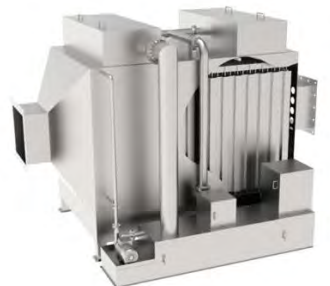
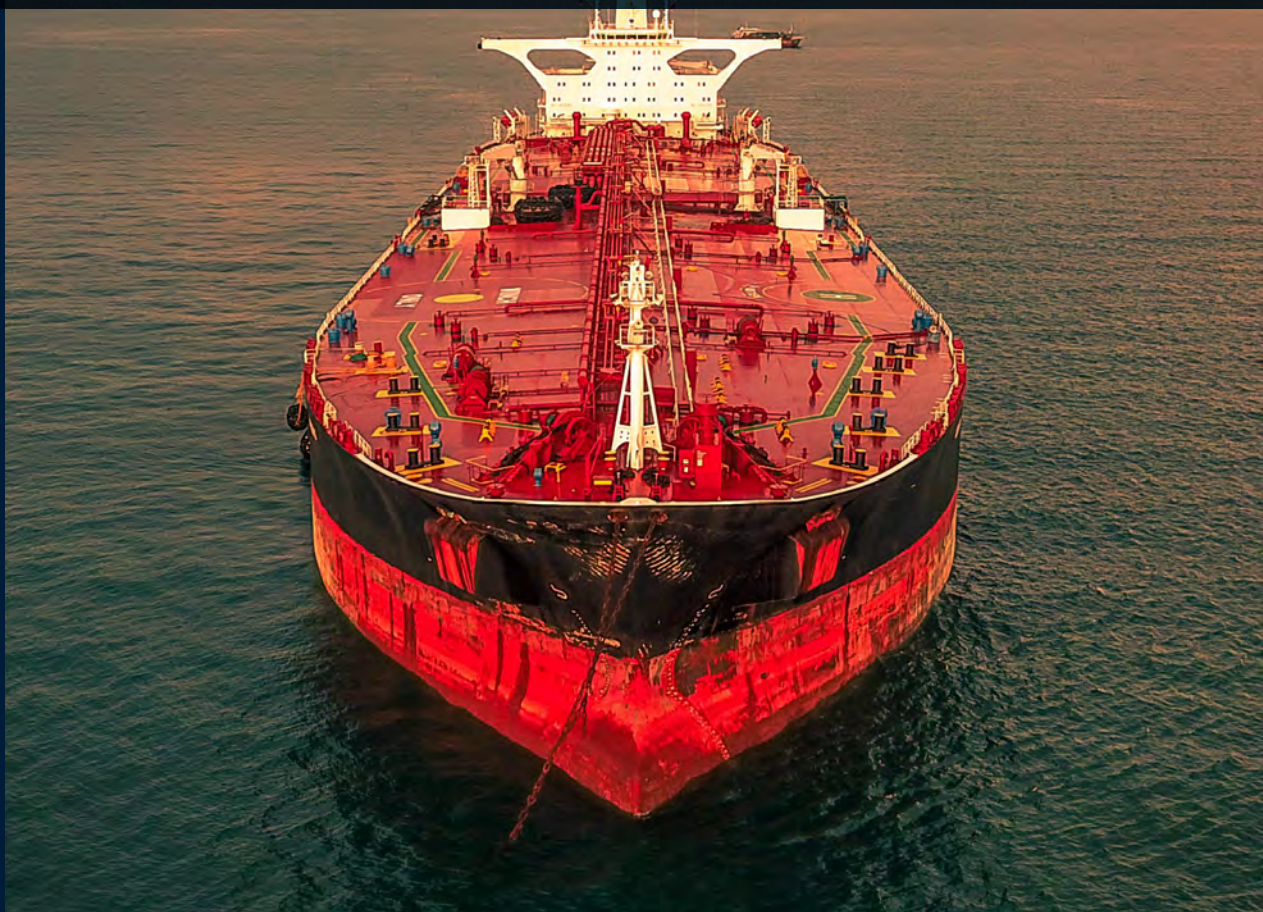


WWW.PLASMAGUARDLLC.COM

PLASMA GUARD™  
M A R I N E

2020

# PLASMAGUARD MARINE™ BUSINESS PROFILE





## WE STRONGLY BELIEVE IN PURITY

PlasmaGuard™ is focused on educating and combating the dangers and concerns surrounding indoor air pollution and harmful exhaust gas emissions. We have dedicated our lives to finding permanent long term solutions in air purification. We offer our clients confidence, safety and security in knowing that all PlasmaGuard™ technologies are designed, engineered and built to the highest standards, with the finest materials available, and require little to no effort from the client to operate.

# Letter From the CEO



As a leader in the air pollution elimination industry, PlasmaGuard™ is committed to providing solutions for eliminating the toughest and most harmful airborne pathogens.

