



## MEMORANDUM

**TO:** Pardis Saffari, Senior Economic Development Manager, Cambridge Community Development Department

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**DATE:** February 23, 2021

**RE:** Suggested Guidance for Management of Ventilation Systems for City of Cambridge Small Businesses (EH&E 24467)

The following suggested guidance is provided for use by City of Cambridge small business operators to support occupancy of facilities during the COVID-19 pandemic. The information presented here is based upon guidance issued by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)<sup>1,2</sup> and the U.S. Centers for Disease Control and Prevention (CDC)<sup>3,4</sup> and includes recommendations on operating building ventilation systems and steps that can be taken to check and confirm operation. All decisions about implementing these considerations should be made according to City of Cambridge and Commonwealth of Massachusetts guidelines as they are updated and issued. City of Cambridge officials can determine, in collaboration with state and local health officials, if and how to implement these considerations while adjusting them to meet the unique needs and

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<sup>1</sup> ASHRAE Epidemic Task Force, *Building Readiness*, Updated February 1, 2021.

<https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf>

<sup>2</sup> ASHRAE Standard 62.1-2016. *2016 Ventilation for Acceptable Indoor Air Quality*, Atlanta, GA: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

<sup>3</sup> Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation (CDC), Updated September 22, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>; and Guidance for Businesses and Employers Responding to Coronavirus Disease 2019 (COVID-19), Updated January 4, 2021 (CDC) <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html>

<sup>4</sup> Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools, and Homes, Updated January 5, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/community/reopen-guidance.html>

circumstances of City of Cambridge small businesses and the local jurisdiction. Their implementation should also be informed by what is feasible, practical, and acceptable.

The materials and information provided were not created by the City of Cambridge and the City of Cambridge does not adopt any positions contained therein. Any questions should be directed to EH&E and not the City of Cambridge. Small businesses need to comply with all federal, state, and local laws, regulations, and rules, but the small business is solely responsible for making any decisions about implementing these considerations and the City of Cambridge is not advising the small business in this regard.

## LIMITATIONS

EH&E's advice, recommendations, guidance and work product are intended to augment and supplement all existing local, state and federal, laws, by-laws, regulations, and ordinances that may apply to the Client's work, workforce and places of work, such as, without limitation, all employment laws, and all U.S. Occupational Safety and Health Administration (OSHA), U.S. Environmental Protection Agency (EPA), and Americans with Disabilities Act (ADA) laws and regulations; therefore where EH&E's advice, recommendations, guidance and work product may overlap or touch upon existing laws and regulations, such advice and recommendations should be construed and interpreted in a manner that further defines existing duties and obligations, and assists in the implementation of policies and procedures to discharge those duties and obligations, and should not be construed or interpreted in a manner that lessens or diminishes existing duties and obligations.

EH&E appreciates the opportunity to support City of Cambridge. If you have any questions or comments on the information contained within this memorandum, please contact us at 1-800-TALK EHE (1-800-825-5343).

Attachment 1: Suggested Guidance for Management of Ventilation Systems for City of Cambridge Small Businesses

# SUGGESTED GUIDANCE FOR MANAGEMENT OF VENTILATION SYSTEMS FOR CITY OF CAMBRIDGE SMALL BUSINESSES

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## SMALL BUSINESSES WITH MECHANICAL VENTILATION

The following action items may need to be conducted in coordination with the building owner and/or a heating, ventilating, and air-conditioning (HVAC) systems contractor:

### System Condition and Operation

- Conduct a walkthrough of spaces that are planned to be occupied and note potential deficiencies with air distribution, such as blocked or partially covered supply and return air diffusers and grilles. Correct issues as required.
- Inspect HVAC system components to verify proper function. Check for dirt/dust accumulation on air filters and replace filters as needed. When servicing air handling equipment such as changing filters, consider having workers use personal protective equipment (PPE).
- Review building automation system (BAS) or the thermostat controlling the HVAC system(s), to confirm that occupancy schedules are appropriately set up.
- Modify thermostat or BAS occupancy schedules as needed to fit the current occupancy schedules for the small business. Consider extending the HVAC system occupied mode so the HVAC systems continue to run for two hours after actual occupancy. Associated exhaust air systems should also be operated during this period.

### Ventilation

- In buildings with operable windows, if the outside air temperature and humidity are moderate (temperature range between 65°F and 78°F and relative humidity between 20% and 75%), consider opening windows during periods of building occupancy. Do not open windows if doing so poses a health or safety risk (e.g., risk of falling, security risk).
- During the HVAC occupied mode, optimize outdoor air ventilation by operating HVAC systems at increased outdoor air rates (i.e., increase the percentage of outdoor air). For HVAC systems equipped to provide cooling, the percentage of outdoor air delivered will be limited to the cooling capacity of the HVAC system and its ability to provide an appropriate discharge air temperature while also controlling for humidity. For HVAC systems that provide heating only, an increased outdoor air intake rate is possible if outdoor air temperatures are moderate (between 65°F and 78°F).

