air control

Tecnologie per il controllo dell'aria

Europe & MENA

DUST FREE®

Breathe The Difference.

Active Sanitizing Systems

EN

European Medical Association

PRODUCT

TÜV KNOW-HOW CLUB TÜV Hessen PROFI Member

TÜV PROFI CERT product 70 706 7058-1

TÜV PROFI CERT product 70 706 7058-2

eurofins

WHAT IS THE INDOOR AIR QUALITY ?

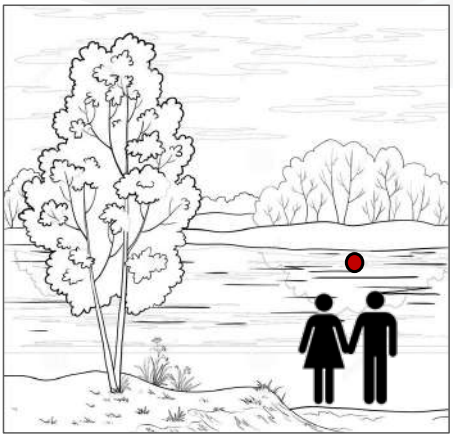
DEFINITION "refers to the quality of the air inside buildings as represented by concentrations of pollutants and thermal (temperature and relative humidity) conditions that affect the health, comfort and performance of occupants."

In our society, we spend up to **90%** of our time indoors and 30-40% of it at the workplace: for this reason the indoor pollution results to be more dangerous respect to outdoor enviroments, it is supposed that the 40 % of absence from work due illness is caused by problems related to **indoor air quality** inside the offices.

INDOOR AND OUTDOOR COMPARISON

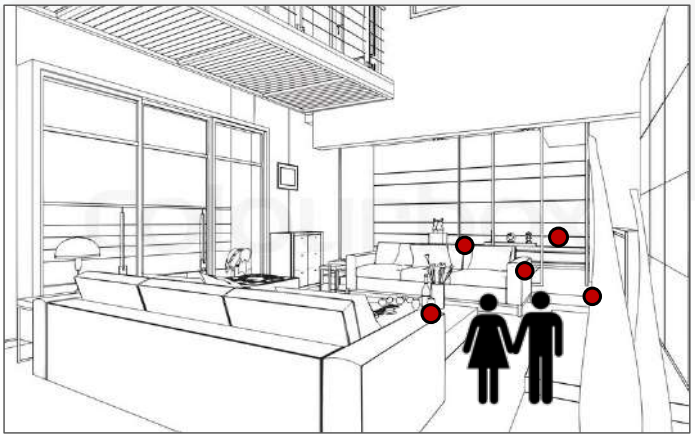
EPA *(Environmental Protection Agency - USA)*, through IEMB *(Indoor Environment Management Branch)* compared the level of **concentration of some air pollutants** recorded in the indoor enviroments with the level recorded in the **outdoor enviroment**. The analysis of the data confirmed that indoor concentrations compared to outdoor ones are generally **1 to 5 times bigger...**

OUTDOOR



1 bacterium

INDOOR



5 bacteria

... indoor exposures is 10 to 50 times higher that outdoor one.

FACTORS THAT AFFECT IAQ

EXTERNAL POLLUTANTS SOURCES
atmosphere/water/soil...

INTERNAL PHYSICAL ENVIRONMENT
building materials/ furnishings ...

PLANT SYSTEMS
Air conditioning systems combustion...

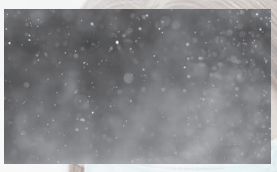
POLLUTING HUMAN ACTIVITIES
Metabolic processes/pets /smoking cooking food/ detergents...

INDOOR POLLUTION - CAUSES

Common activities like cooking, heating, smoking release in the air gasses and particles, a lot of them are potentially dangerous for human beings.
Formaldehyde is another substance potentially dangerous that is released by building materials, coatings and insulations.

Dust, pollen, micro particles generated by vehicular traffic, smoke, cooking of food and bacteria are some of the substances that remain suspended in the air until they will deposit on walls, furniture and floors or they go inside the ducts generating **biofilms**.

PERCEIVABLE POLLUTION



IMPERCEPTIBLE POLLUTION

NEW CONSTRUCTION METHODS

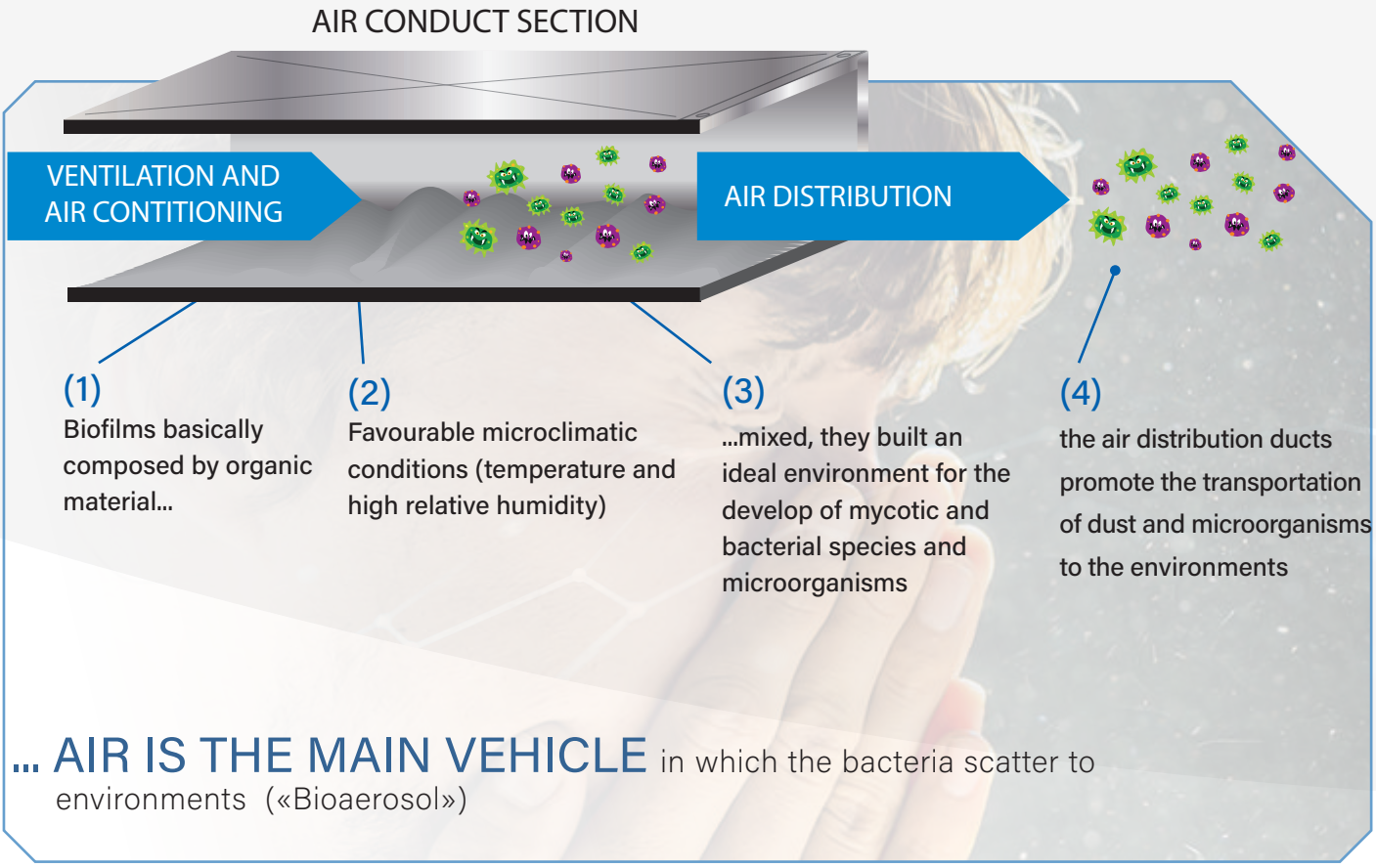
The new generations of buildings are erected with high isolated materials:

