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ADVANCED OXIDATION PROCESSFOR AIR DECONTAMINATION INDUCED BY NON-THERMAL PLASMA



INDOOR AIR QUALITY

Air pollution in confined spaces is an important public health issue, with significant social and economic implications. The high concentration of contaminants in such environments has a negative - albeit not acute - impact on the health and well-being of people, especially in case of long periods of exposure. The European commissions have established guideline values for the main indoors pollutants. Germany, France, Holland, Finland, Belgium and Italy have started monitoring and sampling the key indoor pollutants. On the matter of Indoor Air Quality, the World Health Organisation (WHO), the Italian National Health Institute, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the Scientific Committee on Health and Environmental Risks (SCHER), and the European Commission for Science and Technology have concluded that it is necessary to reduce the sources of contaminations as well as the concentrations of the pollutants included in the shared European list.

Non-Thermal plasma technology (NTP)

Air ionization is a natural phenomenon which occurs spontaneously whenever a molecule is subjected to the action of an energy process in which the total amount of energy is higher than that of the molecule itself. In practical terms, when we add energy to a molecule, the latter "pulls" an electron from the outermost part of the molecule and, as a result of the electrical imbalance, the molecule (atom) takes on the positive electrical charge. The "freed" electron from the outer orbit is fixed immediately onto another atom that takes on a negative electric charge. Each atom has a well-defined probability of becoming a negative or positive atom depending on the saturation of the peripheral crown. In nature, ions are produced by solar radiation, by friction of the winds on the surface of the earth, by thunderstorms, rain and other atmospheric events, by the absorption of cosmic rays, by the collision of particles with kinetic energy. The NTP technology artificially creates ionization of air through the so-called "Cold Plasma". The non-thermal plasma is therefore a physical phenomenon generated at room temperature that uses the air as a gas mixture and turns it an ionized gas that consists of several electrically charged particles: Electrons, ions, atoms, and molecules that clash and produce oxidizing species; particle reactivity causes oxidation phenomena, which can decompose volatile organic compounds, bacteria, microorganisms, odours. It is considered the safest process to oxidise and decompose pollutants; the process is scalable, according to the sanitization requirements.



BENEFIT: *it eliminates indoor pollutants and odours; batteries* and filters are free from contamination; it prevents the formation of legionella: it improves comfort.

WHERE: ideal for use in households, work environments, doctor's surgeries, nursing homes.

WHAT IT DOES: it eliminates all odours, mould, bacteria and viruses, volatile organic compounds; it decomposes pollens, allergens, and animal waste.

BENEFIT: *it prevents the spreading of respiratory disea*ses, improves respiratory functions, reduces symptoms.

> WHERE: ideal for use in doctor's surgeries. waiting rooms, hospital rooms, dental clinics, nursing homes, food industries, veterinary clinics, smoking lounges and in all those places that require absolute air filtration and decontamination of rooms up to 200 square meters.

> WHAT IT DOES: it eliminates dust. bacteria, viruses, mould, odours, smoke, from the air as well as from surfaces.

BENEFIT: it prevents the spreading of diseases; it sanitizes air and surfaes in food production plants; it improves the shelf-life of the products.

MINIMATE

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WHERE: ideal for use in doctor's surgeries. waiting rooms, hospital rooms, dental clinics, nursing homes, food industries, veterinary clinics, reastaurants, smoking lounges and all those places that require absolute air filtration and decontamination of rooms up to 150 square meters

WHAT IT DOES: it sanitizes the air that flows through; it decontaminates the inner walls of the units, the filters and the batteries; it prevents the formation of legionella in the condensation collection travs.

BENEFIT: it improves comfort and eliminates odours

WHERE: ideal for use in cold storage rooms, blast freezers, butcher's, delicatessen, florists, fried-food shops, storage bins, waste collection rooms, supermarkets, WHAT IT DOES: it eliminates bacterias. moulds. and

BENEFIT: *it reduces the formation of moulds on the* surface of cells; it improves the shelf-life of the products; it reduces preserved food waste

INDOOR UNIT • Biosafe quality validation STAND ALONE UNIT • Efficiency validation by the University of Udine