

## **Portable Air Scrubber Or Negative Air Machine..... Which Is Right For You?**

Negative air machines and portable air scrubbers can perform many of the same tasks. Both are designed to pull dirty air through a series of filters, to remove impurities. Both are designed to operate in the “negative air” mode by exhausting filtered air out of the work area through flexible ducting, or in the “recirculation” mode, where filtered air is exhausted back into the work area.

Nonetheless, these products are actually very different from a design and applications perspective. Because of Abatement Technologies’ market leadership in both products, we feel uniquely qualified to help users understand the differences between them, and when one should be selected over the other.

### **Negative Air Machines**

Negative air machines have been used in the asbestos abatement industry since about 1980. These rugged machines are designed primarily to provide maximum airflow per dollar cost, and to withstand on-the-job use and abuse. They are best suited for large, long-duration abatement projects, where numerous units are required, a large number of workers are available, and where cost – not portability - is the major issue.

Peak airflows of negative air machines typically range from 500cfm (cubic feet per minute) for the smallest models, up to about 5,000cfm for the largest models. The most popular are “2,000 class” units. Various “2000” models on the market actually produce peak airflow of anywhere between 1,200cfm to 2,000cfm, depending on the make, model, and motor horsepower. Weights range from 175 lbs. to 200 lbs., and motors from 0.75hp to 1.75hp.

Most negative air machine cabinets are longer than they are tall. Air flows horizontally through the cabinet, which is typically constructed from relatively inexpensive materials such as uncoated galvanized sheet metal or aluminum, or plastic. Lower priced components such as particleboard-frame HEPA filters, forward-inclined, “squirrel cage” blowers, and basic control panels with few “bells and whistles” are used to help keep costs down.

In applications where the units are typically not moved that often, portability becomes a secondary consideration. The cabinets are mounted on four casters to enable one worker to push the unit around the job site. Two or more workers are

typically needed to load most units into or out of a transport vehicle, or to hand-carry them up or down stairways.

Contractors typically pay \$800 to \$1,000 for basic “2000” models, depending on quantity and quality – about \$.40 to \$.80 per cfm of peak airflow.

### **Portable Air Scrubbers**

HEPA-AIRE® Portable Air Scrubbers (PAS) were invented and developed by Abatement Technologies’ engineering staff in the early 1990s to provide contractors and other users with a more lightweight portable unit designed to filter particulates; biopollutants such as molds and bacteria; gases; VOCs (volatile organic compounds); smoke; and odors.

These upright units are designed to enable one operator to maneuver them into and through tight spaces. They are taller than they are long, with a small “footprint”, and the air flows vertically through the cabinet. Some models are mounted on a built-in transport cart attached to the cabinet that includes a handle, front swivel casters, and large rear wheels with smooth rubber tires.

This design enables one operator to load or unload the unit from a truck or van, and to move it to the job site by simply grabbing the handle, tilting the unit back on its rear wheels, and rolling it like a two-wheeled cart. The units can also be stood completely upright to allow the operator to use the front casters to swivel the PAS into position in tight spaces.

The operator is also able to roll a HEPA-AIRE PAS up or down stairways without lifting it or assistance. Abatement’s high-output HEPA-AIRE PAS2400 model even features a modular, two-piece design and stair climber apparatus with non-marking belts to make movement on stairways even easier.

Efficient backward-curved blowers and powerful high-speed/ high-efficiency/ permanent split capacitor motors substantially improve the ability of a PAS to overcome filter static resistance and maintain higher airflow as filters load. This feature significantly increases the useful life of the filters compared to the lower speed economy motors and forward-inclined blowers used in negative air machines and in lower-performance scrubbers.

Metal frame HEPA filters and elaborate controls such as hour meters, variable speed controls and filter change indicator lamps further enhance performance, productivity and user-friendliness. Metal filters are an absolute must for any projects that may involve molds or other fungi.