PRO -> guarantee to have less thermal dispersion, that make easier to heat up or cool down and, in this way, the energetic consumption is decreased.
CONS -> the building to breathe needs specific ventilation systems, that with time, if contaminated, can become another factor that contaminate the indoor environments.

THE PROBLEM

AERAULIC DUCTS

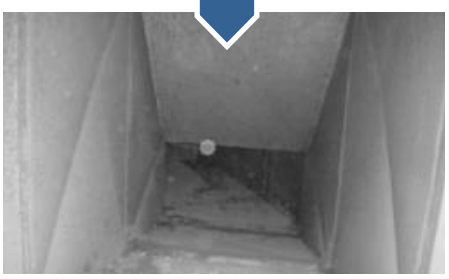
With times the **ducts** can easily become the prey of **microorganisms** like bacteria, mold, allergens, smell and viruses that increase the **potential infection** of people through the air flow.



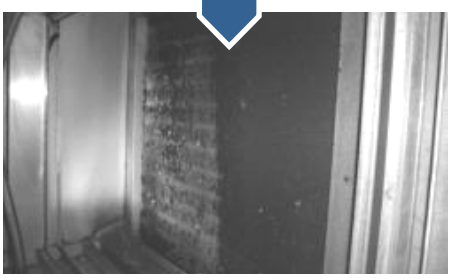
... AIR IS THE MAIN VEHICLE in which the bacteria scatter to environments («Bioaerosol»)

INDOOR POLLUTION - RISKS

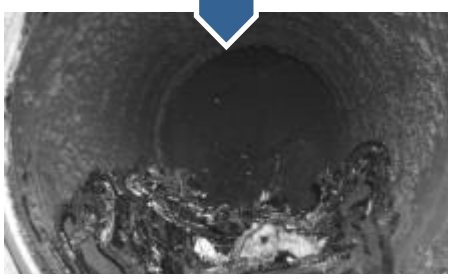
HYGIENIC-SANITARY



ENERGETIC



FIRE



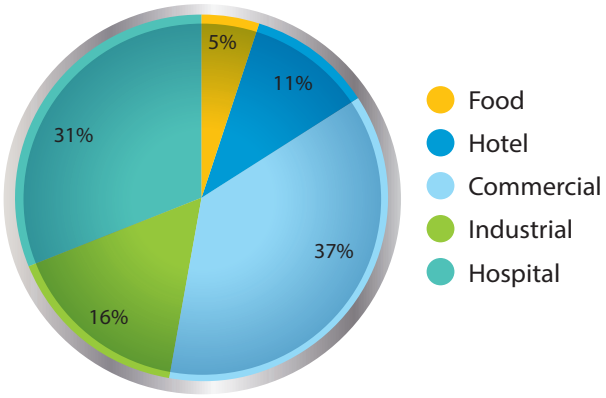
Pollution from fine dust, dust pollen debris and spores are the main causes of allergic disease (damages to mucous, skin, respiratory system) speeding up the deterioration of the equipment inside the premises. Bacteria, viruses and fungi, potentially pathogenic, are the cause of many **infectious disease**.

INDOOR POLLUTION - EFFECTS

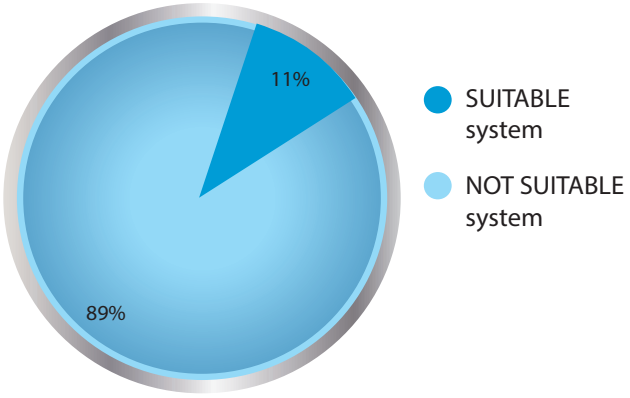
From statistical studies carried out on a significant sample of buildings (112), it has become known that:

- **65%** of air ducts is contaminated
- **65%** of the system does not ensure an adequate air exchange
- **35%** of the sampled buildings, allergy problems were observed
- **10%** of the sampled building are infected with pathogenic bacteria
- **8%** of the sampled buildings contained in airborne fiberglass particles
- **4%** of the sampled buildings, the air contains carbon monoxide produced by traffic emissions

