

## Air Purifier Technology

Personal air purifiers and respirators first appeared in the 1700s and 1800s during the Industrial Revolution when various inventors decided that engineers, sailors and workers could be protected by placing different materials over their faces.

Leonardo da Vinci created a rudimentary respirator with a water-soaked woven cloth.

The first respirator that purified air was invented by Lewis Haslett in the mid-1800s.

The Haslett Lung Protector was comprised of moist fibers in a face protector that had a one way valve to trap particulates in the air.

Industrial workers began wearing a cup-shaped mask created by Hutson Hurd in the late 1800's.

In the 1940's the first free standing HEPA filtration units were developed by the U.S. Army Chemical Corps and the U.S. Atomic Energy Commission. The filters were called 'collective protector filters' and were made of asbestos and created to protect against radioactive and chemical agents used in war.

Later, as the dangers of inhaled asbestos became apparent, other fibers and materials were substituted into the HEPA filters. These filters claimed 99.97% particle removal efficiency rate.



### Modern Air Purifiers

In the 1960's a mechanical engineer named Klaus Hammes invented the first household consumer air purifier for coal ovens. This purifier helped keep the outlet for the ovens clear of black particulate matter. Interestingly, with the capture of coal particulate matter, household residents also found that they suffered less from asthma and allergies. Hammes continued to perfect more air filtration devices for forced air heating and cooling systems and room air

cleaners with fans. In 2000 Hammes produced the first compact air purifier that was proven to reduce allergies and asthma within the household.

## **Current Technologies**

Air purifier technology today strives to be higher capacity, higher efficiency, and with a better ability to clear the air of potential allergens and dangerous particulate matter. The current technology is comprised of many different types of systems that draw from one of at least five different purification methods.

1. **HEPA technology:** This is a mechanical method in which to remove contaminants from the environment. Typically this type of a system is comprised of a very fine screen and a forced air system (usually the heating/cooling system of the home). The HEPA filter abolishes many particles, even those as small as 0.3 microns. This is small enough to capture mold spores and pollen. HEPA fine screen filters do not filter out harmful chemicals.
2. **Adsorption technology:** This technology uses highly absorbent and porous materials such as activated charcoal or zeolite. These materials can remove chemical contaminants, some chemicals in tobacco smoke and some odors found in the air. These materials do not remove particulate matter from the environment.
3. **Pre-filtration.** Pre filters are used on many of the consumer purifier units, especially those with HEPA fine screen filters. Pre filters are coarser screens that collect large airborne contaminants such as hair, dust and dirt. Their main function is to prolong the life of the somewhat expensive fine screen filters used in these air purifiers and thereby increase their efficiency.
4. **Electrostatics:** The air purifiers in this category contain a collector grid that has a particular charge (either positive or negative) and collector plates that are the opposite charge. As the particles pass through this filter, they are ionized (charged opposite to the collector grid and plates) and after ionization, are drawn to the grid and plates that are oppositely charged.
5. **Ultraviolet (UV):** UV Light is often used in hybrid purifiers and serves to kill any microorganisms and mold spores collected by the purifier.

Newer systems that are available are typically hybrid systems designed for various usages and often have a very powerful air flow so that the entire room environment can be cleaned at least 4-5 times an hour.