All of these extra features and upgraded components come at a cost. Contractor price for a quality PAS unit that is fully equipped typically runs about twice as much “per cfm” of peak airflow as negative air units – between \$.80 and \$1.60 per cfm.

## **Why and When To Pay More For A HEPA-AIRE PAS Unit**

So when and why does it make sense to pay more “per cfm” for a HEPA-AIRE PAS instead of buying lower cost negative air units?

Surprisingly, the answer is often. For one thing, portability equals productivity equals profits on many jobs. Except for the smallest models, negative air units are simply too heavy and take up too much space to be practical.

As a rule, contractors should select a portable air scrubber:

- For residential projects
- When space is limited on a commercial project.
- When units must be moved frequently to and from job sites or from one location to another on a site.
- When units must be moved up or down stairs

For contractors who work on both large and small projects, variable-speed PAS units are especially advantageous. The low speed setting on a two-speed, 2,000cfm negative air unit is typically between 900 and 1,200cfm. This may be way too much air and way too much noise on smaller projects, where much less airflow may be needed and too much negative pressure can literally suck the polyethylene sheeting off the walls.

Metal-frame HEPA filters also provide offer significant user benefits compared to particleboard frame filters when users are used for applications such as mold abatement, fire damage, water restoration, sewer backups or bioremediation. In these situations particleboard is susceptible to supporting mold growth and absorbing odors. Temperature or moisture variations can also cause particleboard frames to swell, deform, and fail.

## **Does A HEPA-AIRE PAS Really Cost More?**

The initial price of an air filtration device is typically a much less important consideration than its ongoing operating costs, productivity, and maintenance requirements over its useful operating life. A PAS unit that provides higher performance and productivity may actually cost the user substantially less to own and operate over the long haul than a much lower-priced device.

One big reason is substantially better filter capacity and life. A backward-curved, anodized aluminum blower or an airfoil-type impeller has a far greater ability to pull contaminant-laden air through the filters than a squirrel cage blower. The performance gap widens even more as the filters start to load, flex duct is added, or if carbon filtration is also required.

Some contractors have found that PAS have saved them thousands of dollars per year in replacement filter costs alone, enabling them to recoup the higher initial investment within the first few months of operation. Over the typical useful

operating life of 10 years or more, the savings can add up to ten or twenty thousand dollars - a nice return on a few hundred dollars extra invested up front.

### **Safety Certification**

This is a very important issue. Negative air machines and portable air scrubbers must be tested and safety certified by a Nationally Recognized Testing Laboratory (NRTL), to ensure that they meet applicable U.S. (OSHA) and Canadian electrical safety standards.

### **Is It A True 99.97% HEPA Filter?**

Many projects require true HEPA (High Efficiency Particulate Air) filtration to capture potentially hazardous airborne contaminants. Improperly filtered air exhausted into a “clean” area of the facility can potentially create huge problems for the contractor, the building owner, and the insurer.

Portable air scrubbers and negative air machines must be equipped with a true Type A HEPA filter in accordance with Institute of Environmental Sciences and Technology standard IEST-RP-CC001.3, and UL900, Class II flammability requirements. Unfortunately, some filtration products sold as HEPA units are equipped with HEPA filters that may not meet these requirements.

For example, not all “HEPA” filters on the market are individually tested and certified to ensure that the completed filter provides filtration efficiency of 99.97% or higher @ 0.3 microns, a very important requirement under the IEST standard. Why is this so important? Even if HEPA-efficiency media is used to make the filter, no one can possibly know whether an untested filter actually provides true HEPA efficiency or leaks like a sieve due to a media breach that occurs during the filter manufacturing process, or leakage between the media and the filter frame.

### **Is It Really A Scrubber?**

Don't be fooled. All PAS are not created equal, and prospective purchasers who do their homework will find that quality, performance and features can vary greatly from brand to brand. Some products marketed as portable air scrubbers are actually negative air machines. Some manufacturers and suppliers may not even know the difference - or may not care.