INSPECTED SYSTEM FOR SECTOR TYPE



HYGIENIC-SANITARY EXAMINATION OF SYSTEMS



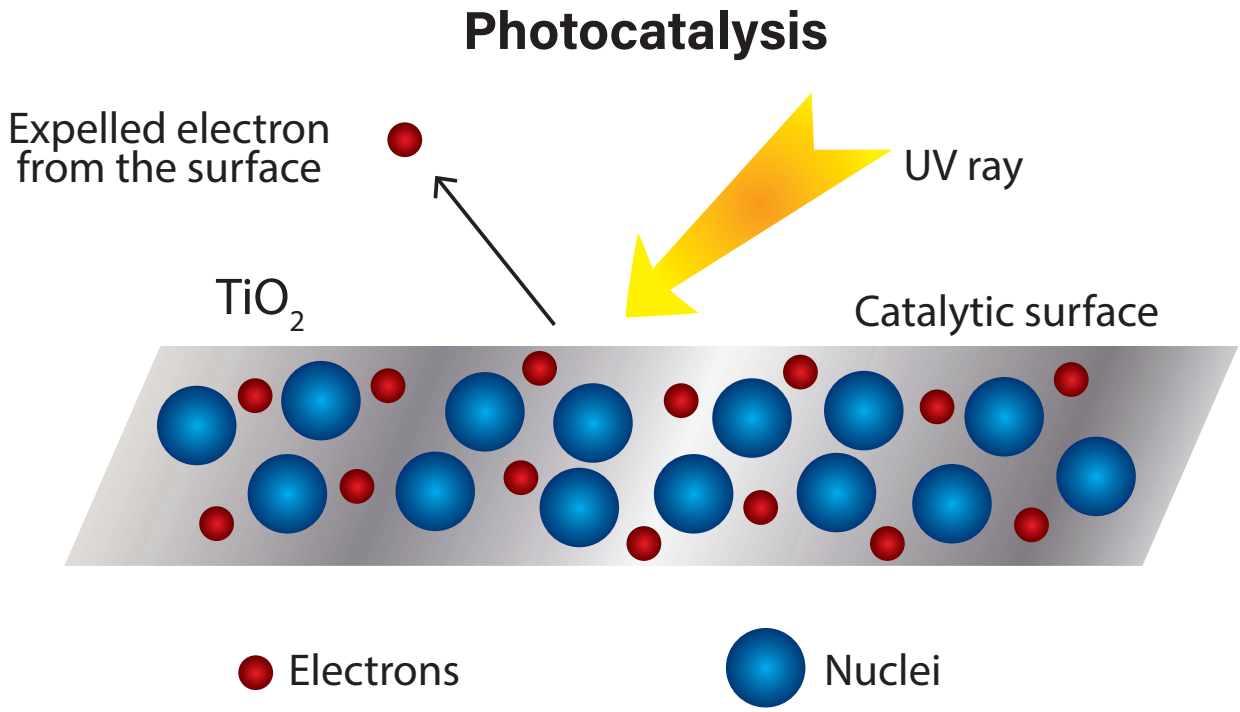
PCO™ TECHNOLOGY

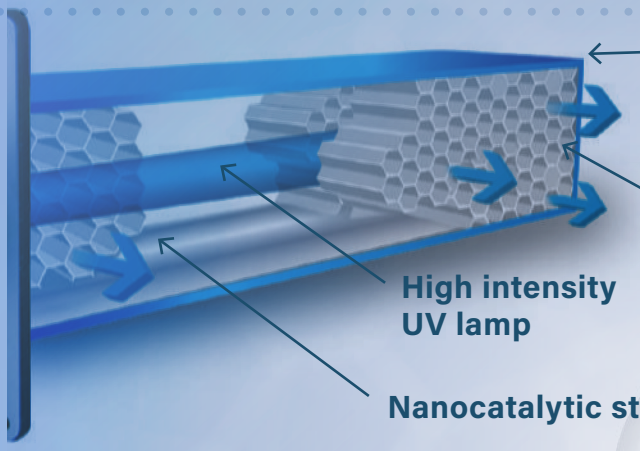
- PCO™ technology, better known as photocatalytic oxidation, has been developed and used by NASA to sanitize the environments intended for space missions, where one of the main needs are **quality** and **healthiness** of air.

- PCO™ technology imitates and reproduces what happens in nature, through photocatalysis, a process which, thanks to the combined action of the sun's UV rays, humidity present in the air and some noble metals present in the nature, generates **oxidizing ions and hydrogen peroxides** that can destroy most of the toxic and polluting substances.

- The photochemical reaction generated thanks to PCO™ allows the destruction of pollutants (bacteria, viruses and mold) using an active natural ingredient.

- The hydrogen peroxide (H_2O_2), generated by the photochemical reaction in small quantities – below 0,02 PPM – is highly effective in destroying the microbial load, both in the air and on the surfaces.





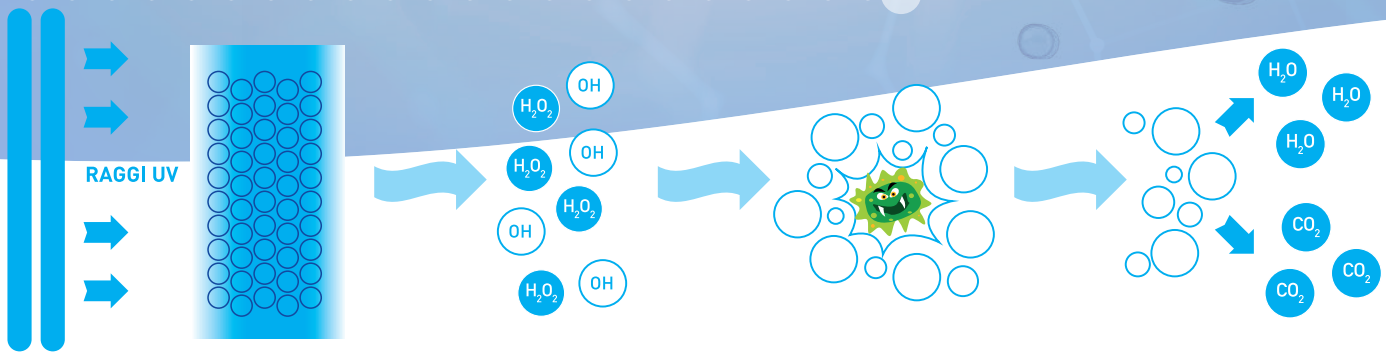
Space Technology

The Dust Free modules, hit by airflow, generate a photochemical reaction that binds one atom of oxygen (O) to the pre-existing hydrogen (H) and oxygen (O) atoms of the humidity (H_2O) thus generating **Hydrogen peroxide** (H_2O_2) **and hydroxyl radicals** (·OH).