In recent months, we have all come to learn how detrimental indoor air quality is to our health and safety. The air indoors can be up to 100 times more polluted than the air outside. The experiences with COVID-19 specifically have demonstrated that current air treatment systems are not adequate in combating airborne illnesses, instead create a breeding ground for harmful pathogens like viruses, allergens, smoke, mold, ozone, and other toxic chemicals. Our proprietary and patented state-of-the-art air pollution control equipment has the highest possible removal rate and efficiency for toxic solid and liquid particles regardless of their chemical composition and size.

PlasmaGuard™ products are the first line of defense to eliminate harmful particles and increase the air quality in your cabins and your exhaust. Our products are the ultimate solution for anyone suffering from asthma, allergies, migraines, and boost overall health, wellness, energy and productivity.

We are committed to providing air security to you, your employees, and patrons. Our products are customized to any vessel, regardless of size. Large or small, we pride ourselves on overcoming any installation difficulty.

PlasmaGuard™ is the best solution available, and provides the confidence everyone needs to breathe easy.

Sincerely,

Dean Rose

CEO

PlasmaGuard, LLC



ALL YOU NEED TO KNOW  
**ABOUT US**

PlasmaGuard™ is an air purification company using the proven Non-Thermal Cold Plasma WESP technology to deliver the purest air possible to any environment.

**1500+**

**SUCCESSFUL PROJECTS**

Over 1500 successful systems installed to date.

**3**

**INDEPENDENT SYSTEMS**

PlasmaGuard™ has 3 independently proven pathogen elimination systems. All PlasmaGuard™ systems are designed and engineered to fit any system, anywhere and no matter the complexity.

**99.9%**

**INACTIVATION**

PlasmaGuard™ inactivates 99.9% of pathogens and contaminants

Our experience with Non-Thermal Cold Plasma harmful particulate removal and organic destruction falls back over 40 years. All of PlasmaGuard's™ technologies utilize cold plasma, which produces an electrostatic charge, an agglomeration, and a non-thermal flame-less plasma. This results in the independently proven destruction of viruses, bacteria and pathogens. This is the safest and best air purification method

available for use throughout the marine industry.

PlasmaGuard™ units are UL tested and certified. Our technologies have the ability to provide excellent destruction efficiency with an extremely small relative surface area to the amount of air flow, regardless of the amount of inlet particulate load. These units efficiently purify everything in the maritime industry.

The Problems

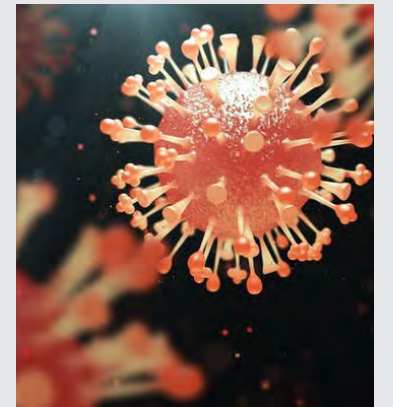
**We Face Today**

Air purification for enclosed cabins with recirculating air conditioning or heating systems has virtually been ignored. Most often, 99% of all cabins do not use anything more than dust particulate filters. Pathogens, viruses, bacteria and fungus (mold spores) smaller than .3 microns in size and pass right through them. PlasmaGuard™ exclusive systems destroy not only flu & cold viruses, but asthma triggers, allergens, respiratory bacteria, VOC's, odors, dioxins, furans, heavy metals, and many other harmful particulates down to 0.1 micron.

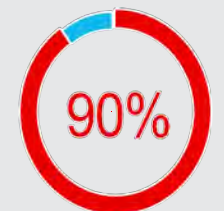
**Devastating Outbreaks**

The recent negative experiences with SARS, Coronavirus and other virus strains, have demonstrated that current air treatment systems inside such premises as marine vessels have performed poorly and even become a breeding ground of virus activity. Viruses that can spread through the air include influenza (flu), common cold (rhinovirus), varicella zoster (chicken pox), mumps and measles. Infected individuals can transmit airborne viruses through droplets and small particles excreted during sneezing and coughing. Recycled air throughout existing HVAC systems exacerbates the overall problem, especially in crowded areas, spreading viruses very quickly from person to person.

According to WHO, the flu results in more than 3 million cases of severe illness per year and about 290,000-650,000 deaths. The most lethal pandemic of influenza virus was the Spanish flu (H1N1) in 1918-1919 that infected about a quarter of the global population and caused more than 40 million deaths. Newly emerged airborne viruses such as Severe Acute Respiratory Syndrome (SARS) and now COVID-19 also spread quickly to many countries all over the world.



