

Why Be Concerned About Maintaining Indoor Air Quality During Renovation Projects and What Can Be Done?

Construction and renovation projects generally release contaminants and pollutants that can impact the indoor air quality (IAQ) of a building. Particles released into the air during facility construction, renovation, demolition and maintenance activities must be properly isolated and contained. Tiny particles and fungal spores are lightweight enough to remain aerosolized (suspended in the air) for hours, days or even weeks. The aerosolized particles can migrate into other areas of a facility on air currents and pose a potential threat to the health of people and pets. Larger particles can create housekeeping problems when they drop out of the air and settle on floors and other surfaces. These contaminants may be transported to other areas of a building beyond the immediate construction or renovated area. While IAQ are not proactively enforced during construction and renovation projects you as a home or property owner should protect yourself

Indoor air pollutants are typically complex mixtures of low level contaminants which are difficult to measure. Rather than attempting to quantify levels of contamination it is more effective to contain them and prevent them from spreading so that they can be disposed in a safe fashion

There are many different types of contaminants associated with construction and renovation projects. Below is a list of the contaminants and why they should be avoided:

Volatile Organic Compounds

Volatile organic compounds (VOCs) are substances that are readily released in the form of a gas from building materials. Construction projects may introduce a variety of VOC emitters into a space. These compounds are associated with a variety of health symptoms. At high enough levels, exposure can cause central nervous system effects (headaches, drowsiness). At lower levels, they are reported to be irritants to the eyes, nose and throat.

Particulates (Dusts and Fibers)

Construction activities may also introduce particulate matter such as dusts and fibers into an environment.

Non toxic or nuisance dusts will be created by cutting, sanding, disturbing dirty areas or the installation of Portland cement, gypsum, limestone, and Plaster of Paris. These dusts will cause no long term health effects, but can increase occupant discomfort and can be mistaken for more hazardous materials such as asbestos. Fiberglass and mineral wool can be irritating to the skin, eyes, and respiratory tract. While long term health effects are still being studied,

environmental controls and appropriate personal protective equipment should be implemented.

Among the toxic particulates, which are subject to special regulation, include lead paint dust which is toxic to the nervous system, and asbestos which is a carcinogen. Projects which may disturb lead painted surfaces or asbestos containing materials warrant close supervision to ensure compliance with all applicable laws.

Combustion Products

Combustion sources (such as equipment powered by combustion engines, and space heaters) may introduce carbon monoxide, carbon dioxide, nitrogen oxides, and sulfur dioxide into a space. Welding can produce these contaminants as well as ozone. These gases may cause eye, nose, throat, and respiratory system irritation. Some individuals, such as those with asthma, may experience more serious reactions. Carbon monoxide exposure may cause headache, dizziness, rapid heartbeat, and at high levels can be fatal.

Biological Materials

Demolition of materials and disturbance of previously sealed areas may contribute to the release of biological pollutants. Fungi, dust mites, insect parts, and microorganisms can become airborne when renovations are undertaken, stagnant water is encountered, and bird or animal droppings are disturbed. Chronically wet or damp areas may be reservoirs of gross contamination. Exposed individuals may develop allergic reactions or infections.

Examples of activities that can release particles into the air that may be harmful to people and pets include:



Best IAQ Control Strategies

Early identification of existing building hazards is the first step toward eliminating the development of an IAQ problem. Inspect the area to be renovated during the project planning stage. Look for possible asbestos and lead containing materials which may be disturbed. Attempt to identify sources of dust and microbial contamination. Consult EH&S documentation and arrange for surveys and analyses when appropriate. Implement a strategy of source management by choosing one or more of the following:

Source Removal

Identify a source of contamination and relocate it so that it will not impact the IAQ. For example, do not locate a diesel generator or a roofing kettle near a building air intake.

Source Substitution

Identify a material likely to impact the IAQ and select a similar but less toxic substitute. Review MSDS's, manufacturer specifications, and consult with EH&S. For example, choose latex over oil based paint, hardwood over pressed wood, water based over solvent based adhesives, low formaldehyde emitting fabrics, and continuous filament carpet.

Source Encapsulation

Create a barrier around the source and isolate it from other areas of the building so that there is no recirculation of air from the work area into occupied spaces. This may include physically isolating a section of the building with polyethylene sheeting or other barriers, as well as isolating the space from the general ventilation system by blocking return air grilles. Keep doors closed and seal stairwells so that they do not act as conduits for contaminants.

Ventilation

Utilize either dilution ventilation or local exhaust ventilation in conjunction with isolation techniques to reduce contaminant levels. Dilution ventilation increases the amount of outside air passing through an area to dilute and flush out low levels of contaminants.

Portable Air Scrubbers (PAS) are designed to contain and capture indoor air particles and other contaminants and odors using a time-proven technique known as negative pressure particle containment. Effective negative pressure containment requires four main elements:

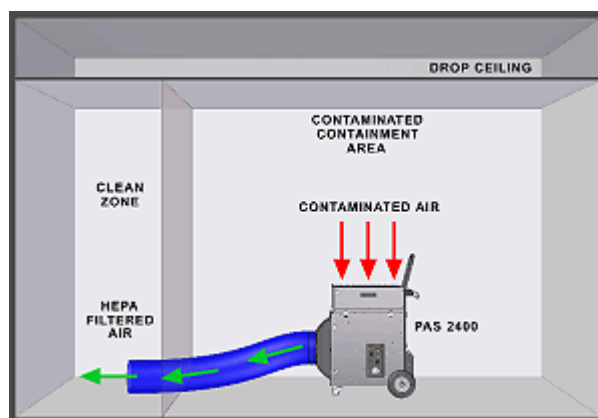
1. Construction of a physical barrier around the work area to separate it from the rest of the facility.
2. Sealing off any HVAC return air grills within the space to protect against particles being pulled into the HVAC system.
3. Continuously pulling air within the area through a HEPA filtration device to reduce the number of airborne particles. Most job specifications require at least 6 air changes per hour (ACH), which means that the device must filter a volume of air equal to the air volume contained within the enclosed space 6 times per hour, or every 10 minutes.
4. Exhausting at least 10% more cubic feet per minute of clean, HEPA-filtered air out of the space than is supplied into it to create and maintain negative pressure within that space. This helps ensure that any air leakage between the contained area and adjacent spaces will be "clean" air flowing in and not "dirty" air flowing out.

Modes of Operation

State-of-the-art Portable Air Scrubbers can be used in any of three modes of operation, depending on the air cleansing objectives and space limitations:

1. Negative Pressure Mode with Portable Air Scrubber Located Inside the Containment Zone:

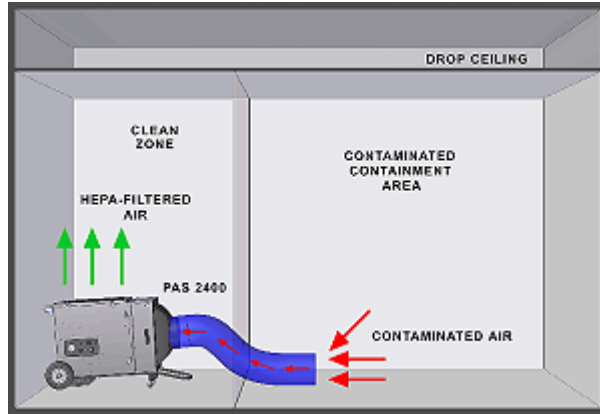
The most common configuration is locating the Portable Air Scrubber within the contained work space and using it to propel clean, HEPA-filtered air out through flexible exhaust ducting. See figure below:



2. Negative Pressure Mode with the Portable Air Scrubber Located Outside of the Containment Zone:

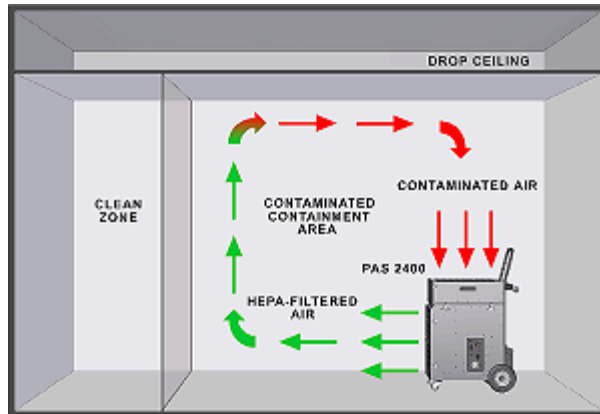
Space limitations within the containment zone sometimes require locating the Portable Air Scrubber in a nearby area. In these instances dirty air is pulled out of the contained area and fed directly into the scrubber inlet manifold through

flexible ducting. The negative pressure inside the ducting by the air scrubber ensures that dirty air cannot leak from the ducting into the clean space. Filtered air can be exhausted into the area in which the PAS is located or ducted outdoors. See figure below:



3. Continuous Air Cleaning and Recirculation:

Portable Air Scrubbers can be used as continuous air cleaners, with no effect on room pressurization, to facilitate the removal rate of airborne contaminants. The PAS is located within the containment zone with no inlet or exhaust ducting attached. See figure below:



Exposure Control

It may be unrealistic to attempt to completely eliminate airborne contaminants during a construction project, but it is possible to minimize occupant exposure to those contaminants by carefully scheduling the work during periods of low occupancy such as holidays, evenings and weekends. In addition, allow for a

“flush out” period of ventilation prior to reoccupying the work area. It is recommended that the area be flushed out with maximum outside air at normal temperatures for 72 hours prior to reoccupancy. Finally, be sensitive to the fact that some individuals are more susceptible to low level contaminants than most, and these people may need to be temporarily relocated.

Housekeeping

Good housekeeping practices will go a long way toward containing dusts and construction debris, and allowing building occupants to feel confident that the project is well managed. Consider using a HEPA filtered vacuum cleaner to minimize recirculation of contaminants. Suppress dust with wet methods. Quickly clean up spilled materials. Protect porous materials such as insulation from exposure to moisture and contaminants.

Notification and Communication Practices

Proactive communication and advance notification of all affected parties can prevent IAQ issues from developing and escalating. Develop a list of building or departmental contacts who can disseminate project details and schedules to all building occupants. Classroom work should include notification of the Registrar’s Office. Signage might be posted to provide a phone number for concerned visitors seeking information. Request that building occupants first contact these representatives, who will then communicate concerns to the Project Manager for resolution. Provide accurate information about chemical products which will be used, noises, dusts, odors, and disruptions to the normal routine well in advance of the project start date. Explain that the least toxic materials available have been selected, and provide Material Safety Data Sheets for review. Listen to occupant concerns, discuss control strategies which will be implemented to minimize contaminants, and allow the end user to have input into the scheduling process. Make allowances for individuals with special concerns or sensitivities. Keep actual health risks in proper perspective.

[About Brace Enterprises LLC](#)

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