The hydrogen peroxide (H_2O_2), generated by the photocatalytic reaction in small quantities – below 0,02 PPM – is highly effective in **destroying the microbial load**, both in the air and on the surfaces.

► For an optimal functioning the **relative humidity** of the air must be at least **20%**.

ACTIVE SANITIZATION



UV lamp

Catalyst alloy

Hydroxyl radicals (·OH) + Hydrogen peroxide (H_2O_2)

Decomposition of bacteria, viruses and pollutants

Decomposition result: CO_2 + H_2O

The hydrogen peroxide (H_2O_2), spread and carried by the airflow, is effectively active on sanitize both on the **duct** surfaces, and on the air of the **environment**, but also by contact on the surfaces of the treated environments.

PCO™ technology of Dust Free modules exploits the combined action of UV rays, produced by a special lamp, and of a catalyst structure made by a honeycomb metal alloy. The metal alloy is composed basically of TiO_2 (Titanium dioxide) and other noble metals in lower quantities.

The air, load of humidity (H_2O), pass through Dust Free modules composed by a metal alloy (4/5 metals). Thanks to the action of the high intensity UV lamp, start an oxidation photochemical reaction that binds an atom of oxygen to the water molecule H_2O; the **hydrogen peroxide** (H_2O_2), spread into the surrounding environment, allow a safety, effective and mostly complete sanitization.

DIFFERENCES BETWEEN TECHNOLOGIES

PASSIVE SYSTEMS

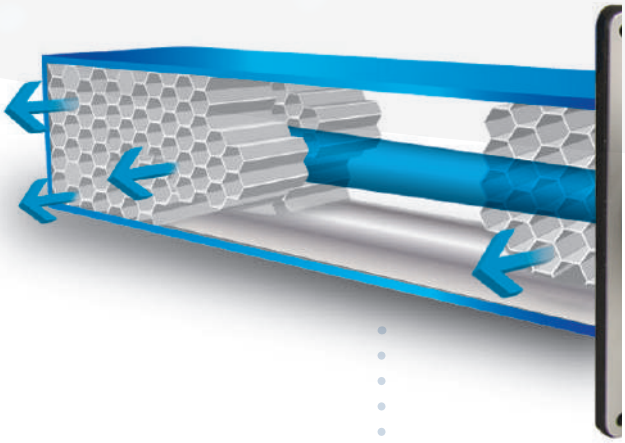
Keep and destroy some of the toxic substances in the point where they are installed.
They are not directly effective on the toxic substances present in the environment.

- Traditional Filters
- Germicidal Lamps

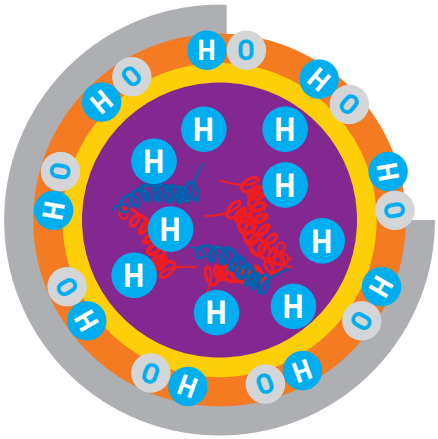
ACTIVE SYSTEMS

Thanks to the oxidizing agents that are generated by PCO™, there is a sanitizing effect, not only in the point in which they are installed but also inside the aeraulic circuit and in the treated environments.

PCO™ TECHNOLOGY
Photocatalytic Oxidation

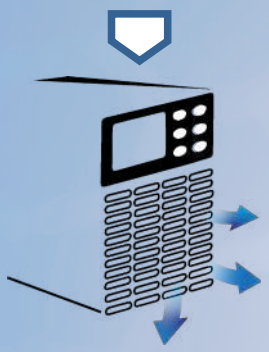


With the photocatalytic reaction, the H_2O_2 generated is able to attack and destroy the molecular structure of pollutants, taking away protons to the cell and give rise to a water recombination.



ACTIVE SYSTEM - DIFFERENCES

OZONE



CHARACTERISTIC
Ozone (O_3) is produced from oxygen molecules excited by electrical discharges. The atom of oxygen is known as a dissolved radical that look for organic compounds for give rise an oxidation reaction.

PRO
Ozone (O_3) is a gas highly instable able to spread itself in the treated environments, oxidizing all the organic compounds.
It is also able to neutralize the odours.

CON
The exposure to the ozone could be very dangerous if extend with time both for human being and for materials.
Do not act on non-organic particulate.

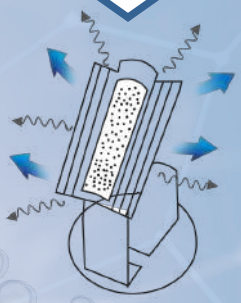
IONIZATION

CHARACTERISTIC
The ionization is produced by high voltage electrical discharges.

PRO
Positive and negative ions aggregate the microparticulate suspended in the air, that when become bigger, heavier and are taken away from the suspension, thus in this way are not any more dangerous for human.

CON
It is highly instable therefore it is not effectively on long part of ducts.
Often produces high concentrations of Ozone.
It must be combined with a filter able to hold medium particulate matter.

PCO™ with IPG



CHARACTERISTIC
Advance technology with photocatalytic oxidation. Hydroperoxides reduce systematically microbes and gasses in the space to be conditioned. The IPG system can generate a bipolar ionization without the ozone production.

PRO
Thanks to the variety of oxidising agents this treatment is extremely active versus a greater number of microbes and gasses. H_2O_2 molecule and the oxidizing agents produced by this technology are more stable respect to a normal ionization. This makes more effective the sanitization also on long part of ducts and on treated environments.