“Research indicates that people spend approximately 90 percent of their time indoors. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors.” - U.S. EPA



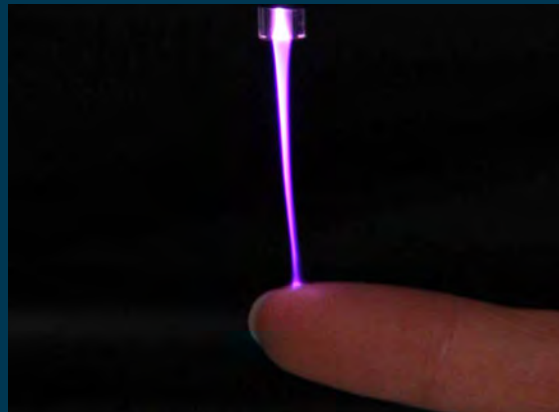
**The Solution - PlasmaGuard**

There are air disinfection methods currently available, but they have several limitations. Some highly contagious airborne pathogens are so small, they would directly pass through air filters and couldn't be removed until now. A new method, shows that Non-Thermal Plasma can inactivate 99.9% of airborne viruses through releasing energetic, charged fragments of air molecules that can destroy viruses in less than a second.

Produced in a Non-Thermal Plasma reactor, when pathogens in the air pass through it, they react with its unstable atoms called radicals (such as ozone). These alter the lipids, proteins and nucleic acids of the microorganisms they encounter – killing the pathogens or rendering them harmless. This is PlasmaGuard™ technology - filtering and destroying pathogens directly from the air stream.

# Technology

## Non Thermal Cold Plasma



The 2014 published article in the American Journal of Physics, a University of Michigan study shows that a non-thermal plasma can inactivate 99.9% of airborne viruses through releasing energetic, charged fragments of air molecules that can destroy viruses in less than a second. The non-thermal plasma can also kill bacteria through destruction of their cell wall.

## What is Non-Thermal Cold Plasma?

Non-Thermal Cold Plasma – a cool gas made up of electrically charged particles, despite having no overall charge – can inactivate airborne viruses and provide sterile clean air to your indoor environment. Although the technology has a long history and many applications (in the medicine and food industry), we have a completely new use for it - introducing PlasmaGuard™.

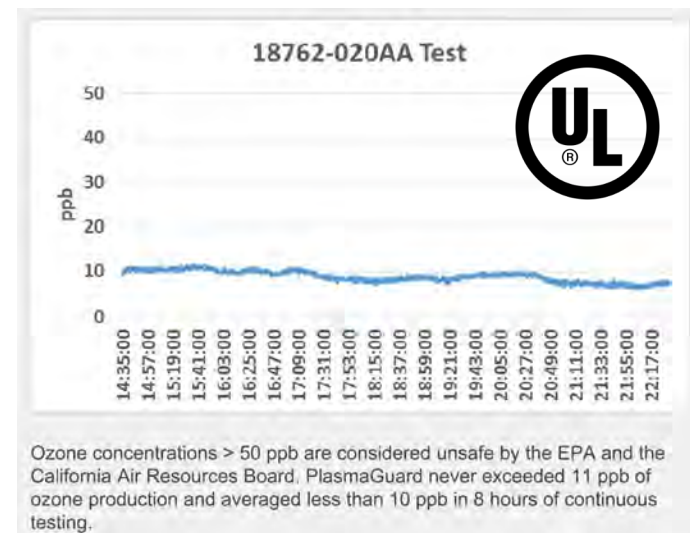
## Is PlasmaGuard™ Certified?

Our systems have been tested and proven safe by Underwriters Laboratories (UL) as an Air Duct Mounted Accessory (ABQK) under section 1995 (Heating and Cooling Equipment) and 867 (Electrostatic Air Cleaners).

## PlasmaGuard™ uses the safe and ultra-high effective Non-Thermal Cold Plasma Technology to destroy pathogens and protect your environment.

You can live without food for three weeks and without water for up to three days, but you can't live without air for more than a few short minutes. It's not just the abundance of air that matters – the quality is essential too. As we know, air can be contaminated with dangerous germs known as airborne pathogens, such as bacteria and viruses.

If anything, the viral pandemic has taught us a lot. We've all witnessed airborne diseases are very easily transmitted, and can result in respiratory illness that can be life threatening. It's therefore no wonder that outbreaks of airborne infectious diseases are a major public health concern, and that researchers are working hard to come up with technologies to provide clean air. Technologies have had limited success, until now.




