

What to Consider When Evaluating Portable Air Scrubbers

When purchasing portable air scrubbers for use on restoration and/or mold remediation projects, there are many factors that should be considered in selecting the proper piece of equipment. Too many times airflow (or claimed airflow) and price are the only issues considered before a purchase. And all too often the contractor finds that the equipment does not meet his expectations or needs when it arrives. Unfortunately, it is too late by then.

The following list has been compiled to assist restoration and remediation contractors choose equipment that will provide the performance and quality necessary to perform at the level needed on their jobs.

1. **Ease of Transport**

This is one of the most important, yet most overlooked, aspects of portable air scrubbers. Scrubbers must constantly be moved from job to job and from location to location during a job. Some units are designed for one-person operation; others may require “two men and a mule” to move. Weight is very important, but so is weight distribution. Scrubbers that include a transport system for easy movement by one operator are safer and more cost-effective to operate. A stair climber is also a valuable feature when negotiating stairs. Size and weight should also be considered when thinking about transport and vehicle options.

2. **Filtration System**

The filtration system is the heart of a portable air scrubber. Poorly designed filtration can add hundreds or even thousands of dollars in annual operating costs. Filters must provide a substantial dirt-holding capacity and long filter life without significant airflow loss. A well-designed filtration system requires three stages of filters to progressively filter all particle sizes. If odors and particulates are to be removed simultaneously, a fourth stage of gas/odor filtration may also be needed.

Easy “no tools” access is important when inspecting and replacing dirty filters. The filter module should not have to be removed to change or inspect filters. This is time consuming and can also cause debris to be spilled onto the HEPA and the surrounding area.

HEPA filters must be individually tested by the filter manufacturer and certified to a minimum efficiency of 99.97% at 0.3 microns. It is not enough to simply assemble a filter using HEPA media. A true HEPA filter must be constructed to the exacting manufacturing practices necessary to ensure that the finished filter does not leak through the filter media or around the frame or seams. If debris can bypass the HEPA media, the filter will not be able to pass DOP testing required in many abatement

specifications. Insist that the HEPA filter itself be certified to HEPA standards, with a certification label affixed to the frame of the HEPA filter.

3. **Blower Type**

Air scrubbers are required to trap large quantities of debris. Debris buildup on the filters hinders the airflow and causes what is technically known as static resistance. Specific blowers are much better suited than others for overcoming this resistance.

There are many types of air moving blowers available, each with specific characteristics for certain applications. For example, forward-inclined “squirrel cage” blowers are designed to move large volumes of relatively clean air and low static resistance. These inexpensive blowers may be suitable for applications such as use in a furnace or even in an asbestos negative air machine; they are not, however, a very good selection for use in an air scrubber.

Backward-inclined or airfoil type blowers are a much better choice since they are engineered with the capacity to overcome the pressure drop of dirty filters. The use of this type of blower will not only increase filter life but will also produce higher airflow as the filters begin to accumulate debris. This generally means significantly better performance (airflow) over the life of the filters and much lower replacement filter expenses than a scrubber or negative air machine that is equipped with a forward incline blower with a comparable peak airflow rating.

4. **Materials and Construction Methods**

Most negative air machines position the blower at the outlet of the cabinet, and pull air through the cabinet. This keeps the entire cabinet – including the section downstream from the HEPA filter - under lower (negative) pressure compared to the air in the surrounding area. With this design, the machine must be perfectly sealed to prevent contaminated air from being sucked into the cabinet and exhausted without ever passing through the HEPA.

This is an especially important concern when the unit is used as a negative air machine and exhausting air into another part of the facility, especially if that area is occupied. Any such leaks will negate the effectiveness of the HEPA filter and will more than likely cause contamination of the area and failure of any air testing required by the job specification. This should be an important liability concern of any mold abatement contractor.

