

Filter Replacement Guidelines

The heart of any high efficiency air purification system lies in the value of the HEPA filters. The system is only as good as the HEPA filters installed within. HEPA's are designed to contain a minimum of 99.97% of particles as small as .3 microns in size. That capture range allows for containment of bacteria and even certain viruses. HEPA filters must be maintained in order to operate to their maximum efficiency. This requires proper pre-filtration and proper leak free sealing of the HEPA element. The CDC guidelines (10/28/94/Vol.43/ No.RR-13) call for periodic quantitative leakage and performance testing twice a year. A dioctylphthalate (DOP) penetration test will verify leakage and filter loading characteristics. Pressure gauges (manometers) attached to units will monitor the resistance levels and function as a window of operation for the device. The pressure/resistance increases as the filters load with particulate matter. Conversely, the air flow through the filters decreases as the resistance increases. Conventional means to determine filter change outs varies with location, environment and concentration of particulate matter at each site.

The nature of the contamination seen by filters in health care settings is different from similar filters utilized in HVAC (heating, ventilation, air conditioning) systems. HVAC system filters normally see higher volumes of air and are capturing more dust, pollen, and the normal types of airborne contamination. They will load faster and their containment is far less critical. They can easily be monitored by pressure gauges to determine their remaining life expectancy. However, this criteria doesn't apply on the same basis as filtration for critical environments. The concentration of particles is far less, but the criticality of particles is far greater. Filters in use in isolation rooms for example, will see far greater amounts of infectious airborne pathogens than filters used for example to filter outside air. The build-up of these contaminated pathogens on the filter matrix will contribute an insignificant amount of resistance to the overall pressure build-up of the filter even with a high concentration of infectious material. In other words determining the filter change point by only reviewing the pressure gage is incomplete. For this reason most hospitals will periodically change pre-filters every three months and automatically replace HEPA filters between 18-24 months based upon overall usage. The build-up of contamination within the filter calls for periodic renewal to provide a safe and continuously effective protection system for patients and staff alike and remains the paramount objective.