AtmosAir vs. Needlepoint Ionization (NP)

1) Smart system with demand controlled capability (see AtmosSmart).
AtmosAir is the only ionization manufacturer to control based on real-time IEQ paramters.

2) Measurement and Verification, Published Efficiency Results.
AtmosAir has third party tested published contaminant reductions with many clients. NP OEM have yet to publish many third party findings or case studies. When asked they don't show anything.

3) NP has little effect on particulate matter.
Tested third party CADR test at ETL shows an AtmosAir 125 Dust CADR rating vs. GPS' 1.36 Dust CADR rating. AtmosAir BPI will 'move' and agglomerate bigger volumes and weights of particles.

4) Ion lifespan.
AtmosAir ions have been tested to have longer persistence or half-lives due to interaction with the AtmosAir DBD field.

5) Size and design of NP systems lead to needle point tips being clogged or covered with particles, dirt, soot and debris.

6) Dynamic ionization adjustment capability.
All AtmosAir systems have various control settings they can be run at. NP systems don't, they run on (1) setting.

7) Strength of AtmosAir BPI Ions vs. NP Ion Generation
See Engineered Air third party test results.

8) Physical Size and Dimensions of Tubes and Systems
NP systems are in some cases a tenth the size of the AtmosAir systems) - Ionization discharge points (2-16 needle pairs vs. 75,000 discharge points on ONE AtmosAir F tube. One AtmosAir 508FC system = 600,000 ion emitter points. **AtmosAir tube has much more surface air in airflow.**

9) Eventual wear of the needlepoints.
Applying high voltage to NP wears the needlepoint tips out quickly.

10) NP has much weaker Electron Volt Potential.
Strength of ionization field can be measured.

11) Perceptual difference.
There is no perceptual difference or impact versus odor when NP installed.

12) **Placement**
AtmosAir recommends systems be on the supply side of the air while GPS recommends I-Bar to be on return side of the air. The design and placement of the IBAR product that we've seen would only impact a portion of the HVAC conditioning coils as aerodynamics would push the ions through a small section where the IBAR is typically placed.
An AtmosAir system designed and applied for coil cleaning benefit would more evenly saturate the coil with ions affecting a much larger area.

13) There is no published peer reviewed research on needlepoint ionization.

14) AtmosAir has been vetted and partnered with the largest AHU and controls OEM. NP technology when also vetted by JCI did not have third party measured data to substantiate claims.

The Difference Is The Technology

AtmosAir vs. Competing IAQ Technologies

	AtmosAir DBD BPI	Media Filtration	UV	PCO	Needlepoint Ionization	Carbon Filters	Electronic Air Cleaners
Affects Contaminants "In the Space"	Yes	No	No	Yes	No	No	No
Reduces Odors	Yes	No	No	No	No	Yes	No
Reduces VOCs	Yes	No	No	No	Yes	Yes	No
Reduces Particles (PM)	Yes	Yes	No	No	No	Yes	Yes
Effective on Bacteria and Virus and Germs	Yes	No	Yes	Yes	Yes	No	No
Produce Ozone	No	No	Yes	Yes	No	No	Yes
Low Pressure Drop	Yes	No	Yes	Yes	Yes	No	Yes
Maintenance	Every 2 Years	Quarterly	Yearly	Yearly	6 months - 2 years	Bi-Annually	Monthly
Re-engineering of HVAC system needed	No	Yes	No	No	No	Yes	Yes
New Design and Retro-Fit Applications	Yes	No	Yes	Yes	Yes	No	No
Reduces Energy Costs	Yes	No	Yes	Yes	Yes	No	No
No Chemicals or By-Products	Yes	Yes	No	No	Yes	No	Yes
Tested Contaminant Reductions in Occupied Space	Yes	No	No	No	No	No	No
Published and Peer Reviewed Research	Yes	Yes	Yes	Yes	No	Yes	Yes
"Smart" System (Integrated with sensors and monitors)	Yes	No	No	No	No	No	No

