



## SecureAire's Revolutionary ACTIVE Particle Control™ for the Home

# What Makes SecureAire Technology Unique?

### Introduction

SecureAire's ACTIVE Particle Control Technology is a revolutionary breakthrough in air purification technology. With a SecureAire Whole-Home Air Purification system, every aspect of indoor air pollution is addressed: removing airborne particulates, dangerous pathogens, and toxic VOCs (volatile organic compounds).

Recent studies have shown that the smallest airborne particles represent the greatest risk to our health, and there is growing concern about what the combined effect of all three contaminants has on our health and longevity.

Up until now, air filtration technologies have primarily focused on the obvious: sifting large particulates out of the air. Some technologies go further and attempt to kill pathogens and some claim to break down VOCs. For the most part, these technologies have proven to be largely ineffective at removing any or all three of these contaminants from the air that we breathe.

SecureAire is the first product, proven in commercial clean rooms and hospitals to have a significant effect on all airborne contaminants, providing you and your family with the safest, healthiest, and cleanest indoor air possible.

The best indoor  
air quality for your  
home and family

- Safest
- Healthiest
- Cleanest

The smallest  
airborne particles  
remain suspended  
in the air space  
causing sickness  
and irritation. With  
SecureAire's ACTIVE  
Particle Control  
Technology, these  
small particles are  
actually put to work  
to clean the air.

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## **Why should you be concerned about the air in your home?**

Nearly every day there is news about the negative effects of air pollution. According to a recent CNN article, nearly 5 million people died from airborne pollution last year, and UNICEF says that over 4 million children are being exposed to unhealthy pollution levels every day.

The Environmental Protection Agency has determined that the long-term effects of exposure to common household airborne pollutants can have a serious negative impact on human health. These effects, which include some respiratory diseases, heart disease, and cancer, can be severely debilitating or even fatal. The EPA encourages homeowners to improve the indoor air quality in their home even if symptoms are not noticeable.

[www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality](http://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality)

On a larger scale, the International Agency for Research on Cancer (IARC), a part of the World Health Organization, classifies airborne particulates in general as a Group 1 carcinogen ([www.monographs.iarc.fr/list-of-classifications-volumes](http://www.monographs.iarc.fr/list-of-classifications-volumes)) because they are small enough to affect every system of the body on a cellular level and cause permanent damage, even leading to premature death.

## **What do airborne particulates include?**

Airborne particulates are known to science as Particulate Matter, or PM, and they include everything from large particles and liquid droplets down to the smallest of particles that can only be seen with an electron microscope. Based on size, particulate matter can be divided into three categories:

**Large:** Ranging from 2.5 to 10 microns (PM10)

**Fine:** Ranging from 0.1 to 2.5 microns (PM2.5)

**Ultrafine:** Below 0.1 microns (PM0.1)

Most of the mass, or weight, of airborne particulate matter is comprised of particles in the 0.25 to 10-micron range. However, over 90% of the total quantity of airborne particles is in the ultrafine, or 0.25 micron and smaller range.

This means that devices that affect the larger particles, those of 0.25 micron and larger, are only affecting a very small percentage of the total number of airborne particles, and it's actually the smaller particles that pose the greatest threat to our health.

