# Applications

## Save Energy By Reducing Outside Air

Utilizing the ASHRAE 62 Indoor Air Quality Procedure, combined with SPG' air purification technology, outside air may be reduced by up to 75% in non-healthcare applications, subject to building pressure.

The IAQP allows air purification to be applied to clean the air within the building from the contaminants of concern, thus allowing the outside air to be reduced, since the outside air is no longer required to dilute the contaminants of concern.

To assist engineers and designers with the IAQP, SPG has developed a spreadsheet that calculates the outside air based on both the Ventilation Rate Procedure and the Indoor Air Quality Procedure.

Over 600 projects have been designed using SPG' IAQ spreadsheet with outside air quantities reduced to as little as 2.5 CFM per person!

- The Tampa Bay Times Arena avoided over 700 tons in chiller capacity, reduced first costs by over $1 million and saves over $115,000 per year in energy.

- K-12 schools and higher education facilities will save $300,000 to $500,000 in first costs by reducing outside air. Average energy savings will be $0.20 to $0.45 per square foot per year. As a side benefit to the energy savings, attendance will be higher since the SPG technology kills the pathogens that could make students sick.

In many localities around the United States, the air quality outside is poor.

## Save Energy By Cleaning up Cooling Coils

It has been well documented that cooling coils become clogged over time and biofilm grows on the coils.

This growth creates an insulating layer between the fin surface area and the air stream which causes the chiller/compressors to work harder by providing more chilled water or higher refrigerant pressures to accomplish the same amount of work to achieve the desired leaving air temperature.

In addition to the reduced thermal transfer, the added biofilm and debris will reduce the "free" passageways for the air to flow and the air pressure drop will increase and requiring the fan to work harder.

As an example, by mounting SPG's SPG-IBAR on the air inlet side of a cooling coil as shown in the figure below, it will clean the coils up over a few weeks and restore the thermal transfer and pressure drop to their original factory levels.

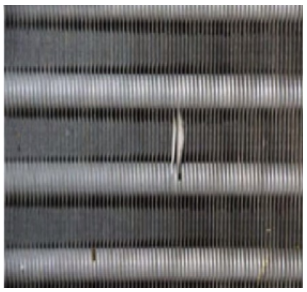
Where does the dirt go, you may ask?
As the ions kill the biofilm, they lose their grip on the coil surface.

When the cooling coil starts to condense moisture (when the air dewpoint is above the cooling coil discharge drybulb leaving air temperature), the biofilm will run off with the condensate and it all goes down the drain.

The SPG-IBAR has several advantages over UV lights:

- No replacement parts and no glass tubes with mercury in the airstream
- No visible light; therefore, no safety precautions such as door switches are required
- Less energy required – only 60 watts of power up to 60,000 CFM
- SPG technology cleans the entire depth of the cooling coil
- SPG technology kills pathogens downstream from the system and it's not line-of-sight like UVC
- SPG' technology controls odors, UVC does not
- SPG' technology mounts direct to the cooling coil frame – UV lights require a separate framing system requiring more install labor

Before SPG-IBAR



After SPG-IBAR

## Control Odors

Many applications require odor control. SPG patented needlepoint technology has been used in airports, hospitals, casinos, locker rooms, cigar bars, restaurants, dining halls, assisted living facilities, morgues, nail salons, kennels, veterinarian offices, fish markets, flood damage, fire damage and trash rooms.

Odors can be hard to track down and many times, exhaustive (and expensive) IAQ investigations raise more questions than provide

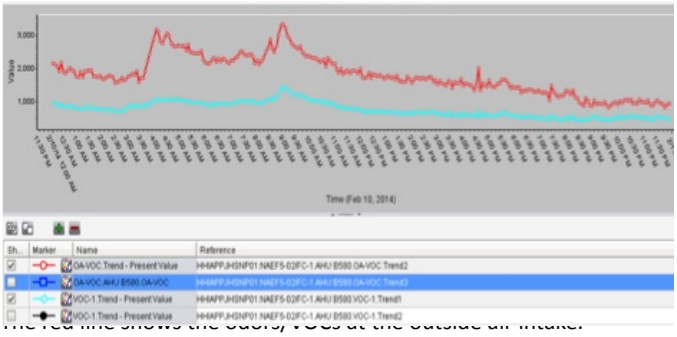
answers. SPG' technology has been used in several of these "unknown" source of the odor applications with great success.

In general, SPG' technology can effectively control gases with electron volt potentials less than 12. Every gas has an electron volt potential (Ev) associated with it. SPG purposely controls the ionization output so nothing over an electron volt potential of 12 will be oxidized; this is how SPG prevents ozone from being created. Oxygen's Ev number is a little over 12. If you ionize oxygen, ozone is created, and that is an undesirable byproduct.

Below are odors effectively controlled by SPG' technology:

- Food Odors
- Diesel Odors
- Jet Fumes
- Cooking Odors
- Body Odor
- Mold & Mildew Odors
- Red Tide Odor
- Dirty Sock Syndrome
- Helicopter Odors
- Cigarette and Cigar Smoke Odors

A recent study from an installation at Methodist Hospital in Houston, Texas, shows how well the SPG-IBAR system controlled the problematic diesel generator exhaust odors during weekly testing. When the backup generators are tested, the exhaust odors were being drawn back into the building causing a high volume of complaints.



The red line shows the odors/VOCs at the outside air intake.

The blue line shows the odors/VOCs immediately downstream of the SPG-IBAR system.

After the installation of the SPG-IBAR system, the odor complaints ceased.

## Kill Pathogens, Reduce Particles & Control Allergens

SPG has invested hundreds of thousands of dollars in 3rd party testing to prove how well the technology can kill mold, bacteria and virus.

It is important to understand how the technology works in order to apply it properly in pathogen control applications.

- Ions do not pass through filters.

  Healthcare applications generally have final filters and if ions are desired to enter the space to kill pathogens in the air and on surfaces, the SPG technology would have to be mounted after the final filters.

  In several hospital applications, SPG-IBARs have been mounted on the cooling coils to keep them clean and then after the final filters to kill pathogens in the space.

- Kill rates are determined by the ion density and the amount of time exposed to the ions as can be seen by the 3rd party test data

- Based on numerous customer testimonials, allergy sufferers have been relieved of their symptoms after installation of SPG' technology.

  Many allergies and asthma attacks are triggered by particles or more particularly, mold spores. The SPG technology helps to reduce both particulates and mold spores.

Below are real world test results from a recent SPG client who is also an IAQ testing specialist with his comments provided.

I installed a SPG-2400 in my home and tested the air the next day. The pictures below are the results I am getting due to the installation.


3 micron air-borne particles in one cubic foot of air. The historical volume for my home has been 400,000 to 800,000


3 micron air-borne particles in one cubic foot of air. The historical volume for my home has been 2,000 to 4,000


3 micron air-borne particles in one cubic foot of air. The historical volume for my home has been 1,000 to 2,000

*"I installed the unit for a space that housed 50 - 60 homeless people.*

*The odor coming fom this space and people was a ´bone of contention´ for the staff running the shelter.*

*We installed the unit on Friday and by Monday morning there was no trace of the odor."*