

## Air Purification Through Bi-Polar Ionization

Nu-Calgon has partnered with Global Plasma Solutions (GPS) to bring a new, advanced air purification technology to the HVACR market. This patented technology called needle-point bi-polar ionization uses carbon fiber brushes to produce a refined electrical charge to proactively and safely clean the air in residential and commercial buildings. The iWave approach produces equal amounts of positive and negative ions (combined charge neutral) that react and break down pathogens, allergens, particles, smoke, odors and VOCs in the air, creating a healthy environment without producing any harmful byproducts like ozone or unstable ROS (Reactive Oxidation Species) molecules that result in the use of PCO technologies.



### How Bi-Polar Ionization Works

iWave devices are bi-polar, meaning they use two emitters to create equal amounts of positive and negative ions. When these ions are injected into the air stream, creating a plasma region, they break down passing pollutants and gases into harmless compounds like oxygen, carbon dioxide, nitrogen and water vapor. When the ions come in contact with viruses, bacteria or mold, they remove the hydrogen molecules from the pathogens. Without hydrogen, the pathogens have no source of energy and will die. The ions also attach to allergens, such as pollen, smoke and other particles, causing them to band together until they are large enough to be caught by filters.



iWave's technology generates the same ions that nature creates with lightning, waterfalls, ocean waves, etc. Nature uses ion energy to break apart molecules, naturally cleaning the air and producing a healthy environment. The only difference between iWave's technology and nature is that iWave does it without developing detectable ozone. In fact, third party testing of iWave technology by Intertek/ETL to the UL867 ozone chamber test confirmed ozone levels less than 0.00PPM!

### How iWave Ionization Differs from PCO Technology

Unlike iWave's bi-polar ionization method, Photo Catalytic Oxidation (PCO) technology uses UV light, commonly with titanium dioxide (TiO<sub>2</sub>) and often with other alloys, to create ionization. The Centers for Disease Control (CDC) has warned of cancerous risks involved with TiO<sub>2</sub>\* – not something you want in a building's air quality!

ASHRAE issued a position document in January 2015 on Filtration and Air Cleaning where they cautioned UV lamps used in many PCO devices can emit significant ozone – known to be harmful for human health. They also observed and reported on page 9 of the document "...potential of an incomplete oxidizing process, which produces by-products of reaction that can be more toxic or harmful than the original constituents (i.e. formaldehyde). The catalysts can be contaminated (poisoned) by airborne reagents and/or products of oxidation, which results in reduced or total efficiency failure of the process." Lastly, the PCO approach requires the replacement of the UV cell every year or two. Bi-polar ionization requires no replacement parts, and on the self-cleaning models, they are maintenance free. The chart on the next page shows several advantages of iWave technology over two common market approaches.

\*CDC Current Intelligence Bulletin 63



## Advantages of iWave Technology Over Two Common Market Approaches:

Feature	<i>iWave</i>	UVPCO Ionizers	UV Lights
Kills pathogens downstream?	Yes	Yes	Only line-of-sight pathogens
Controls odors?	Yes	Yes	No
Reduces airborne particles?	Yes	Poor	No
Replacement parts?	No	UV cell replaced every 1-2 years	Bulb replaced every 1-2 years
Self-cleaning options?	Yes	No	No
Performance	Self-cleaning provides continual peak performance	Fades with UV output	Fades with UV output
Harmful byproducts?	No	Creates ozone & other byproducts	Some bulbs emit ozone
Cleans entire depth of coil?	Yes	Yes	Cleans only one side
Mercury in airstream?	No	Yes	Yes
Energy required	< 10 watts	> 60 watts	> 60 watts
Universal voltage?	Most models	Most models don't	No
Robust construction?	Solid state design	UV bulbs can break	UV bulbs can break
UV material breakdown?	No	UV lights hard on materials	UV lights hard on materials
Contains Titanium Dioxide?	No	Some Models	No
Three Year Warranty	Yes	Replace parts in 1-2 years	Replace parts in 1-2 years



### Products:



4900-20

#### iWave®-R

With technology installed in over 100,000 applications worldwide, iWave-R is the world's first self-cleaning, bi-polar ionization air cleaner specially designed for residential duct air conditioning systems up to 6 tons (2400 CFM) in size. Needle-point ionization actively treats air in the living space with no replacement parts, no maintenance and universal voltage (24-240VAC). It can mount easily inside or outside of duct in about 15 minutes, or it can attach magnetically near indoor fan. iWave-R always works at peak performance, producing over 160 million ions/cc, more than any interior air quality product on the market. Patent-pending self-cleaning design includes programmable cleaning cycle with alarm contact option. UL and cUL approved. Three-year limited warranty.



4900-30

#### iWave®-F

iWave-F is a flexible and highly versatile three foot ion-generating bar that can treat IAQ in nearly any HVAC application. Its revolutionary circuit bar with special ion-generating needles suitable for any HVAC cooling coil up to 48" wide. Plus, it can be shortened in the field to any size! Perfect for ducted package or ductless HVAC systems in living centers, hotels, commercial buildings, residential (including mini-splits), transport cooling coils or even in ice machines – applications where mold is an issue. Provides the highest level of ionization energy in the most compact size available on the market. UL and cUL approved with universal voltage (110-240VAC). Virtually maintenance free with no replacement parts. Produces over 240 million ions/cc per foot of flexible ribbon. Three-year limited warranty.



4900-35

#### iWave®-M

iWave-M is a flexible ion-generating bar that can treat IAQ in nearly any HVAC application. Its revolutionary circuit bar with special ion-generating needles suitable for any HVAC cooling coil up to 36" wide. Plus, it can be shortened in the field to any size! Perfect for ducted package or ductless HVAC systems in living centers, hotels, commercial buildings, residential (including mini-splits), transport cooling coils or even in ice machines – applications where mold is an issue. Provides the highest level of ionization energy in the most compact size available on the market. UL and cUL approved with universal voltage (110-240VAC). Virtually maintenance free with no replacement parts. Produces over 240 million ions/cc per foot of flexible ribbon. Three-year limited warranty.



4900-40

#### iWave®-V

With technology currently installed in over 100,000 applications worldwide, iWave-V is a versatile, low-maintenance bi-polar ionization generator for treating air in residential duct air conditioning systems up to 6 tons (2400 CFM) in size. Needle-point ionization actively treats air in the living space with low maintenance and no replacement parts. Produces over 160 million ions/cc, more than any other interior air quality product on the market. Requires only 15 minutes to install inside or outside of duct, or attach magnetically near indoor fan. UL and cUL approved. Three-year limited warranty.