Needlepoint Bipolar Ionization Air Purification Guide Specification

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

This section describes the design, performance and installation of an air purification system intended for use as part of another manufacturer's air handling unit or mounted on the duct as determined by the manufacturer or authorized representative for best results.

1.2 REFERENCED CODES & STANDARDS

The following codes and standards are referenced throughout. The edition to be used is that currently enforced by the authority having jurisdiction (AHJ) or in absence of such direction that referenced by the current enforceable IBC code or as indicated by the contract documents, except where specifically referenced by this section of the specifications.

1. ASHRAE Standards 62 & 52
2. National Electric Code NFPA 70
3. UL 867-2007 including ozone chamber test required as of December 21, 2007
4. UL 2998 no ozone production test

1.3 RELATED WORK

A. Testing, Adjusting and Balancing
B. Facility Access and Protection
C. Ductwork
D. Filters
E. Water and Refrigerant Piping
F. Electrical Wiring
G. Control Wiring

1.4 QUALITY ASSURANCE

A. Basis of design is iAIRE, LLC ultraPURE. All other manufacturers requesting prior approval must submit product drawings, specifications and test results specified in this document at least four weeks prior to bid date.
B. A qualified representative from the manufacturer shall be available to inspect the installation of the air purification system to ensure installation in accordance with manufacturer's recommendation.
C. Technologies that do not address gas disassociation such as UV Lights, Powered Particulate Filters and/or polarized media filters shall not be considered. Uni-polar ion generators shall not be acceptable. "Bipolar Ionization" particulate filters shall not be acceptable.
D. Any system containing titanium dioxide (Ti02), which has been listed by the CDC as a known carcinogen, shall not be acceptable.
E. Projects designed using ASHRAE Standard 62, IAQ Procedure shall require the manufacturer to provide Indoor Air Quality calculations using the formulas within ASHRAE Standard 62.1-2007 to validate acceptable indoor air quality at the quantity of outside air scheduled with the technology submitted.

F. The Air Purification Technology shall have been tested by UL to prove conformance to UL 867-2007 and UL 2998 including the ozone chamber testing and peak ozone test for

electronic devices. Manufacturers that achieved UL 867 prior to December 21, 2007 and have not been tested in accordance with the newest UL 867 standard with the ozone amendment shall not be acceptable. All manufacturers requesting prior approval shall submit their independent UL 2998 test data with ozone results to the engineer for preliminary review and during the submittal process. All manufacturers shall submit a copy with their quotation. Contractors shall not accept any proposal without the proper ozone testing documentation.
G. The maximum allowable ozone concentration per the UL 2998 chamber test shall be 0.005 PPM. The maximum peak ozone concentration per the UL 2998 peak test as measured 2 inches away from the electronic air cleaner's output shall be no more than 0.005 PPM. Manufacturers with ozone output exceeding these ozone values shall not be acceptable.

1.5 SUBMITTALS
A. Product Data: Submit manufacturer's technical product data for ion generators including:
1. Schedule of Bipolar Ionization generators indicating unit designation, number of each type required for each unit/application.
2. Data sheet for each type of ion generator, and accessory furnished; indicating construction, sizes, and mounting details.
3. Performance data for each type of ion device furnished.
4. Indoor Air Quality calculations using the formulas within ASHRAE Standard 62.1-2007 to validate acceptable indoor air quality at the quantity of outside air Scheduled (when projects are designed with outside air reduction).
5. Product drawings detailing all physical, electrical and control requirements.
6. Copy of UL 2998 independent ozone test.
7. Statement on the manufacturer's letterhead stating that the technology contains no titanium dioxide (Ti02).
B. Operating & Maintenance Data: Submit IOM for all ion devices used in system.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING
A. Deliver in factory fabricated shipping containers. Identify on outside of container type of product and location to be installed. Avoid crushing or bending.
B. Store in original cartons and protect from weather and construction work traffic.
C. Store indoors and in accordance with the manufacturers' recommendation for storage.

1.7 WARRANTY
A. Equipment shall be warranted by the manufacturer against defects in material and workmanship for a period of twenty-four months from the date of shipment. Labor to replace equipment under warranty shall be provided by the owner or installing contractor.

