

EMCOR Group, Inc. | **WHITE PAPER**

Improving Indoor Air Quality

NEEDLEPOINT BIPOLAR IONIZATION



Amid the current public health crisis, efforts to improve indoor air quality (IAQ) are more pressing than ever. As businesses begin to reopen, companies can count on **EMCOR Group, Inc.** for the latest in IAQ technology, such as Needlepoint Bipolar Ionization (NPBI).

For clients seeking to improve air quality and promote occupant health and comfort, our NPBI technology is the ideal solution. It can help reduce airborne pathogens, particulate matter, and odors from indoor air, while simultaneously helping to boost the efficiency of your HVAC systems, potentially lowering energy costs and improving your carbon footprint.

As your trusted single-source mechanical construction and HVAC system services provider, let EMCOR guide you through this crisis and help ensure you are providing the safest, healthiest environment for your building occupants.

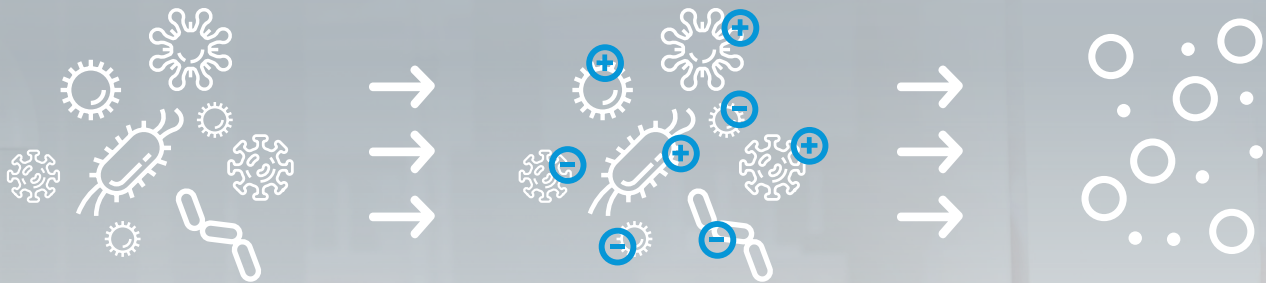
How NPBI Works

With a cough or a sneeze, any individual can introduce harmful pathogens into the air. To minimize exposure, NPBI produces millions of positively and negatively charged ions that travel through the air via the HVAC system, continuously seeking out and attaching to harmful particles — including pathogens' surface proteins, rendering the pathogens ineffective.

Harmful Particles
(including pathogens)

NPBI renders the pathogens
ineffective by introducing millions
of positive and negative ions

The ions breakdown harmful VOCs
into harmless compounds like O₂,
CO₂, N₂, and H₂O.



Why NPBI?

Pathogen Control: Independent testing by Centers for Disease Control and Prevention (CDC) affiliate labs confirms kill rates as high as 99 percent for various pathogens and mold spores—helping to keep cooling coils clean and improving operation.

Particle Reduction: Air ionization causes micro-particles to accumulate and clump

together into larger, filterable particles that even lower-efficiency filters can easily capture from the air.

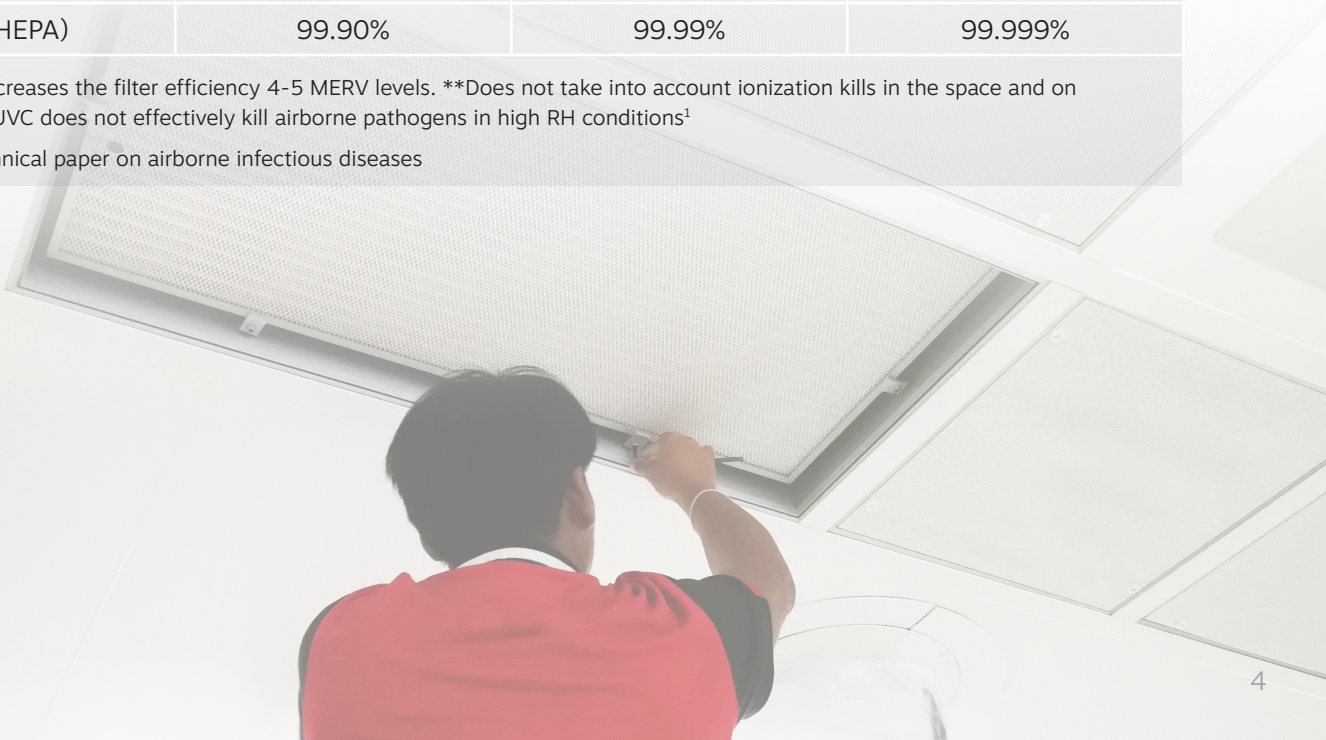
Odor Control: During the ionization process, volatile organic compounds (VOCs) that create many unpleasant odors are oxidized to gasses already present in the air, eliminating the odor.

