



WHAT DOES PLASMA KILL?

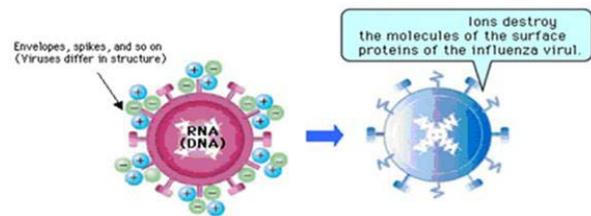
The needlepoint bi-polar ionization (NPBI) module used in our **ULTIMUM Self-contained Fan Driven Airborne Mitigation Systems** creates cold plasma discharge that consists of positive ions (H^+) and negative ions (O_2^-) from water vapor in the air. These ions have the property of clustering around microparticles and gases, and thus, they surround harmful substances such as airborne mold, virus, bacteria, volatile organic compounds and allergens. At that point, a chemical reaction occurs on the cell membrane surface and they are transformed into OH radicals, a powerfully active but unstable material, which robs the harmful substance of a hydrogen atom (H). As a result, they are inactivated by severing the protein on the cell membrane, opening holes. The OH radicals instantly bond with the removed hydrogen (H), forming water vapor (H_2O), and return to the air.

NOTABLE ADVANTAGES OF NPBI TECHNOLOGY:

1. The NPBI generator creates bi-polar ionization (cold plasma), replicating the same positive and negative ions found abundantly nature, for example, in forests and near waterfalls. The highest concentrations of ions in nature are found where the ocean meets the shore and at high elevation in the mountains. The NPBI process artificially creates the ions found in these desirable locations and supplies them into the building, enhancing the indoor air quality.
2. The ions turn into OH radicals only on the surface of harmful substances to inactivate them, so they are completely harmless to the human body and pets.
3. The ions generated will effectively eliminate bacteria, viruses, mold, and volatile organic compounds by working throughout the ambient air of your building, not just within the air cleaning units themselves.
4. Other technologies, such as ultraviolet (UV) light, cannot kill pathogens outside of the zone where the UV light is located. These UV, and similar, systems are limited by the effectiveness of the ventilation system/air cleaner to get the pathogen back to the air handler for exposure and mitigation.
5. The plasma process consumes a miniscule amount of additional electricity, less than a 5-watt light bulb, in most applications.

MECHANISM OF PLASMA FOR INACTIVATING AIRBORNE VIRUS

The positive (H^+) and negative (O_2^-) ions surround the hemagglutinin (surface proteins that form on organisms and trigger infections) and change into highly reactive OH groups called hydroxyl radicals ($\cdot OH$). These groups take a hydrogen molecule from the hemagglutinin and change it into water (H_2O). The ions destroy the virus surface structure, for example its envelopes and spikes, on a molecular level. As a result, the virus cannot infect even if it enters the body.



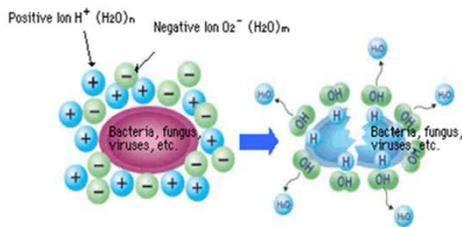
Various Pathogens that Plasma Kills

Target Substance	Species	Testing & Verification Organization	Date of Announcement
Fungi	Cladosporium (black mold, mildew)	Ishikawa Health Service Association	September 2000
		Universitätsklinikums Lübeck University Clinic (Germany) (proliferation control effect)	February 2002
		CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences)	November 2004
	Penicillium, Aspergillus	Universitätsklinikums Lübeck University Clinic (Germany) (proliferation control effect)	February 2002
	Aspergillus, Penicillium (two species), Stachybotrys, Alternaria, Mucorales	CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences)	November 2004
Bacteria	Coliform bacteria (E. coli)	Ishikawa Health Service Association	September 2000
	<i>E. coli</i> , <i>Staphylococcus aureus</i> , <i>Candida</i>	Shanghai Municipal Center for Disease Control and Prevention, China	October 2001
	<i>Bacillus subtilis</i>	Kitasato Research Center of Environmental Sciences	September 2002
		CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences)	November 2004
	MRSA (methicillin-resistant <i>Staphylococcus aureus</i>)	Kitasato Research Center of Environmental Sciences	September 2002
		Kitasato Institute Medical Center Hospital	February 2004
	<i>Pseudomonas</i> , <i>Enterococcus</i> , <i>Staphylococcus</i>	Universitätsklinikums Lübeck University Clinic (Germany)	February 2002
		CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences)	November 2004

