Minimum efficiency reporting value

From Wikipedia, the free encyclopedia

Minimum efficiency reporting value, commonly known as *MERV rating,* is a measurement scale designed in 1987 by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to rate the effectiveness of air filters. The scale "represents a quantum leap in the precision and accuracy of air-cleaner ratings"[1] and allows for improved health, reduced cost and energy efficiency in heating, ventilation and air conditioning (HVAC) design. For example, a HEPA filter is often impractical in central HVAC systems due to the large pressure drop the dense filter material causes. Experiments indicate that less obstructive, medium-efficiency filters of MERV 7 to 13 are almost as effective as true HEPA filters at removing allergens, with much lower associated system and operating costs.[2]

The scale is designed to represent the worst case performance of a filter when dealing with particles in the range of 0.3 to 10 micrometres. The MERV rating is from 1 to 16. Higher MERV ratings correspond to a greater percentage of particles captured on each pass, with a MERV 16 filter capturing more than 95% of particles over the full range.

Below is a table grouping MERV ratings by particle size:

MERV	Min. particle size	Typical controlled contaminant [2]	Typical Application [2]
1–4	> 10.0 μm	Pollen, dust mites, cockroach debris, sanding dust, spray paint dust, textile fibers, carpet fibers	Residential window AC units
5–8[3]	10.0–3.0 μm	Mold, spores, dust mite debris, cat and dog dander, hair spray, fabric protector, dusting aids, pudding mix	Better residential, general commercial, industrial workspaces
9–12	3.0–1.0 μm	Legionella, Humidifier dust, Lead dust, Milled flour, Auto emission particulates, Nebulizer droplets	Superior residential, better commercial, hospital laboratories
13–16	1.0–0.3 μm	Bacteria, droplet nuclei (sneeze), cooking oil, most smoke and insecticide dust, most face powder, most paint pigments	hospital & general surgery
17–20[4]	< 0.3 μm	Virus, carbon dust, sea salt, smoke	Electronics & pharmaceutical manufacturing cleanroom

While the smallest MERV value in each row has no minimum requirement for filtering that row's particle size, it does have stricter requirements for all larger particle sizes than any smaller MERV value. For example, MERV 13 the "0.3–1.0 μm" row has no minimum requirement for removing 0.3–1.0 μm particles (the standard specifies "<75%") but has higher minimum removal percentages of 1.0–3.0 μm, 3.0–10.0 μm, and > 10 μm particles than MERV 12 and all smaller MERV values. All other MERV values on each row do have minimum removal percentages for that row's particle size.[2]

References

1. ^ Wilkinson, Ron. "Air Filters: New Facilities, New Standard" (http://www.foustco.com/_fileCabinet/ProductInstructions/HVACFilters/merv_explanation.pdf). Retrieved 2007-03-29.
2. ^ *a b c d* "Residential Air Cleaners (2nd Edition): A Summary of Available Information" (http://www.epa.gov/iaq/pubs/residair.html). EPA. Retrieved 2012-08-20.. Table 2 (http://www.epa.gov/iaq/pubs/residair.html#table%202) shows the detailed requirements for each MERV level.
3. ^ ANSI/ASHRAE Standard 62.2-2007 requires a filter of at least MERV 6 efficiency for residential applications in the US.
4. ^ MERV values of 17–20 are not part of the official standard specification. These may be roughly equivalent to HEPA or ULPA filters (http://www.epa.gov/iaq/pubs/residair.html#Defining_Efficiency_and_Effectiveness) but the specifications are fundamentally different.

- M.N.Rama Rao & Company. "Industrial Filters (Eurovent and ASHRAE Classifications)" (http://www.mnrfilters.com/automotive.html). Retrieved 2007-09-19.
- Newell, Donald (February 2006). "Interpreting Filter Performance: The meaning behind the terminology of ASHRAE standards 52.1 and 52.2" (http://www.emcorservicesnynj.com/news/FilterPerformanceByDN.pdf). *HPAC Engineering*. Retrieved 2009-05-11.

External links

- http://www.epa.gov/iaq/pubs/residair.html
- MERV Ratings Infographic (http://airfilterbuy.com/all-about-merv-ratings/)