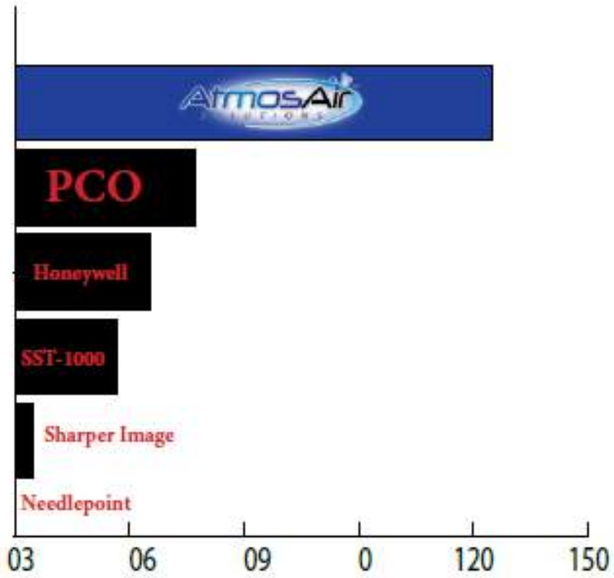
The Difference Is The Technology

AtmosAir vs. Competing IAQ Technologies

- CADR is a standard developed by ANSI (American National Standards Institute) and AHAM (American Home Appliance Manufacturers).
- CADR is used to measure a product's effectiveness on particle removal within a space.

Source: ETL Testing Laboratories		
Manufacturer/Tech	*CADR Rate*	*Variance from CAG (%)*
AtmosAir Bi Polar Ionization (BPI)	125	n/a
Photocatalytic Oxidation (PCO)	47.4	264%
Honeywell Electronic Air Cleaner	35.8	349%
Electrostatic Air Cleaner	27.2	460%
Negative Ion Generator	4.8	>2500%
Needlepoint Ionization	0.4	>2500%
CADR = Clean Air Delivery Rate		

Source: Intertek Laboratories, January 2012



ANSI
American National Standards Institute

Results:

Results of Performance Tests:

Model/Configuration	Test Particulate	Natural Decay Rate	CADR	CADR STDEV.
White-Rogers SST1000- Comfort Plus Serial # S0516464671 64.8 CFM - 82.6 Average Duct Velocity	**Dust**	**0.01017**	**27.2**	**0.6**
Honeywell F300E 100 Enviro-Care Elite Serial # 208418J 63.7 CFM - 81.1 Average Duct Velocity	**Dust**	**0.01284**	**35.8**	**0.5**
Lennox PCO - 12C - Healthy Climate Serial # S2105H48156 64.2 CFM - 81.78 Average Duct Velocity	**Dust**	**0.01136**	**47.4**	**0.6**
Ionic Breeze 3.0 Serial # 3252147 68.99 CFM - 87.89 Average Duct Velocity Air flow loop running during natural	**Dust**	**0.01258**	**4.8**	**0.3**
AtmosAir 100C	**Dust**	**0.00424**	**125.0**	**2.5**

Summary

Testing of the above units was designed to simulate real world use. A test chamber duplicating typical household conditions was modified to introduce outside air processed by the units as might be seen in a standard installation.

Report Reviewed By:

Terence J. O'Beirne
Senior Project Engineer
Appliance Group

Tested By:

Dominick A. Pennello Jr.
Technician
Appliance Group

dap

Intertek

GPS RN

Results of Performance Tests:

Model/Configuration	Test Particulate	Natural Decay Rate	CADR	CADR STDEV.	Power (Watts)
ActivTek 2000, Speed tested as received, UV Light on	**Smoke**	**0.00266**	**-0.40**	**0.1**	**23.4**
	Dust	**0.00923**	**-3.90**	**0.6**	**23.6**
	Pollen	**0.10044**	**17.7**	**6.2**	**23.8**
GPS RN, Speed tested as received, Ionizer on	**Smoke**	**0.00273**	**0.11**	**0.1**	**16.8**
	Dust	**0.00755**	**1.36**	**0.4**	**16.8**
	Pollen	**0.09548**	**7.02**	**4.1**	**16.9**

Conclusion:

The results reported above for model ActivTek 2000 and GPS RN fall below the minimum limits of measurability of the ANSI/AHAM AC-1-2006 "Association of Home Appliance Manufacturers Method for Measuring Performance of Portable Household Electric Room Air Cleaners" Test Method.