CON
It must be combined with a filter able to hold medium particulate matter.

TECHNOLOGICAL FUNCTIONALITY OF FILTERS

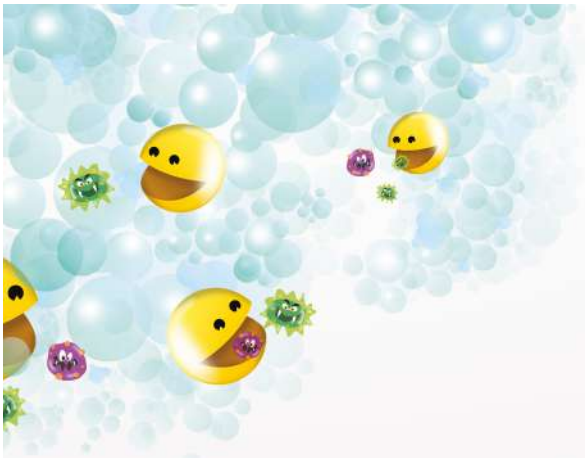
✓ EFFECTIVE

	HEPA	SYNTHETIC FILTERS MIDDLE EFFICIENCY	ACTIVE CARBON FILTERS	ECTROSTATIC FILTERS	NEGATIVE ION GENERATOR	OZONE GENERATORS	UV	PCO IPG
FINE PARTICULATE	✓			✓	✓			✓
MEDIUM PARTICULATE	✓	✓	✓	✓	✓			
PARTICULATE ATM	✓	✓	✓	✓	✓			✓
MICROBES/ BACTERIA	✓				✓	✓	✓	✓
VIRUS						✓	✓	✓
FUNGI	✓					✓	✓	✓
MOLD	✓					✓	✓	✓
GAS						✓	✓	✓
ODORS						✓		✓
AIR-CONDITIONED SPACES								✓

BENEFITS OF PCO™ TECHNOLOGY

Shortly, the benefits associated with the installation of Dust Free modules with PCO™ technology can be summarized as follows:

- Continuous sanitization able to reduce the risk of contamination and exposure 24/24h
- Active treatment of the canals, in the rooms and on the surfaces themself
- Elimination of germs, bacteria e viruses, which proliferating cause the spread of diseases and allergies
- Elimination of odours
- Reduction of harmful microparticles present in the air, including ultra-fine matter not generally treated by common filters
- Reduction of dust clusters
- Better general indoor air quality
- Reduction of the periodic interventions (and related costs) foreseen for the cleaning of the aeraulic channels
- Reduction of the interventions (and related costs) foreseen for the sanitization and remediation of the aeraulic channels



"Breathe the difference"

Active sanitization systems

DUST FREE®
Breathe The Difference.

It actively works 24 h 24 in the air and on the surfaces too!

"PACMAN EFFECT"

99 %
BACTERIA REDUCTION

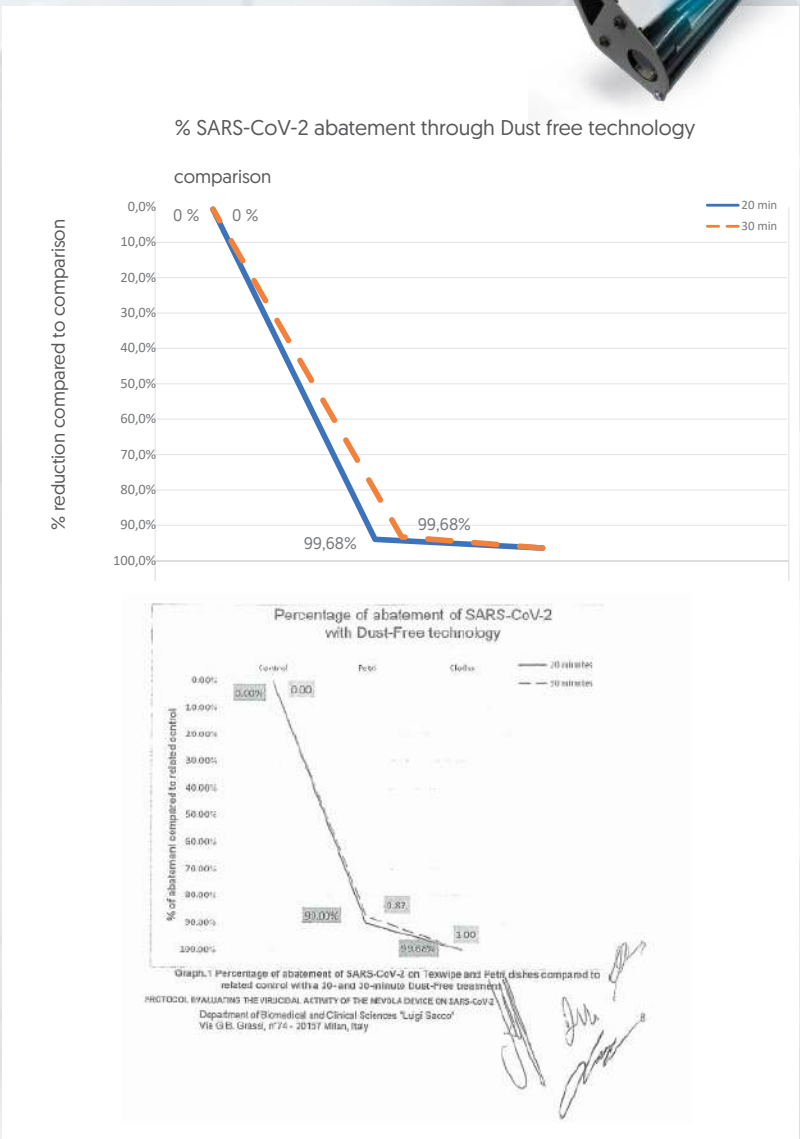
air control
Tecnologie per il controllo dell'aria

UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI SCIENZE BIOMEDICHE
E CLINICHE "LUIGI SACCO"

SARS-CoV-2 TEST

AT THE " LUIGI SACCO " DEPARTMENT OF
BIOMEDICAL AND CLINICAL SCIENCES

TEST COVID-19 CERTIFIED



The "Luigi Sacco" Department of Biomedical and Clinical Sciences of the University of Milan, whose laboratory has been indicated as the national reference for the response to bioterrorism and to the infectious disease emergency, has carried out the following clinical tests.

