

# Indoor airPLUS Technical Bulletin



## Filtration



High efficiency filters help remove small particles from the air that can cause adverse health effects, so upgrading HVAC filtration has the potential to make important improvements in indoor air quality for homeowners. What this means is that your homeowners can breathe better every day knowing their home is equipped to help manage a critical respiratory contaminant — airborne particles.

### Selecting the Right Filter

The home's heating, ventilation, and air-conditioning (HVAC) system regularly recirculates indoor air, distributing and redistributing dust, pollen, mold spores, pet dander and other indoor air contaminants. Air filters should be installed not only to help protect the HVAC system components, but also to remove particulates and improve the overall air quality indoors. Filters should also be installed in fresh air intakes to clean outside air that is brought into the home.

Air filter efficiency is graded using the MERV rating, a scale based on test methods established in ASHRAE Standard 52.2, although some filters may be graded by their manufacturers on alternative proprietary scales. MERV stands for "Minimum Efficiency Reporting Value." A typical 1-inch-thick spun fiberglass furnace filter has a rating of 1 to 4 on the MERV scale and can trap particles like sawdust, carpet fibers, dust mites, and pollen.

Indoor airPLUS currently requires filters to be at least MERV 8. These filters can generally clean the air of contaminants such as cement dust, mold spores, animal dander, hair spray, and most of the larger particles that are 3-10 microns in size. However, filters with higher MERV levels are available and recommended by EPA to more effectively remove smaller particles (PM<sub>2.5</sub>), which are of greatest health concern.



Filters with a MERV of 11 remove roughly 20% of the particles between .3 and 1 micron, and a MERV 13 filter typically demonstrates at least 50% removal efficiency for the smallest particles tested. High Efficiency Particulate Air (HEPA) filters with MERV ratings from 17 to 20 are more effective at filtering out smaller particles, including viruses. However, higher MERV filters do tend to restrict airflow. So builders and HVAC contractors wishing to install them must carefully size the ducts and filter box to allow for thicker or wider filters, which generally create less static pressure and help improve air flow.

As we continue to learn more about the benefits of particulate reduction indoors, and as improved filters are becoming more accessible in the market, EPA plans to increase the filtration requirements in future versions of the Indoor airPLUS Construction Specifications.

### How to Design Systems with High MERV Filters

- Design (or require the HVAC contractor to design) the HVAC duct system using ACCA Manual D to determine the maximum static pressure that the filter can have and select a MERV 8 or higher filter within that limit.
- Use the highest rated filter that your system fan and filter slot can accommodate. Consider adjusting the duct size, duct length, and/or filter width to ensure that the total pressure drop across the system does not exceed the blower fan motor's limit, given the size of the unit.
- Design the filter slot on the return side of the HVAC air handler with an appropriate seal to ensure that there is no path for airflow around the filter.

## Proper Installation of Furnace and Air-Handler Filters

Filters with higher MERV ratings can trap pollutants like pollen, dust mites, and mold spores. However, a dirty, clogged filter can dramatically reduce airflow, increasing furnace run time, wear on the motor, and energy consumption. For optimum operation of both the filter and the HVAC equipment, the filters should be replaced or cleaned frequently.

### How to Design the HVAC System with Filter Replacement in Mind

- Locate the filter where it can be easily accessed by the homeowner for replacement or cleaning, without obstruction by other appliances, fixtures, or mechanical components.
- If the filter is installed in a filter media box attached to the air handler, the access panel for the filter should be fitted with a flexible, air-tight gasket to prevent air leakage.



For more details and best practices related to filtration, download [EPA's guidance on air cleaners and air filters](#) or visit the Indoor airPLUS technical guidance on the [Department of Energy's Building America Solution Center](#) for more information.

Learn more at:  
[www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus)