



## **Interim Guidance: Ventilation for Non-Healthcare Organizations During the COVID-19 Pandemic**

**September 12, 2020**

The following guidance was developed by the San Francisco Department of Public Health for use by local facilities, and will be posted at [www.sfgdcp.org/COVID-Ventilation](http://www.sfgdcp.org/COVID-Ventilation). This interim guidance may change as knowledge, community transmission, and availability of PPE and testing change.

**AUDIENCE:** Non-healthcare organizations (including Businesses, companies, offices, schools, faith-based and similar organizations). Healthcare personnel and first responders should check with their infection control and safety & health groups for guidance and see more information at [www.sfgdcp.org/covid19hcp](http://www.sfgdcp.org/covid19hcp) under Health Care Exposures.

**Please Note:** The ventilation intervention considerations listed below come with a range of initial costs and operating costs which, along with risk assessment parameters such as community incidence rates, facemask compliance and number of occupants in a space, may affect decisions about which interventions to implement. The guidance provided is general in nature and may not be applicable to your specific building or activity. Always consult with building engineering or maintenance staff prior to making changes to a mechanical ventilation system. For healthcare organizations always consult with your (a) infection prevention and control and (b) health and safety support as there are specific hazards or hazardous activities which ventilation systems are set to control. Be aware that some of the changes may result in increased energy bills or increased wear on ventilation system components.

### Definitions

**Mechanical Ventilation** refers specifically to a ventilation system that can bring air into a building through one or more centralized intakes and can distribute and vent the air through ducts.

**Passive (“Natural”)** ventilation refers to ventilation that is accomplished by opening windows and doors to the outside.

**Fans** are devices that pull or push air in one direction. Fans can be placed in windows or doorways, they may be “pedestal type” that can be placed anywhere in a room, or they may be attached to ceiling fixtures. Some fans have switches that allow the user to change the direction of air flow of the fan; fans that do not have such switches must be physically turned to change the direction of air.

**Air cleaners** are standalone devices that move air in a room through a filter. Some filters are capable of removing tiny particles, including virus particles and smoke.

### Improving Mechanical Ventilation

Consider mechanical ventilation system upgrades or improvements and other steps to: 1) increase the delivery of clean air and 2) dilute potential contaminants in the building. Obtain consultation from experienced Heating, Ventilation and Air Conditioning (HVAC) professionals when considering changes to HVAC systems and equipment. Some of the recommendations below are based on the American Society of



Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) [Guidance for Building Operations During the COVID-19 Pandemic](#). Review additional [ASHRAE guidelines for schools and universities](#) for further information on ventilation recommendations for different types of buildings and building readiness for occupancy. Not all steps are applicable for all scenarios.

- Further open outdoor air dampers and close recirculation dampers (“economizers”) to reduce or eliminate air recirculation. In mild weather, this will not affect thermal comfort or humidity. However, in cold, hot, or humid weather this may result in changes to indoor air and result in building occupant discomfort.
- Improve central air filtration to as high as possible without significantly diminishing design airflow. Target air filtration should be MERV 13 or greater.
  - Inspect filter housing and racks to ensure appropriate filter fit and check for ways to minimize filter bypass
  - Clean, or replace filters, and check filters to ensure they are appropriately installed and functioning. Note that during air quality events like wildfire smoke, higher efficiency filters will foul faster and will need closer monitoring.
- If HVAC systems operate on day/night or other pre-programmed cycles, consider running the HVAC system at maximum outside airflow for 1-2 hours before the building opens and for 2-3 hours after the building is closed.
- Generate clean-to-less-clean air movement by adjusting the settings of supply and exhaust air diffusers and/or dampers (particularly in higher risk areas).

## Improving Passive Ventilation

Consider implementing any of the following to improve the supply of outside air into a space, using caution on poor air quality days:

- When weather conditions allow, increase fresh outdoor air by opening windows and doors. Do not open windows and doors if doing so poses a safety or health risk (e.g., risk of falling, triggering asthma symptoms) to anyone using the facility.
- Use **fans** to increase the effectiveness of open windows. Position fans securely and carefully in or near windows. Position fans to minimize air blowing from one person to another. Window fans placed in exhaust mode can help draw fresh air into a room via other open windows and doors without generating strong room air currents. NOTE: For buildings with both operable windows and mechanical ventilation systems, the interactions between the two needs to be carefully considered.

## Portable Air Cleaners (“HEPA Air Filters”)

Portable Air Cleaners can be considered in rooms and areas where mechanical and passive ventilation cannot be improved. Portable Air Cleaners come in a range of sizes, features, and prices and higher-priced units may not necessarily provide greater improvements to air quality. At the minimum:

- Purchase units which are [certified for ozone emissions and electrical safety by the California Air Resources Board \(CARB\)](#).



- Ensure units are Appropriately sized for the room or area they are deployed in. One method for selecting the appropriate size unit is the unit's [Clean Air Delivery Rate \(CADR\)](#). The authors of the CADR standard suggest that a unit should have a CADR at least 2/3 of the room's floor area (in square feet), with adjustments made if the room's ceiling is >8 feet in height. If this method is used, the unit's CADR for Tobacco Smoke should be used.

### General Considerations

In general, the greater the number of people in an indoor environment, the greater the need for ventilation with outdoor air. Focus efforts on providing fresh air ventilation to the spaces with the highest density of occupants. Decrease occupancy in areas where outdoor ventilation cannot be increased. In settings where ventilation cannot be optimized, consider having occupants spaced greater than 6 feet apart and ensure face coverings are used at all times. Other changes that can be considered in buildings with specific ventilation features include:

- Ensure restroom exhaust fans are functional.
- Inspect and maintain local exhaust ventilation in other areas such as laundry or kitchens.
- Consider using portable high-efficiency particulate air (HEPA) fan/filtration systems to enhance air cleaning in higher risk areas such as where people congregate or persons are exerting themselves.
- Avoid activities that affect air quality, as these could counteract any positive impact of efforts to improve the indoor air: smoking cigarettes, pipes and cigars, frying foods, sweeping, vacuuming, spraying aerosol products, burning candles or incense, or using gas-powered appliances, propane, wood-burning stoves and furnaces.

### Resources

San Francisco Department of Public Health (SFPDH): [www.sfgdcp.org/covid19](http://www.sfgdcp.org/covid19)

Centers for Disease Control:

- [Operating schools during COVID-19: CDC's Considerations](#)
- [Wildfire Smoke and COVID-19: Frequently Asked Questions and Resources for Air Resource Advisors and Other Environmental Health Professionals](#)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):

- [Guidance for Building Operations During the COVID-19 Pandemic](#)
- [ASHRAE Resources Available to Address COVID-19 Concerns](#)
- [ASHRAE Reopening Schools and Universities C19 Guidance](#)

Environmental Protection Agency (EPA)

- [Ventilation and COVID-19](#)
- [Indoor Air in Homes and COVID-19](#)

World Health Organization:

- [Q&A: Ventilation and air conditioning in public spaces and buildings and COVID-19](#)