

ELEC

ELIZABETH LOFTS EMERGENCY COMMITTEE

Better Together

Tip 8: A Guide to HVAC Filters

When the forest fires of 2020 neared Portland, air quality became hazardous. It was obvious because the sky turned yellow and dimmed the sun. These conditions create a health hazard, especially for people with respiratory problems. To help keep the smoke out of the building and the units, CMI closed outside air vents. For most, this was sufficient, but some may want to take additional steps.

The obvious step is to use an HVAC filter that catches and traps smoke particles. As the image (from the [visual capitalist](#)) below shows, smoke particles are quite small compared to most particulates.



Smoke is only about 0.5 micron in circumference. The Covid virus is even smaller at 0.2 microns, but fortunately Covid doesn't travel alone. It is almost always in a water droplet and so it is effectively larger than several microns. In comparison, dust is about 2.5 microns and pollen about 15 microns.

The ability of a material to filter microscopic particles varies. MERV, or minimum efficiency reporting values is a common rating system for air filters. For non-commercial HVACs, filters with a MERV rating from 5-15 can be found in hardware stores. No filter is perfect. That is, it doesn't filter every smoke particle. The better the filter, the higher percentage of smoke or any particle it will filter.

A filter with a MERV 8 rating will trap about 20% of particles in the 1-3 micron range. So smoke particles largely get through a filter with this rating. With a MERV 13 rating, about 85% of particles in the 1-3 micron range are trapped (about the same rate for smoke). HEPA (high efficiency particulate air) filters trap about 99.9% of smoke.

Besides price, why shouldn't you use the best filter available? Better filtration comes with the tradeoff that your HVAC has to work harder to push air through the filter. This shortens the life of your HVAC. Sometimes considerably. For example, there are filter with rating above 15, but these are largely reserved for specialized commercial spaces where air quality is paramount. ASHRAE, an engineering society, recommends against using a MERV filter greater than 15 in a residential HVAC.

So what do we recommend? If you are in good health and have no allergies, a MERV 8 filter is sufficient most of the time. If the air becomes hazardous, temporarily replace it with a MERV 13 or 11 filter until the hazard passes. Then return to using the MERV 8 filter. Place the MERV 13 filter in a trash bag and save it until it is needed again. Filters usually last for 3 months. So it can have many uses before its effectiveness declines. If you have ongoing respiratory issues, you may want to use the higher rated filter all or most of the time, but expect your HVAC to have a shorter life. Finally, HEPA filters are overkill for all but the most sensitive lungs.

Life would be simple if there was only one rating system, but there are 2 more: MPR and FPR. A MERV 8 corresponds to a MPR600 or FPR 4-5. A MERV 11 is comparable to a MPR1000 or a FPR 7 and a MERV 13 corresponds to a MPR1900 or a FPR 9-10. Last, write the date you installed the filter on the filter. That way you know when you need to replace it in 3-4 months. You can also set yourself a calendar reminder to replace the filter.

ELEC are not HVAC engineers. You should consult an HVAC professional about the most appropriate filter for your specific health and comfort needs, and to advise on the filters that work best for your HVAC unit.

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