Generally, the use of gaskets and solid rivets produce the most leak free cabinets. Beware of any cabinet that uses fasteners such as hollow pop rivets, or threaded fasteners such as sheet metal screws or nuts and bolts, since these devices do not afford the airtight seal necessary to keep small particles from infiltrating a negative pressure cabinet. It has been found that sub-micron particles can actually travel along the threads of a screw or bolt! Also make certain that any hardware, instruments, or transport system components that penetrate into the cabinet are sealed in such a way as to prevent any leakage or bypass.

5. **Airflow (CFM)**

Cubic Feet Per Minute (CFM) is one of the most difficult aspects of air scrubbers to compare between various pieces of equipment. First, peak (maximum) airflow ratings do not necessarily provide an accurate indicator of performance under “real life” operating conditions. Second, manufacturers often use vastly different ways to measure airflow, which often produce different results. Some claims are based on tests without filters in place; some simply quote blower curve ratings; others simply seem to use “guesstimates”. This makes it very difficult for a purchaser to compare different equipment on an “apples to apples” basis.

Because of these discrepancies, it is probably not a good idea to put too much emphasis on differences in manufacturers’ published CFM ratings when choosing an air scrubber. You want to choose a machine with adequate airflow for the type of jobs that will be done with the equipment, keeping in mind that in general the higher the airflow the larger the unit.

If you primarily handle very small jobs where portability and size is crucial, a 500 CFM machine will more than likely meet your needs. Contractors doing a broad range of jobs that require a moderate amount of airflow and easy transport from job to job and within job sites might find a 1,000 CFM machine the best choice.

A 2,000 CFM machine might best suit contractors looking for as much airflow as possible for large commercial projects, especially if transport of the machine is of little concern. However, contractors doing various types and sizes of projects might prefer the added flexibility of having multiple smaller units instead.

6. **Multi-Speed vs. Single Speed**

Containment size on mold remediation projects varies significantly. This means that the airflow needed to maintain adequate negative pressure inside the containment will also vary. If too little air is exhausted through the air scrubber, negative pressure will not be maintained and contaminants could be released from the containment area. If too much air is exhausted, the poly can be pulled from the wall and the entire containment lost. A variable speed system provides the capability of adjusting the airflow to provide the optimum negative pressure for each application.

Variable or multiple speed settings are also a useful feature using the unit as an air scrubber in the recirculation mode in an occupied area. Often, there are situations where occupants prefer to turn the unit down to lessen the noise. Variable speed motors may add some cost but they offer the best solution for these adjustments.

7. **Versatility**

Some of the questions that should be considered when choosing an air scrubber: Can it filter odors as well as particulates at the same time? Can it be used in both the horizontal and vertical position? Is it designed for easy vehicle loading and unloading? Can it be used as a recirculating device as well as a negative (or positive) air machine? Does it use commonly available types and sizes of inlet and outlet ducting?

8. **Warranty**

Check the length of the warranty and what the warranty covers. The length and extent of

warranty coverage not only offers the buyer some protection if the product fails; it is also a good barometer as to the confidence the manufacturer has in its equipment.

9. Amenities and Appearance

Look for features on the control panel such as an hour meter and a filter change indicator. Check the power cord configuration. Is it permanently attached or can it be removed for transport. If it is attached, make sure it can be wrapped safely off the floor, in a way that it does not interfere with transporting the unit.

Another important factor is the over-all look of the unit. If it looks high-tech and impressive, it will provide a quality image of your company with your customers and with insurance adjusters. Also, features like powder coating add to the durability and ease of decontamination of the unit.

10. Price

Price should certainly be a consideration when purchasing any piece of equipment, but buyers can be penny wise and pound-foolish. When all things are equal, price can be the deciding factor. When they are not, examine each product closely and try to determine a value for each of the features and construction differences. This will provide you with a much better basis to make an informed buying decision.

It is important to consider that this is an investment. A properly engineered scrubber can easily last for five to 10 years or more with minimal maintenance, while a lesser product might be an ongoing maintenance nightmare and only provide a few years of service at best.

And remember, productivity and replacement filter costs can also vary greatly between various products.