

OREGON AIR REPS PRESENTS:

Best Energy Saving Ideas for Hospitals and High-Tech Buildings

Protect Your HVAC System Against Airborne Pathogens and Energy Loss



UV lights shining on the down-stream side of a cooling coil

Ultraviolet Light (UV) & HVAC System Efficiency Cooling coils are in dark, mostly moist environments that are loaded with organic nutrients of all kinds. This is an ideal environment to support growth of mold and bacteria. Even a monolayer of this bio-film can cause airflow and heat exchanger inefficiencies – sufficient enough to render a system inadequate for its intended use.

OAR recommends using UV products by UV Resources (UVR). UV has been used very successfully in HVAC equipment for over a decade, improving both the quality of indoor environments as well as helping to return heat transfer and equipment efficiency.

Example of a typical UV Light Installation:

- 50-ton AC System
- 20,000 CFM
- Installed Cost of UVResources Double Ended Fixture (DEF) Standard Output (SO) System = 0.14 \$/CFM
- Replacement cost of SO bulbs for above system = less than \$180 per year
- Monthly operating cost of UV-C system = \$15.00 based on 0.075 \$/kWh
- Expected payback = less than 4.5 years (reduction of .75" static pressure)

The 253.7 nanometer UV-C wavelength goes to work breaking down and vaporizing organic structures to clean a coil sufficiently to return its performance characteristics. An increase of .75" of static pressure due to a fouled coil in the 50-Ton AC system above, increases the overall energy usage of the supply fan by 7,500 kWh per year (\$560.00 per year!). This increased energy consumption does not take into account the heat exchange inefficiencies which create additional compressor work. The typical payback on a DEF UV SO light system is typically 4.5 years or less. Additional savings will be found in reduced maintenance costs.

The above example installation is based on ASHRAE 2008 handbook recommendations - horizontal lamp placement, 12" off of coil face w/ a UVC flux density sufficient to continuously destroy a monolayer of mold and bacteria typically found in HVAC systems.

Benefits to using UV Resources UV-C product:

- Restores AHU capacity and efficiency
- Lowers energy use in restored systems
- Installs quickly and easily anywhere
- Inactivates/kills airborne microbes
- Diminishes circulating cold and flu viruses
- Destroys mold and bacteria on coils
- Industry's lowest cost of ownership, yet highest UV Flux Density in air

Please contact Henry Bauer or Stefan Lidington for more information.

HVAC manufacturers continue to strive to make improvements to equipment—increasing energy efficiency.

Our newsletter details what we think are some of the best returns on investing in energy efficiency.



Fanwall Technology Saves More than Energy

Recently, OAR performed an energy evaluation for one of our local industrial customers. In doing so, we discovered a fan running 24/7 at constant volume at the energy cost of \$.66 per cfm/year. We provided a Huntair FWT replacement array to operate at the cost of \$.34 per cfm/year. The total implementation cost of the equipment and installation was \$1.83/cfm. The simple payback for the project is 6.2 years.

After the Energy Trust Incentive, payback is 3.1 years. After applying the state of Oregon Business Energy Tax Credit, the payback is 1.54 years.

Fanwall technology is the simple idea of placing many fans in a common bulkhead to behave and function as a single large diameter fan with respect to air flow and static pressure. The combining of multiple small fans into an array maintains the upstream and down stream distance to allow any remaining turbulent flow to settle into a stable velocity profile. A uniform piston of air evenly loads filters and coils creating less turbulence in the casing and less vibration transmitted to the building supporting the unit. The resulting benefits include:

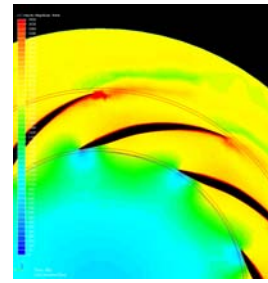
- Reduction in Vibration (eliminating a large single rotating mass)
- Built in redundancy
- Elimination of Belts/sheaves and the associated on going maintenance
- Smaller motor components easily replaceable without extensive rigging
- Reduction in footprint in systems larger than 30,000 CFM
- Easily installed in existing cabinets and systems

Huntair developed a highly efficient, well balanced, small diameter fan for application in fan filter units to accomplish more air movement with less electricity consumption which differentiated their offering from the forward curved fans that were the standard industry offering.

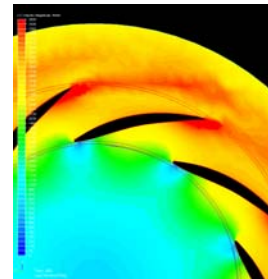
Typically, most small diameter fans are inefficient because the average fan manufacturer would optimize the design of a single fan wheel size and produce other wheel sizes by scaling the original prototype down to create other offerings.

However, Huntair employed Computational Fluid Dynamics (CFD) to optimize the smaller fans. CFD allowed them to quickly evaluate trade offs between the spacing of blade elements, angle of attack and shape of the air foil element. They have also been employing other manufacturing advances. For instance, laser cutting of the fan back plate and impeller inlet to receive the fan elements in a precise fit for a higher degree uniformity to avoid noise and vibration from air buffeting and rotational imbalance.

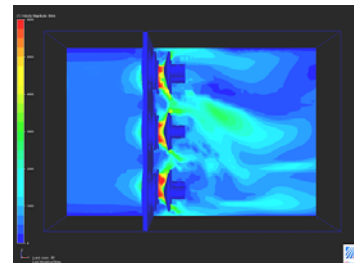
Currently, Huntair is offering both price and lead-time savings. To find out more information please contact Henry Bauer or Stefan Lidington in our Portland office.