On November 9, 2020, the report was drawn up in which the virucidal activity of the Dust Free technology was evaluated, obtaining excellent results, i.e. 99.68% reduction of the SARS-CoV-2 charge in 20 minutes.

DOWNLOAD THE TEST RESULT

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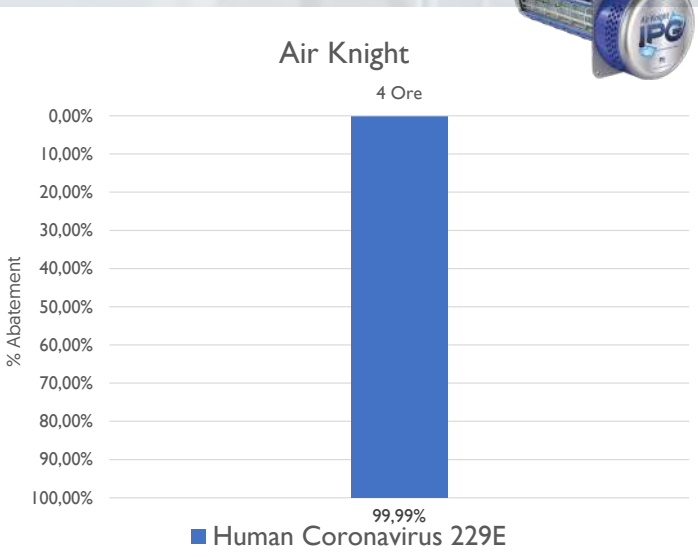
TEST ON HUMAN CORONAVIRUS

EVALUATION OF THE BIOCIDAL ACTIVITY OF THE PROCESS
"DUST FREE" ACCORDING TO A METHOD BASED ON EN 17272



Title of the test viral suspension: lgDICT50 = 8.25.
No cytotoxicity was observed on the bare carrier which was previously treated by the disinfection device according to the treatment performed.

	Degree of cytopathic effect lgDICT50	Reduction (log_{10})
Sensibility of cells to virus		
- **With treatment (S1)**		
Carrier 1	8.50	
Carrier 2	8.13	Difference < 1 log
Mean	8.32	
- **Without treatment (S2)**		
Carrier 1	8.25	
Stop of disinfection activity		
- **With treatment (S1)**		
Carrier 1	8.25	
Carrier 2	8.13	Difference < 0,5 log
Mean	8.19	
- **Without treatment (S2)**		
Carrier 1	8.38	
Test controls		
Carrrier 1	6.75	
Carrrier 2	6.88	
Mean	6.82	
Test		
Carrrier 1	2.50	
Carrrier 2	3.00	**4.07**
Carrrier 3	2.75	
Mean	2.75	

Eurofins Scientific through its subsidiaries is a world leader in food, environmental, pharmaceutical and cosmetic testing and in agroscience CRO services. It is also one of the global independent market leaders in laboratory testing and services for genomics, discovery of pharmacology, forensics, advanced materials sciences, and clinical trial support.

Eurofins has tested the Dust Free Air Knight device according to the European standard EN-17272, indicated for the determination of the disinfectant activity of surfaces by air diffusion without any operator.

Virus evaluation: Human Coronavirus 229E

DOWNLOAD THE TEST RESULT

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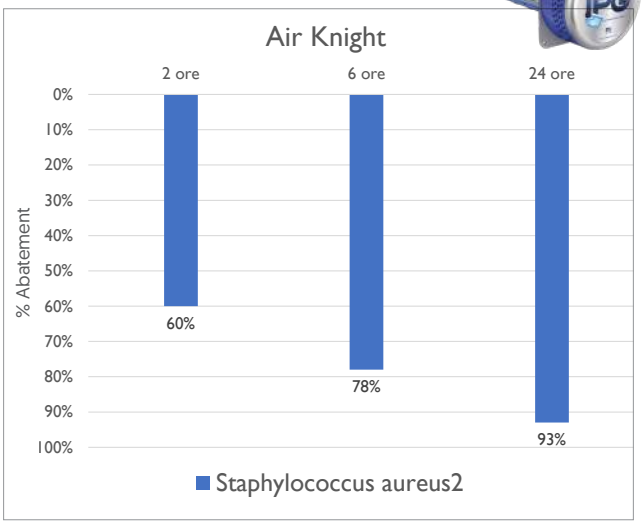
TEST ON STAPHYLOCOCCUS AUREUS

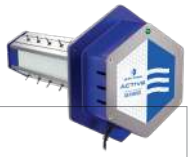
EVALUATION OF THE BIOCIDAL ACTIVITY OF THE PROCESS "DUST FREE" ACCORDING TO A METHOD BASED ON EN 17272

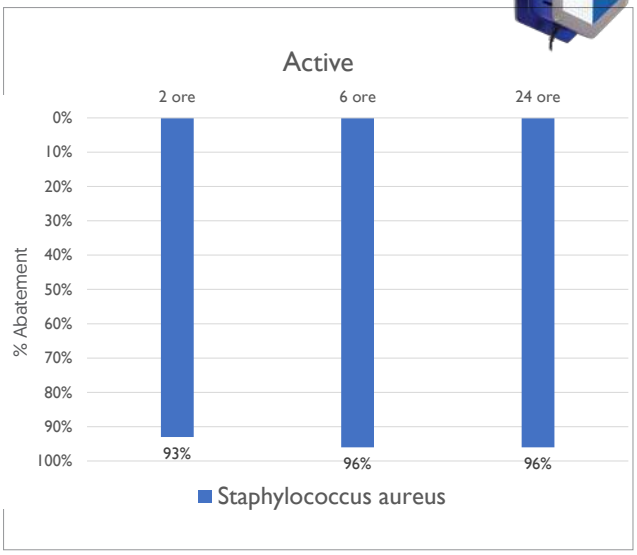


Eurofins has tested the Dust Free Air Knight devices according to the European standard EN-17272, indicated for the determination of the disinfectant activity of surfaces by air diffusion without any operator.