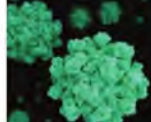


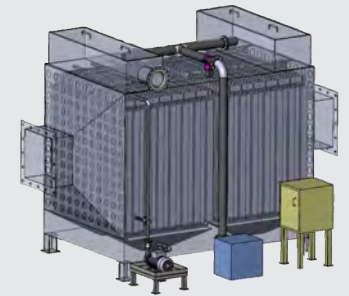
Ozone Safe Technology

## WHY

# PlasmaGuard™?

- Natural, safe, and effective air quality management
- Combines the most sophisticated sensors with the latest air purification technology
- Removes 98% of all fine particle allergy and asthma triggers from the breathing space that are normally circulated through the HVAC system
- Improves health and wellness
- System works in real-time with data driven results
- Ozone is not a problem or issue with non-thermal plasma and our patented ozone depletion technology. Releases no negative byproducts
- Floods living and work space with vast amounts of Ions for larger sq. ft. coverage
- Neutralizes the air from pathogens and germs keeping you and your customers healthier
- Responds to changes in air quality
- Makes filtration 30% faster and more effective
- Cleans indoor air of viruses, allergens, pathogens, odors, pollen, dander, smoke, dust, mold, ozone and harmful chemicals
- Easily retro-fits to current residential & commercial HVAC systems
- Industrial grade engineering
- Low maintenance system

Pathogen	Total Elimination Percentage	Improvement Over Untreated Airflow
 <b>E. coli</b>	99.5%	95.7%
 <b>A. baumannii</b>	97.4%	51.4%
 <b>S. aureus</b> (Staph Infection)	99.2%	90.4%
 <b>Non-Enveloped Viral Test</b> (e.g., Norovirus)	99.998%	96%



## Consequences are Expensive

Asthma accounts for 33% of all emergency room visits and more than 200,000 hospitalizations each year. Up to 65% of asthma cases could be prevented with proper IAQ. PlasmaGuard™ technology can help prevent these hospitalizations and other business expenditures such as Employee Absenteeism & Presenteeism.

\*Sources: Air Pollution and Kids, Environmental Protection Agency, Asthma Facts, EPA Indoor Air Quality, American Journal of Respiratory and Critical Care Medicine, National Safety Council, 2014

## Research: Full Antimicrobial Study

PlasmaGuard™ deactivates and inactivates the structure of the viruses and bacteria, including Coronavirus Surrogates, E. Coli, Norovirus and more.

PERFORMANCE

# PlasmaGuard™ vs. Alternative Methods

**WHAT DOES PLASMAGUARD™ OFFER THAT OTHER ELECTRONIC FILTERS OR IONIZERS DON'T?**

Ionizers and other types of systems need "time" and "multiple passes" of the same contaminated air to reach any decent destruction efficiency. As harmful particulates pass through HVAC systems, they land on surfaces in other rooms and floors. These pathogen particulates are not recirculated back through the HVAC system, thus never having the time, nor the opportunity, to be treated and destroyed. This condition prevents these pathogen particulates from being treated, let alone captured and removed. Additionally, ionizers do not have the ability to treat these pathogen particulates and suffer the same limitations. PlasmaGuard ELT™ offers the only commercial "First-Pass" destruction, capture, and self-cleaning system in the market today.

**WE DELIVER AIR SECURITY WHERE YOU NEED IT MOST**

**SAFE AND EFFECTIVE**

The PlasmaGuard™ purification system uses sensors that monitor and track indoor air quality, then bombards the air with millions of air-cleaning oxygen ions, removing particles, eliminating germs, and breaking down hazardous VOC's. The PlasmaGuard™ unit removes unwanted ozone to a completely safe level by means of a proprietary catalyst. The catalyst captures ozone molecules while allowing the super-oxide ions to pass through. This provides the powerful effect of air purification without the negative side effect of ozone. The patented ozone remediation technology ensures the safe delivery of clean purified air, and the reduction of any outside source of ozone. This Non-Thermal Cold Plasma technology not only ensures rapid pathogen and contaminant reduction, but also ensures that excess reactive ion species are always available in the air to rapidly respond to any air quality threat.



Humans thrive in a negative ion environment. Investing in PlasmaGuard's™ technology is a small price to pay for the protection and significant improvement to everyone's health.

	PlasmaGuard ELT™ PlasmaGuard STAX™	PlasmaGuard PRO™	Typical Ionizers	Media Filtration	UV
Inactivates all Pathogens on 1st Pass	✓	✗	✗	✗	✗
Capture/Reduce Contaminants	✓	✓	✗	✓	✗
Significantly Reduces Surface Contamination	✓	✓	✗	✗	✗
Continuously Disinfects Ducts	✓	✓	✗	✗	✗
Reduces Odors	✓	✓	✓	✗	✗
Reduces VOCs	✓	✓	✓	✗	✗
Reduces Particles (PM)	✓	✓	✓	✓	✗
Effective on Bacteria, Viruses and Germs	✓	✓	✓	✗	✓
No Chemical or By-Products	✓	✓	✓	✓	✗
Maintenance	NONE	Bi-Annually	Bi-Annually	Quarterly	Annually

**PlasmaGuard™ Exclusives**

- LAB TESTED against Coronavirus Surrogates Phi6 & 229e
- Wave pattern technology creates significantly more (-) Ions
- SMART monitor automatically reacts to particulate levels
- Catalyst/Corona tube process coverts harmful Ozone to O2
- Generates both strong Reactive Oxygen and Nitrogen Species (RONS)
- Generates higher RONS concentrations than lower voltage systems
- Generates RONS with longer reactivity to deactivate both airborne & surface pathogens
- Generates RONS that are known to attack the building blocks of pathogens – lipids, proteins, and DNA



**LONG TERM HEALTH and FINANCIAL BENEFITS**

Installing a PlasmaGuard™ system significantly reduces any required duct cleaning and assists in the care and maintenance of maintaining a "Clean-Air" vessel. It reduces the risk of employee absenteeism, and provides employees the comfort and confidence to return to work. Patrons will now be more likely to enter a PlasmaGuard™ protected vessel.

