HEPA FACTS:

What does the term HEPA mean?
HEPA is an acronym for "High Efficiency Particulate Air" or "High Efficiency Particulate Arrestance." This acronym refers to a filter that is manufactured, tested and certified to meet Institute of Environmental Sciences and Technology (IEST) construction, performance and certification standards as currently published in IEST RPCC001.3.

How long have HEPA filters been in use?
The first HEPA filters were developed for the Atomic Energy Commission during World War II for use in facilities manufacturing components for the Manhattan (atomic bomb) project. These HEPA filters were originally designed to capture microscopic radioactive particles too small for effective removal by existing types of filters. HEPA filters used today are much more efficient and economical than the products made in the 1940's.

Where are HEPA filters used today?
HEPA filters are generally specified for applications where microscopic airborne particles or biopollutants could cause human health or product quality problems. Typical users include military, nuclear, pharmaceutical, electronics, biological and medical facilities.

What is it that makes HEPA filters so efficient?
The ultra-fine glass-fiber medium captures microscopic particles that can easily pass through other filters by a combination of diffusion, interception and inertial impaction. To qualify as a Type A HEPA filter, the filter must capture at least 99.97% (9,997 out of 10,000) of particles 0.3 microns in size–about 300 times smaller than the diameter of a human hair, and 25 to 50 times smaller than we can see. To a HEPA filter, catching a one-micron particle (1/1,000,000 of a meter) is like stopping a cotton ball with a door screen.

Are filters this efficient really necessary for IAQ applications?
Laser particle counter measurements typically show that more than 99% of the particles suspended in indoor air are one micron (1/1,000,000 of a meter) or smaller in size. EPA calls these “lung-damaging” particles, because they can lodge deep in the lungs when inhaled. The ability of HEPA filters to capture particles this small is what sets them apart from other types of filters. Regulations developed by EPA, OSHA, CDC and other federal, state and local government agencies responsible for human health and IAQ issues specify HEPA filters for asbestos, lead and mold abatement, TB and SARS isolation rooms and healthcare renovation projects.

Are all filters made with HEPA filter media HEPA filters?
Manufacturing a filter with HEPA filter media does not mean that the filter itself meets true HEPA efficiency requirements. Serious filter leakage can go undetected if filters are not individually tested and certified at the end of the manufacturing process. Even the tiniest pinhole leaks in the media or breach of the seal between the media
pack and the filter frame can cause the filter to fail IEST requirements. The testing requires very specific procedures using a thermally generated mono-dispersed aerosol and a laser particle counter. Some regulations also

require field-testing by the user prior to going into service and periodically thereafter.

Why is the testing done with a 0.3-micron particle size test aerosol?
Filter efficiency studies have shown that 0.3-microns is the "Most Penetrating Particle Size (MPPS)" for HEPA filter media. Efficiency is typically greater than 99.97% against larger or smaller particle sizes. Particles larger than 0.3 microns are typically more easily trapped, or intercepted, by the media. Smaller particles often lack sufficient mass to penetrate the media.

Is a "HEPA Type" filter the same as a HEPA filter?
No. In fact, the differences are huge. According to the American Lung Association, filters classified as "HEPA type" filters may capture as little as 55% of 0.3-micron particles (5,500 out of 10,000). By this definition, the true HEPA filter could be more than 1,800 times as efficient as the "HEPA type" filter.

Does HEPA filter efficiency decrease as the filter gets dirty?
No. Unlike electronic air cleaners and other air purification technologies that experience substantial loss of efficiency as they become dirty, exactly the opposite typically happens with HEPA filters. In fact, the dirtier a HEPA filter gets, the more efficient it can become.

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