PART 2 – PRODUCTS

2.1 GENERAL
A. The air purification system(s) shall be of the size, type, arrangement, and capacity indicated and required by the unit furnished and shall be of the manufacturer specified.
B. Basis of Design: iAIRE, LLC ultraPURE
C. All other Suppliers of comparable products requesting prior approval shall:
1. Submit for prior approval four weeks in advance in accordance with the requirements

2. In addition, manufacturers submitting for prior approval for Bipolar Ionization must as part of the prior approval request provide their ASHRAE 62.1-2007 calculations that prove conformance to the ASHRAE Standard with the reduction of outside air to the scheduled values. A letter on the manufacturer's letterhead requesting prior approval must accompany the request for prior approval stating their calculations are ASHRAE compliant.
3. Submit independent test data from UL showing ozone levels produced during the UL 2998 ozone chamber test. Manufacturers without this test data shall not be acceptable.
4. Submit at least two other end user references in the same application with contact phone number, email, equipment used and application for the equipment at that facility. Manufacturers not having the above references in similar applications using the same equipment models as proposed on the current project shall not be acceptable.
5. Ionization bars manufactured using DC output ionization modules shall not be permitted due to corrosion, ion short-circuiting, and intermittent coil coverage and shock hazard.
6. Ionization bars manufactured using ion modules not having epoxy coating all circuit boards and internal components shall not be acceptable.
7. Manufacturers submitting as an alternate shall include their DO-160 test results.
8. It is the responsibility of any alternate manufacturer and mechanical contractor proposing an alternate to the basis of design to confirm any proposed substituted product does not infringe on the intellectual property of the basis of design. The engineer and owner recognize the basis of design holds multiple patents and multiple patents are pending.

2.2 BIPOLAR IONIZATION DESIGN & PERFORMANCE CRITERIA

A. Each piece of air handling equipment, so designated on the plans, details, equipment schedules and/or specifications shall contain a Bipolar Ionization Generator with Bipolar Ionization output as described here within.

B. The Bipolar Ionization system shall be capable of:

1. Effectively killing microorganisms downstream of the bipolar ionization equipment (mold, bacteria, virus, etc.).
2. Controlling gas phase contaminants generated from human occupants, building structure, furnishings, and outside air contaminants.
3. Capable of reducing static space charges.

C. The bipolar ionization system shall operate in a manner such that equal amounts of positive and negative ions are produced. Uni-polar ion devices shall not be acceptable.

1. Air exchange rates may vary through the full operating range of a constant Volume or VAV system. The quantity of air exchange shall not be increased due to requirements of the air purification system.
2. Velocity Profile: The air purification device shall not have maximum velocity profile.

D. Humidity: Bipolar Ionization Generators shall not require preheat protection when the relative humidity of the entering air exceeds 85%. Relative humidity from 0 - 100%, condensing, shall not cause damage, deterioration, or dangerous conditions within the air purification system. Air purification system shall be capable of wash down duty.

E. Air Handler Mounted Units:

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1. Where so indicated on the plans and/or schedules Bipolar Ionization Generator(s) shall be supplied and installed. The mechanical contractor shall mount the Bipolar Ionization Generator and wire it to the remote mount power supply using the cables provided by the air purification manufacturer. When less than 3 ion blocks, the ionization will be wired to 24 V. Larger systems come complete with a transformer to power the ionization devices(s). These can be hooked to line voltage which can be 115VAC, 208-230VAC or 460VAC. No more than 75 watts shall be required per power supply. Each power supply shall be capable of powering up to 15 ionization blocks.
2. Where the ionization bars are mounted downstream of steam humidifiers, the air handler manufacturer shall provide an angled hat section that will cover the ionization bars and deflect any direct condensation towards the floor and off the bars.

F. Bipolar Ionization Requirements: Needlepoint Bipolar Ionization Air Purification

3. Ozone Generation:
   a. The operation of the electrodes or Bipolar ionization units shall conform to UL 2998 proving no ozone output.
4. Electrical Requirements:
   A. Wiring, conduit, and junction boxes shall be installed within housing plenums in accordance with NEC NFPA 70. Bipolar Ionization Generator shall accept an electrical service of 24VAC, 115 VAC, 208-230VAC or 460VAC 50/60 Hz.
   B. The contractor shall coordinate electrical requirements with air purification manufacturer during submittals.
5. Control Requirements:
   A. The Bipolar Ionization Generator power supply shall have internal circuitry to sense the ionization output and provide a local “Bipolar Ionization On” indication light.
6. The installing contractor shall mount and wire the Bipolar Ionization device within the air handling unit specified or as shown or the plans. The contractor shall follow all manufacturer IOM instructions during installation.