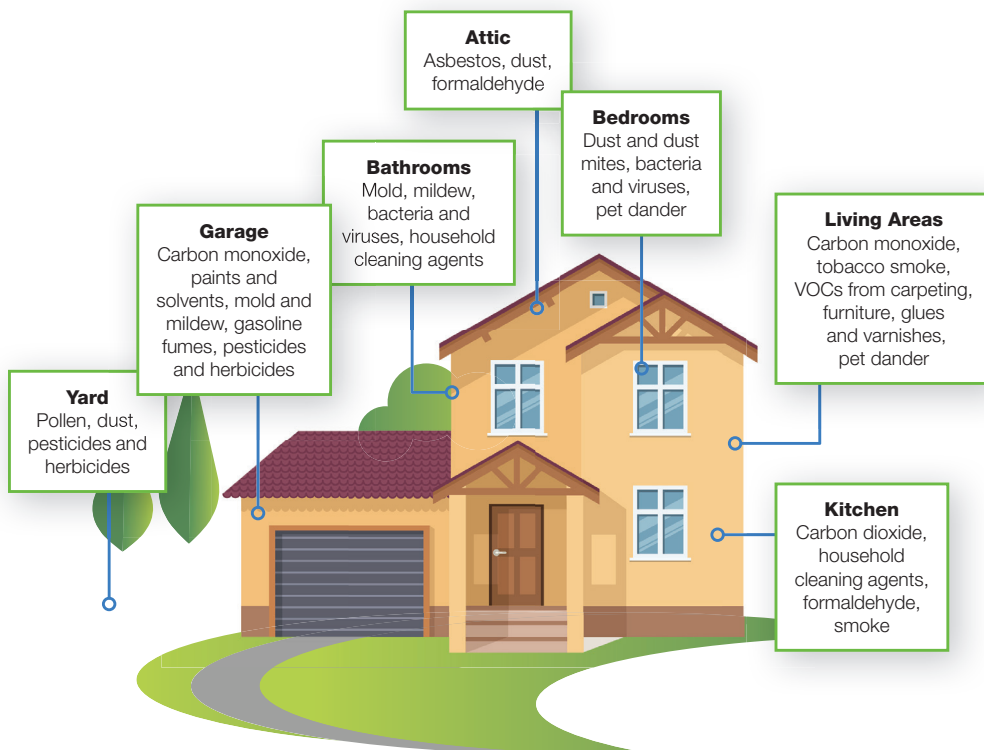
## How does indoor air pollution affect you and your family's health?

We breathe over 10,000 quarts of air each day. According to the EPA and the American Lung Association, indoor air can be up to ten times more polluted than outdoor air. That's because every home generates and traps millions of potentially harmful airborne particles, pathogens, and gases, most of which are too small to be affected by airflow.

These very small airborne contaminants are taken in through the lungs, absorbed into the bloodstream, and transported into vital organs. Most of the smallest particles, down to the molecular level, are the most harmful to our health, and least affected by traditional air filtration technologies. Long-term exposure to poor indoor air quality has been linked to serious conditions like asthma, COPD, cancer, cardiovascular disease, and even damaging brain plaques.

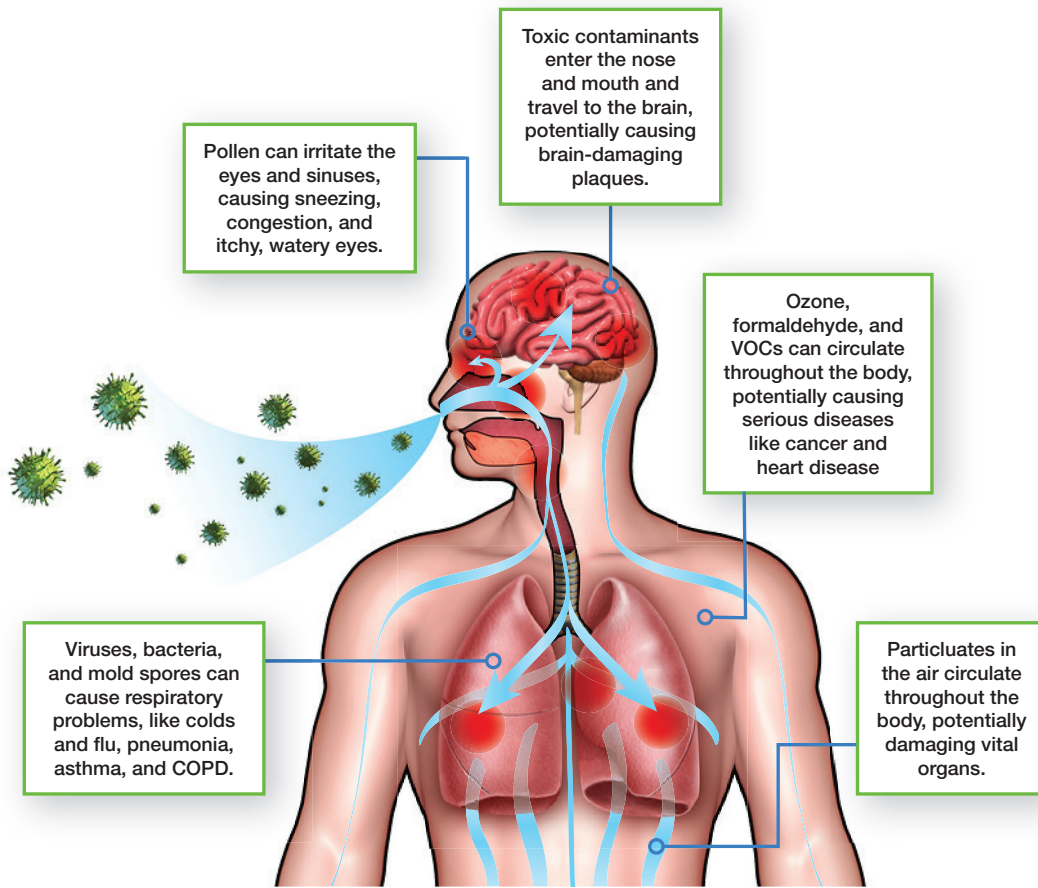
Common household airborne pathogens, microorganisms that can cause disease, including viruses, bacteria and fungi such as mold. Viruses and bacteria can cause sickness and be transmitted to other family members through the air. Mold spores irritate the eyes and upper respiratory tract, often triggering an allergic reaction, causing sneezing, itchy, watery eyes, sore throat, and even headaches and nausea. And among the smallest of airborne contaminants are volatile organic compounds or VOCs.

