Healthy Indoor Air with Energy Savings

Boston Green Tourism
April 27, 2017
The AtmosAir Advantage

[AtmosAir Video LINK]
PROduced by Gensler
The AtmosAir Advantage

You Are What You Breathe

AtmosAir actively contributes to better health by restoring indoor air to its natural state where no pollution or contaminants exist, while reducing energy use and emissions in the process.
Wellness Begins with the AIR you BREATHE
The Urgent Need

- The US Department of Health and Human Services states that more than 50 million Americans are suffering from Allergies. (HHS)

- Statistics show that 83% of travelers would prefer a room specially treated to reduce airborne allergens. (Cornell School of Hotel Administration)

- Hotel guests routinely are subjected to unhealthy indoor air. (Wall Street Journal).

- Problems from mold and mildew alone required hundreds of millions of dollars annually in remediation and repair costs. (American Hotel Association)

- More than two-thirds of frequent travelers in a recent national survey are concerned about air quality in the country's hotel rooms. (Wall Street Journal)
The AtmosAir Advantage

Hospitality Brands with AtmosAir

- Hilton Worldwide
- Hard Rock Hotel
- The Ritz-Carlton
- Loews Hotels & Resorts
- Norwegian Cruise Line
- Marriott
- Trump Hotel Collection
- Hyatt Hotels & Resorts
- Royal Caribbean International
AtmosAir has been built on results
Design Community Allies

Architects and Mechanical Engineering Consultants Specifying AtmosAir:
AtmosAir’s goal is to restore the air inside your home or building to the quality found at mountain elevations, where high ion levels occur naturally.
Ionization is nature’s air cleaning process. The positively and negatively charged ions generated by the AtmosAir system mimic the process that occurs in nature and actively attract, bind, and neutralize all types of pollutants from the air in indoor environments.
Restoring the nature of clean air
Continuous Disinfection Technology

Other Products Only Clean the Air That Goes Through Them. AtmosAir Cleans The Air In The Space Where You Breathe.

Contaminated Air  AtmosAir BPI  Restored Air
Removing What We Shouldn’t Be Breathing

Molds, spores, germs, particulates, viruses, VOCs, be gone.

Volatile organic compounds (VOCs), particulate, allergens and asthmagens are potential pollutants that come from humans, building materials, carpets, finishes, cleaning products, office equipment, building densification, and outside air.

Ultrafine Particulate & Mold Spore Reduction Testing

Tested Results Against Virus and Microorganisms

- AtmosAir BPI effect can be both preventative and curative.
- Less pathogens = healthier environment, reduced absenteeism.
- Testing includes C. Diff, Staph, MRSA, Fungi, Molds, Bacteria, Viruses, and Allergens.

Source: Antimicrobial Test Laboratories Study Report, September 2015
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.

<table>
<thead>
<tr>
<th>Source: ETL Testing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manufacturer/Tech</strong></td>
</tr>
<tr>
<td>AtmosAir Bi Polar Ionization (BPI)</td>
</tr>
<tr>
<td>Photocatalytic Oxidation (PCO)</td>
</tr>
<tr>
<td>Honeywell Electronic Air Cleaner</td>
</tr>
<tr>
<td>Electrostatic Air Cleaner</td>
</tr>
<tr>
<td>Negative Ion Generator</td>
</tr>
<tr>
<td>Needlepoint Ionization</td>
</tr>
</tbody>
</table>

\[ \text{CADR} = \text{Clean Air Delivery Rate} \]

Source: Intertek Laboratories, January 2012
Energy Opportunity

Airside efficiency is typically the largest untapped opportunity for building owners.

Moving and Conditioning OA Typically Represents:
• At least 35% (typically 50%) of total building energy consumption.

AtmosAir Bi-Polar Ionization:
• Can Reduce OA Requirements for Hotel Common Areas up to 50% within ASHRAE 62.1/IMC code
• Takes up little space within duct a duct or air handler.
• Has little to no pressure drop.
• Requires negligible power to operate.
Energy Opportunity - CapEx

Capital Expenditure Savings

Reduced Outside Air in Combination with AtmosAir:

- Reduction in Heating/Cooling Loads
- Reduction in Equipment. Collateral Cos Savings in Installation, Piping, Electrical, Ductwork
- Potential 20-30% Reduction in HVAC Tonnage/Plant Sizes
- Less of an opportunity to bring in pollution from outside.

