm^3) for subjects with any address in the grid area surrounding the LAX airport. In race/ethnicity-stratified analyses, African Americans, the subgroup who had the highest exposure, showed a HR of 1.32 (95% CI, 1.07-1.64) for malignant brain cancer per IQR in UFP exposure. UFP exposure was not related to risk of meningioma overall or by race/ethnicity. These results support the hypothesis that airport-related UFP exposure may be a risk factor for malignant brain cancers. SIGNIFICANCE: Malignant brain cancer risk increases with airport-related UFP exposure, particularly among African Americans, suggesting UFP exposure may be a modifiable risk factor for malignant brain cancer.

Schraufnagel Experimental & Molecular Medicine (2020) 52:311–317
https://doi.org/10.1038/s12276-020-0403-3

Experimental & Molecular Medicine

REVIEW ARTICLE Open Access

The health effects of ultrafine particles

Dean E. Schraufnagel[1]

Abstract

Ultrafine particles ($PM_{0.1}$), which are present in the air in large numbers, pose a health risk. They generally enter the body through the lungs but translocate to essentially all organs. Compared to fine particles ($PM_{2.5}$), they cause more pulmonary inflammation and are retained longer in the lung. Their toxicity is increased with smaller size, larger surface area, adsorbed surface material, and the physical characteristics of the particles. Exposure to $PM_{0.1}$ induces cough and worsens asthma. Metal fume fever is a systemic disease of lung inflammation most likely caused by $PM_{0.1}$. The disease is manifested by systemic symptoms hours after exposure to metal fumes, usually through welding. $PM_{0.1}$ cause systemic inflammation, endothelial dysfunction, and coagulation changes that predispose individuals to ischemic cardiovascular disease and hypertension. $PM_{0.1}$ are also linked to diabetes and cancer. $PM_{0.1}$ can travel up the olfactory nerves to the brain and cause cerebral and autonomic dysfunction. Moreover, in utero exposure increases the risk of low birthweight. Although exposure is commonly attributed to traffic exhaust, monitored students in Ghana showed the highest exposures in a home near a trash burning site, in a bedroom with burning coils employed to abate mosquitoes, in a home of an adult smoker, and in home kitchens during domestic cooking. The high point source production and rapid redistribution make incidental exposure common, confound general population studies and are compounded by the lack of global standards and national reporting. The potential for $PM_{0.1}$ to cause harm to health is great, but their precise role in many illnesses is still unknown and calls for more research.

Review Article | Open Access | Published: 17 March 2020

Ultrafine particles: unique physicochemical properties relevant to health and disease

Hyouk-Soo Kwon, Min Hyung Ryu & Christopher Carlsten

Experimental & Molecular Medicine 52, 318–328 (2020) | Cite this article

Abstract

Ultrafine particles (UFPs) are aerosols with an aerodynamic diameter of 0.1 μm (100 nm) or less. There is a growing concern in the public health community about the contribution of UFPs to human health. Despite their modest mass and size, they dominate in terms of the number of particles in the ambient air. A particular concern about UFPs is their ability to reach the most distal lung regions (alveoli) and circumvent primary airway defenses. Moreover, UFPs have a high surface area and a capacity to adsorb a substantial amount of toxic organic compounds. Harmful systemic health effects of PM_{10} or $PM_{2.5}$ are often attributable to the UFP fraction. In this review, we examine the physicochemical characteristics of UFPs to enable a better understanding of the effects of these particles on human health. The characteristics of UFPs from diesel combustion will be discussed in the greatest detail because road vehicles are the primary source of UFP emissions in urban pollution hotspots. Finally, we will elaborate on the role of UFPs on global climate change, since the adverse effects of UFPs on meteorological processes and the hydrological cycle may even be more harmful to human health than their direct toxic effects.

Heterogeneity of passenger exposure to air pollutants in public transport microenvironments

Fenhuan Yang[1], Daya Kaul[1], Ka Chun Wong[1], Dane Westerdahl[1,2], Li Sun[1], Kin-fai Ho[3], Linwei Tian[3], Peter Brimblecombe[1], Zhi Ning[1,2*]

[1] School of Energy and Environment, City University of Hong Kong
[2] Guy Carpenter Asia-Pacific Climate Impact Centre, City University of Hong Kong
[3] The Jockey Club, School of Public Health and Primary Care, The Chinese University of Hong Kong

Abstract

Epidemiologic studies have linked human exposure to pollutants with adverse health effects. Passenger exposure in public transport systems contributes an important fraction of daily burden of air pollutants. While there is extensive literature reporting the concentrations of pollutants in public transport systems in different cities, there are few studies systematically addressing the heterogeneity of passenger exposure in different transit microenvironments, in cabins of different transit vehicles and in areas with different characteristics. The present study investigated $PM_{2.5}$ (particulate matter with aerodynamic diameters smaller than 2.5μm), black carbon (BC), ultrafine particles (UFP) and carbon monoxide (CO) pollutant concentrations in various public road transport systems in highly urbanized city of Hong Kong. Using a trolley case housing numerous portable air monitors, we conducted a total of 119 trips during the campaign. Transit microenvironments, classified as 1). busy and secondary roadside bus stops; 2). open and enclosed termini; 3). above- and under-ground Motor Rail Transport (MTR) platforms, were investigated and compared to identify the factors that may affect passenger exposures. The pollutants inside bus and MTR cabins were also investigated together with a comparison of time integrated exposure between the transit modes. Busy roadside and enclosed termini demonstrated the highest average particle concentrations while the lowest was found on the MTR platforms. Traffic-related pollutants BC, UFP and CO showed larger variations than $PM_{2.5}$ across different microenvironments and areas confirming their heterogeneity in urban environments. In-cabin pollutant concentrations showed distinct patterns with BC and UFP high in diesel bus cabins and CO high in LPG bus cabins, suggesting possible self-pollution issues and/or penetration of on-road pollutants inside cabins during bus transit. The total passenger exposure along selected routes, showed bus trips had the potential for higher integrated passenger exposure compared to MTR trips. The present study may provide useful information to better characterize the distribution of passenger exposure pattern in health assessment studies and the results also highlight the need to formulate exposure reduction based air policies in large cities.

> Environ Pollut. 2017 Sep;228:201-210. doi: 10.1016/j.envpol.2017.05.032. Epub 2017 May 22.

Exposure to ultrafine particles in different transport modes in the city of Rome

Mario Grana [1], Nicola Toschi [2], Laura Vicentini [1], Antonio Pietroiusti [3], Andrea Magrini [3]

Affiliations + expand

PMID: 28544997 DOI: 10.1016/j.envpol.2017.05.032

Abstract

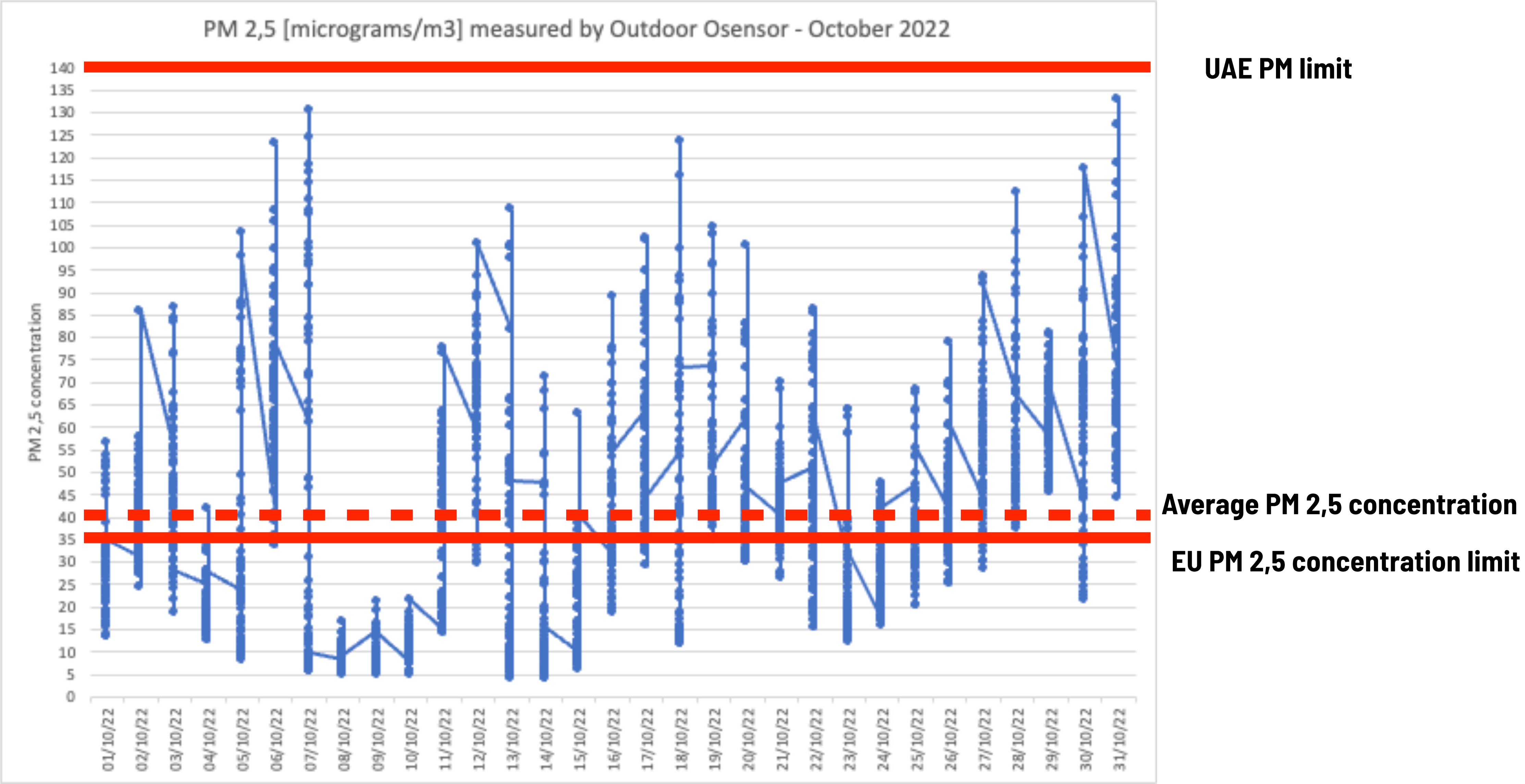
There is evidence of adverse health impacts from human exposure to particulate air pollution, including increased rates of respiratory and cardiovascular illness, hospitalizations, and pre-mature mortality. Most recent hypotheses assign an important role to ultrafine particles (UFP) (<0.1 μm) and to associated transition metals (in particular Fe). In a large city like Rome, where many active people spend more than one hour per day in private or public transportation, it may be important to evaluate the level of exposure to harmful pollutants which occurs during urban travelling. In this context, the aim of this work was to examine the relative contribution of different transport modes to total daily exposure. We performed experimental measurements during both morning and evening traffic peak hours throughout the winter season (December 2013-March 2014), for a total of 98 trips. Our results suggest that the lowest UFP exposures are experienced by underground train commuters, with an average number concentration of 14 134 cm^{-3}, and are largely a reflection of the routes being at greater distance from vehicular traffic. Motorcyclists experienced significantly higher average concentrations (73 180 cm^{-3}) than all other exposure classes, and this is most likely a result of the presence of high-concentration and short-duration peaks which do not occur when the same routes are traveled by car. UFP concentrations in subway train environments were found to be comparable to urban background levels. Still, in underground trains we found the highest values of PM_{10} mass concentration with a maximum value of 422 μg/m^3. PM_{10} concentration in trains was found to be four and two times higher than what was measured in car and motorbike trips, respectively. Transport mode contribution to total integrated UFP daily exposure was found to be 16.3%-20.9% while traveling by car, 28.7% for motorbike trips, and 8.7% for subway trips. Due to lower exposure times, commuting by car and motorbike is comparable to other daily activities in terms of exposure. Our data can provide relevant information for transport decision-making and increase environmental awareness in the hope that the information about inhaled pollutants can translate into a more rational approach to urban travelling.