Ionization Helps Improve Filter Efficiency:

MERV RATING	FILTER ONLY	FILTER + UVC***	FILTER + IONIZATION* **
6	6.2%	10%	34%
7	7%	12%	61%
8	11%	19%	84%
10	12%	35%	89%
13	46%	84%	97%
15	71%	97%	99%
16	76%	98.80%	99.90%
17 (HEPA)	99.90%	99.99%	99.999%

*Ionization increases the filter efficiency 4-5 MERV levels. **Does not take into account ionization kills in the space and on surfaces. ***UVC does not effectively kill airborne pathogens in high RH conditions¹

¹ASHRAE technical paper on airborne infectious diseases



Reducing the Spread of Disease

Rapid, Continuous Air Cleaning NPBI technology releases ions that immediately begin attaching to particulates, and, as ions enter the air stream, they offer continuous cleaning throughout the entire facility.

Inactivate Pathogens When ions come into contact with pathogens, they not only make them more filterable, their microbicidal effects also reduce the infectivity of the virus.



PATHOGEN	TIME EXPOSED	KILL/INACTIVATION RATE
E. coil	15 minutes	99.68%*
C. Diff	30 minutes	86.50%*
Noro Virus	30 minutes	93.50%*
MRSA	30 minutes	96.24%*
COVID-19	30 minutes	99.40%*

*White papers that detail these results are available upon request from the manufacturer of the needlepoint bipolar ionization technology.

Benefits for Virtually Every Facility Environment

From commercial office spaces to educational institutions to healthcare facilities and much more, our NPBI product is well suited for the unique needs of a wide-array of facility types.

- **Hospitals and Healthcare:** Healthcare facilities require the highest levels of air and environmental quality. NPBI can help keep HEPA and other high-rated filters operating their finest.
- **Higher Education:** Improved IAQ has been show to correlate with improved student performance, and, NPBI can also boost HVAC system efficiency, helping schools and universities hit budget parameters.
- **Airports:** High-traffic facilities, like airports, demand exceptional performance from their HVAC systems. By keeping coils and HVAC equipment free of pathogen buildup, NPBI helps maintain that performance level.
- **Military/Government:** Military and governmental facilities often house sensitive technology and equipment. Our product does not produce potentially disruptive line-noise or electromagnetic forces (EMF) and is even approved by the Federal Aviation Administration (FAA).

Frequently Asked Questions

What is Needlepoint Bipolar Ionization? NPBI is an artificial generation of both positive and negative ions without the production of ozone or byproducts.

How does this product kill pathogens? NPBI produces ions that kill pathogens by robbing them of life-sustaining hydrogen. The ions also breakdown harmful VOCs into harmless compounds like O₂, CO₂, N₂, and H₂O.

Does the technology generate line noise or EMF? NPBI technology does not generate line noise or electromagnetic forces. This is one of the only ionization technologies approved by the FAA for installation on aircraft. It passes the stringent DO-160 certification, proving no line noise and no EMF, which could be detrimental to aircraft avionics, if produced.

Are there byproducts? No. Passing through an ionization field causes harmful compounds to break into one or more of four basic elements—Oxygen, Nitrogen, Carbon Dioxide, or Water Vapor—already present in the air.

Do air filters need to be changed more frequently when used with NPBI? Filter change intervals may be increased in some applications based on run time and how the space is utilized. Most applications can maintain their existing filter change schedule.

Does ionization degrade filters, insulation, wire coatings, and plastic like UV lights? No. Ionization leaves other equipment unaffected.

Is this product UL Certified? Yes. Our Needlepoint Bipolar Ionization technology has been certified By UL 867 and UL 2998 to be ozone free, as well, RCTA DO-160 for aircraft.

How long does the product last? On average the product lasts 7-10 years. Accelerated life-cycle testing has shown the emitter brushes and the motor that actuates them to last more than 20 years.

Is NPBI safe for people and animals? NPBI products are completely safe for humans and animals. This technology only produces elements and compounds that are naturally found in air and has been certified by UL 2998 as ozone free.



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