FOCUS on FACILITIES
Diocese of Cleveland Facilities Services Corporation

More Pollen = More Air Filter Changes

Every fan-powered heating, ventilating, and air-conditioning (HVAC) will come with a filter(s) to protect the coils within the air-handling unit. For residential heating and ventilating (H&V) units and residential HVAC units historically a service company will be contracted to visit the home and service the unit semi-annually. Quite often the service company will arrive without a filter simply because the company has no record or keeps no record of the homeowner's unit filter size. As a result, residents are often required to purchase their filters at a local or big box hardware store or go on-line to purchase these filters for installation when the service technician arrives.

For larger facilities e.g., multi-building campus, the on-site maintenance person or service technician may change the filters quarterly because the hours of operation are significantly more than the resident's air-handling unit run-time. This is primarily because residential units cycle on and off as needed to maintain space thermostat set point. In some buildings the air-handling units operate constantly during the buildings' occupied hours and then shut down for the evening. During the unoccupied hours this equipment may cycle on to maintain a night setback space temperature and then cycle off when the thermostat setting is satisfied.

For institutions where air filtration is more critical for their application, e.g., hospitals, the filters may be changed more frequently to maintain the supply air quality being delivered to the building and its occupants. With this added emphasis on air filtration, the building operator may increase the

MERV RATING CHART

Standard 62.6 Minimum Efficiency Reporting Value	Dust Spot Efficiency	Arrestance	Typical Controlled Contaminant	Typical Applications and Limitations	Typical Air Filter/Cleaner Type
20	n/a	n/a	< 0.30 pm particle size	Cleanrooms	≥99.999% eff. On .10-.20 pm Particles
19	n/a	n/a	Virus (unattached)	Radioactive Materials	Particles
18	n/a	n/a	Carbon Dust	Pharmaceutical Man.	Particulates
17	n/a	n/a	All Combustion smoke	Carcinogenetic Materials	≥99.97% eff. On .30 pm Particles
16	n/a	n/a	.30-1.0 pm Particle Size	General Surgery	**Bag Filter-** Nonsupported
15	>95%	n/a	All Bacteria	Hospital Inpatient Care	microfine fiberglass or synthetic media, 12-36 in. deep, 6-12 pockets
14	90-95%	>98%	Most Tobacco Smoke	Smoking Lounges	**Box Filter-** Rigid Style Cartridge Filters 6 to 12" deep m ay use lofted or paper media.
13	89-90%	>98%	Droplet Nucell (Sneeze)	Superior Commercial Buildings	
12	70-75%	>95%	1.0-3.0 pm Particle Size Legionella	Superior Residential	**Bag Filter-** Nonsupported microfine fiberglass or synthetic media, 12-36 in. deep, 6-12 pockets **Box Filter-** Rigid Style Cartridge Filters 6 to 12" deep m ay use lofted or paper media.
11	60-65%	>95%	Humidifier Dust Lead Dust	Better Commercial Buildings	
10	50-55%	>95%	Milled Flour Auto Emissions	Hospital Laboratories	
9	40-45%	>90%	Welding Fumes		
8	30-35%	>90%	3.0-10.0 pm Particle Size Mold Spores	Commercial Buildings	**Pleated Filters-** Disposable, extended surface area, thick with cotton-polyester blend media, cardboard frame **Cartridge Filters-** Graded density viscous coated cube or pocket filters, synthetic media **Throwaway-** Disposable synthetic panel filter.
7	25-30%	>90%	Hair Spray Fabric Protector	Better Residential	
6	<20%	85-90%	Dusting Aids Cement Dust	Industrial Workplace	
5	<20%	80-85%	Pudding Mix	Paint Booth Inlet	
4	<20%	75-80%	>10.0 pm Particle Size Pollen	Minimal Filtration	**Throwaway-** Disposable fiberglass or synthetic panel filter.
3	<20%	70-75%	Dust Mites Sanding Dust	Residential	**Washable-** Aluminum Mesh
2	<20%	65-70%	Spray Paint Dust Textile Fibers	Window A/C Units	**Electrostatic-** Self charging woven panel filter.
1	<20%	<65%	Carpet Fibers		

filter replacement schedule frequency or the air-handling unit may have been engineered to include a magnehelic gauge. The "mag" gauge senses the pressure upstream of the filter and directly after the filter to determine the differential pressure across the filter.

When a filter is installed, the initial resistance the supply air will incur may be a resistance value of 0.3 inches static pressure loss. As the filter becomes dirty, capturing dust particles in the air the filter resistance will increase to a higher value e.g., 0.6 inch. The filter manufacturer documents on the filter literature what their recommended initial static pressure drop e.g., 0.3 inch, should be and what the final pressure drop e.g., 0.75 inch, should

be. Once a building operator sees on the mag gauge a pressure differential reading 0.75 inch or more, then it is time to replace the filter.

In the spring, when pollen is in the air, the air filters will be challenged to capture as much dust in the air as possible. For the residential unit that has no direct outdoor air connection to the air-handling unit and recirculates 100% of the unit's supply air, then filters will not be as challenged to the pollen outdoors. This, and the fact that the air-handling unit cycles on and off and does not run continuously, reduces the potential for the filter to "load up" with pollen and other dust in the air. As a result, changing residential air filters may be done semi-annually although other factors can come into play if the homeowner has pets that shed their hair during the year. That said, purchasing and changing one's own filter more than twice a year may be considered money-well-spent to capture the dust at the air-handling unit and continue to keep the unit's coils clean.

For building air-handling units that continuously introduce outdoor ventilation during the occupied hours and/or operate 24-hours a day introducing outdoor air mixed with return air, the scheduled filter replacements is not the optimum method to follow. The reason for this statement is the introduction of pollen during the spring results in an added burden to the air filter dust holding capacity. At peak pollen time a clean filter can be loaded up with pollen dust within a couple of days. The scheduled filter replacement plan would not pick up on this sudden surge in dust being introduced into the building from outside air.

The filter change-out solution for a building operator is to install mag gauges across the various air-handling unit filters to record the dust particle build up. A building maintenance person, on his or her scheduled tour of the equipment rooms, can check the gauge pressure differential to see if the readings are within the manufacturer's recommended range. If the filters have a buildup of dust resulting in an excessively high-pressure drop across the filter then it is time to replace the dirty filter. For those facility managers with a building computer automation system, and with the correct mag gauges, the pressure differential across filters can be linked to the computer and a high-limit alarm may be programmed to notify the computer operator of the dirty filter condition.

For more on information on filters and what are the recommended MERV (Minimum Efficiency Rating Value) typical application e.g., MERV 12 Superior residential application. CLICK HERE.

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