

AIR FILTER FAQ SHEET

WHAT DOES MERV RATING MEAN WHEN IT COMES TO AIR FILTERS?

The most common industry standard for filter efficiency is the Minimum Efficiency Reporting Value, or “MERV rating.” The MERV scale for filters ranges from 1 through 20. The higher the MERV rating the more particles are captured as the air passes through the filter. Higher MERV (higher efficiency) filters are especially effective at capturing very small particles that can most effect health.

The filters used in the central heating/cooling system can effectively reduce indoor particle concentrations when the system is operating or when only the fan is turned on. Most systems use a low MERV (1-4) fiberglass filter that is 1” thick. Replacing this filter with a medium efficiency filter (MERV 5- 8) can significantly improve air quality. Higher efficiency filters (MERV 9-12) will work even better, and a true high efficiency filter (MERV 13-16) can reduce indoor particles by as much as 95 percent. Filters with a High Efficiency Particulate Air (HEPA) rating, (or MERV 17-20) are the most efficient.

WHAT MERV AIR FILTER SHOULD I USE FOR MY BUSINESS?

The higher the MERV rating the better the filter is at trapping specific types of particles (see table below). You may need to consult with a local heating and air technician or the manufacturer of your central air system to confirm which (or if) high efficiency filters will work best with your system.

TABLE 1: APPLICATION GUIDELINES

MERV Std 52.2	Intended Dust Spot Efficiency Std 52.1 (1)	Average Arrestance	Particle Size Ranges	Typical Applications	Typical Filter Type
1 - 4	<20%	60 to 80%	> 10.0 µm	Residential/Minimum Light Commercial/ Minimum Minimum Equipment Protection	Permanent / Self Charging (passive) Washable / Metal, Foam / Synthetics Disposable Panels Fiberglass / Synthetics
5 - 8	<20 to 60%	80 to 95%	3.0-10.0 µm	Industrial Workplaces Commercial Better / Residential Paint Booth / Finishing	Pleated Filters Extended Surface Filters Media Panel Filters
9 - 12	40 to 85%	>90 to 98%	1.0-3.0 µm	Superior/Residential Better/Industrial Workplaces Better/Commercial Buildings	Non-Supported / Pocket Filter / Rigid Box Rigid Cell / Cartridge V-Cells
13 - 16	70 - 98%	>95 to 99%	0.30-1.0 µm	Smoke Removal General Surgery Hospitals & Health Care Superior/ Commercial Buildings	Rigid Cell / Cartridge Rigid Box / Non-Supported / Pocket Filter V-Cells

Note: This table is intended to be a general guide to filter use and does not address specific applications or individual filter performance in a given application. Refer to manufacturer test results for additional information.

(1) ANSI/ASHRAE 52.1 ranges are provided for reference only. The ANSI/ASHRAE 52.1 Standard was discontinued as of January 2009.

HOW OFTEN DOES THE FILTER NEED TO BE CHANGED?

There are many factors that can determine when an air filter should be changed, the three most important factors are listed as below:

- How often the HVAC unit runs
- Air quality
- Humidity

Other factors can vary greatly from application to application. For most 1", 2" and 4" deep panel or pleated style filters, it is usually recommended to **change the filter every 2-3 months**. In many commercial and industrial applications, static pressure can be monitored and the filters can be changed when they reach their recommended final resistance in inches of water gauge.

INSTALLATION OF HIGH-MERV FILTERS IN AN EXISTING SYSTEM

Replace the air filters in ducted Heating, Ventilating, and Air-Conditioning (HVAC) equipment with new filters having a MERV rating of 6 or higher and a resistance to airflow that does not exceed the allowable pressure drop for the HVAC system. Install the filters per U.S. Department of Energy's Building America Solutions Center guidelines: <https://basc.pnnl.gov/resource-guides/proper-installation-filter#quicktabs-guides=7>

ARE THERE ANY ISSUES WITH INSTALLING A HIGHER MERV AIR FILTER IN MY BUSINESS?

When you put a filter in the air stream, the air has to go through it. As the air stream passes through the filter, it decreases its velocity due to the resistance of the filter, therefore it's important to purchase filters with a pressure drop performance that meets your HVAC system specifications to run the equipment efficiently and prevent damage.

If a high MERV filter is installed without designing for it and the static pressure is increased to an amount much higher than the optimum, several negative consequences could potentially result:

- The HVAC system's overall efficiency (Seasonal Energy Efficiency Ratio or SEER) will go down.
- The equipment could malfunction or burnout (especially equipment with PSC motors).
- In hot, humid climates, if the pressure drop is too high across the filter (i.e., if the filter offers too much resistance), it slows down the air coming through the fan and decreases supply air speed so much that the air in the supply ducts gets too cold.

References:

- *ANSI/ASHRAE 52.2 2017 – Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*
- *ANSI/AHRI Standard 680 2015 – Standard for Performance of Rating of Residential Air Filter Equipment*
- *U.S. Department of Energy, Energy Efficiency & Renewable Energy, Building America Solution Center, Guides for proper installation of Filter*
- *Is there a downside to High-MERV Filters? By Springer; Home Energy Magazine*
- *U.S Environmental Protection Agency – Indoor Air Filtration Fact Sheet EPA- 452/F-18-005*