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 filter replacement schedule frequency or the air-handling unit may have been engineered to include a magnetheic 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
Focus on Facilities: More Pollen = More Air Filter Changes (cont.)

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 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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