

A Path to Healthy Indoor Air

Follow both paths and implement as many options as possible!
For more details on each option, read the next page.

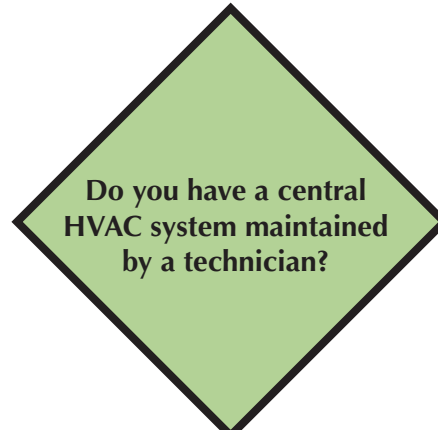
VENTILATION



YES

Open your windows and doors as much as possible. Ensure your windows have screens.

FILTRATION



YES

Upgrade your HVAC filters to the highest MERV rating that the system supports.

No

YES

Did you upgrade your central HVAC filter to at least MERV 13?

No

Add at least one CO₂ monitor. If CO₂ is >1100ppm, make sure to ventilate and filter.

Add portable HEPA filters to meet your required Clean Air Delivery Rate (CADR).

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Ways to Improve Air Quality

Open your windows and doors as much as possible. Ensure your windows have screens.

Open windows and doors to ventilate your space with fresh outdoor air, reducing the risk of airborne illnesses. If possible, turn on some fans too.

Running fans or air conditioning without opening doors or windows won't help. It can even spread illness by pushing around unhealthy air!

Doing this is easy and inexpensive or free, but it's not always practical, such as in the winter. Also, make sure you use proper screening to keep out insects.

Add at least one CO₂ monitor. If CO₂ is >1100ppm, make sure to ventilate and filter.

CO₂ monitors estimate whether your space has stagnant air. Try to keep CO₂ below 1100 parts per million (ppm)—if it goes above this number, make sure you're using other protective measures, such as open doors and windows with fans, portable HEPA filters, or proper central HVAC.

A monitor costs about \$200 and requires no maintenance. Consider installing one per 1000 square feet of occupied space.

Opening windows will decrease CO₂, though it will not normally go below 400 ppm. HEPA and central HVAC filters will not reduce the CO₂ in your space, even though they decrease viral particles in the air.

Most indoor CO₂ comes from air exhaled by people. But there are indoor sources too, including propane and natural gas burning, candles, and dry ice.

Upgrade your HVAC filters to the highest MERV rating that the system supports.

Upgrade your filters to the maximum MERV rating they support, preferably MERV 13 or better. Be sure to check with your HVAC technician to ensure the system can support this.

Some systems can add outdoor air. If your system supports this, turn it on if your technician approves.

When spaces are occupied and there is increased risk of transmission, you may wish to override your AUTO or SMART HVAC settings to ensure its fan and filtration system is consistently running, even if there is no heating or cooling demand.

Add portable HEPA filters to meet your required Clean Air Delivery Rate (CADR).

To calculate your filtration needs, read the next page!

Portable HEPA filters should be correctly sized for your space and operate at a moderate to high fan setting depending on noise tolerance. Do not use AUTO or SMART mode.

Filters can be turned on or off depending on whether a space is occupied. They may be turned off at night to conserve power, but should be turned on at least one hour before the space is heavily populated.

HEPA filters can be used with open windows or doors.

Use a portable CO₂ monitor to assess whether the air has become stagnant. If CO₂ is greater than 1100 ppm, make sure your HEPA filters are on.

Devices that only use ionizers or carbon filters will not be as effective as HEPA filters, and devices that emit ozone may be harmful.

Some well-known brands are Levoit, Coway, Winix, Blueair, and Medify.

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Calculating the Size of Your Space

Why?

It's important to know how much air is in your space to make sure you are selecting the correct products to deliver adequate clean air. In their advertising, HEPA filters usually aim towards homeowners who have rectangular rooms with 8-foot ceilings, which may be different from businesses.

You only need to do this calculation once, unless you have a substantial change in your space, such as opening new parts of your building or major construction that adds significant square footage.

What?

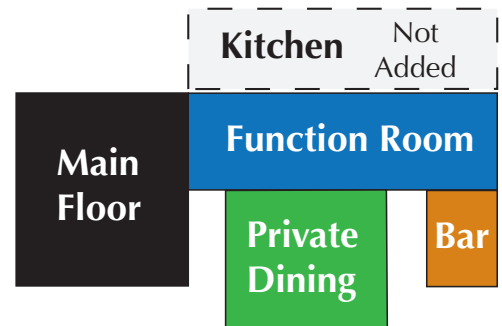
Identify the indoor spaces where people routinely congregate, including customers (such as dining areas in a restaurant, or store floors in a retail shop) and staff (breakrooms). You should ignore any outdoor space, even outdoor locations with a roof, such as a porch or patio.

Ignore spaces that are infrequently occupied, such as storage rooms, bathrooms, walk-in freezers, and unoccupied basements. You should also ignore commercial kitchen space, even though these spaces are often occupied, because they usually include substantial ventilation equipment over cooking spaces.

How?

Measure the width, length, and height of your space and multiply them together. This is the volume of your space in cubic feet (cuft). Round up your measurements to the nearest foot, and ignore partitions, furniture, bars, or other fixed or moveable features (such as floor display cases).

If you have a complex floorplan with multiple rooms, you can break the space up into subspaces and calculate the volume of each one separately. Multiply the length, width, and height for each subspace, then add up the subspaces to get the total volume of your space.



BREAK UP YOUR SPACE IF YOU NEED TO!

Here's an example: In a small restaurant with a floor area of 500 square feet and 10-foot ceilings, the volume of the space would be 5,000 cubic feet. If it has 12-foot ceilings, its volume is 6,000 cubic feet.

What do I do with this information?

Use it to calculate your required Clean Air Delivery Rate (CADR). HEPA filters are often marketed as appropriate for a specific size of space in square footage. This is not a universal truth, and is often an inaccurate measurement to ensure adequate filtration. Instead, use the Clean Air Delivery Rate (CADR), which should be listed in the units of cubic feet per minute (or sometimes cubic feet per hour).

To calculate your required CADR, take your total volume and divide it by 15. This should deliver 4 air changes per hour on a high fan setting, which is enough for non-medical businesses.

Buy a filter that can deliver your required CADR. When in doubt, round up to deliver more clean air. If you can't find one HEPA filter that can deliver your CADR, buy multiple units that, when combined, deliver your CADR. Some well-known brands are Levoit, Coway, Winix, Blueair, and Medify.

Here's an example: In my hypothetical 5000-cubic-foot restaurant, I need a HEPA filter capable of an average CADR of at least 333 cubic feet per minute.

Space #1: _____

Length: _____ ft

Width: _____ ft

Height: _____ ft

Length × Width × Height =

Volume #1: _____ cuft

Space #2: _____

Length: _____ ft

Width: _____ ft

Height: _____ ft

Length × Width × Height =

Volume #2: _____ cuft

Space #3: _____

Length: _____ ft

Width: _____ ft

Height: _____ ft

Length × Width × Height =

Volume #3: _____ cuft

Space #4: _____

Length: _____ ft

Width: _____ ft

Height: _____ ft

Length × Width × Height =

Volume #4: _____ cuft

Space #5: _____

Length: _____ ft

Width: _____ ft

Height: _____ ft

Length × Width × Height =

Volume #5: _____ cuft

Add Up Volumes = **Total Volume:** _____ cuft

Total Volume / 15 = **Required CADR:** _____ cuft per minute