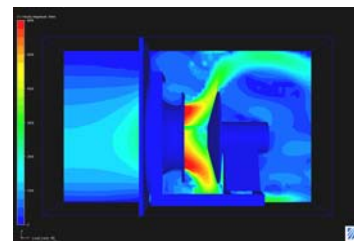
Fanwall cross section in CFD



Single plenum fan cross section in CFD Highest velocities are shown



Side view of fanwall in CFD



Side view of single plenum fan in CFD

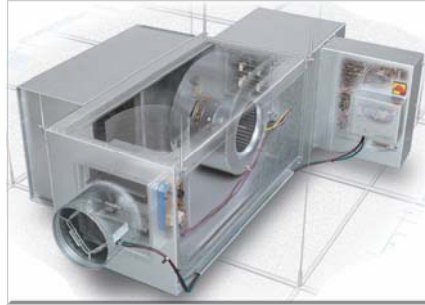


EPIC/ECM technology on fan-powered boxes and fan coil units offers lower operating costs and significant energy savings

Normal Payback is 6 to 18 months. Investment is approximately \$350/box

Nailor Industries developed the ECM (Electronically Commutated Motor) with on-board EPIC controller providing unparalleled comfort, control, and ease of balancing.

The ECM is an ultra high efficiency programmable brushless DC motor utilizing a permanent magnet rotor and a built-in inverter. DC motors are significantly more energy efficient than AC motors and much easier to control.



Nailor's Stealth series fan-powered terminal unit

Reasons why you'll want to use ECMs:

- Full-load ECM motor efficiency is approx 80%. PSC motor efficiency is approximately 60%
- Ability to turn-down while maintaining efficiencies between 65-72%. A PSC motor with an SCR controller will have efficiencies in the 12-45% range through its narrower turn-down ratio.
- Operates at a cooler temperature because of their higher efficiencies, therefore reducing heat gain from the motor.
- ECM motors along with the on-board controller reduces the time required by a balancer to adjust FCU airflow and measure each diffuser output
- Provide pressure-independent fan operation, thus higher space comfort.

To find out more information please contact: Henry Bauer or Stefan Lidington in our Portland office.

Achieving energy and cost savings through insulating dispersion tubes

Insulating the dispersion tubes in your Dri-Steem humidification system is another way to cost effectively reduce energy consumption, thus saving you money. DRI-STEEM designs and manufactures industrial and commercial humidification systems for customers around the world, and leads the industry in advanced humidification control.

New Installations

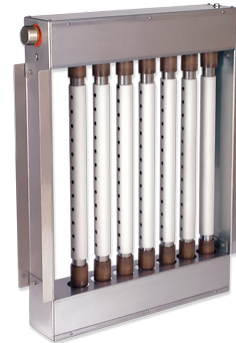
\$1,600 Investment, normal payback is .81 years

Retrofits

\$5,300 investment, normal payback is 2.71 years

The following example illustrates the energy and cost savings that can be achieved:

70"x82" Ultra-sorb, 6" OC, 20,000cfm, 18" absorption distance, 53°F EAT, 70°F / 40% rh setpoint, 20% OSA, \$0.08/kWh, \$0.0025/gallon, 3700 hr TMY2 estimated run time.



Ultra-sorb humidification array with white PVDF insulation on dispersion tubes

Continued on next page



Insulating dispersion tubes continued

Estimated kWh savings / yr: 24,400 kWh

Estimated water savings / yr: 8,445 gal

Estimated total cost savings: \$1970

Estimated temperature rise: 1.3°F un-insulated, 0.4°F insulated

Estimated CO₂ Reductions: 31,124 lbs/yr

Estimated payback (new): 0.81 yrs

Estimated payback (retrofit): 2.71 yrs

Reasons you'll want to insulate your dispersion tubes:

- 212°F tube surface temperature heats the air that has just been mechanically cooled to 55°F
- Greater heat loss from the tubes requires the steam generator to be oversized to account for additional condensate
- Every pound of condensate wastes about 1000 btu/h of energy
- Every 8.3 pounds of condensate wastes a gallon of water
- Every ounce of condensate wastes water treatment chemicals

Polyvinylidene Fluoride (PVDF) is factory-applied in new installations and field-installed in existing installations of DRI-STEEM Ultra-sorb and Rapid-sorb dispersion arrays. Please contact Henry Bauer or Stefan Lidington for more information.

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www.aaon.com

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AEROTECH & TWA—Radiant Cooling/Heating Panels

www.aerotechmfg.com www.twapanel.ca

AEGIS—Shaft grounding bearing protection

www.est-aegis.com

AIRCUIITY—Indoor Air Quality Controls

www.aircuiity.com

AIREDALE—Vertical classroom A/C units

www.airedaleusa.com

AMERICAN AIR FILTER (AAF) - Unit Ventilators

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ARCTICHILL—Modular Chillers, Process and Medical Chillers

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BLENDER PRODUCTS—Air Blending Units

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HEAT HARVESTER—Heat pump

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MK PLASTICS—Fiberglass Fans/Fume Exhaust Systems

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www.mcquay.com

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www.temtrol.com

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UNITED COOL AIR—Specialty AC Units, 1-20 tons, Gas Heat PTAC Units

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VENMAR—Custom Energy Recovery Units, Heat Pipe, Flat Plate Heat, Wheel Heat Exchangers

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XETEX—Air to Air Plate and Heat Wheel Heat Recovery

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