GREEN Building air quality standard.

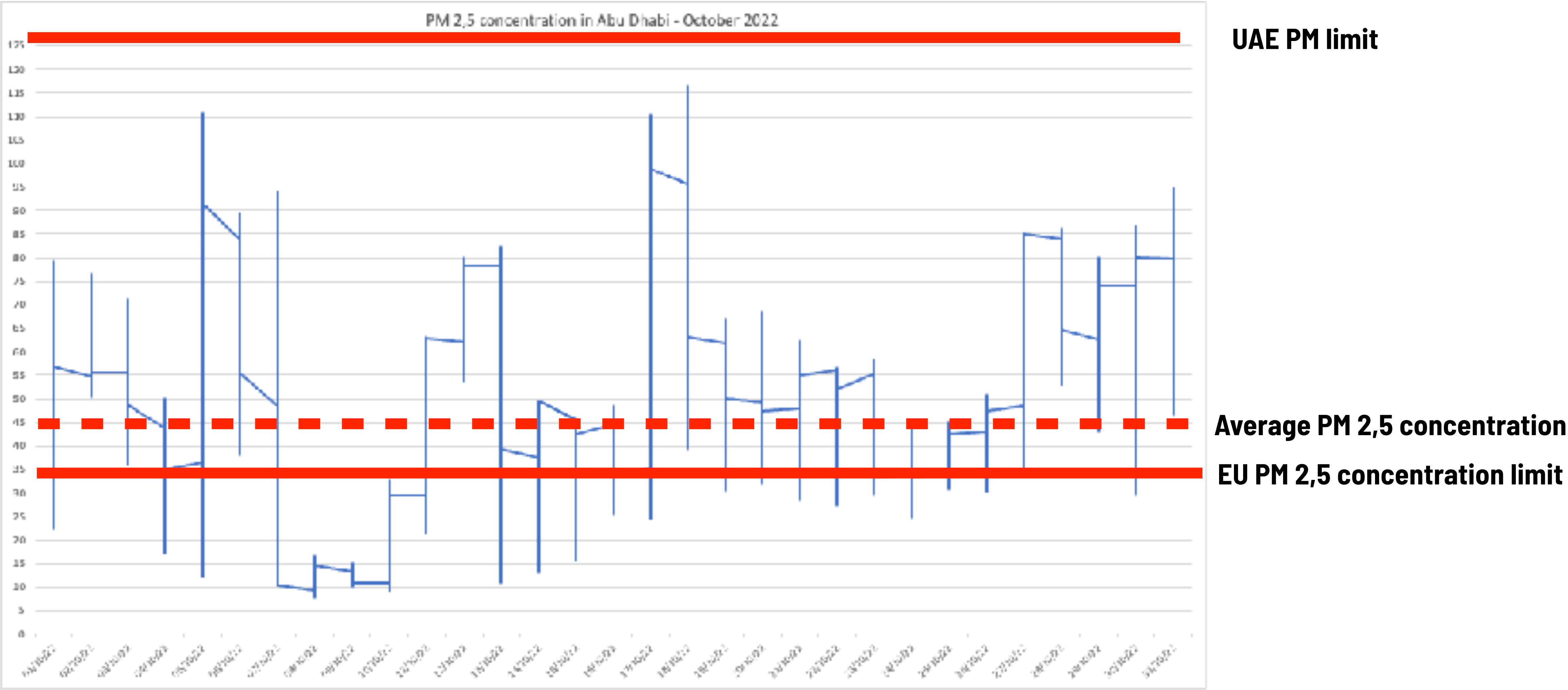
Table 102.02 (1)

Sampling Schedule	Type of Samples	Maximum Acceptable	Sampling Duration
Initial test completed by 31 December 2011. Further testing within 5 years of last compliant test.	Formaldehyde	< 0.08 ppm	8- hour continuous monitoring (8 hour time-weighted average [TWA])
	Total Volatile Organic Compound (TVOC)	< 300 micrograms/ m^3	
	Respirable Dust (<10 microns)	< 150 micrograms/ m^3	
	Ozone	0.06 ppm (120 micrograms/ m^3)	
	Carbon Dioxide	800 ppm (1440 microgram/ m^3)	
	Carbon Monoxide	9 ppm (10 micrograms/ m^3)	
	Bacteria	500 CFU/ m^3 (Algar plate)	
	Fungi	500 CFU/ m^3 (Algar plate)	

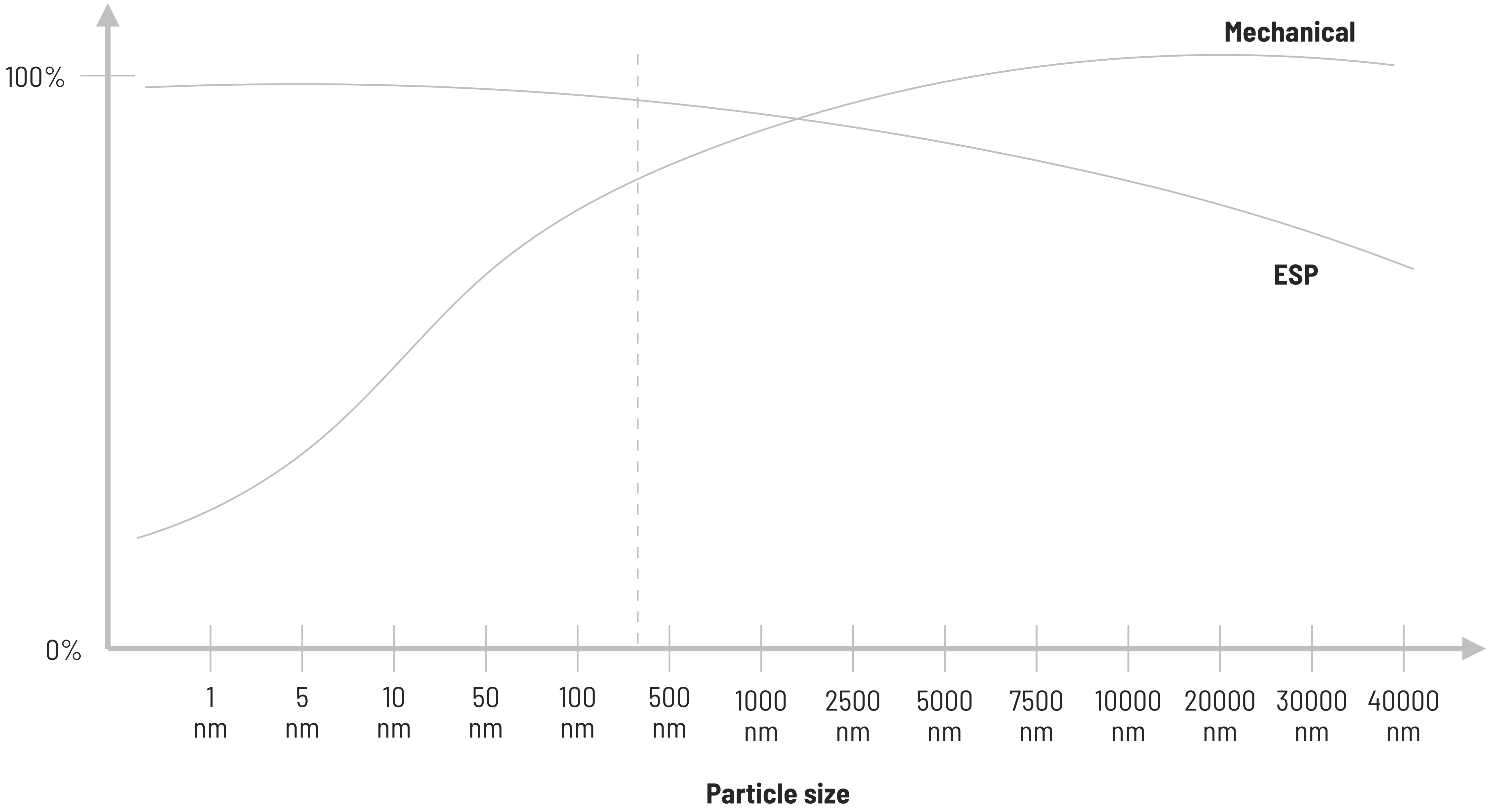
Dubai PM in October 2022



Abu Dhabi PM in October 2022



Mechanical filters Vs ESP



What are the types of filters available in an HVAC system?

Here are the different types of filters available for residential HVAC systems.

- Fiberglass Air Filters. Fiberglass air filters are disposable and the least expensive type of filter.
- Pleated Air Filters. Pleated air filters are made of cotton or polyester folds.
- HEPA Filters.
- UV Filters.