Evaluation of the bacterium: Staphylococcus aureus

DOWNLOAD THE TEST RESULT





Eurofins has tested the Dust Free Active devices according to the European standard EN-17272, indicated for the determination of the disinfectant activity of surfaces by air diffusion without any operator.

Evaluation of the bacterium: Staphylococcus aureus

DOWNLOAD THE TEST RESULT

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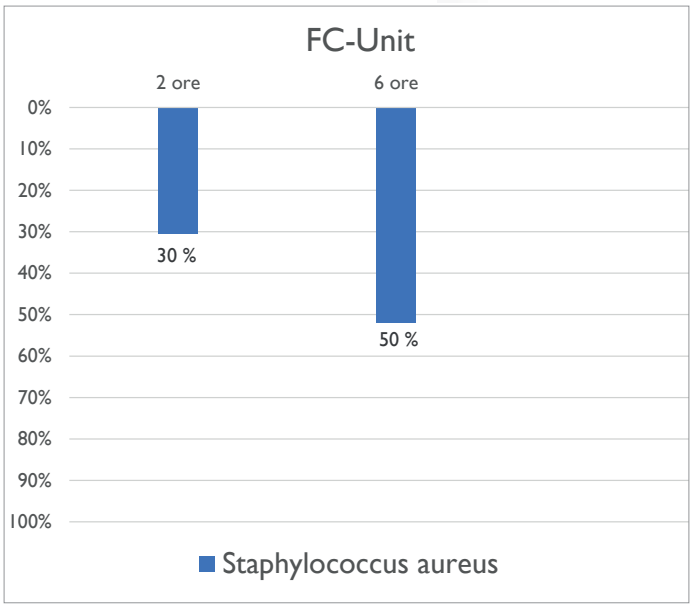
TEST ON STAPHYLOCOCCUS AUREUS

EVALUATION OF THE BIOCIDAL ACTIVITY OF THE PROCESS
"DUST FREE" ACCORDING TO A METHOD BASED ON EN 17272



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Eurofins has tested the Dust Free FC-Unit device according to the European standard EN-17272, indicated for the determination of the disinfectant activity of surfaces by air diffusion without any operator.

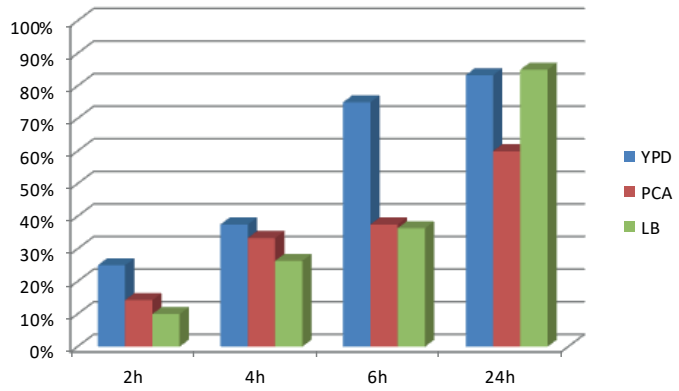
Evaluation of the bacterium: Staphylococcus aureus

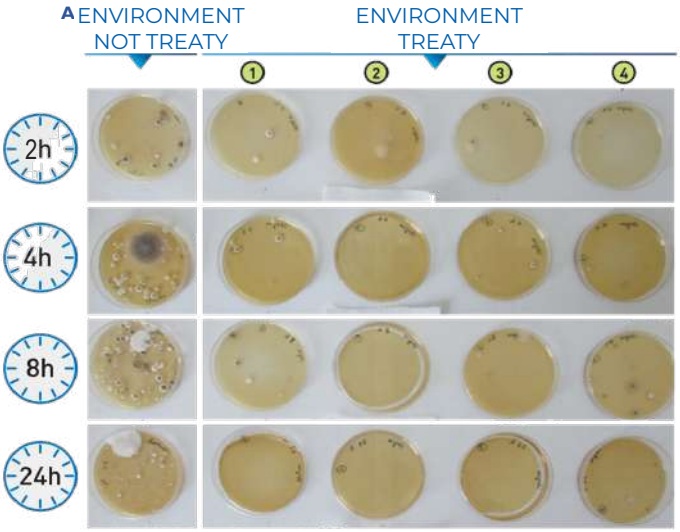
DOWNLOAD THE TEST RESULT

Università di Salerno
Dipartimento di Ingegneria Industriale

MICROBIAL TESTS ON PHOTOCATALYTIC SYSTEM

ASSESSMENT OF MICROBIAL ACTIVITY AT THE INDUSTRIAL ENGINEERING DEPARTMENT OF THE UNIVERSITY OF SALERNO





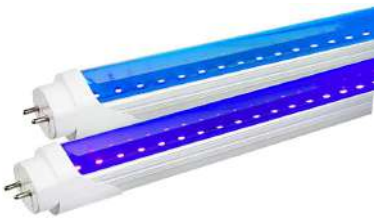
The industrial engineering department of the University of Salerno has laboratories, some certified according to the UNI EN ISO 9001-2000 standard, equipped with advanced analytical tools and pilot plants for the study of materials and nanomaterials, the analysis of process, experimentation with new technologies and materials. The tests carried out show that the photo-catalytic system provided by Air Control was able to significantly limit the growth of airborne microorganisms present in the investigated environment on LB, PCA and YPD type culture media.

It is possible to estimate that after 24 hours of treatment the microbial load found on the agar medium (mainly molds normally present in the environment) in the presence of PCO-001 is about 100 times lower than that of the control, that is to that present on the plate left. in the same environment but in the absence of Dust Free.

DOWNLOAD THE TEST RESULT

Not all effective solutions are safe

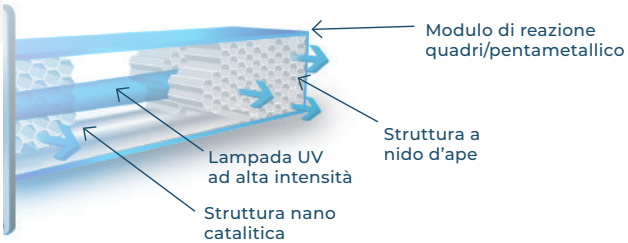
UV ULTRAVIOLET



The UV rays emitted by the light sources must be shielded.

OZONE

Shock sanitation must be performed by qualified personnel.



