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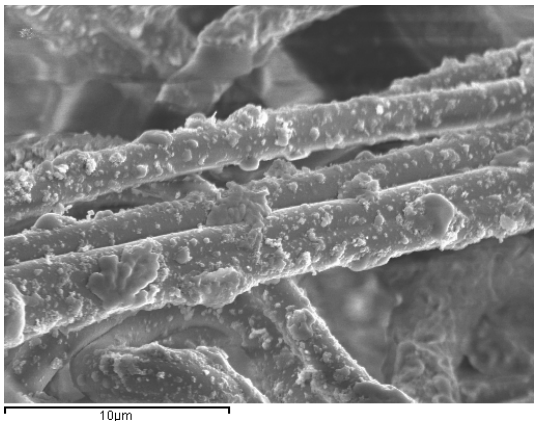
CAN FILTERS HELP PREVENT THE TRANSMISSION OF COVID-19?

We've gotten that question a lot recently, it is a long and complicated answer but the simple answer is YES. We will attempt to give more details and address some of the issues below in what is hopefully a simple and understandable manner.

The airborne transmission of diseases/illnesses has been widely studied for decades and COVID-19 is no exception to the aerosol transport and physical surface mechanisms that are common for transmission. As a result of this, many are calling for common actions to reduce transmission rates: washing your hands, social distancing, the wearing of a face mask and the increase in filtration. Those calling for increased filtration include: ASHRAE, CDC and OSHA, their recommendation to increase filtration has been centered around increasing filtration to MERV 13 or higher.

Before we explore this in more detail, let's do a quick overview of filter testing. In simplified terms, ASHRAE Standard 52.2 is the test method that determines the efficiency of air filters. Efficiency is expressed in terms of MERV (**M**inimum **E**fficiency **R**eporting **V**alue) which range from 1 to 16, the higher the MERV the higher the removal efficiency. To determine this rating the filter is tested via an accelerated test in a highly controlled test lab, efficiency of 12 particle size ranges between 0.3 and 10 microns are used to calculate MERV.

It is important to note that the increase of efficiency in air filtration will reduce the number of airborne particles thus reducing the risk of airborne transmission. This has been documented by numerous internal case studies as well as data from the ASHRAE 52.2 test results and external studies. The SEM photo (right) shows filter fibers after being used in a healthcare facility. This photo clearly shows the capture of very small particles; actually of a size range typical of COVID transmission. Note that these are NOT COVID as this case study pre-dates COVID, however they are the same size as the COVID nuclei demanding the improved filtration needs. This visual evidence is in addition to case studies and test data of the effectiveness of air filtration to reduce the risk of airborne particles and the risk associated with them.



But there is a danger in simply just upgrading your filter to a MERV 13 because the goal in upgrading the filter is to upgrade the 'system ' efficiency, or more simply stated the goal is to improve the cleanliness of the air in your building. Just simply removing your old filter and installing a filter rated at MERV 13 (or higher) does not guarantee you will have improved 'system' efficiency. Let's look at a couple of examples below to help make this more clear.

AIR BYPASS
Air bypass is the dirty/contaminated air that flows through gaps between filters, gaps between the filter and housing/holding frame or gaps in the housing/ductwork rather than going through

the filter, thus is unfiltered and contaminated air that entered the occupied space. Air bypass has been documented in studies to show an efficiency loss of several MERV values. For example: if there is air bypass around a MERV 13 filter it could reduce the system efficiency to a MERV 10 or 11, and depending on the amount of bypass (size of the gap) the efficiency loss could be even greater. When pleated filters are tested per ASHRAE 52.2, they are taped into the test duct to prevent any air bypass so the MERV rating is calculated with zero air bypass. If you are using pleated filters with a cardboard frame, you WILL have bypass of unfiltered air unless you take extreme measures. Any of the agencies that are request that you upgrade to MERV 13 (or higher) advise to be sure to tightly seal the filters in the HVAC unit to prevent air bypass. If there is not an airtight seal you cannot achieve MERV 13 system efficiency.

EFFICIENCY LOSS

Some medias utilize an electrostatic charge to boost their efficiency. This electrostatic charge can dissipate in certain environmental conditions or when the filter fiber becomes coated with captured particulate. This when combined with not enough filter fibers to be a mechanical filter can cause the loss of efficiency, this efficiency loss can be very significant. This efficiency loss has been documented in many studies and has resulted in ASHRAE adding the optional APPENDIX J to the ASHRAE 52.2 test. Appendix J simulates this real world efficiency loss in a test lab. The results of the Appendix J test are reported as MERV-A 13 or MERV 13A. Medias used to manufacture MERV 13 pleats may have an electrostatic charge.

These are not the only factors that effect 'system' efficiency but both our examples, air bypass and efficiency loss, could have a huge impact on the 'system efficiency' and on the cleanliness of the air, and on the reduction of the risk of transmission for the occupants of your building. So to just remove your old air filter and install a filter that has a MERV 13 (or higher) rating does not necessarily offer the results that ASHRAE, CDC, OSHA and others are trying to achieve to with their recommendation. Also please note that the discussion above is very basic and we can provide more detailed information for your review. Please contact your local representative for more details or for a system efficiency assessment. You can request an assessment through our website (www.tridim.com), via email (info@tridim.com) or by calling 800-458-9835.