



## HVAC Filter Selection Guide

Understanding ASHRAE 52.2-2007  
and  
Minimum Efficiency Reporting Value (MERV) Ratings





## About ASHRAE Standard 52.2-2007

ASHRAE Standard 52.2-2007 is intended to assist end-users and specifiers in their selection of appropriate air filtration products by defining anticipated performance throughout the useful life of a filter. Specifically it is a method of testing all general ventilation air-cleaning devices (HVAC filters) for removal efficiency by particle size.

For more information visit [www.ashrae.org](http://www.ashrae.org) or ask your King Filtration representative for a copy of the National Air Filtration Association (NAFA) User's Guide for ANSI/ASHRAE Standard 52.2-2007

### **Background**

The obsolete AHSRAE52.1 was used as the standard for several decades in the general ventilation air filter industry. A main component of 52.1 was the Average Dust Spot Efficiency Tests. The new standard, however, evaluates air filter efficiency as a function of particle size. The new test method determines the ability of an air filter to remove dust by specific particle sizes ranging from 0.30 to 10 microns. This advancement led to the creation of a Minimum Efficiency Reporting Value (MERV) to determine the performance of each filter tested. MERV is a central feature of ASHRAE 52.2

### **MERV Performance**

The Minimum Efficiency Reporting Value, or MERV is a guideline to inform consumers how efficient a filter will be when installed. MERV 1 - 4 air filters are typically disposable panel filters or pads and are used primarily to protect equipment from particles no smaller than 10 microns. MERV 5 - 8 filters are a better choice and more commonly found in both residential and commercial applications. They are capable of effectively collecting particles as small as 3 microns. MERV 9 - 12 air filters are used in commercial and industrial settings, or in residential, where dust control is valued. These filters are capable of collecting particles in the 1 – 3 micron range. It is important to change these filters when recommended due to the negative impact they will have on air flow when they become dirty. MERV 13 - 16 are the most efficient air filters and can stop particles as small as 0.3 microns. These filters are typically used in hospitals or manufacturing facilities where super clean environments are necessary.

One important characteristic of ASHRAE 52.2 is the required calculation of dust holding capacity and arrestance, explained in Addendum B. A key element of 52.2 is particle size efficiency, which has the most significant value when determining filter performance. King Filtration's technical specialists are available to provide assistance to customer's in understanding the latest standards.

### **Appendix J Conditioning**

ASHRAE 52.2-2007 also introduces a standard that insures air filter purchasers and users are aware of the filter's performance in specific applications. Appendix J is an optional test which replaces the non-mandatory filter-conditioning step of 30 grams of dust loading with a potassium-chloride (KCL) conditioning method which is intended to closely mimic the aerosol-particle size distribution normally seen when filters are operated under "real-life" conditions. This test provides an additional value, MERV A, which can be used to quantify a filter's performance.

In a few cases, the efficiency of a filter decreases after conditioning, some sufficient enough to decrease the MERV rating by several numbers. Although these measures are useful tools in selecting air filters, it is suggested that customers look at MERV numbers in terms of (+) or (-) 1. Be sure to purchase a better filter, rather than a better test result.

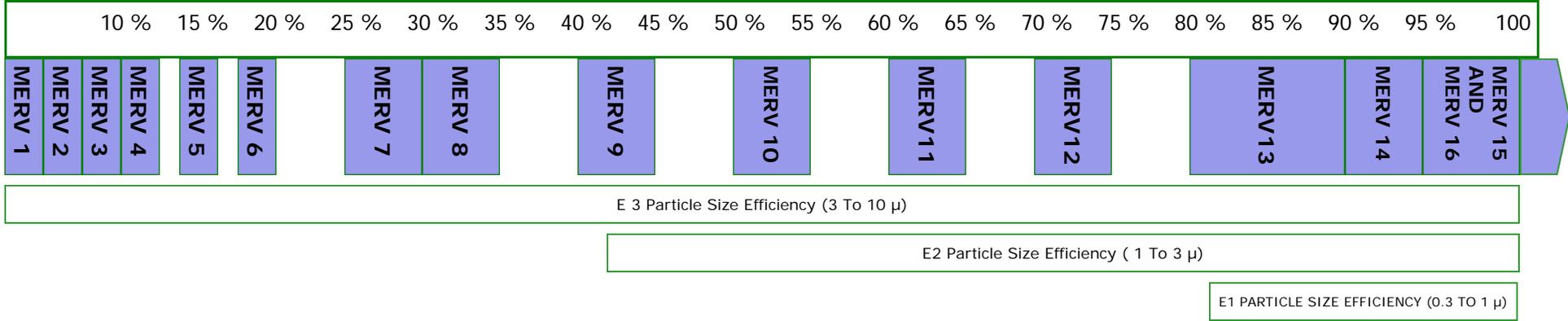
### **Standard Test Airflow Rates**

The Minimum Efficiency Reporting Value (MERV) must be stated with the air velocity at which the filter was tested. For example, if the filter was tested with an air velocity of 492 FPM and was found to be MERV 8, the filter's Minimum Efficiency Reporting Value would be MERV8 @ 492 FPM. ASHRAE Standard 52.2 tests are to be conducted at one of seven airflow rates:

118 FPM (0.60 m/s)  
246 FPM (1.25 m/s)  
295 FPM (1.50 m/s)  
374 FPM (1.90 m/s)  
492 FPM (2.50 m/s)  
630 FPM (3.20 m/s)  
748 FPM (3.80 m/s)



# ASHRAE TEST STANDARD 52.2 –2007



## APPLICATION GUIDELINES

MERV Standard 52.2	Particle Size Ranges	Average Arrestance (Addendum B)	Typical Applications	Typical Filter Type
MERV 1—4	> 10 Micron	60 % - 80 %	Residential / Minimum Light Commercial Minimum / Equipment Protection	Permanent. Self Charging (passive) Washable Metal or Foam Synthetics Disposable Panels Fiberglass / Synthetics
MERV 5—8	3.0—10 Micron	80 % - 90%	Industrial Workplaces Commercial Better / Residential Paint Booth / Finishing	Pleated Filters Extended Surface Filters Media Panel Filters
MERV 9—12	1.0—3.0 Micron	> 90 - 98 %	Superior/Residential Better/Industrial Workplaces Better/Commercial Buildings	Non-Supported / Pocket Filter / Rigid Box Rigid Cell / Cartridge
MERV 13—16	0.3—1.0 Micron	> 95 - 99 %	Smoke Removal General Surgery Hospitals & Health Care Superior / Commercial Buildings	Rigid Cell / Cartridge Rigid Box / Non-Supported / Pocket Filter
MERV 17—20 * (1) Deleted From ASHRAE			Clean Rooms High Risk Surgery Hazardous Materials	HEPA ULPA

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) ASHRAE does not have a test procedure for HEPA testing and has thus dropped the MERV 17—20 classifications.

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