Are these filters able to assure the filtration of UFP?

Filters with a MERV (ASHRAE standard) rating greater than 13 (higher value) can remove 95 percent or more of the particles 0.3 microns or larger.

Higher filtration efficiencies are available through the use of high efficiency particulate air filters (HEPA). These filters can capture up to 99.7 percent of all contaminants 0.3 microns or greater.

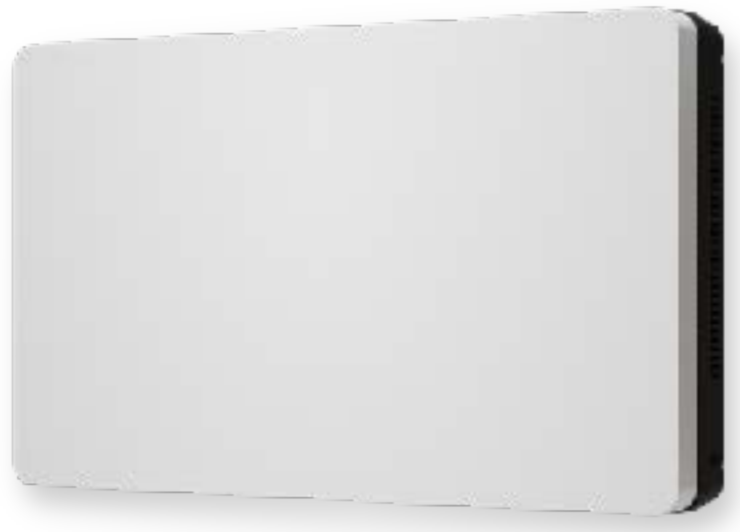
What happen to UFP < 0,3 microns?

WHAT'S AirFlow

CHANGE THE WAY YOU BREATH

More than an air purifier, more than a design made in Italy.

AirFlow thanks to CrossField® technology enhance people's health and quality of life. Eliminates **99,9% of PMs (including Ultra-fine particulate), allergens, virus, bacteria, fungi, spores and mould.**



Sensors integrates allow to measures :

- **Temperature**
- **Humidity**
- **Carbon Dioxid**
- **Volatile Organic Compound (VOC) index**
- IAQ Indoor air quality index
- PM 1, 2.5,10

Optional measures (sensors available on request)

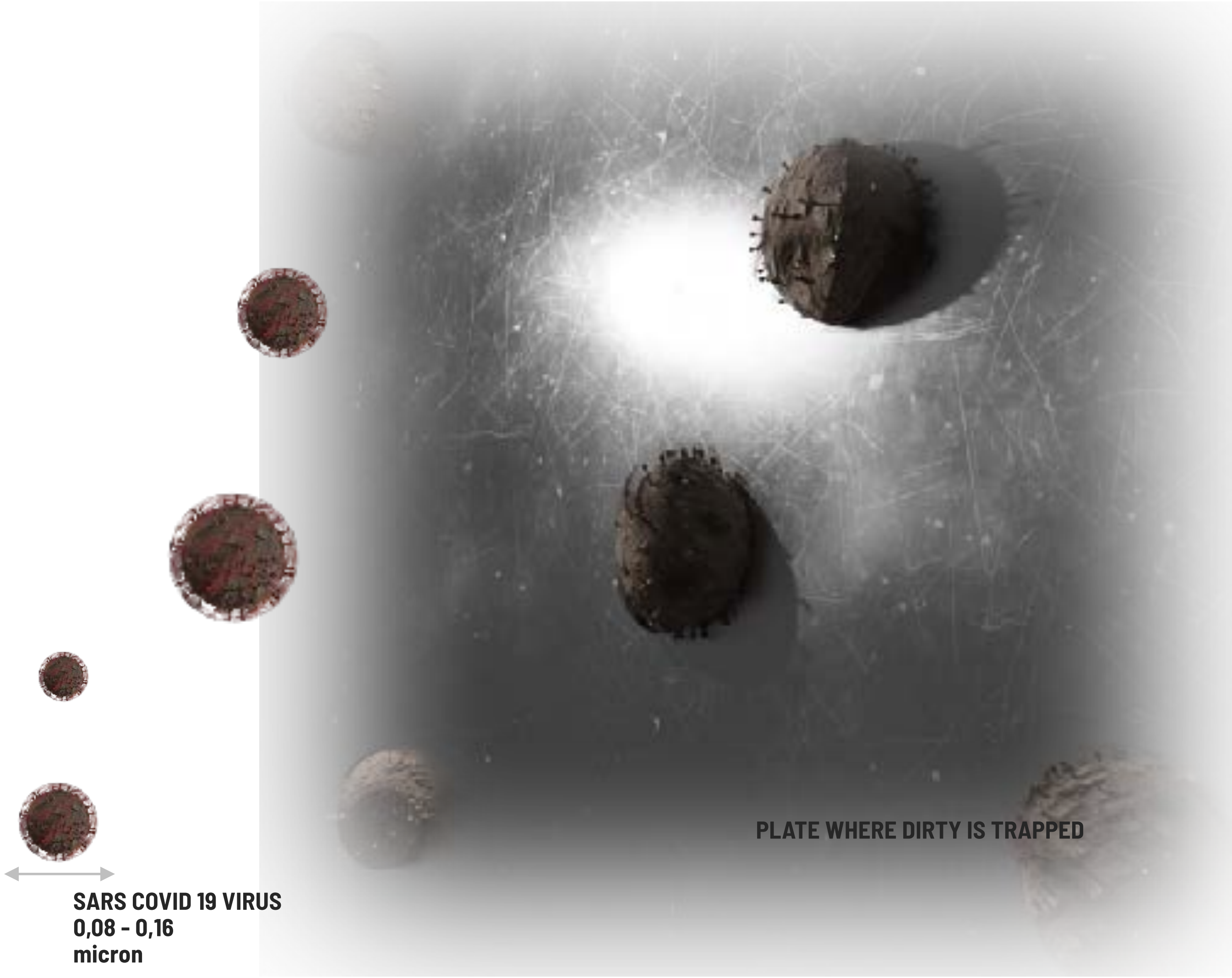
- Carbon monoxide
- Formaldehyde
- SO_2
- N_2
- Ozone

AirFlow

TRAP THE INVISIBLE ENEMIES HIDE IN INDOOR AIR

PATENTED PENDING AND CERTIFIED
CrossField® trap ultra-fine particle (diameter lower than 1 micrometer)as for SARS-COVID 19 and FLU virus.

Airflow is the unique air purifier that not only filters **dirty** air but can trap and **destroy** microbial pollution and ultra-fine particle that normal commercial filter is not able to FILTER



AirFlow

CERTIFIED TO BE SAFE*

AirFlow has been designed and tested in the laboratory to be **Ozone free***.

*Ozone concentration tests were performed according to **CEI EN 60335-2-65**

MAINTENANCE

AirFlow

While HEPA filters get clogged and need to be frequently changed, AirFrame is a **filter-free**, minimal maintenance system. With AirFrame, you simply clean our device with the wipe of a cloth and never have to worry about releasing any harmful pollutants that's been captured.

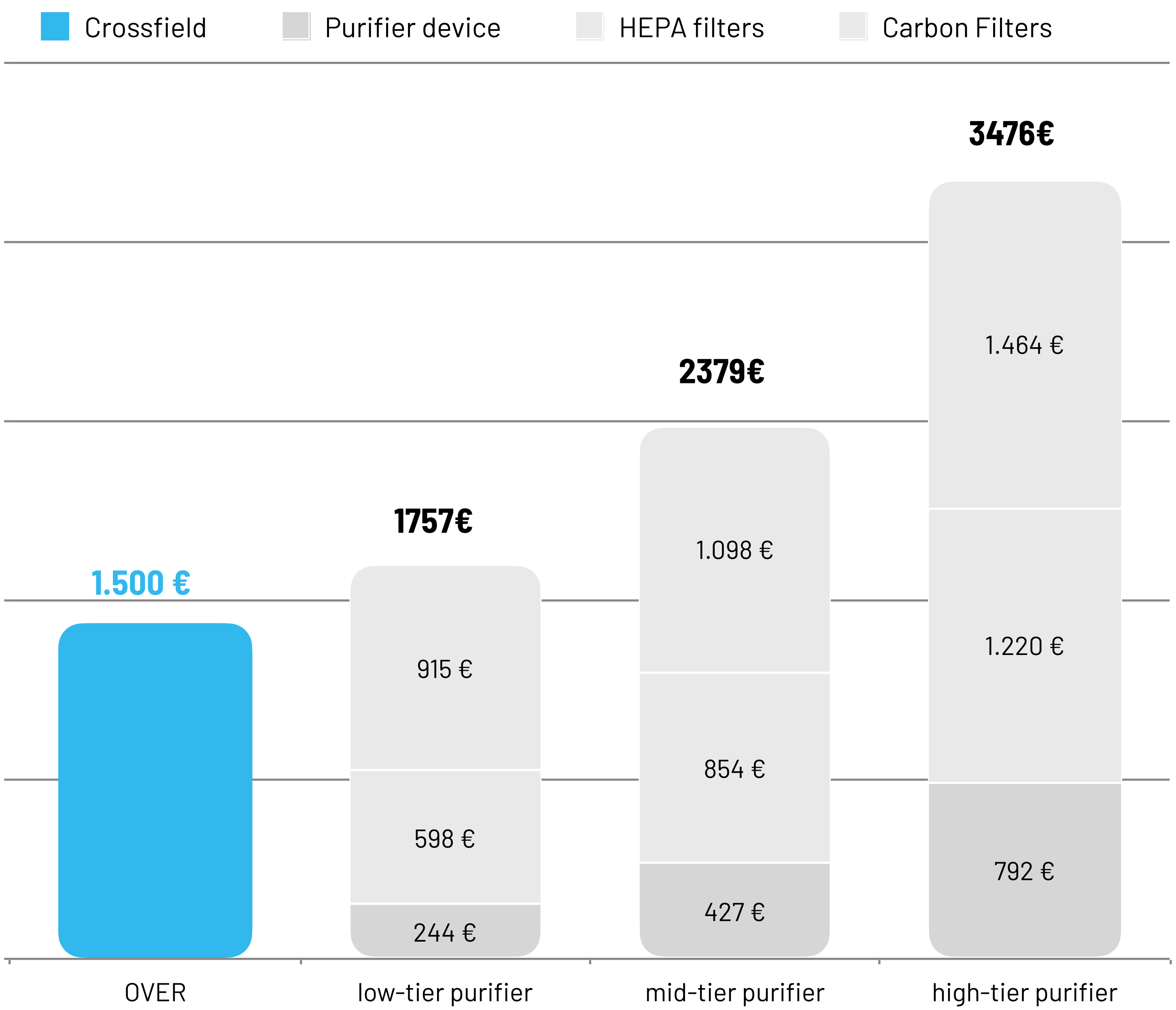
Remove the Electrostatic filter gently pulling it in your direction

Use the cloth and neutral detergent on the plate

Collocate the Electrostatic filter in the correct position again

Remove the dirty on the cover plate

Crossfield technology **DOES NOT** require any expenses after the installation



Health and safety in the workplace

The employer has a duty of care to ensure that a **safe** and **healthy environment** is provided.