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## What Makes SecureAire Technology Unique?

VOCs are considered “volatile” because they are highly influenced by charge. This allows them to “stick” to anything with an opposite charge, the cells in your nasal passages, for instance, or hemoglobin in your blood. From there they are transported to vital organs and the brain.



***Surprisingly, many small particles, like viruses, bacteria, and harmful VOCs, are so small that they are virtually weightless and completely unaffected by air currents.***

## Why aren't regular air filters enough?

Typical air purification systems work by moving air through a standard filter, sifting out particulates, and trapping them in the filter. Depending on the filter type, these products will typically remove only the larger particles. Even when airborne particulates are captured, any that include pathogens will still be active and capable of reproducing, releasing more of their kind back into your home.

Surprisingly, many small particles, like viruses, bacteria, and harmful VOCs, are so small that they are virtually weightless and completely unaffected by air currents. They remain suspended in the air, much like fruit suspended in gelatin, and are never returned by the air stream to the filter. These small, ultrafine particles comprise over 90% of the total number of airborne particulates and are the most damaging to your health.

## What about other air purification technologies?

Some IAQ products don't have any filter at all but charge airborne particles with a process that causes particles to get heavier and drop onto surfaces in your home. In effect, this makes everything in the house the dirt collector.

There are other products that claim to safely breakdown VOCs or gases that are being constantly generated in your home, and some claim to kill airborne viruses and bacteria in the living space and on surfaces. To create these results, these products produce so-called "friendly oxidizers". Examples of friendly oxidizers are ozone and hydrogen-peroxide. The American Lung Association, the Environmental Protection Agency, and the HVAC industry's American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) all state that any amount of ozone as well as hydrogen peroxide have been shown to harm lung tissues.

## How does SecureAire technology work?

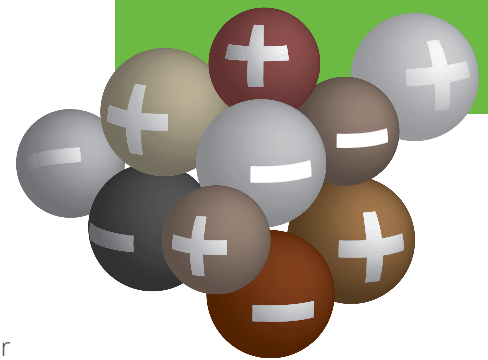
SecureAire's patented ACTIVE Particle Control Technology safely conditions all particles, large and small, from dust, to pathogens, to VOCs. Without creating harmful by-products, the system gives each particle a small electrical charge that attracts it to the filter. Large particles will immediately be trapped on the filter. The smallest particles, too small to be captured, pass through SecureAire's energy field and are conditioned, making them "net neutral". They are then sent back out into the air space. These conditioned particles actually do the work of cleaning the air in the living space.