Report Reviewed By:

Eric Dunay
Engineer
Energy Efficiency Group

Tested By:

Mike Podoliak
Technician I
Energy Efficiency Group

Intertek

Third Party Test

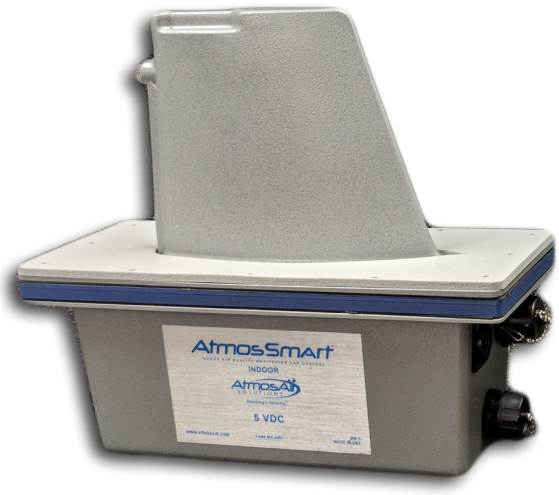
Testing Information			Measured at Unit Discharge		Measured at 24" from Discharge		Measured at 48" from Discharge	
Technology	FPM	CFM	Positive Ions	Negative Ions	Positive Ions	Negative Ions	Positive Ions	Negative Ions
AtmosAir Matterhorn (DBD BPI)	575	23.575	4.5	3.7	3.2	3.5	2.2	2.4
	1192	48.872	7.2	6.3	5.8	6	4.5	4.2
	1710	70.11	14.3	7	12.8	6.8	10.8	5.7
Needlepoint Ionization (NP BPI)	570	23.37	3	3.1	1.2	0.2	0.2	0.2
	1102	45.182	2.2	4.3	1.8	3	0.5	0
	1685	69.085	6.3	5.2	4.5	3	0	0

Source: Dan Glendon, Engineered Air

Findings demonstrated that it was evident that ions generated from the DBD style device created ions that were much stronger and more sustainable for longer distances.

PRODUCT SUBMITTAL

AtmosSmart



Application

The AtmosSmart ionization system's sensor head & controller, is intended to be mounted in the return duct or air handler of a heating, cooling, or ventilating system. The unit is intended to monitor and control the AtmosAir® Active Ionization Systems. With data visibility using Bac-Net.

Specifications:

General Product Information	Product Description		Feedback for active ionization intensity; monitoring & control
	Product Application		Air Handling Units; Roof top units
	Control Capacity		Controls up to eight (8) AtmosAir® Ionization systems.* (Requires master control box *Optional) Standard unit; (1) BPI. Optional Unit; (2) BPI (Must be ordered)
Sensor Suite Full**		**Test Range**	**Sensor Application**
Lite ‡	** Air-Quality Sensor 1 ‡	50 ~ 500 ppm	Integral - TVOC (Total volatile organic compounds)
	** Air-Quality Sensor 2	0.01 ~ 4.0 ppm	Integral - HCHO (Formaldehyde Concentration)
	** Air-Quality Sensor 3	0.5 ~ 250 µg/m³	Integral - PM 2.5 (Particulate Matter 2.5)
	** Humidity Sensor ‡	5% ~ 95% (%RH)	Integral
	** Temperature ‡	-10°C ~ 50°C	Integral
	** Ozone Sensor ‡	0.01 ~ 5.0 ppm	Integral
	** Carbon Monoxide	0.25 ~ 2.5 ppm	Integral
	** Carbon Dioxide ‡	100 ~ 2500 ppm	Integral
Other Sensors	Flow Sensor		Differential pressure switch* (Optional; Must be ordered separately)
Electrical Statistics	Rated Voltage		90VAC to 240VAC Power Supply
	Frequency (Hz)		50/60
	Voltage Range (V)		Control - 5VDC
	Power Consumption (W)		12
	Current (A)		2.4
	Regulation of BPI Control		Algorithm-Based Modulation
	Output Current for Modules		5VDC to 24VDC
	Interface		Data/BMS
Product Ratings	Ambient Temp.		-10°C ~ 50°C
	Protection Class		0% - 99% Non-Condensing
	Humidity		0% - 99% Non-Condensing
	Ingress Protection		IP41 (DIN EN 60529)
	Electrical Safety Compliance		EN 60730-1
	EMC Compliance		EN 60730-1, EN 61000-6-1, EN 61000-6-3
Installation Statistics	Directives Dimension (L/H/D)		2006/95/EC, 2004/108/EC, 2011/65/EU
	Required Space (L/H/D)	AA508FC	(Typ.) 704mm (~27.75 in) (L) x 273mm (~10.75 in) (H) x 241mm (~9.5 in) (D)
	Sensor Head Size (L/W/D)		305mm (~12 in) (L) x 127mm (~5 in) (H) x 267mm (~10.5 in) (D)
	Weight Installation		Sensor 1.5Kg (~3.3 lbm); AA508FC (Typ.) 10.04Kg (~22 lbm)
	Treated Air Volume		Specific Calculation = M dot
	Internet Connection		TCP/IP

AtmosAir Solutions™

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