The Approved Code of Practice accompanying the Workplace (Health, Safety and Welfare) Regulations, states that indoor air quality should be adequate for comfort and health of the people inside the building.

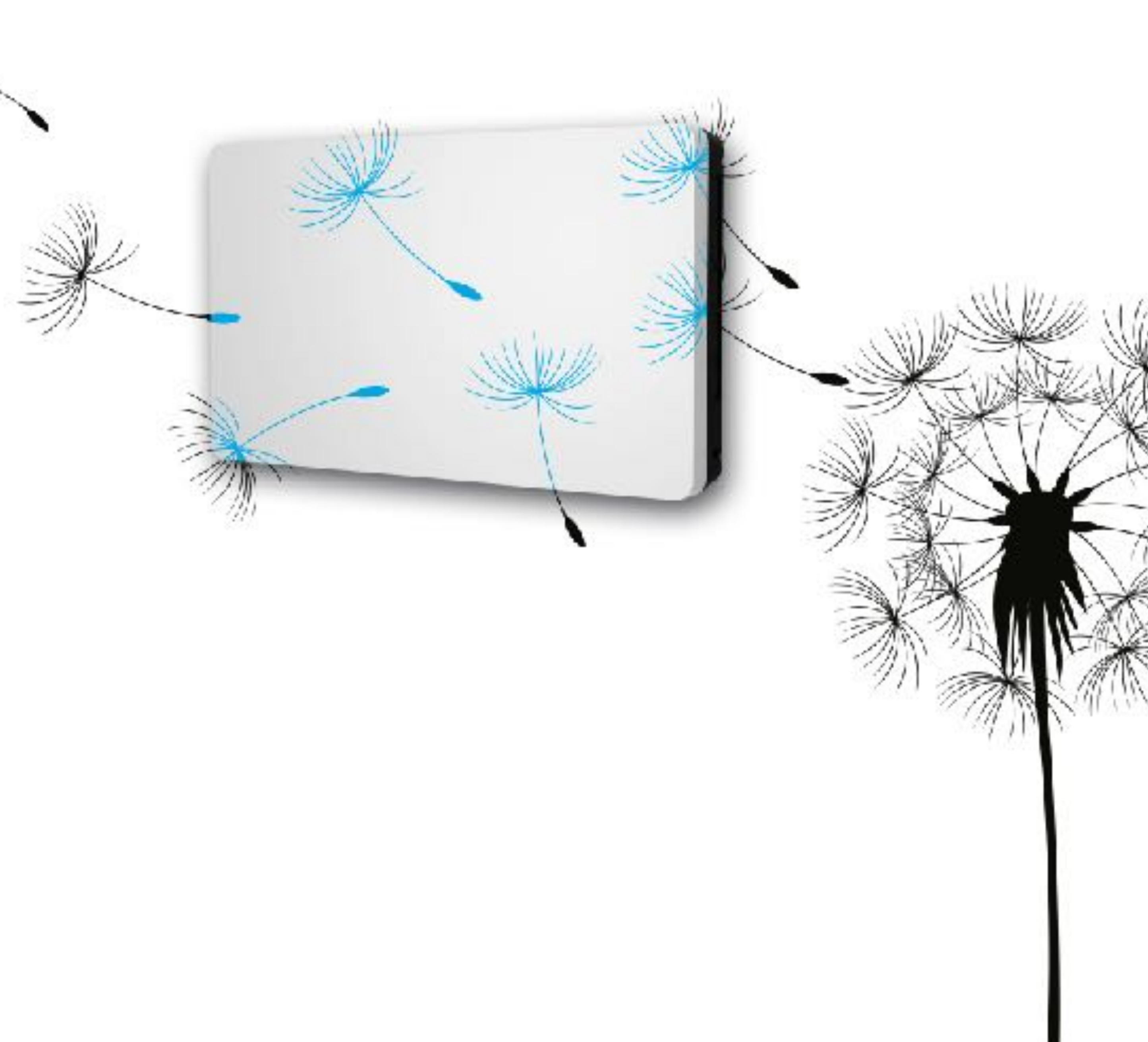
Building and ESG certification

Airflow is a system of **managing** and **monitoring of indoor air quality** integrate in energy efficiency solution, compliant of the requirements for the major building and sustainability certifications

Increase the sustainability and value of your buildings

AirFlow matches the ambients

AirFlow is a **wall decoration**, you can choose between different covers or ask for a customised version (for example with your logo).



AirFlow

THE PERFECT AIR PURIFIER FOR THE SCHOOLROOM - SAFE AIR, LOW NOISE, AND PARTICULAR MATTER FILTRATION

AND WITH A DASHBOARD COVER, IT CAN BE **PERFECTLY INTEGRATED** WITH CLASSROOM FURNITURE.

CrossField®

AirFlow

THE BEST AIR PURIFIER FOR SCHOOL'S BUILDING

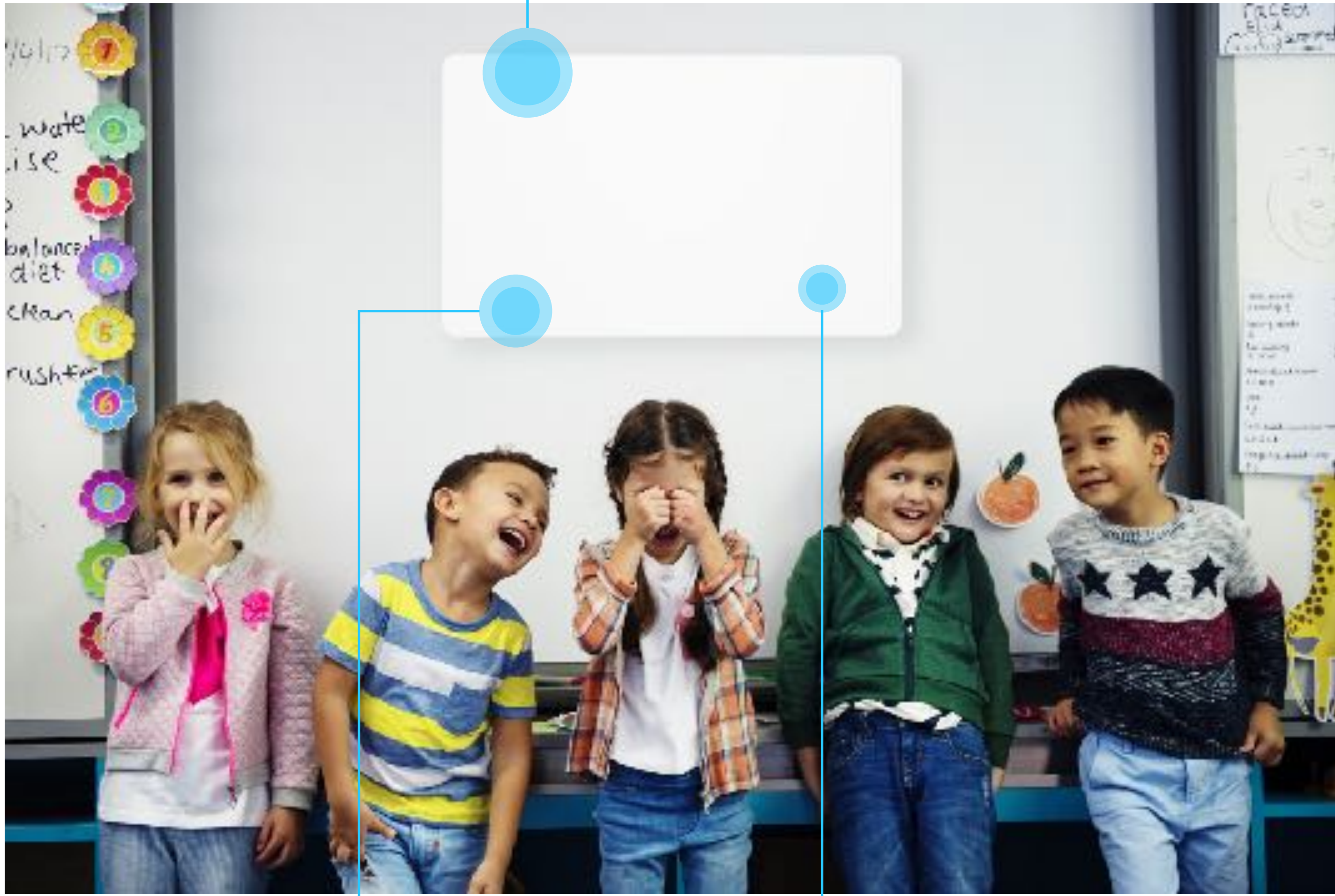
Indoor air quality is essential for good health and growth, overall during childhood.

Open the windows is generally not enough to ensure good indoor air quality, for example in polluted areas, against viruses and bacteria spread, and VOC that can be released by internal source as detergent products and furniture

- No mechanical filters
- Noiseless
- Integrated with system of mechanical controlled ventilation
- Ozone Free
- Integrated with energy efficiency solutions
- Compliant with school standards and guidelines

THE MOST ADVANCED

Crossfield ® IS A PATENTE SOLUTION



THE MOST EFFECTIVE

Against pollutants and pathogens such as: pollen, particulates, bacteria, viruses, fungi, molds.