All Dust Free devices are safe and effective, moreover, once integrated into the air handling machines, they are subjected to the safety test according to IEC 60335-2-65: 2002

In Air Control, there is a certified test cabin built according to IEC 60335-2-65: 2002

TÜV PROFI CERT

CERTIFICATE

for

Production process and product inspection process

By means of periodical audits it is assured, that the inspection process assures the product/service conformity including all requirements therefor. This certificate does not acquit the company of its responsibility for the compliance with all legal requirements and service properties.

Air Control S.r.l.
Via Colico, 10
I-20158 Milano (MI)

scope:

Production of machinery for the treatment and distribution of air
(Related products see annex)

Certificate registration No. **70 700 7058**	Certificate valid from 2021-01-12 to **2024-01-11**
Audit report No. 4378 9954	First certification 2021-01-12

Darmstadt, 2021-01-12
Certification body of TÜV Hessen
– Head of Certification body –

PAGE 1 OF 2.
This certification was conducted in accordance with the TÜV PROFICERT-plus auditing and certification procedures and is subject to regular surveillance audits. Verifiable under www.proficert.com. Original certificates contain a glued on hologram.
TÜV Technische Überwachung Hessen GmbH, Robert-Bosch-Straße 16, D-64293 Darmstadt, Tel. +49 6151/600331 Rev-GB-1711

TÜV PROFiCERT is the well-known brand of the certification body of TÜV Hessen. The TÜVs (abbreviation from German: Technischer Überwachungsverein) are independent and internationally active service companies from Germany and Austria that test, inspect and certify technical systems, structures and objects of all kinds in order to minimize risks and prevent damage.

On December 1, 2021, TÜV PROFiCERT inspected and guarantees the compliance of the Dust Free devices supplied by Air Control with regard to the production of machinery for the treatment and distribution of air.

TÜV PROFI CERT product

The European Medical Association (EMA)

is a non-profit organization that allows European doctors to participate in a key network and contribute to the development of European healthcare.

On 6 June 2021, the EMA assesses and declares that Air Control products with PCO technology meet the criteria of quality, healthiness and health protection.

EMA European Medical Association

EMA European Medical Association

Bruxelles, 6 June 2021

To
AIR CONTROL Srl
Via Colico 10
20158 Milano

P.IVA 08805520969 Air Control

Ref : AIR CONTROL PRODUCTS WITH PCO TECHNOLOGY

CERTIFICATE

The products submitted to EMA's Scientific Technical Committee meet the criteria of quality, healthiness and protection of health.

This certificate is valid for a period of three years (05-06-2024).

Dr. Vincenzo Costantino
President

Dr. Prof. Angelo Manenti
General Secretary

Avenue des Volontaires, 19 – 1160 Bruxelles • Vrijwilligerslaan, 19 – 1160 Brussel • Belgium
T: 32(0)2 734 29 60 – F: 32(0)2 734 20 23 – E-mail: contact@EMAnet.org – Internet: https://www.EMAnet.org

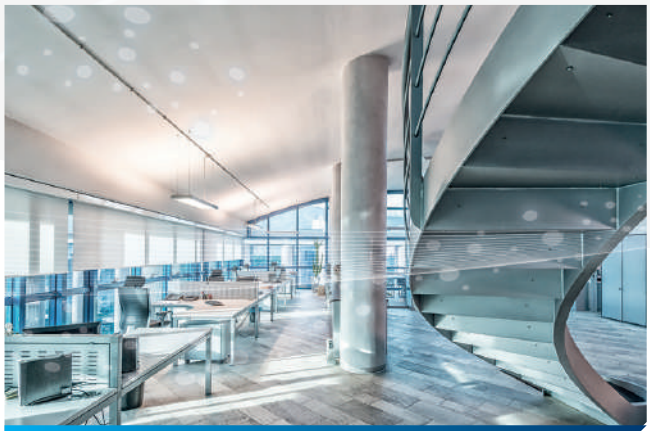
ACTIVE SANITIZATION EFFECTS

Europe & MENA
DUST FREE®
Breathe The Difference.

ACTIVE 24 H / 24
IN EVERY TREATED ROOM

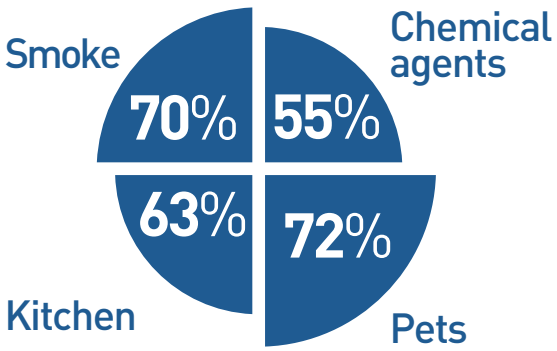
ELIMINATES POLLUTING AGENTS
WHEREVER THEY ARE

UNIQUE SYSTEM ABLE TO ACT
ALSO ON SURFACES

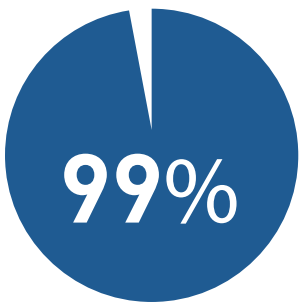


REMOVE SAGELY AND EFFECTIVE
BACTERIA AND ODORS

ODOR REDUCTION



BACTERIA, MOLD AND VIRUSES REDUCTION



MAIN SECTORS OF USE

FOOD
FOOD TRANSPORT

Elimination of mold and bacteria.
Better conservation = more freshness and quality.

INDUSTRIAL

Sanitation of channels and environments with the abatement of chemical / biological pollutants.
Healthier work environment.

MEDICAL / HOSPITAL

Reduction of the proliferation of bacteria.
Healthcare environment less exposed to bacterial contamination.

RESIDENTIAL VMC SYSTEMS

Elimination of bacteria, allergens and odors.
Healthier and more comfortable environment.

OFFICES / WORKPLACES

Elimination of bacteria, allergens and odors.
Decrease in the disease rate.

RESTAURANTS / HOTELS

Elimination of odors and bacteria.
More pleasant and lasting stay in the premises.

TRANSPORT

Elimination of bacteria.
Less exposure to bacterial contamination.
Healthier and more comfortable environment.