Reduce HVAC Equipment by up to: 15%
Energy Opportunity - OpEx

Operational Expenditure Savings For Common Areas

Reduced Outside Air in Combination with AtmosAir:

• 20-40% Reduction in HVAC Energy Expenditures (Electrical/Natural Gas)
• 4-8% Reduction on ENTIRE utility bill.
• Extend life of HVAC filters
• Extend life of HVAC equipment (sustainability)
AtmosAir Large Induct Systems

AtmosAir 500 Series (508FC)  |  AtmosAir 500 Series (500FC)

<table>
<thead>
<tr>
<th></th>
<th>508FC</th>
<th>500EC</th>
<th>500FC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Tubes</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Tube Size</td>
<td>FC</td>
<td>EC</td>
<td>FC</td>
</tr>
<tr>
<td>Tube Type</td>
<td>New MCC</td>
<td>New MCC</td>
<td>New MCC</td>
</tr>
<tr>
<td>Use</td>
<td>Commercial</td>
<td>Commercial</td>
<td>Commercial</td>
</tr>
<tr>
<td>Air Volumes up to</td>
<td>15,000 CFM</td>
<td>7,000 CFM</td>
<td>10,000 CFM</td>
</tr>
</tbody>
</table>

AtmosAir has been tested to UL 867 Ozone Standards (induct products): No measurable ozone
Installation Locations

- Supply Duct Mounted
- Rack Mounted in AHU Supply (Discharge) Plenum
- Duct Mounted in AHU Main Supply
- Supply Duct Mounted with Exterior Insulation
- Exterior Duct Mounted with Custom Weatherproof Enclosures (RTU installation)
- Wall Mounted on Custom Frame in AHU Supply Chamber
- Duct Mounted in Custom Frame

Rack Mounted AHU Supply Plenum
Duct Mounted in AHU Main Supply
Duct Mounted in AHU Main Supply
AtmosAir Small Induct Systems

<table>
<thead>
<tr>
<th>Number of Tubes</th>
<th>Matterhorn 1000</th>
<th>Matterhorn 1002</th>
<th>FC100</th>
<th>FC400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Size</td>
<td>C, D, E, or F</td>
<td>C, D, E, or F</td>
<td>C, D, E</td>
<td>B</td>
</tr>
<tr>
<td>Tube Type</td>
<td>New MCC</td>
<td>New MCC</td>
<td>New MCC</td>
<td>New MCC</td>
</tr>
<tr>
<td>Use</td>
<td>Residential/light commercial</td>
<td>Residential/light commercial</td>
<td>Fan Coils/Heat Pumps</td>
<td>Fan Coil/Heat Pumps</td>
</tr>
<tr>
<td>Air Volumes up to</td>
<td>3,000 CFM</td>
<td>5,000 CFM</td>
<td>3,000 CFM</td>
<td>1400 CFM</td>
</tr>
</tbody>
</table>

AtmosAir has been tested to UL 867 Ozone Standard (induct products): No measurable ozone
Real-time Measurement and Verification

AtmosAware Dashboard:

Display Local Outdoor Air Quality and Indoor Air Quality on Phone, App, or Monitor
Improved Indoor Air. The Benefits Are Clear.

Cleaner air equals

- Better Guest Experience
- Increased Comfort
- Less Germs and Mold Spores
- Allergy Friendly Opportunities
- Higher Employee Productivity
- Energy Savings
- Marketing & Reputational Advantage
Improved Indoor Air. The Benefits Are Clear.

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- Better Guest Experience
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- Higher Employee Productivity
- Energy Savings
- Marketing & Reputational Advantage
Shift The Conversation
Differentiate Your Wellness Approach

Great air can make a fitness, spa or studio room stand out.
# Case Study | The Ritz Carlton, Shanghai