Allergens	Mite allergen (dust from dead mite bodies and feces), pollen	Graduate School of Advanced Sciences of Matter, Hiroshima University	September 2003
	Airborne allergens	Asthma Society of Canada	April 2004
Viruses	H1N1 influenza virus (Swine Flu)	Kitasato Research Center of Environmental Sciences	September 2002
		Seoul University, Korea	September 2003
		Shanghai Municipal Center for Disease Control and Prevention, China	December 2003
		Kitasato Institute Medical Center Hospital	February 2004
	H5N1 avian influenza virus	Retroscreen Virology, Ltd, London, U.K.	May 2005
	Coxsackie virus (summer colds)	Kitasato Research Center of Environmental Sciences	September 2002
	Polio virus	Kitasato Research Center of Environmental Sciences	September 2002
Corona virus	Kitasato Institute Medical Center Hospital	July 2004	

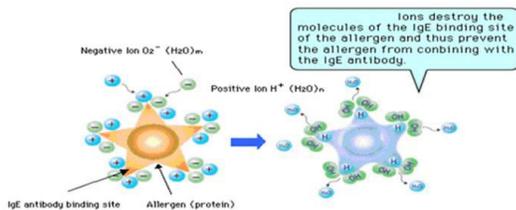
MECHANISM OF PLASMA FOR INACTIVATING AIRBORNE FUNGI

The positive (H+) and negative (O2-) ions cluster together on the surface of airborne fungi, causing a chemical reaction that results in the creation of highly reactive OH groups called hydroxyl radicals (•OH). The hydroxyl radical will take a hydrogen molecule from the cell wall of an airborne fungi particle. This process inhibits mold infestation as well as controls musty and household odors (caused in large part by mold fungi) as they occur.



MECHANISM OF PLASMA FOR DEACTIVATING AIRBORNE ALLERGENS

The positive (H+) and negative (O2-) ions surround the airborne allergen and change into highly reactive hydroxyl radicals (•OH). The hydroxyls then deactivate the molecules of the immunoglobulin E (IgE) antibody binding site of the allergen that leads to allergic reactions. No allergic symptoms occur even if allergens enter the body.



CONTROL OF GASES, ODORS AND VOCs WITH PLASMA

While NPBI is very effective at pathogen killing, it is also effective at controlling gases, odors, and volatile organic compounds (VOCs). Just as the plasma surrounds pathogens and deactivates them, the plasma also surrounds gas molecules. As the gas molecules are attacked by the plasma, the molecular bond of the gas molecule is broken down, just as glue is broken down by contact with paint thinner, and the gas reverts back to its natural state. What the gas molecule starts out as will depend on what it breaks down to. Using ammonia (NH3) as an example, ammonia breaks down to oxygen, nitrogen and water vapor when subjected to a plasma field of sufficient strength.

DESTROYS PATHOGENS IN THE OPEN AIR ENVIRONMENT OF ANY ROOM!



BE SAFE, BREATHE EASIER WITH ULTIMATUM IONIZATION TECHNOLOGY

With more than forty five years experience in both commercial and industrial applications, Ultimatum's stable reputation has put us at the forefront of the air cleaning, mitigation, filtration and exhaust industry.

Our company maintains the philosophy that the business of assessment, implementation and service is built upon a reliable relationship we have established with our customers. We employ critical strategies toward a more effective, economical solution in eliminating hazardous pollutants which can improve workforce productivity and reduce building maintenance and utility costs.



Ultimatum = The Highest Ion Output Volume Per Second In The Industry



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