

MERV RATINGS AND INDUSTRIAL

Dust Collector Filtration



FILTER CONFUSION

There is often a lot of confusion around selecting the optimal cartridge filters for dust collectors. For the HVAC industry, MERV (minimum efficiency reporting value) ratings are king. Higher MERV ratings generally signify superior filtration. However, that is not always true for industrial dust filters, which operate in a dynamic environment and work as part of a dust collection system.

There is a new test standard to evaluate the performance of dust collection systems - ASHRAE Standard 199. This standard should be your first “go-to” when selecting a system. MERV ratings can also help you select a filter with an appropriate filtration efficiency for your system. Although, this is only one aspect of selecting the appropriate filter for an industrial dust collection system. This ebook explains other factors used in selecting proper dust collection filters and equipment, as well common questions about MERV.

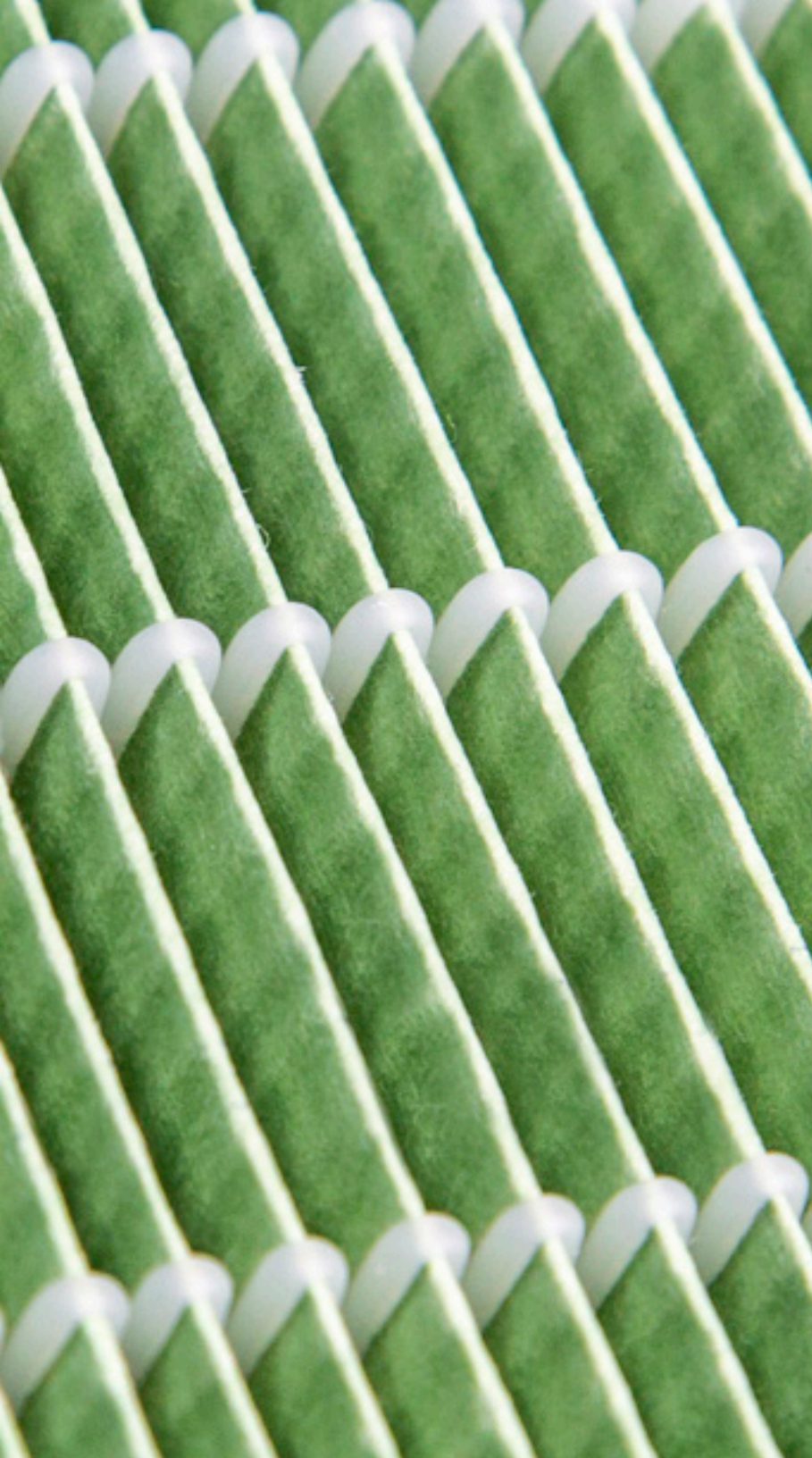
What is MERV?

MERV is a measurement scale designed in the late 1980s by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to compare the effectiveness of air filters. ASHRAE 52.2 defines a test method and rating system in which a filter's initial efficiency is assigned a number. This number identifies the filter's minimum performance in removing particulates from an airstream.

How does the MERV scale work?

The scale goes from 1 to 16 and corresponds to a filter's ability to capture particles in different size ranges from 0.3 to 10 microns. Higher MERV ratings correspond to a greater percentage of particles captured throughout the test. It is helpful to use this number to select dust collector filters with the appropriate initial filtration efficiency, but it doesn't indicate much beyond that as to how the filters or the collector will perform as a system.





What factors are more important than MERV rating when ordering dust collector filters?

MERV ratings are limited, because they apply only to new filters and their initial efficiency in a static environment with light dust loading. However, dust collectors and their filter cartridges manage emissions over time in a dynamic system. Industrial dust collection systems face high dust loading, so they are equipped with a pulse cleaning system. The filters are constantly being loaded and unloaded. Also, the MERV testing procedure measures initial pressure drop, but not how pressure drop will change over time or how it will effect overall energy usage. These factors will have a dramatic effect on the efficiency and performance of the filter over time, the MERV rating does not take them into account.

Why does filter efficiency constantly change in a dust collector?

As a dust collector runs, dust loads onto the filters and forms a dust cake. This dust cake resists airflow across the filter media. The resistance is measured in water gauge or pascals and is referred to as pressure drop. It is usually below 1" of water with clean filters. As dust loads and pressure increases, the filter efficiency increases, but the dust collector must work harder. This triggers the pulse cleaning system, which knocks off the dust cake and starts the process over. As a result, the dust cake is constantly changing and so are the pressure drop and filter efficiency. Eventually, the dust load will increase to a level where pulse cleaning is no longer helpful, and the only option is to change out the filter for a new one.



Do higher efficiency filters use more energy and compressed air?

As mentioned previously, both higher efficiency filters and dust buildup restrict airflow. With this higher restriction, more energy and compressed air are required to maintain the proper airflow and pressure drop, and this can be costly. MERV ratings don't take this into consideration.

What type of filter is best for a dust collector?

The best filter for a dust collector is one that offers the best efficiency and cleaning performance. Dust collector performance is based more on its airflow management, cleaning system, and the media's ability to load and release dust particles. This can only be evaluated by testing how the filter and the dust collector work together as a system.





If I shouldn't select filters based on MERV rating, how do I determine which filter is best for my application?

In order to determine the efficiency of the dust collection system, ASHRAE created Standard 199. This test method calculates the performance of all industrial pulse cleaned dust collectors including filtration performance and energy consumption. The resulting summary offers an indication of filter life. The 199 test is a better method for determining both system and filter performance because it provides an accurate portrayal of the dynamics of the the industrial dust collection system as a whole, versus the single filter initial efficiency methodology used in MERV.



For more information on MERV ratings
and industrial dust collector filtration, visit
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