

WILDFIRE SMOKE FACTSHEET

Indoor Air Filtration



When wildfire smoke gets inside your home it can make your indoor air unhealthy, but there are steps you can take to protect your health and improve the air quality in your home. Reducing indoor sources of pollution is a major step toward lowering the concentrations of particles indoors. For example, avoid burning candles, smoking tobacco products, using aerosol products, and avoid using a gas or wood-burning stove or fireplace. Another step is air filtration. This fact sheet discusses effective options for filtering your home's indoor air to reduce indoor air pollution.

Filtration Options

There are two effective options for improving air filtration in the home: 1) upgrading the central air system filter, and 2) using high efficiency portable air cleaners. Before discussing filtration options, it is important to understand the basics of filter efficiency.

Filter Efficiency

The most common industry standard for filter efficiency is the Minimum Efficiency Reporting Value, or "MERV rating." The MERV scale for residential filters ranges from 1 through 20. The higher the MERV rating the more particles are captured as the air passes through the filter. Higher MERV (higher efficiency) filters are especially effective at capturing very small particles that can most affect health.

Central Air System Filter

The filter used in the central heating/cooling system of the home can effectively reduce indoor particle concentrations when the system is operating or when only the fan is turned on. Most home systems use a low MERV (1-4) fiberglass filter that is 1" thick. Replacing this filter with a medium efficiency filter (MERV 5-8) can significantly improve the air quality in your home. Higher efficiency filters (MERV 9-12) will work even better, and a true high efficiency

filter (MERV 13-16) can reduce indoor particles by as much as 95 percent. Filters with a High Efficiency Particulate Air (HEPA) rating, (or MERV 17-20) are the most efficient. You may need to consult with a local heating and air technician or the manufacturer of your central air system to confirm which (or if) high efficiency filters will work with your system. If you can't switch to a more efficient filter, running the system continuously by switching the thermostat fan from "Auto" to "On" has been shown to reduce particle concentrations by as much as 24 percent.

Portable Air Cleaners

Portable air cleaners are self-contained air filtration appliances that can be used alone or with enhanced central air filtration to effectively remove particles. How well they reduce air particle concentrations depends on several factors such as the size of the air cleaner, the area to be cleaned, the filter efficiency, how frequently the unit is turned on and the fan speed. Portable air cleaners fitted with high efficiency filters can reduce indoor particle concentrations by as much as 85 percent. Furthermore, portables can be operated continuously at a lower cost compared to the continuous operation of a central system.

Choosing a Portable Air Cleaner

There are a wide variety of air cleaners on the market, ranging in price from about \$50 to \$3,000. Air cleaners that cost less than about \$200 often do not clean the air as well and may not be helpful for wildfire smoke.

Types of Air Cleaners

Most air cleaners fall under two basic categories: 1) mechanical and 2) electronic.

Mechanical air cleaners operate by pulling air through a filter that traps particles. Mechanical air cleaners are very reliable and do not produce ozone, an air pollutant that is a known health hazard. Filters in these devices need to be replaced according to the manufacturers' recommendations, or when the filter is dirty and the air cleaner is not operating efficiently.

Electronic air cleaners often use an electrical charge to charge particles and remove them from the air. The three main types of electronic air cleaners are electrostatic precipitators (ESPs), ionizers, and intentional ozone generators. ESPs have plates (collectors) that need to be cleaned when they get dirty. Ionizers work by making particles deposit on nearby materials. **Ozone generators produce large amounts of ozone, and should never be used in homes or other occupied spaces.** Other types of electronic air cleaners use ultraviolet (UV) bulbs and surface coatings like titanium dioxide to improve the removal of pollutants. However, these devices can emit ozone and some that are designed to remove chemicals actually emit volatile organic chemicals into the air. This includes devices that are sold as "hydroxyl" generators.

Electronic air cleaners are not currently regulated, except in California. Caution should be used when selecting an electronic air cleaner, as they may generate ozone and/or other potentially harmful chemical compounds. Air cleaners certified as being ozone-safe can be found on California's list of certified air cleaners at: <https://www.arb.ca.gov/research/indoor/aircleaners/certified.htm>.

Size Rating of Air Cleaner

When purchasing an air cleaner, check the square footage rating of the device to be sure that the air cleaner capacity is appropriate for the space it is intended to clean. A useful way to estimate the proper size device is the Clean Air Delivery Rate, or CADR, which is the removal efficiency for a specific size particle and volume of air delivered by an air cleaner in one minute. A useful tool to determine the appropriate air cleaner size for the intended space can be found at <http://www.ahamdir.com>.

Efficiency and Noise

For best results, the portable air cleaner you purchase should have a filter rated as "high efficiency" (high MERV) or HEPA. The filters for these devices may be more expensive but will do a much better job of cleaning the air than devices with cheap, low efficiency filters.

Noise level is also an important consideration, as some air cleaners can be quite loud when operating at the maximum settings. If noise level is important to you, look for models with low noise ratings, or those that are rated by a reputable reviewer as quiet.

For more information on air cleaning devices:

- California Air Resources website: <https://www.arb.ca.gov/research/indoor/aircleaners/consumers.htm>
- Learn about home air cleaners: <https://www.epa.gov/indoor-air-quality-iaq/guide-air-cleaners-home>