SAFER AND COMFORTER SCHOOL

it can be installed on the wall, it is equipped with electrical safety systems, simple maintenance


CrossField®
AirFlow
THE INNOVATIVE AIR PURIFIER FOR
A 5 STARS AIR IN THE HOTELS

CrossField®

AirFlow

THE INNOVATIVE AIR PURIFIER FOR A 5 STARS AIR IN THE HOTELS

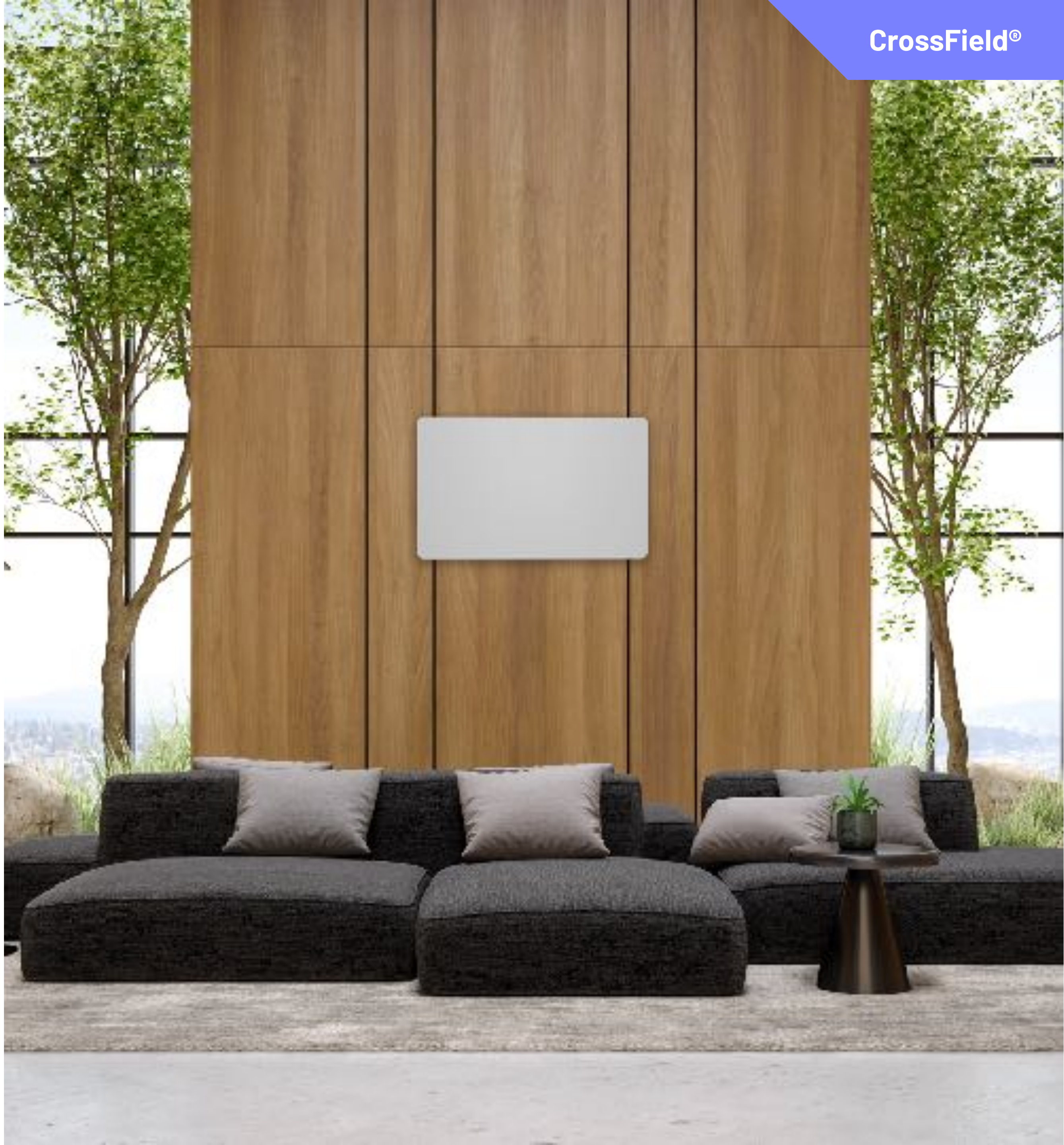
More and more customers, after the pandemic period, express the need to stay in facilities that can guarantee **sanitised** rooms and **clean** air.

Poor indoor air quality in hotel rooms can negatively affect guests' comfort, especially for people with allergies, asthma, and respiratory disorders.

Offer to your client a 5 stars and unique service to ensure the perfect indoor air quality.

MAJOR POLLUTANTS SOURCES

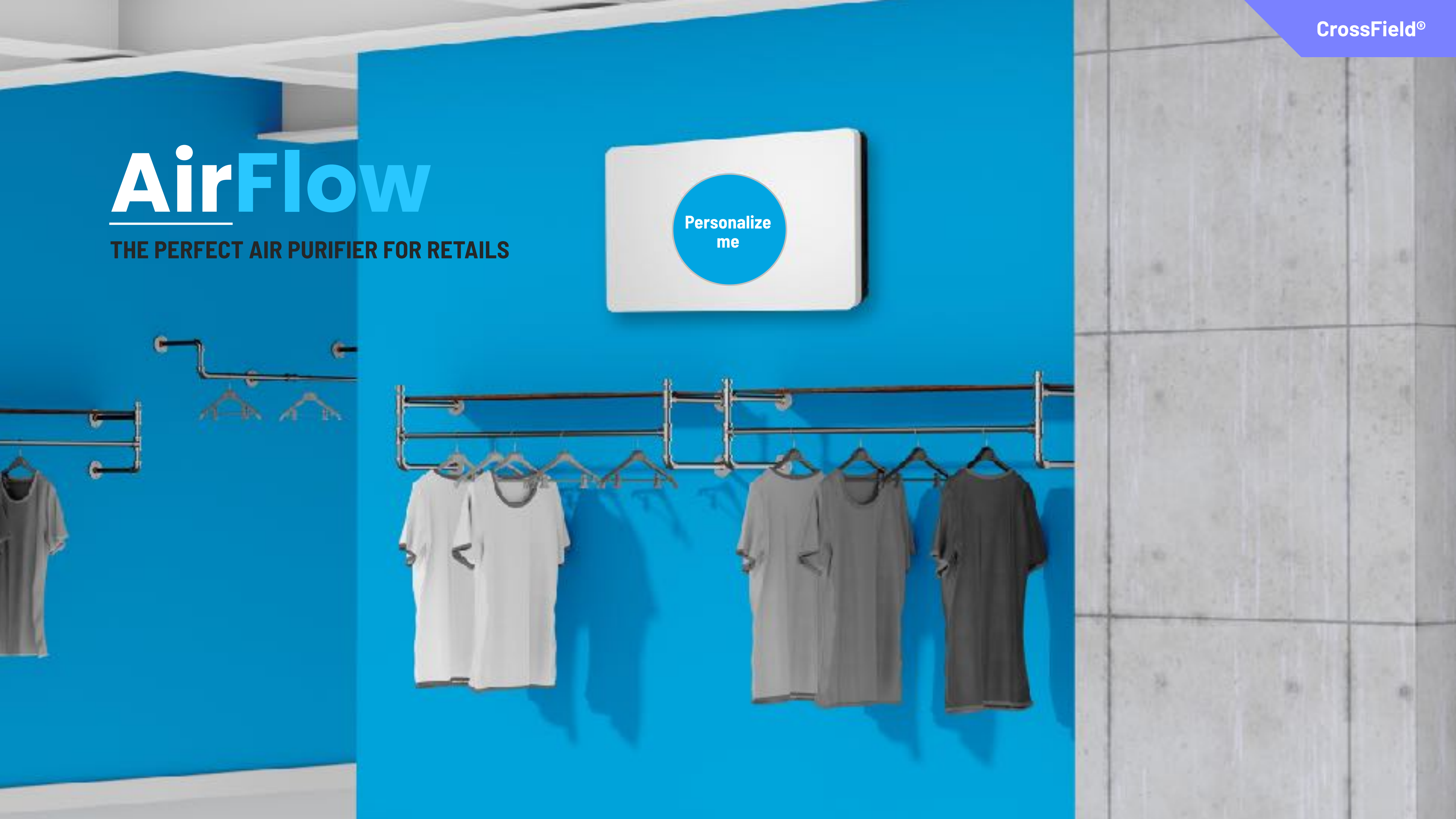
- POLLENS
- MITES AND DUST
- MOLD
- PEOPLE
- DETERGENS
- FORNITURES
- NON WELL MAINTAINED DUST AIR FILTERS



