
HEPA Air Purifiers

High Efficiency Particulate Arresting (HEPA) air filters were developed by the military in the 1940's and became available for home use in the 1950's. Air purifiers using HEPA technology can help alleviate symptoms caused by dust, dander, bacteria, molds and other airborne pollutants.

HEPA filters only allow very tiny particles to pass through. Very little air is able to pass through a single sheet of HEPA paper because of the small size of the holes. In a HEPA filter, paper is folded back and forth so as to present a very large surface area to the airflow. This is how HEPA filters are made. Some have as much as 40 square feet of material folded into a single HEPA filter section.

HEPA filters look like a very thin bail of fibers. Airflow must find a path through a dense collection of fibers. There are three ways HEPA filters purify the air. Firstly, larger particles run directly into fibers and stick. Second, medium-sized particles get "caught" because of the sheer density of fibers in the filter. Third, smaller particles (about 0.1 micron), collide with other molecules while traveling through the filter and get trapped as a result of the collision and density of fibers.

HEPA air purifiers remove dust, mold spores, as well as, many bacteria and viruses. Most air purifiers claim to be 99.97% efficient at removing particles 0.3 microns and larger from the air that passes through the HEPA filter. This claim is not accurate in poorly designed HEPA air purifiers where some of the airflow may pass around the HEPA filter. If the airflow does not have the opportunity to pass through the HEPA filter, it will not be cleaned. Thus the HEPA filter should specify that at least 90–95% of airflow entering the air purifier goes through the HEPA filter.

Pure HEPA air purifiers do not remove odors, chemicals or gasses. These are substances that are smaller than the 0.3 micron holes in a HEPA filter. Therefore typical HEPA air purifiers have some level of activated carbon based material to absorb odors and chemicals that will not be caught by the HEPA component itself.