OUR COMPANY  
**STRATEGY**

**WE STRIVE TO DELIVER  
THE PUREST AIR POSSIBLE TO  
EVERYONE**

The EPA has determined that indoor air is a greater risk to human health than outdoor air. This fact, coupled with the new concerns surrounding biological contamination and spread, requires a new approach to certified air quality. What is required, is a technology that has proven science behind, it directly related to our most relevant indoor air concerns (viruses, bacteria, pollen, molds, dust, VOC's, allergens, etc.). The PlasmaGuard™ family of products are the only products available today that meets stringent EPA requirements at 99.9% efficiency.



**US EPA  
(2019)**

"In the last several years, a growing body of scientific evidence has indicated that the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities. Other research indicates that people spend approximately 90 percent of their time indoors. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors." [1]

[1] The Inside Story: A Guide to Indoor Air Quality. (2019, October 03). Retrieved August 20, 2020, from <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality>

[2] Xia, T., Kleinheksel, A., Lee, E. M., Qiao, Z., Wigginton, K. R., & Clack, H. L. (2019). Inactivation of airborne viruses using a packed bed non-thermal plasma reactor. Retrieved August 20, 2020, from [https://4478e646-071e-4235-b5fd-24ced3f2025d.filesusr.com/ugd/2b5def\\_7effc4e4be2f4f0e83b305f5ac72bc90.pdf](https://4478e646-071e-4235-b5fd-24ced3f2025d.filesusr.com/ugd/2b5def_7effc4e4be2f4f0e83b305f5ac72bc90.pdf)



**US National Library  
of Medicine  
(Xia et al., 2019)**

"The US EPA concludes that there is insufficient evidence, and no standard test procedures, for assessing UVGI performance, and that UVGI provides virtually no additional protection over the use of conventional HEPA filtration alone. Conventional filtration presents several drawbacks, including the low fluid permeability needed for high particle collection efficiency, which inherently increases the differential pressure across the filter and promotes infiltration of untreated air into indoor spaces at partial vacuum. In buildings not constructed to an air-tight standard, this can lead to high costs of building reconstruction and retrofit." [2]



Our  
**Family of Products**

**PlasmaGuard  
PRO™**

Delivering pure air to any vessel

PlasmaGuard PRO™ is an air purification system that works in conjunction with the HVAC unit in your cabin and vessels so you, your employees, and guests are always breathing the cleanest air possible. Single units are made for cabins up to 3,000 square feet, but can be combined to with others for larger vessels.