## AtmosAir IAQ Testing at the Portman Ritz Carlton

<table>
<thead>
<tr>
<th>Contaminant of Concern</th>
<th>Before</th>
<th>After</th>
<th>Difference in one wk</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM 0.3</td>
<td>3,694,251</td>
<td>423,921</td>
<td>3,270,330</td>
<td>-89%</td>
</tr>
<tr>
<td>PM 0.5</td>
<td>231,832</td>
<td>41,155</td>
<td>190,677</td>
<td>-82%</td>
</tr>
<tr>
<td>PM 1</td>
<td>49,864</td>
<td>28,024</td>
<td>21,840</td>
<td>-44%</td>
</tr>
<tr>
<td>PM 2.5</td>
<td>22,077</td>
<td>18,093</td>
<td>3,984</td>
<td>-18%</td>
</tr>
<tr>
<td>PM 5</td>
<td>3,374</td>
<td>2,567</td>
<td>807</td>
<td>-24%</td>
</tr>
<tr>
<td>PM 10</td>
<td>1,260</td>
<td>957</td>
<td>303</td>
<td>-24%</td>
</tr>
<tr>
<td>TVOC (PPM)</td>
<td>96</td>
<td>83</td>
<td>13</td>
<td>-14%</td>
</tr>
<tr>
<td>CO (Carbon Monoxide)</td>
<td>1.37</td>
<td>1.12</td>
<td>0</td>
<td>-18%</td>
</tr>
<tr>
<td>Benzene</td>
<td>53</td>
<td>42</td>
<td>11</td>
<td>-21%</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>54</td>
<td>10</td>
<td>44</td>
<td>-81%</td>
</tr>
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</table>

## Weather Data:

<table>
<thead>
<tr>
<th></th>
<th>Temperature °C</th>
<th>Relative Humidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>26.9</td>
<td>50</td>
</tr>
<tr>
<td>After</td>
<td>26.5</td>
<td>53</td>
</tr>
<tr>
<td>Difference</td>
<td>0</td>
<td>-4</td>
</tr>
<tr>
<td>Percentage</td>
<td>1%</td>
<td>-7%</td>
</tr>
</tbody>
</table>
Case Study | The Hyatt Andaz, NYC

- HVAC Equipment First Cost Savings
- Operating Cost Savings
- Improved Indoor Air Quality

Ventilation Codes would have required $2 Million increase in HVAC Capacity
- ASHRAE 62.1 IAQ Procedure was applied
- Inclusion of AtmosAir BPI with Existing HVAC Equipment
  - Cost: $450K = $1.5 Million Capital Savings
- Room Fan Coils Comparison: Operating Cost with MERV 13 Filter vs BPI
  - Identical rooms. Identical Temp. Settings
  - Room with MERV 13 Filter consumed 37% More Energy Than AtmosAir Room
- AtmosAir Room had Better IAQ: 90% Less VOC levels, 20% Less PM2.5
AtmosAir is installed in more than 50 US Army Buildings
- ASHRAE 62.1 IAQ Procedure applied to reduce Outside Air
- AtmosAir BPI significantly reduced Particulate Matter and Mold

### Fort Belvoir Power and IAQ Testing Before After Percentage Difference

<table>
<thead>
<tr>
<th></th>
<th>Power</th>
<th>IAQ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outside Air</strong></td>
<td>40%</td>
<td>19</td>
</tr>
<tr>
<td><strong>Energy Consumption Costs</strong></td>
<td>$363,232</td>
<td>$306,235</td>
</tr>
<tr>
<td><strong>Avg amps/kWh rooftop readings</strong></td>
<td>29.6</td>
<td>23.06</td>
</tr>
<tr>
<td><strong>Avg kWh rooftop readings</strong></td>
<td>3.44</td>
<td>2.65</td>
</tr>
</tbody>
</table>

#### Power
- Outside Air: 40% to 5% (5 CFM Per Person) -35%
- Energy Consumption Costs: $363,232 to $306,235 $56,996
- Avg amps/kWh rooftop readings: 29.6 to 23.06 28%
- Avg kWh rooftop readings: 3.44 to 2.65 23%

#### IAQ
- PM2.5: 19 to 5 -74%
- PM10: 24 to 7 -71%
- Total Indoor Mold Spores: 7,480 to 69 -99%
**Purpose:** The Albanese Organization, Owners of the Homewood Suites in NYC decided to improve guestroom air quality and market *Allergy-Friendly rooms*.

**Solution:** AtmosAir equipment was installed to provide 24/7 air purification for 35 guestrooms.

**Guest Benefits:** AtmosAir significantly improved indoor air quality by reducing odors, bacteria, mold, mildew, particulate matter, allergens and irritating VOCs.

**Pricing Strategy:** Homewood Suite sold the Allergy-Friendly rooms for a $20 *premium*.

**ROI:** After the first 3 months the Allergy-Friendly rooms were sold out nearly 80% of the nights. The AtmosAir system was paid for, thanks to the $20 premium in less than 3 months.
Thank You!
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