"Net neutral" means that the particle has a neutral, or zero, total charge. This is significant in three ways. First, given that there is zero net charge, these particles will not be attracted to or stick to the surfaces in your home. This keeps your home safe and clean.

Second, if you examine each net-neutral particle, there are countless small sites on each particle that have either a positive or negative charge. Each of these individual sites can attract other smaller particles – including even gas molecules – that have an opposite charge. Remember that 90% of all airborne particles are in the ultrafine category, smaller than 0.1 microns. As a result, every net neutral particle works both as a powerful magnet to attract other ultrafine particles, and as an absorbent sponge, soaking up oppositely-charged VOCs.

The third advantage to net neutral conditioning is the benefit to your heating and air conditioning system's performance. Technology that puts a charge on particles can cause them to be attracted to the system's blower wheel, motor, heat exchanger, indoor coils, and ductwork. When any or all of these components become excessively dirty, the heating and cooling system has to work harder, requires more frequent repairs, and costs more to operate. Not only that, but the system becomes noisier and doesn't work right, resulting in reduced comfort throughout the home. SecureAire's air purification technology, with its patented process, helps keep your heating and cooling system clean and efficient for up to a full year without significant airflow restriction. Replace the filter every 6 months, or even up to a year, and the heating and cooling system will perform like new throughout its lifetime.

***This graphic representation of a small particle includes an equal balance of positively- and negatively-charged sites. The overall effect is a neutrally charged, or "net neutral", particle. Each charged site on the particle can attract oppositely charged sites on other small particles.***



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***Once a SecureAire system is installed, the airspace in your home will have billions of these net-neutral particles working to keep the air you breathe clean and healthy.***

### **The “Net Neutral” afterglow**

Once a SecureAire system is installed, the airspace in your home will have these net-neutral particles working to keep the air you breathe clean and healthy. In fact, this phenomenon can last for a period of time even if you shut the system off. The ACTIVE Particle Control process puts these net neutral particles to work to constantly clean your air. Open the door or window and let in more pollutants? Don't worry, SecureAire's net neutrals are on the job, protecting you and your family 24 hours a day.

### **What happens to pathogens and collected VOCs?**

Pathogens, including bacteria and viruses, are actually very small particles (see the adjacent graph). When airborne pathogens are attracted to and combined with conditioned particles in the living space, these heavier particles are eventually brought back to the filter to be collected.

The filter is within SecureAire's active energy field. The energy field causes extreme oxidative cellular stress within each viable pathogen, destroying it and rendering it harmless. The remains are kept on the filter, held by strong ionic bonds, never to be released back into the airstream.

Very small volatile organic compound molecules are comprised mostly of carbon and as a result, are very strongly influenced by charge. Small net-neutral particles pick up these volatile compounds and carry them back to the filter. The active energy field also has an effect on the filter, causing fiber molecules within the filter to stretch and open up, making them highly effective at soaking in and trapping VOCs.

### **How is SecureAire Unique?**

The SecureAire product and processes are unique in four ways. The combination of these characteristics will ensure your home has the safest, healthiest and cleanest air possible.

First and foremost, none of SecureAire's processes produce any potentially harmful byproducts that could enter into the living space.