**PlasmaGuard  
ELT™**

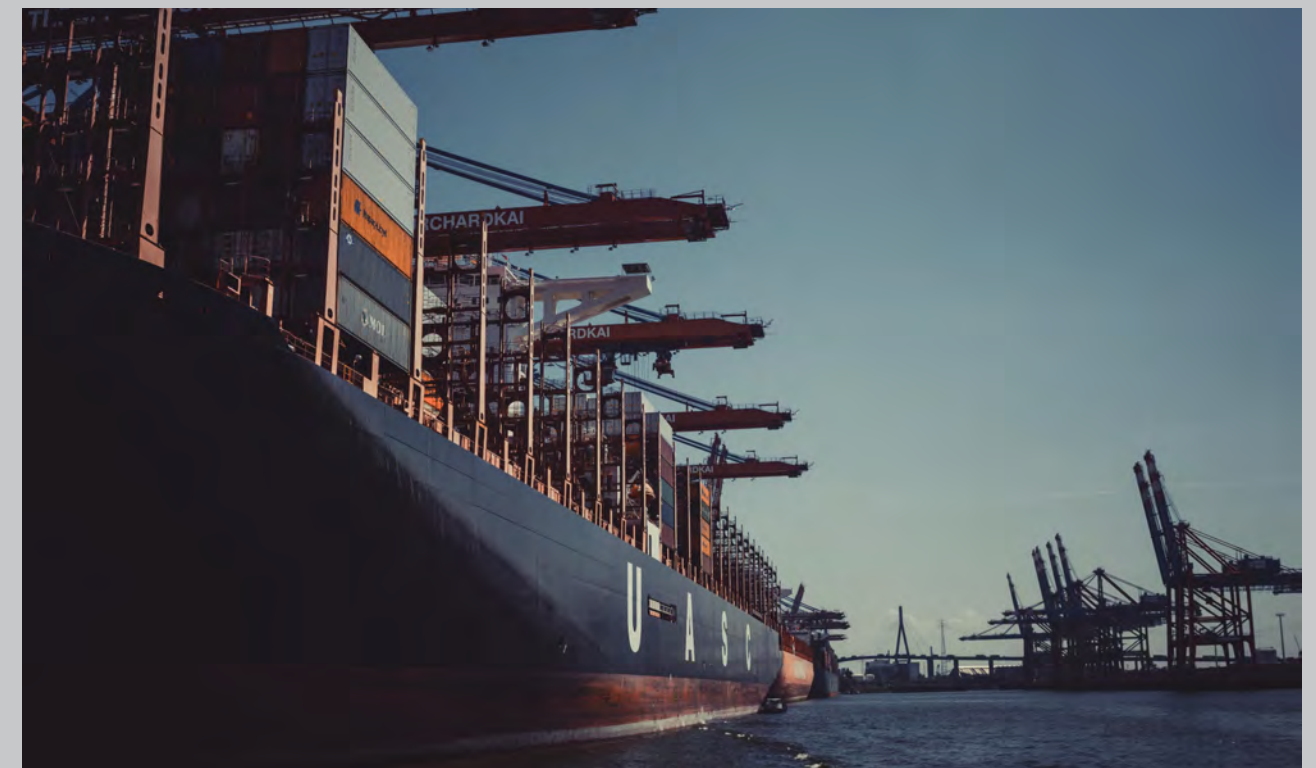
Delivering pure air to any sized vessel

For vessels and cabins 3,000 sq.ft. and greater, the PlasmaGuard ELT™ air purification systems were developed for larger occupancy environments. They are designed to work harmoniously with PlasmaGuard PRO™ systems or stand alone. All PlasmaGuard ELT™ systems are engineered to perfectly retrofit to your existing HVAC system.

**PlasmaGuard  
STAX™**

Purifying exhaust air from maritime vessels

PlasmaGuard STAX™ systems are the permanent exhaust air solution for the marine industry. PlasmaGuard STAX™ systems flawlessly connect directly to a ship's exhaust and HVAC system. Our system uses only the highest quality metal alloys for superior performance. Our system requires little to no maintenance and maintains extremely low operational costs with no additional burden to any electrical system.



WHAT MAKE US

# PlasmaGuard PRO™



PlasmaGuard PRO™ systems protect you, your employees, and patrons – eliminating up to 99.9% of all airborne contaminants within minutes. PlasmaGuard PRO™ systems achieve this by actively monitoring indoor air quality and controlling the movement of the purified air. PlasmaGuard PRO™ is the permanent air purification system that this changing world now demands.

## PlasmaGuard SMART System



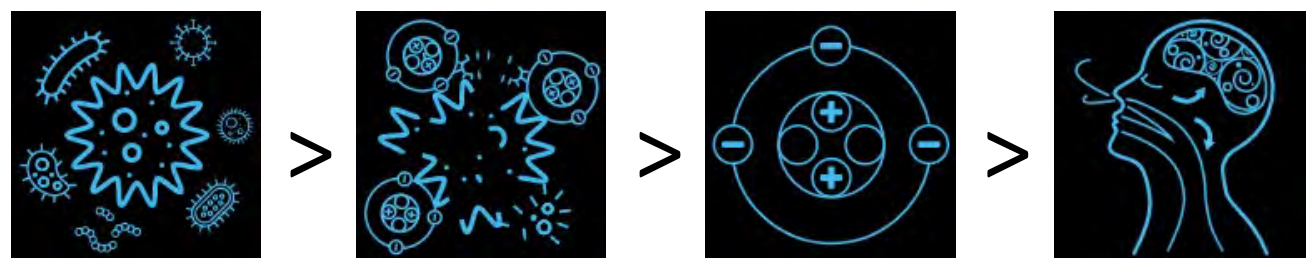
**PLASMAGUARD PRO™ IS THE BEST AIR PURIFICATION SYSTEM AVAILABLE TODAY.**

## YOU CAN NOW BREATHE EASY

Traditional HEPA filters only seize pollutants and contaminants greater than 5 microns in size, but not efficient enough to capture highly harmful pathogens and contaminants that exist today. PlasmaGuard PRO™ works harmoniously with your HVAC unit and inactivates harmful pathogen and contaminants as small as 0.1 micron in size, ensuring that the purest air possible is always available to you.

## THE POWER OF "PRO"

With the addition of the cost effective PlasmaGuard PRO™ system, you won't have to worry about "dirty" air any more. Using the air flow from your existing HVAC fan, the PlasmaGuard PRO™ purification system uses sensors that monitor and track indoor air quality, then bombards the air with millions of air-cleaning oxygen ions, removing particles, eliminating germs, and breaking down hazardous VOC's. The PlasmaGuard™ purification unit removes unwanted ozone to a completely safe level by means of a proprietary catalyst. The catalyst captures ozone molecules while allowing the super-oxide ions to pass through. This provides the powerful effect of air purification without the negative side effect of ozone. The patented ozone remediation technology ensures the safe delivery of clean purified air, and the reduction of any outside source of ozone. This Non-Thermal Cold Plasma technology not only ensures rapid pathogen and contaminant reduction, but also warrants that excess reactive ion species are always available in the air to rapidly respond to any air quality threat.



