UNIVERSITY OF ILLINOIS EXTENSION

Healthy Indoor Air Series

Furnace Filters

What does a furnace filter do?

Furnace filters protect the furnace. They also contribute to good health and well-being by cleaning the air circulating through the house.

Filter designs and rating systems vary. Some filters remove large, heavy particles from the air but allow smaller particles to flow through. Large particles (from 6 to 100 microns in size) include lint, pollen, and mold spores. Medium particles (from 0.3 to 6 microns) include dust, animal dander, and bacteria. The smallest particles (0.3 microns and below) include smoke, smog, and viruses. By comparison, a human hair is between 3 to 200 microns.

Particles below 10 microns are invisible to the human eye.

The most common airborne particle size is 2.4 microns.

The most harmful particle size is less than about 1 micron.

The American Society of Heating, Refrigeration, and Air Conditioning Engineers has devised a rating system for filters. They use numerical values ranging from 1 to 12, with the higher number capturing more of the dust.

The 3M Company, a major manufacturer of filters, primarily uses a Filter Performance Rating (FPR). It is based on the ability of the filter to capture particles from 0.3 to 1.0 microns. These sub-micron particles are most likely to be inhaled, where they can cause problems in the lungs. Their rating of filters range from 300 to 1600.

What are the different types of filters?

- **fiberglass or cellulose pad**—usually held in a cardboard frame capable of protecting the equipment; catches most of the larger dust particles, which tend to block the heating and cooling coils; low cost but least effective.
- **washable/reusable filter**—uses a flat plastic or metal foil pad; can be washed with a hose and reinstalled; some can be sprayed with a tacky coating material to increase their ability to catch small particles; should be washed monthly; may last 3 to 5 years.
- **pleated polyester filter**—provides more filtering capacity than a flat filter; many are made with electrostatically-charged fibers that attract small particles; lasts about 3 months.
- **deep-pleated, high-efficiency air filter**—about the same size as the ordinary filter but 4 to 6 inches thick; do not fit in standard filter holders and require a special box in the duct system; electrostatically charged fibers can be used in the filtering media.
- **electronic filter**—about the same size as the box for a deep-pleated filter; requires electricity to operate; air is directed through a high-voltage grid which applies a positive charge on particles in the air stream; particles are attracted to a negatively charged element; should be washed monthly; removes small smoke particles; high initial cost and maintenance are disadvantages as is the cost of repair if the power unit fails.

How effective are these filters?

The effectiveness of various filter types in removing sub-micron particles is:

- Fiberglass up to 2%
- Washable/reusable up to 6%
- Thin pleated up to 11%
- Deep pleated up to 25%
- Pleated electrostatic up to 49%
- Electronic up to 94%

Air filters capture many of the allergens that aggravate allergy and asthma symptoms. Pollen, molds, and dust are common in any household and can be reduced by using a furnace filter.

The filter will also keep your heating or air conditioning system coils cleaner, which can save up to 15 percent on your energy bills.

How often should filters be replaced?

A general rule of thumb is to change filters at least every three months to maintain maximum efficiency. Some types of filters, however, may need to be washed or replaced more often, so check monthly.

The following factors affect the life of a filter:

- Dirty duct work
- House pets
- Tobacco smoke
- Remodeling/woodworking in home
- Continuous fan operation

Read the manufacturer's instruction manual for recommended care.

Resource: *Smart Homeowner Magazine*, Nov/Dec 2001, www.hankspies.com

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2004

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