CrossField®

AirFlow

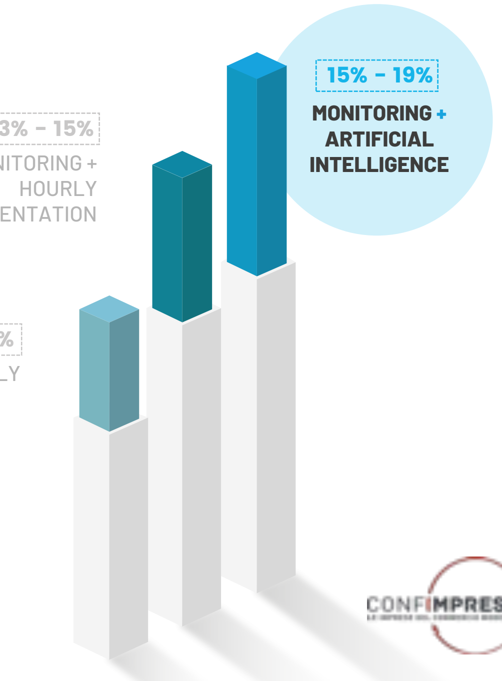
THE PERFECT AIR PURIFIER FOR RETAILS



AirFlow

CUSTOMIZABLE AND WALL-MOUNTED TO BE PERFECT FOR EVERY LOCATION

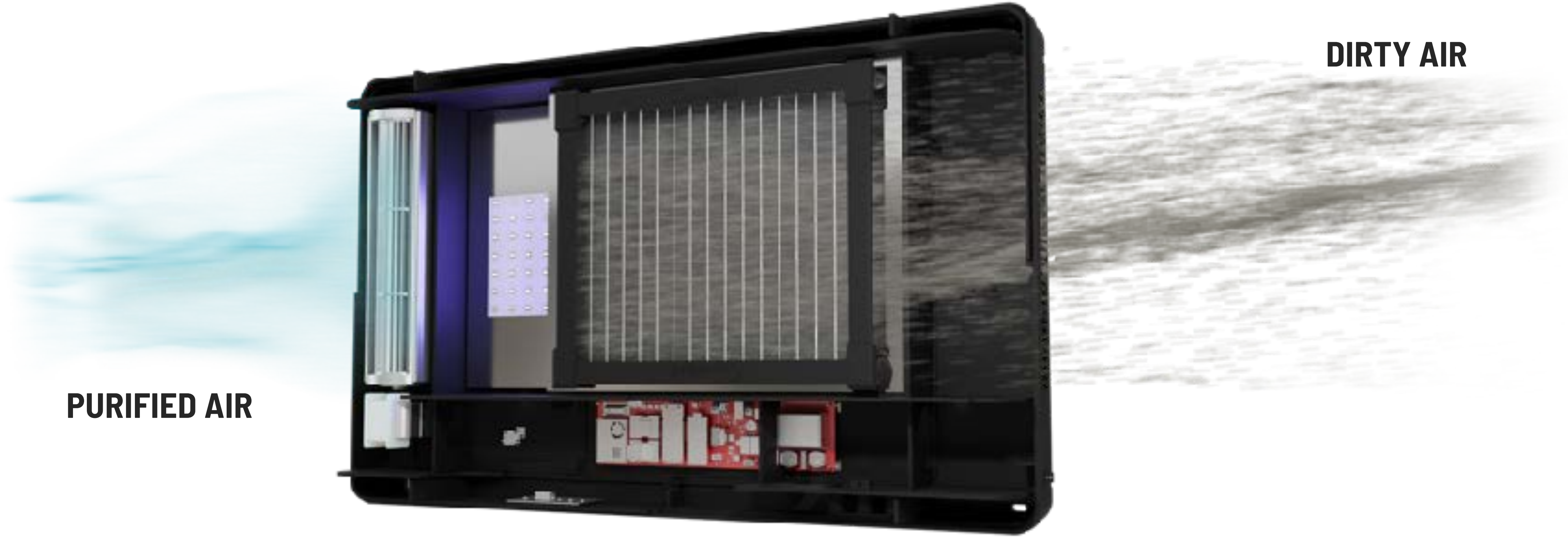
Help maintain a healthy environment also in crowded shop.
The smart integration allow to reduce energy consumption.



In collaboration with Confimprese we are helping retailers in Italy to reduce carbon footprint and energy costs.

CrossField®

A CLOSER LOOK

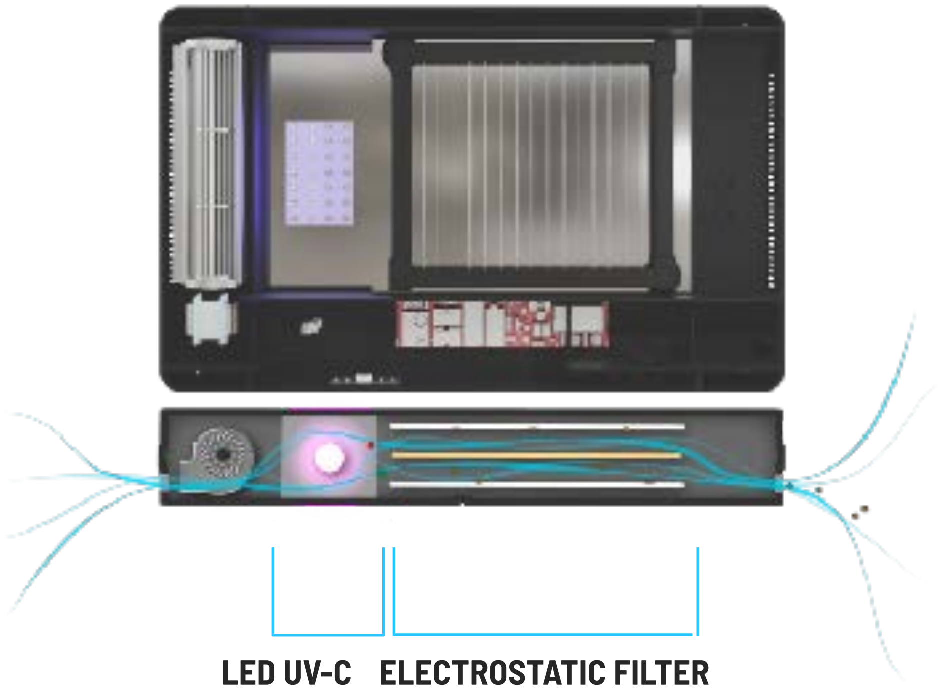


CrossField®

THE AIR TREATMENT ADVANCED TECHNOLOGIES

CrossField® is a sustainable solution (No mechanical filter and made by recycled plastic) with a 99,9%* of efficacy against pollutant and bio-pollutants.

How it works?
The dirty air pass primarily in the electrostatic filter that trap pollutants, trap kill or damage bio pollutant.
The air than pass thought UV-C rays where the sanitation process is completed.



FILTER AND SANITIZED FROM

Volatile Organic Compound (VOC)