**99.8%  
INACTIVATION  
OF PATHOGENS**

**99.5%  
INACTIVATION OF  
AIRBORNE  
ASTHMA TRIGGERS**

**5 YEAR\*  
LIMITED  
WARRANTY**

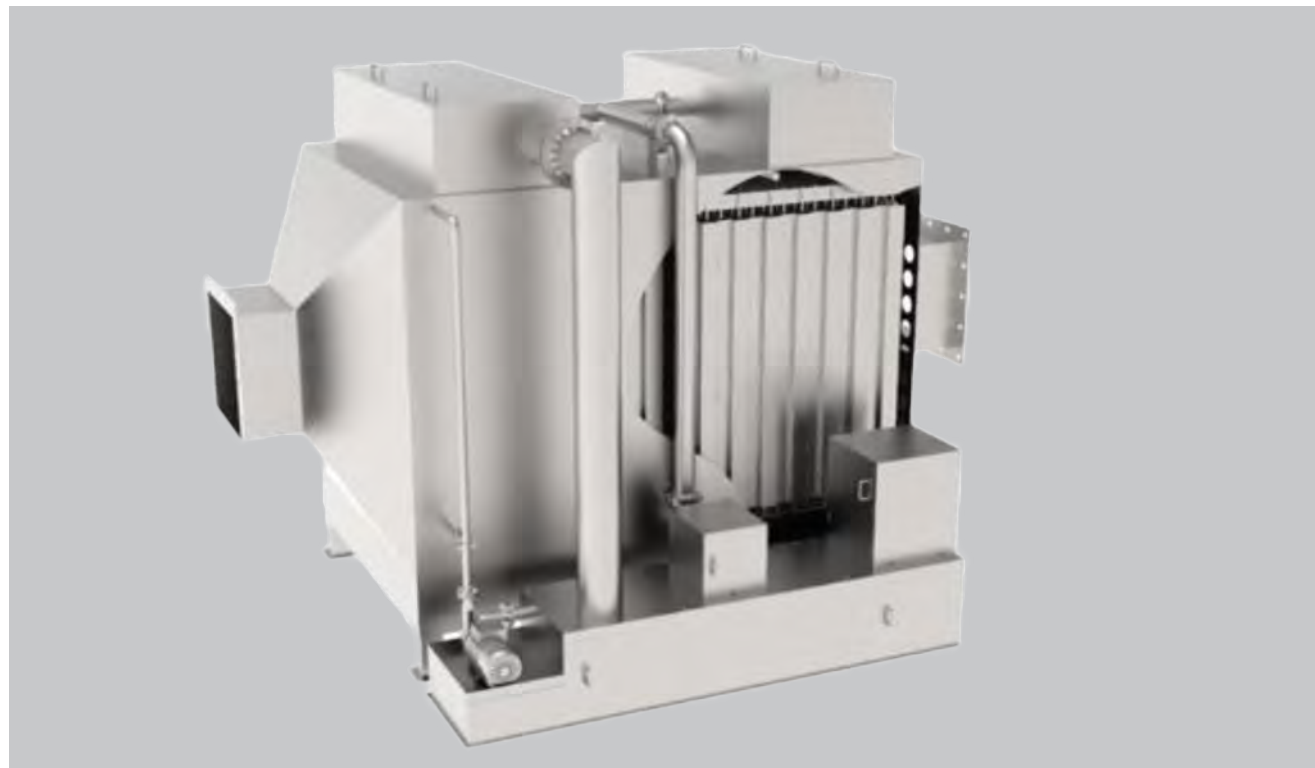
\*5-year Limited Warranty on PlasmaGuard™ Air Purifier. 2-year Limited Warranty on PlasmaGuard™ Sensor and Hub.

WHAT MAKE US

# PlasmaGuard ELT™



Our state-of-the-art Maritime systems are made of special high-quality alloy materials and are fully customized to clean and purify the air in some of the largest vessels around.



**PLASMAGUARD ELT™ IS THE ONLY “FIRST PASS” AIR PURIFICATION SYSTEM.**

## THE POWER OF PLASMA

Traditional UV systems are the current suggested large area contaminant destruction systems. These systems fail miserably in areas where the air is circulated. The PlasmaGuard™ process uses Non-Thermal Cold Plasma technology (NTP) to destroy unwanted chemicals and airborne pathogens (viruses, bacteria, etc.) by splitting them at a molecular level. This inactivates harmful pathogens/contaminants as small as 0.1 microns in size in all conditions, including rapidly moving air systems. This ensures that the purest air possible is always available to everyone. PlasmaGuard ELT™ also reduces allergens and other asthma triggering contaminants that makes large public spaces undesirable for people with allergies.