- During the HVAC system unoccupied mode, the HVAC systems can continue to operate continuously and at minimum outside air mode. Associated exhaust air systems should also be operated during this period.

## Air Cleaning and Filtration

- Perform an inventory of HVAC systems and document the types and the Minimum Efficiency Reporting Value (MERV) rating of particulate air filters installed in the systems. This inventory can be used for assessing the potential of upgrading the systems with higher efficiency filtration.
- For HVAC filtration, consider increasing the level of filtration in the air handling systems to a MERV-13 or greater if existing fan systems permit.
- If the use of MERV-13 or greater filtration is not possible, portable high efficiency particle air (HEPA)-filtered units can be used in occupied spaces to provide continuous local filtration. These units can also be used in higher occupancy spaces to supplement HVAC filtration, as warranted.
- Although there is no guidance recommending specific air exchange rates for small businesses during the COVID-19 pandemic, the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) pandemic guidance for some indoor environments including schools suggests supplementing outdoor air ventilation with an additional 2 air changes per hour (ACH), which may be provided through MERV-13 or higher filtration in the HVAC system or through use of portable HEPA-filtered units. This recommendation would equate to the range of 4 to 6 ACH for many types of small businesses.
- Consider installing ultraviolet germicidal irradiation (UVGI) as a supplemental technique to inactivate potential airborne virus in the upper-room air of occupied small business spaces, where feasible, especially if increased ventilation and filtration cannot be implemented.<sup>1</sup> Note: Upper room UVGI is a well-established disinfection method endorsed by Centers for Disease Control and Prevention (CDC) and ASHRAE; this should not be confused with ionizers and other emerging technologies whose effectiveness at treating particles in the air have not been established. Ensure that they are sized correctly and operate in accordance with industry and manufacturer guidelines.

## SMALL BUSINESSES WITH NO MECHANICAL VENTILATION

- Many City of Cambridge small businesses rely on natural ventilation through operable windows and heating using perimeter baseboard radiation. For these small businesses it is important to ensure all windows are operable and insect screens and animal guards are in place.

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<sup>1</sup> <https://www.ashrae.org/File%20Library/About/Position%20Documents/Airborne-Infectious-Diseases.pdf>

- In small businesses with operable windows, if the outside air temperature and humidity are moderate, keep windows open as much as possible to promote increased ventilation. In addition, increased circulation of outdoor air can be provided by opening doors if possible and using fans. Do not open doors if doing so poses a safety or health risk for occupants, including children (e.g., a risk of falling or of breathing outdoor environmental contaminants). If fans are in use, ensure that they are not blowing air directly on occupants.
- For restrooms with mechanical exhaust, check to verify that exhaust systems are operating and that restrooms are operating at a slight negative pressure. For restrooms not equipped with mechanical exhaust, open windows where possible to provide increased ventilation.
- Operate all building exhaust fans continuously including bathroom and kitchen exhaust.
- Consider using portable HEPA-filtered air cleaners to increase air cleaning. These units should operate continuously during hours of small business occupancy and for approximately 2 hours after closing.
- Consider installing UVGI as a supplemental technique to inactivate potential airborne virus in the upper-room air of occupied small business spaces, where feasible, especially if increased ventilation and filtration cannot be implemented.<sup>2</sup> Note: Upper room UVGI is a well-established disinfection method endorsed by CDC and ASHRAE; this should not be confused with ionizers and other emerging technologies whose effectiveness at treating particles in the air have not been established. Ensure that they are sized correctly and operate in accordance with industry and manufacturer guidelines.

The ACH targets are based on using a combination of outdoor air and clean air, where clean air is defined as the outdoor airflow plus the recirculated airflow that passes through an air filter at its rated cleaning efficiency. For spaces that operate at lower outdoor air ventilation rates, achieving the recommended target range can be achieved by providing highly filtered air through an existing HVAC system or through supplemental filtration provided by portable HEPA-filtered air cleaners. Although there is no guidance recommending specific air exchange rates for small businesses during the COVID-19 pandemic, ASHRAE's pandemic guidance for some indoor environments including schools suggests supplementing outdoor air ventilation with an additional 2 ACH, which may be provided through MERV-13 or higher filtration in the HVAC system or through use of portable HEPA-filtered units. This recommendation would equate to the range of 4 to 6 ACH for many types of small businesses.

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