PM_1

$PM_{2.5}$

PM_{10}

Polliens

Formaldehyde

Fungi

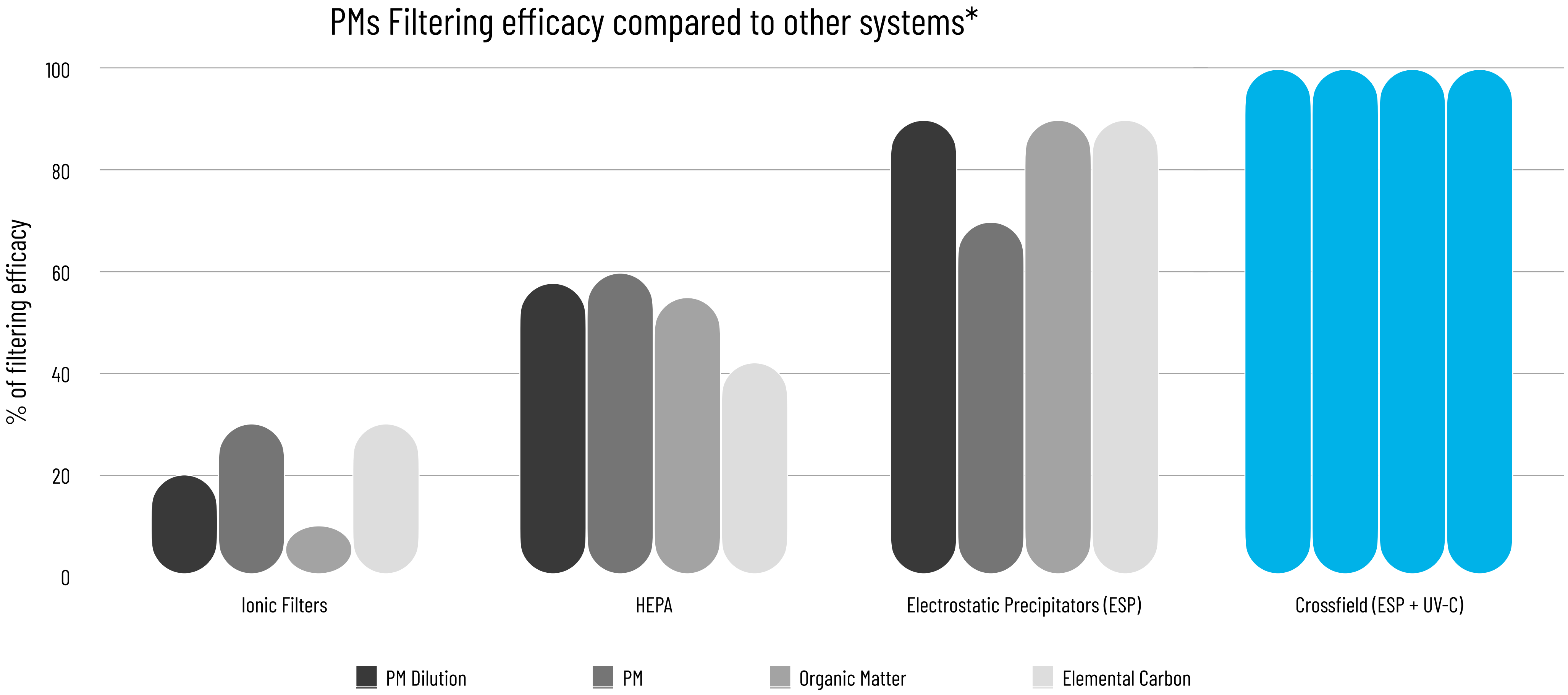
Molds and spores

Allergens

Virus and bacteria

***efficacy and inactivation tests carried out in accredited laboratories**

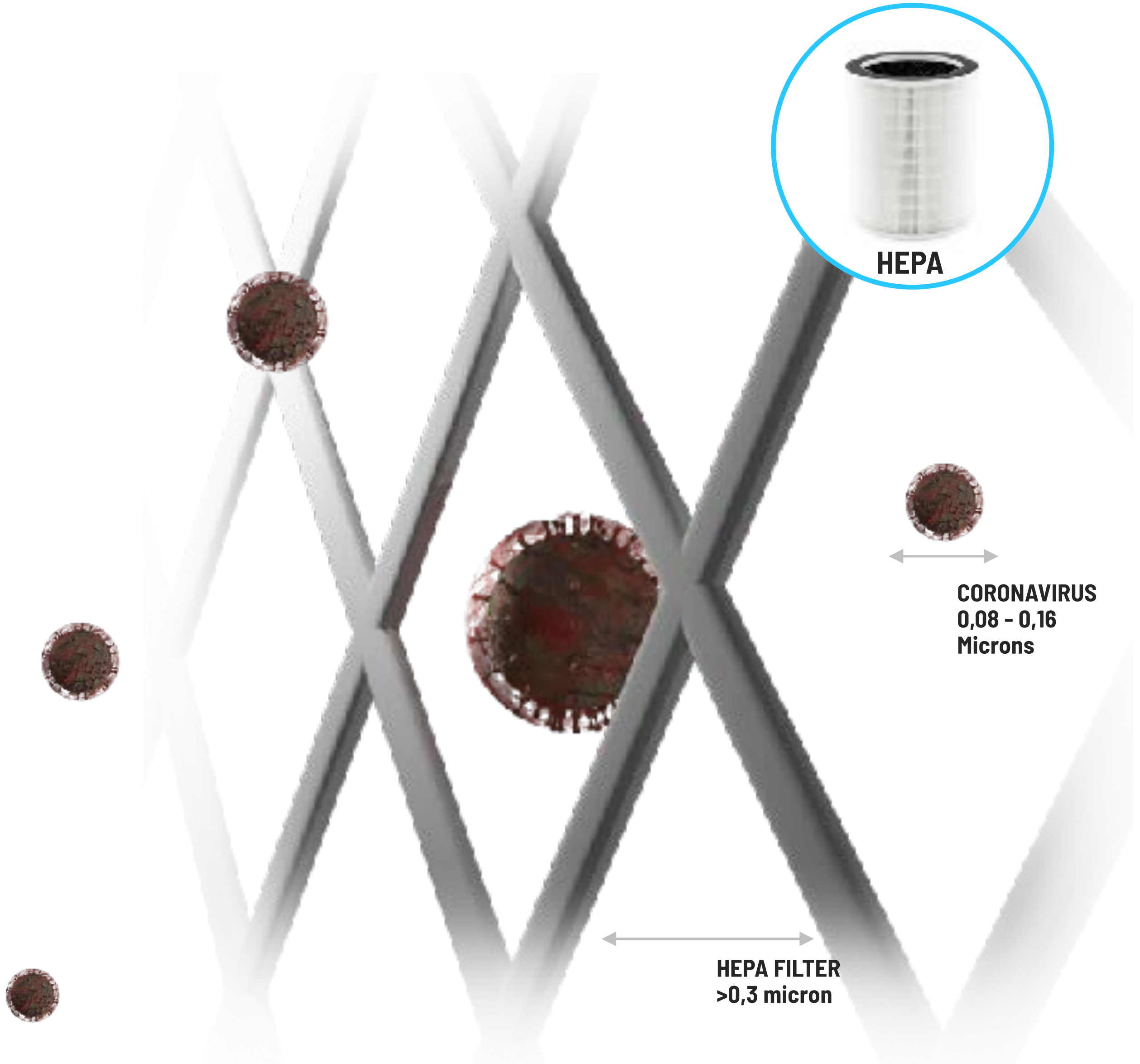
Crossfield®



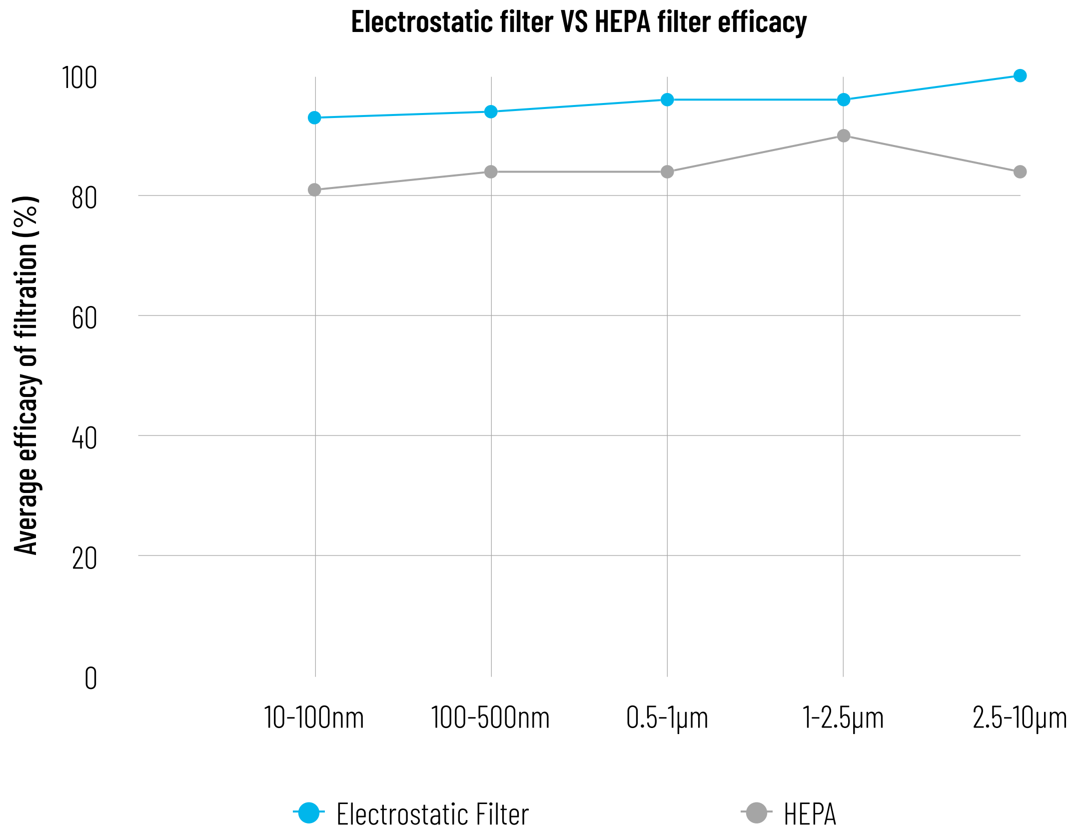
*Published on 2021 Sep 10. doi: 10.1016/j.heliyon.2021.e07976

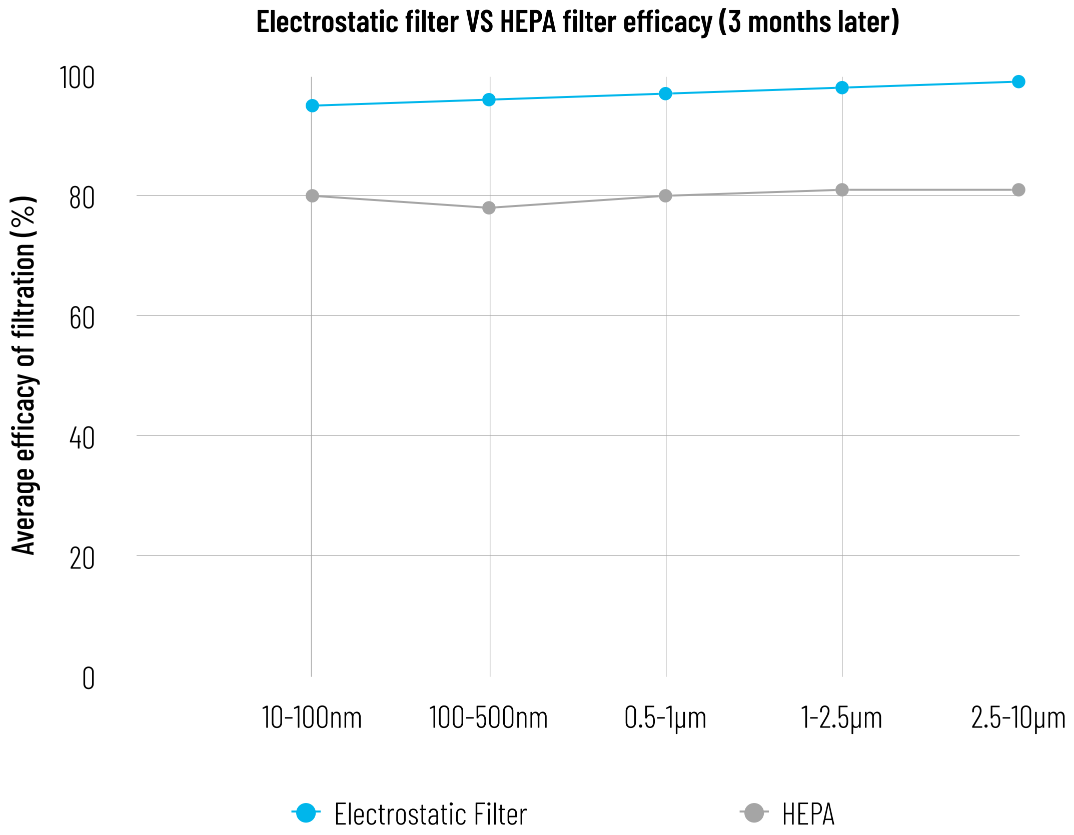
Are HEPA efficacy against small dimension virus?

HEPA and ULPA filters can trap particles with a diameter of up to 0.3 microns*: virus as SARS-COVID19 or FLU pass through because they have a diameter between 0.08 and 0.16 microns.



*epa.gov/indoor-air-quality-iaq/what-hepa-filter


Electrostatic filter VS HEPA filter efficacy
Average efficacy of filtration (%)
100
80
60
40
20
0
10-100nm
100-500nm
0.5-1μm
1-2.5μm
2.5-10μm
Electrostatic Filter
HEPA


Electrostatic filter VS HEPA filter efficacy (3 months later)
Average efficacy of filtration (%)
100
80
60
40
20
0
10-100nm
100-500nm
0.5-1μm
1-2.5μm
2.5-10μm
Electrostatic Filter
HEPA

Crossfield test in laboratory

The unique combinato of the electrostatic filter and UV-C rays of CrossField® was 99.9% effective at neutralising and destroying indoor air pollutants which is the highest inactivation rate ever achieved by any purifying technology! We tested the inactivation rate in accredited laboratories for:

Serratla Marcescens
Stronger to inactivation more than COVID-19

Serratia marcescens is an opportunistic enteric pathogen, a class of bacteria responsible for a significant proportion of hospital-acquired*

*2011 Nov;193(21):6057-69. doi: 10.1128/JB.05671-11. Epub 2011 Sep 2.

Bacillus Subtilis
Stronger to inactivation more than COVID-19

Bacillus subtilis is a Gram-positive, rod-shaped bacterium that forms heat-resistant spores. It is commonly found in the soil. It is nonpathogenic. It serves as a model organism for studies of sporulation and of the behaviour of low GC Gram-positive bacteria*.