### **inactivates PATHOGENS ON “FIRST PASS”**

#### **CONSTANT CYCLE OF CLEAN AIR**

Using over 60,000 volts, the PlasmaGuard PRO™ system terminates 99.9% of all living pathogens on “First Pass” while continuously self-cleaning and washing all now-harmless waste into the sewer systems; leaving only fresh clean air circulating in your workplace.

The PlasmaGuard ELT's Micro-WESP™ technology produces an electrostatic charge, agglomeration, and NTP flame-less oxidation for the destruction of viruses and bacteria and all pathogens. This is the safest and best air cleaning method now available for use throughout all industries.

## THE DESIGN

Compact in size, the PlasmaGuard ELT™ is the best customized air purification solution for all large maritime vessels. Uniquely designed, each system is independently engineered for the most rugged and demanding application to safely deliver 99.9% purified air consistently. Using the finest available metal alloys for long-life and maintenance free operation, this self-cleaning machine consumes very low power and delivers the highest density electrical field to ensure super high-efficient results. All controls can be monitored and modified by the end user based on the demand and changes of the occupied space and anticipated contaminant load. PlasmaGuard ELT™ fully integrates into any existing HVAC system with minimal intrusions or modifications and maintains a 25-year warranty.

**3,000+ sq.ft.**

**REMOVES AIRBORNE ALLERGENS**

Our design is fully customized to fit almost any sized vessel.

**99.9%**

**REMOVAL OF PATHOGENS AND CONTAMINANTS**

PlasmaGuard ELT™ systems can collect, clean and destroy particulate matter as small as 0.1 microns in size.

**25 YEAR WARRANTY**



WHAT MAKE US

# PlasmaGuard STAX™



PlasmaGuard STAX™ systems are the permanent external exhaust air solutions for industrial facilities or marine vessels. PlasmaGuard STAX™ systems flawlessly connect directly exhaust smokestacks and HVAC systems. Our systems use only the highest quality metal alloys for superior performance, require little to no maintenance, and maintain extremely low operational costs without additional burden to your electrical system.

**99.9%**  
REMOVES  
HEAVY METALS  
AND MERCURY

**99.9%**  
OPACITY  
REDUCTION

**25 YEAR**  
WARRANTY



**PLASMA GUARD  
STAX™ USES  
NTCP-WESP  
TECHNOLOGY  
TO PURIFY  
OUTDOOR AIR.**



## WET HIGH VOLTAGE SYSTEM

This PlasmaGuard STAX™ wet high voltage electrostatic precipitator system is designed to solve the following pollution problems and issues:

- Greenhouse-gases
- Acid rain
- Mercury and heavy metal contamination
- Reduction in dependence of fossil fuels

## CYCLONE COLLECTORS

Cyclone Collectors are designed to achieve optimum dust/particulate collection. Our team of experts will custom build a highly efficient, abrasion resistant, cyclonic separator with the most suitable configuration for your space restrictions and efficiency requirements. Each unit may be installed with (based on engineering requirements and review):

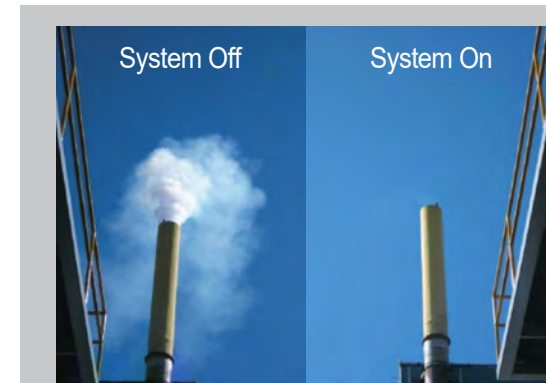
- Discharge gate dampers
- Collecting hoppers
- Hot gas quenchers
- Low energy Venturi scrubbers
- High energy Venturi scrubbers
- Pack towers for gas absorption
- Marble bed scrubbers
- Wet Electrostatic Precipitators

## THE DESIGN

The PlasmaGuard STAX™ design is unique and can be scaled up or down to fit your engineering specifications. Our engineers will analyze your requirements and provide you with a complete proposal explaining the detail of our unique approach to save you on capital costs, and most importantly, the operational costs for electrical energy and maintenance. Our system is super high-efficient for all regulated pollutants and will meet not only current, but all future government regulations.

## SCRUBBERS

PlasmaGuard STAX™ systems collect suspended particulate matter by capturing them in liquid droplets. Harmful gases are collected by dissolving and/or absorbing them into the liquid. PlasmaGuard STAX™ reduces the temperature and volume of exhaust gas flow. This reduces the PlasmaGuard STAX™ unit size compared to other control devices. This results in lower capital costs and more flexibility regarding site location of the scrubber.



**THANK YOU  
FOR YOUR  
BUSINESS**



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