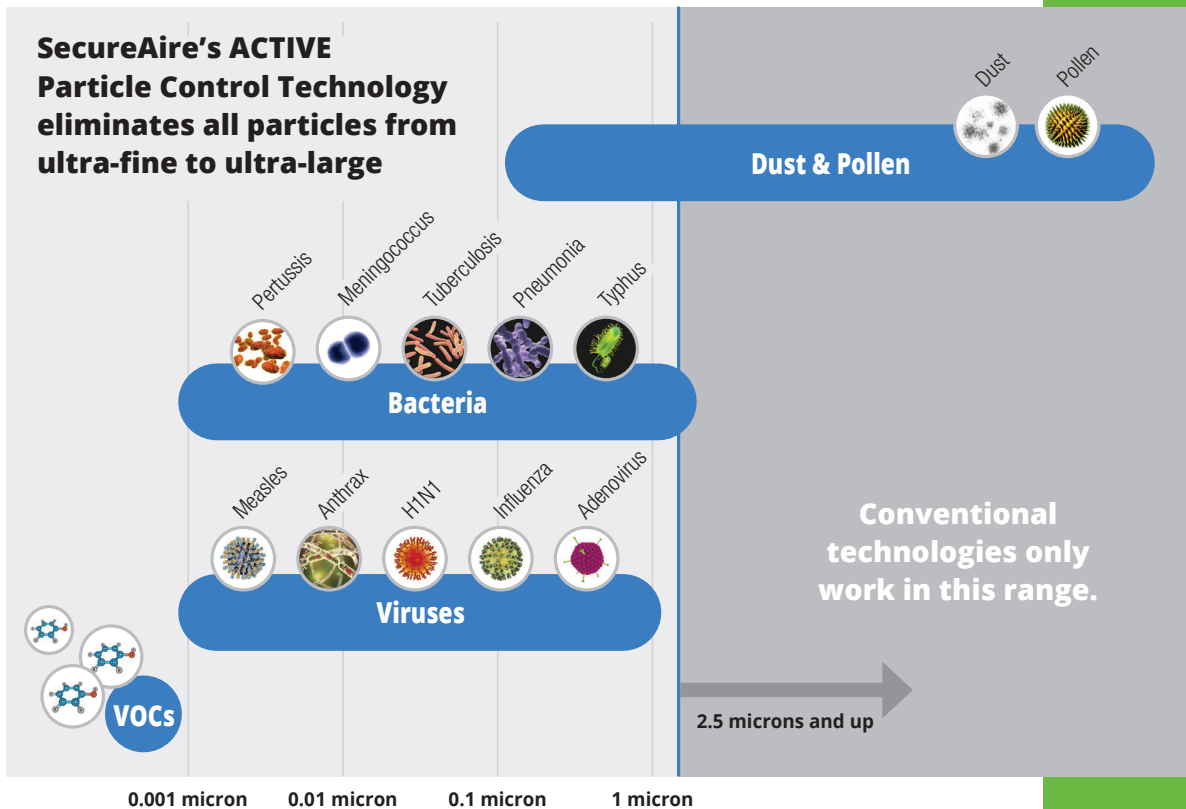
SecureAire's patented ACTIVE Particle Control Technology will safely condition all particles, large and small, and either collect them on the filter, or deliberately send them back into the airstream to “gather up” the smaller airborne particles that are in the living space, those that are too light to be transported by themselves back to our filter.

Airborne pathogens, very small particles themselves, will be caught up with all other small particles, and brought back to the SecureAire filter where they will be captured and killed.

As SecureAire's conditioned particles travel through your home, they will also remove VOCs, essentially soaking them up, and bring them back to the patented filter where they will be safely removed from the airstream.

## Conclusion

With SecureAire's ACTIVE Particle Control Technology, the smallest particles, instead of remaining suspended in the air space causing sickness and irritation, are actually put to work to clean the air, neutralizing harmful pathogens, and sweeping away toxic VOCs. In addition to making indoor air safe, healthy, and clean, the technology also keeps itself and your HVAC components clean and running efficiently, saving both your health and your pocketbook.



**For further information,  
please contact your local  
SecureAire representative.**

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## About SecureAire

SecureAire is headquartered in Dunedin, Florida. The Company is the industry leader in ACTIVE Particle Control, which is based upon technologies developed and employed in semiconductor cleanrooms and hospitals. SecureAire has advanced and developed highly sophisticated air purification technologies that make air flow the dominant transport mechanism for airborne contamination removal.

## To Learn More

**Contact your local SecureAire authorized dealer or visit our website at: [www.secureaire.com/residential](http://www.secureaire.com/residential)**

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