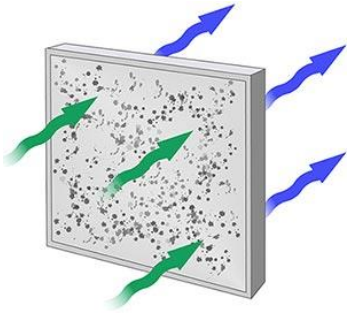
Most Common Types of Air Purifiers

HEPA Technology

HEPA is an acronym for High Efficiency Particulate Air and is a technology that has been used for many years to physically filter particles. HEPA filters must meet a standard of physically trapping at least 99.97% of all particles larger than 0.3 microns. HEPA air purifiers are highly effective at removing particles like pollen, dander, mold, and dust from the air. Most HEPA air filters, however, cannot directly trap microorganisms smaller than 0.2 microns like viruses, and bacteria.



The HEPA filter is a very fine fiber-like material that has been folded back and forth to create the shape of an accordion. This accordion shape creates a maze of randomly arranged fibers and presents a very large surface area for air to be pushed through by the air purifier fan. Air must have an opportunity to pass through the filter for the air to be cleaned. The more times air passes through the filter in an hour, the cleaner the air will become. As the HEPA filter becomes full, air will no longer be able to pass through, and a new filter will be needed.

Large particles will not be able to pass through the openings of the fibers and will immediately get caught. The smaller particles will get caught by one of three mechanisms. The first is when particles come within one radius of a fiber and stick to it. This mechanism is called interception. The second mechanism, called impaction, is when larger particles collide with fibers and embed into them. Finally, they get caught by a mechanism called diffusion. Diffusion is when the smallest particles collide with gas molecules. This, however, slows down their velocity and makes the first two mechanisms more likely. Via these mechanisms and Brownian movements, some viruses, bacteria, mold and mildew may ultimately be trapped by the filter, which become a secondary source of exposure.

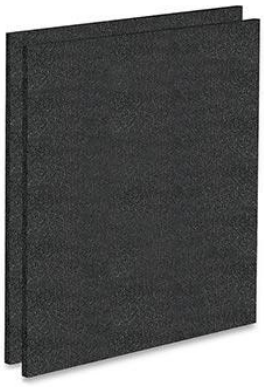
HEPA air purifiers are the most effective at trapping airborne particles; however, they do not remove odors, chemicals, or gases. Therefore, most HEPA air purifiers have some level of activated carbon-based material to absorb odors and chemicals not caught by the HEPA filter. In addition, **HEPA filters do not kill viruses, bacteria, mold, or mildew**. As a result, live pathogens are redistributed into the room by the internal fan.

Since HEPA filters do not kill viruses, bacteria mold or mildew, we recommend treating the HEPA filter with My-shield® Surface Sanitizer/Disinfectant to kill these pathogens as they pass through a new filter or become trapped in a filter near the end of its life cycle.

Most Common Types of Air Purifiers

Activated Carbon Technology

Activated carbon is a form of carbon that has been processed to make it extremely porous and to give it a very large surface area for absorption. Activated carbon filters are comprised of many molecular sized pores that have high absorbent ability and chemical bonding. These properties make them a very effective tool for capturing pollutants such as chemical emissions, gases, tobacco smoke and odors. Once these pollutants are captured, they are not released back into the air, eliminating recontamination.



Air purifiers with activated carbon filters are particularly helpful to people with Multiple Chemical Sensitivity (MCS) because they absorb formaldehyde, which is found in carpet, wood paneling, and furniture upholstery. Perfumes, as well as chemicals in household cleaning items are also removed, making the environment much more breathable, especially for asthma sufferers, babies, children, and the elderly.

Carbon air filters help a great deal in reducing the contamination of the air in our rooms; however they are **unlikely to trap germs and do not kill viruses, bacteria, mold and mildew**. As a result, live pathogens are redistributed into the room by the internal fan.

Since activated carbon filters do not kill viruses, bacteria mold or mildew, we recommend treating the activated carbon filter with My-shield® Surface Sanitizer/Disinfectant to kill these pathogens as they pass through or become trapped in the filter.

UV Technology

UV technology is most often used in conjunction with particulate filter systems employing HEPA filters and/or activated carbon, since it does not really get rid of airborne particles. It is, however, a method to kill germs such as bacteria and viruses. Air purifiers using this technology have a UV lamp installed and as microorganisms pass by the UV rays radiated from the lamp, cellular or genetic damage occurs, destroying the microorganism. However, these **particles must be exposed to much higher levels of UV light for much longer than in a typical air purifier for the radiation to have any meaningful effect**. The effectiveness of this type of air purifier is highly dependent upon the wattage of the light and the time of exposure to the light.

A UV air purifier can convert molecules of oxygen and water found in your air into ozone and hydroxyl. The active molecules react with the air pollutants and destroy them into harmless components like water and carbon dioxide.

Most Common Types of Air Purifiers

Although UV technology is effective at killing viruses and bacteria, it is best used with a filter system ahead of the lamps. Without a filter system, too many microorganisms get shaded from the light by particulates. Therefore, most air purifiers that employ UV start by filtering the air with HEPA and activated carbon and use the UV as a final stage of filtration.

These air purifiers can produce ozone, and you should take steps to make sure ozone production stays under recommended guidelines. As per safety standards instituted by the National Institute for Occupational Safety and Health (NIOSH), Ozone concentration must be below 100 parts per billion (ppb).

My-shield® Surface Sanitizer/Disinfectant has a quicker kill time and zero dwell time. We recommend treating the HEPA and activated carbon filters, that are often employed with UV air purifiers, with My-shield® Surface Sanitizer/Disinfectant to kill viruses, bacteria, mold and mildew that pass through or become trapped in the filter.

Negative Ion

Negative ions can and will occur naturally in some environments, especially near waterfalls or after rain, leaving a positive effect on humans, animals, and even in the environment due to the pure air created from the negative ions.

Ionic air purifiers are extremely quiet and operate without a motor. Ionic air purifiers work through negative ion formation to emit a steady stream of these ions into the air. Through electrostatic attraction, the negative ions take the airborne particles out of the air and transfers them to walls and surrounding solid surfaces in the room. They do not eliminate them. Although they are stuck to walls and other surfaces, they have the ability to become loose and re-circulate themselves back into the air. Therefore, the negative ion air purifier has not cleaned and eliminated these particles, and there is still a chance they will contaminate the air again. Negative Ion air purifiers **do not effectively kill viruses, bacteria, mold and mildew**.

Some ionic air purifiers have electrostatic precipitators that trap positively charged particles to a metal plate inside the air purifier.

Some negative ion air purifiers do produce some ozone. If so, make sure your unit meets safety guidelines. As per safety standards instituted by the National Institute for Occupational Safety and Health (NIOSH), Ozone concentration must be below 100 parts per billion (ppb).

To solve this issue, we recommend electrostatically spraying My-shield® Surface Sanitizer/Disinfectant in rooms where negative ion air purifiers are employed to kill viruses, bacteria, mold and mildew that are magnetically attracted to the positive charge on walls and other surfaces. We also recommend treating electrostatic precipitators or filters.

Contact Us at www.rjmnanotech.com regarding an exciting, state-of-the-art air purifier technology which creates powerful oxidizers that are actively released into the air where they seek out and destroy viruses and bacteria.