*P.J. Piggot, in Encyclopedia of Microbiology (Third Edition), 2009

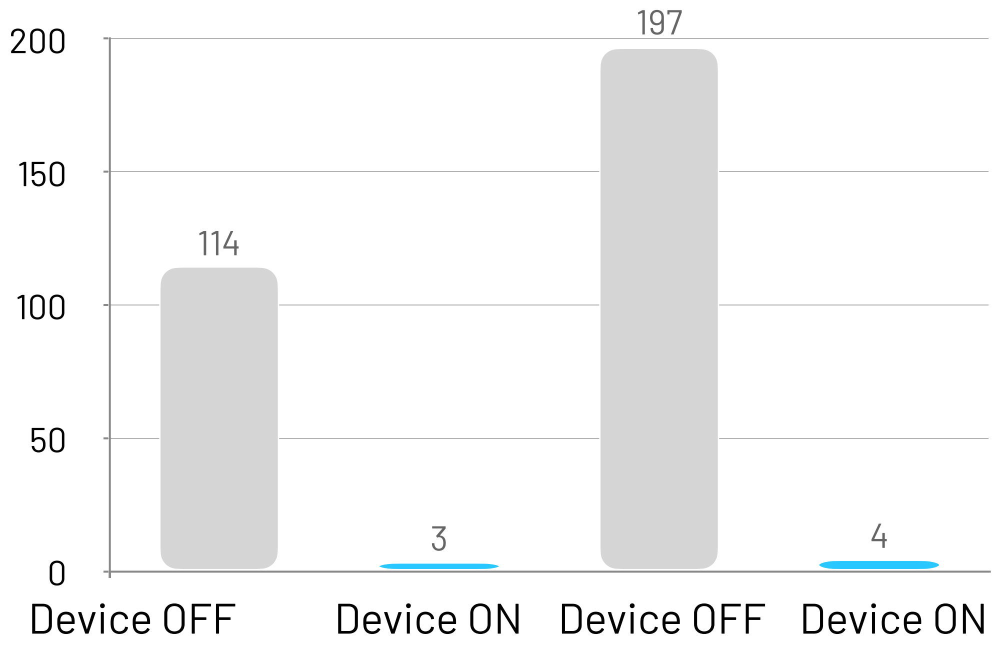
Cladosporium Sphaerospermum
Fungi from Chernobyl

Dematiaceous saprophytic fungus commonly found in diverse environments, has been reported to cause allergy and other occasional diseases in humans*

* https://doi.org/10.1016/B978-0-323-91232-7.00012-X

UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

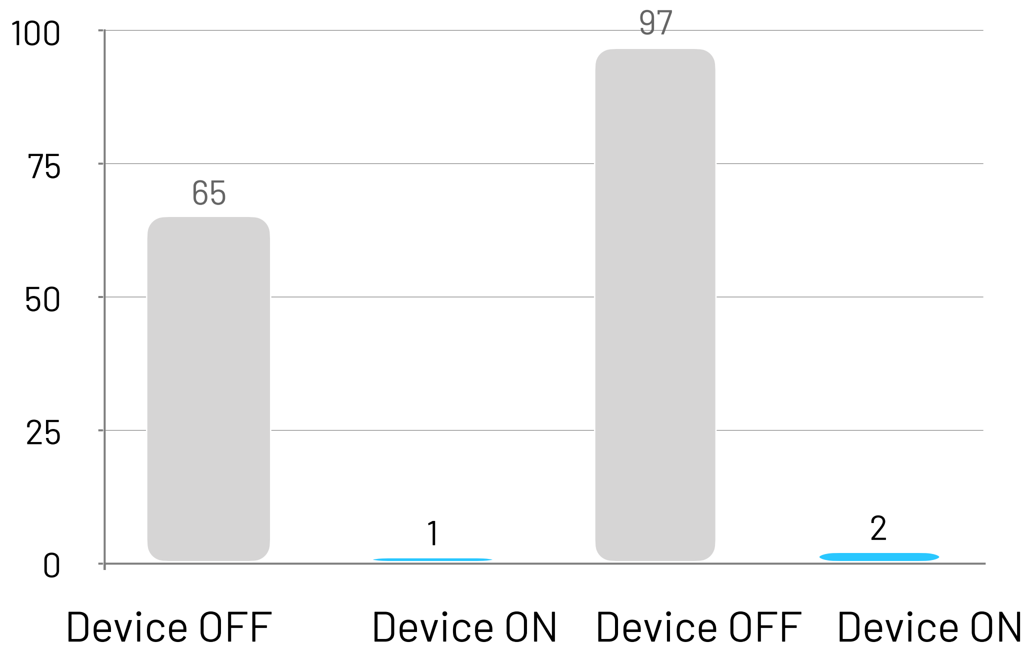
Bacteria colonies growth



24h **97.4%**

48h **97.4%**

Fungi colonies growth



48h **98.5%**

72h **98.0%**

Test conducted in **Insubria University** growth cell laboratories

CrossField®

UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

How colonies appears on petri plates

FUNGI and MOLD

Bacterias

FUNGI and MOLD

Bacterias

First step:

Air sampling with Crossfield technologies turned OFF

Crossfield in action:

The number of colonies is zero for bacteria and near to zero for fungi and mold

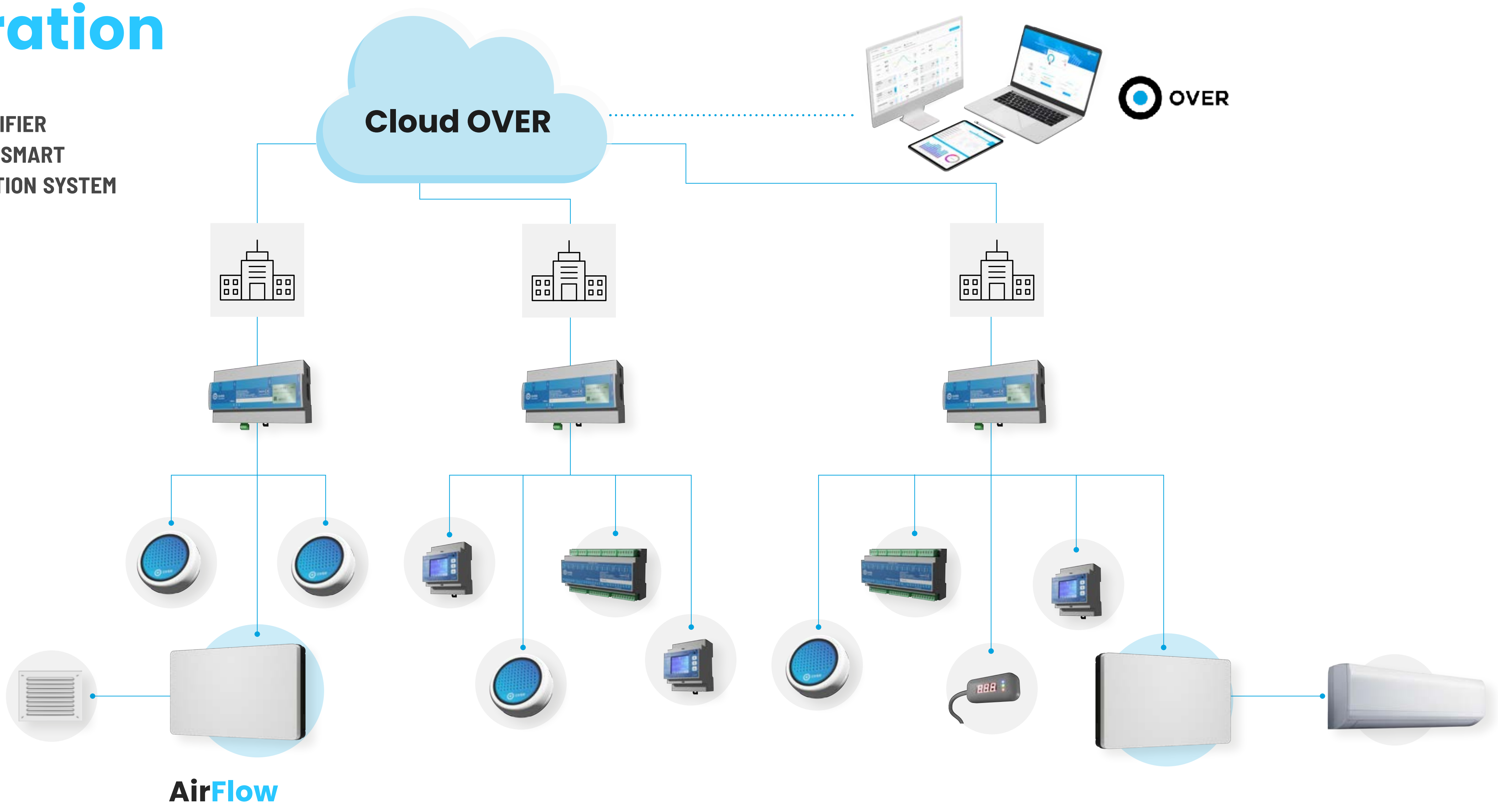
Smart Integration

AirFlow è available in **STAND-ALONE or INTEGRATED** with Smart Automation Solution

Smart integration allows control and monitoring using web DASHBOARD the Airflow, and third-party devices for air ventilation and energy efficiency functions.

Smart Integration

THE ONLY AIR PURIFIER INTEGRATED WITH SMART BUILDING AUTOMATION SYSTEM



AirFlow

Technical details

Power Supply	220V/50Hz
Weight	12,5 Kg
Dimension	82x52x12 cm
Energy consumption	26 W (modalità eco, bassa velocità) – 57 W (modalità Boost, alla velocità)
Measured parameters	PM (1, 2.5 & 10), temperature, humidity, IAQ index CO2, VOC index. On request : CO, formaldheyde, O3, NO2, SO2
IP	2X
Wi-fi frequency	2,4GHz
Operating temperature	10-50 °C
Noise levels	30 dB – 60dB
Air Volume treated at max setting (Fan mode):	230m^3/h

AirFlow

99,9% efficiency

Test conducted in accredited laboratories

Sustainable Case

Made by recycled plastic

Zero Waste

Respect the environment and zero operating cost

Low energy consumption

26 - 57 W low operating cost and Leo environment impact

Smart integratio

Integrated with smart building solution to monitor air quality, as part of energy efficiency strategies and simple to control by a web dashboard

AirFlow respects the environment in every step of lifecycle

Designed according to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements.

AirFlow

an investment to save money adding value at the buildings

- **Energy saving** thanks to decreasing the need for recycling AIR and introducing fresh air;
- **Brand reputation** increased for people's well-being and environmental impact care
- **Decrease of employees' sick leaves** associated with indoor pollution
- **Decrease the spread of spores and mould** in the building
- A tool to **analyse the ecological condition** causing mould and fungi
- **Better indoor experience** due to absence of poor air condition as eyes and nose irritation, allergies, asthma

Thank you!

OVER

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