

Anatomy of an Air Cleaner

Air filters, air cleaners and air purifiers are often confused. The explanations that follow should clear up some of the mystery.

Air Filter

Most of the time, this term is used when talking about a replacement element in an HVAC system. These types of filters are available in many sizes. They vary in length and width according to the air handling system into which they are being inserted but their thickness and the “type” will determine how well they will work.

Air filters are usually specified in one of two types, straight fiber media or pleated media. As a rule, the pleated media out performs the straight media because a pleated filter provides more surface area in the same amount of space as the straight. Also, a pleated filter usually offers less resistance than a straight filter and therefore is not only more effective but can make the operation of the total system more efficient.

Both types are available in varying efficiencies. Generally speaking, as the efficiency of the filter increases, the amount of airflow decreases. Trading off a reduction in airflow for higher efficiency filters is sometimes warranted. The longer the air has contact time with the filter, the more effective the filter becomes.

Air filters are also found in point-of-use air cleaners/purification systems. They are sometimes designed as pre-filters but most often serve the same function as air filters in HVAC systems – particle filtration.

Air Cleaners/Air Purifiers

An air cleaner is an appliance that removes particles and gases from the air. Gases and vapors can't be seen but oftentimes can be smelled. They are too small for a filter to handle (particles are measured in microns and gases are measured in angstroms, sometimes 10,000 times smaller than a micron) and must be dealt with using media capable of adsorbing and absorbing gases.

The most common media is activated carbon. Others include potassium permanganate and zeolite. Carbon has difficulty adsorbing certain gases especially some found within hotels. Potassium permanganate has oxidizing disinfectant properties and can therefore assist the carbon at doing its job. Zeolite is a volcanic ash and is very effective at absorbing uric acid and other human odors and is less expensive than the other two. Because of these different but desirable properties, manufacturers of high quality air cleaners use all three types of these media in a blend.

In order to be effective, air cleaners/purifiers must provide multistage replaceable elements to handle filtration and adsorption.

Ozone Generators

These devices really don't deliver the intended result and according to all the research that is available from the engineering and medical communities, ozone is not safe. The following is from Occupational Health & Safety, February 1997. To receive a complete copy of the article by fax or mail, please call 1-800-929-2626.

Ozone's reaction with various vapors has been well studied within the scientific community. Ozone in a concentration of 100 ppb (already an unhealthy level) reacts extremely slowly with most compounds found in the indoor environment. Half-life reduction in compound concentrations is in the order of years rather than hours.

The only exception is the alkene compounds: ozone can convert volatile organic compounds (TVOC's). In short if an ozone reaction occurs, it occurs with the alkene compounds, but it simply does not yield carbon dioxide and water. Instead, this reaction reduces additional indoor pollutants or contaminants.

As safety and environmental professionals, we have the skills to recognize unsafe or unhealthy trends and practices. We must base our decisions not on the emotions of sales pitches or sales fads, but on good safety and health engineering and scientific principles. When we see our employers, clients or loved ones becoming innocent victims, we need to speak up and convince the of the facts."

Note: The National Ambient Air Quality Standard for Ozone, Primary and Secondary Standard, is 0.12 ppm. OSHA's permissible exposure level (PEL) for ozone is 0.1 ppm for an eight-hour shift.

About the author: James D. A. Felds is President of EverGreen Rooms by Hartford, Inc. EverGreen manufactures air and water purification and dehumidification systems and has been dedicated to the lodging industry since 1992. There are thousands of systems in operation in most branded and many independent properties. EverGreen provides service on all its systems and offers a variety of programs for systems acquisition.

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