

Facilities Management – COVID-19 Related HVAC Measures





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Background

Since the onset of the COVID-19 pandemic, Western University has followed public health and technical guidelines provided by the agencies and organizations that issue design and operating standards that apply to Western University's operation. In reference to ventilation systems and strategies in particular, the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) is the organization whose jurisdiction covers ventilation system design and operating standards. ASHRAE's published findings determined that dramatic increases in ventilation rates delivered diminishing infection risk mitigation returns—in contrast with increased mask efficiency—it has, through its Epidemic Task Force, provided ongoing technical guidance for mitigating the spread of COVID-19 with respect to ventilation systems. Although Middlesex London Health Unit (MLHU) has not highlighted ventilation as a concern and no classroom-based transmissions were identified last year, Western takes pride in following best practices and in achieving the best possible performance from its building systems—including those that provide ventilation. This document provides a summary of both Facilities Management's (FM) normal operating activities that align with ASHRAE Epidemic Task Force's current guidelines as well as the supplementary actions that FM has taken in response to the guidelines and in preparation for a full return to in-person classes and operations this fall.

Summary

Since the beginning of the COVID-19 pandemic, Western University has implemented a comprehensive approach to reducing the risk of COVID-19 transmission on its campus. During every stage, Western used the best available data and information from public health authorities and industry leaders to form decisions and transmission mitigation actions. For facility ventilation in particular, this approach included closely monitoring the findings and adopting guidance issued by ASHRAE relating to HVAC system operation. This diligence in following an evidence-based approach to address health and safety concerns associated with COVID-19 throughout the duration of the pandemic leaves Western well positioned to welcome staff and students back to a safe and healthy campus.

Summary Of ASHRAE's Core Recommendations & Western's Response

From ASHRAE Epidemic Task Force's Core Recommendations for Reducing Airborne Infectious Aerosol Exposure guidance paper published in January 2021, found at <https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf>



Recommendation 1: Follow Public Health Guidance

- i. Follow all regulatory and statutory requirements and recommendations for social distancing, wearing of masks and other PPE [personal protective equipment], administrative measures, circulation of occupants, reduced occupancy, hygiene and sanitation.
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Recommendation 2: Ventilation, Filtration, Air Cleaning

- i. Provide and maintain at least required minimum outdoor airflow rates for ventilation as specified by applicable codes and standards.
 - ii. Use combinations of filters and air cleaners that achieve MERV 13 or better levels of performance for air recirculated by heating, ventilation and air conditioning (HVAC) systems.
 - iii. Only use air cleaners for which evidence of effectiveness and safety is clear.
 - iv. Select control options, including stand-alone filters and air cleaners, that provide desired exposure reduction while minimizing associated energy penalties.
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Recommendation 3: Air Distribution

- i. Where directional airflow is not specifically required, or not recommended as the result of a risk assessment, promote mixing of space air without causing strong air currents that increase direct transmission from person to person.
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Recommendation 4: HVAC System Operation

- i. Maintain temperature and humidity design setpoints.
 - ii. Maintain equivalent clean air supply required for design occupancy whenever anyone is present in the space served by a system.
 - iii. When necessary to flush spaces between occupied periods, operate systems for a time required to achieve three air changes of equivalent clean air supply.
 - iv. Limit re-entry of contaminated air that may re-enter the building from energy recovery devices, outdoor air intakes and other sources to acceptable levels.
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Recommendation 5: System Commissioning

- i. Verify that HVAC systems are functioning as designed.

Corresponding Facilities Management Measures

1

Recommendation 1: Follow Public Health Guidance

In response to the COVID-19 pandemic, Western University has worked closely with public health partners including the MLHU to ensure that all public health guidelines and best practices relating to COVID-19 infection mitigation were followed. A comprehensive history, information and current guidance for the campus community can be found at <https://www.uwo.ca/coronavirus/>

2

Recommendation 2: Ventilation, Filtration, Air Cleaning

Western University's facilities' ventilation systems are designed in accordance with ASHRAE standards as part of the requirements of the Ontario Building Code. The systems are tested, adjusted and balanced to the satisfaction of the design engineers and FM before FM takes over their operation. FM's licenced trade staff subsequently maintain these systems in good working order as part of FM's ongoing preventative maintenance program. In addition to the regularly scheduled maintenance activities, FM also controls and monitors most systems through the Western Environmental System (WES) a direct digital control building automation system. WES issues automated notification in the event of controlled systems going outside of their normal operating ranges. These notifications prompt investigative and, if necessary, remedial maintenance work to ensure normal operation.

Western uses a variety of MERV (Minimum Efficiency Reporting Value) rated air filters based on the activities in the spaces. Air filters vary from MERV 10 to 14 across the campus. In areas with a higher potential for aerosolization of particles the use of MERV 13 filters have been installed where HVAC equipment can physically accommodate them. As well, the maximization of fresh air added to spaces through adjustments to the HVAC controls has been implemented and the shedding of fan load during peak provincial electrical load days has been paused.

Additionally, in some places like practice rooms in the Don Wright Faculty of Music building, cardio labs and clinics, and Health Services patient examination rooms, air purifiers have been and continue to be added to further improve the air quality in these specialized spaces.

3

Recommendation 3: Air Distribution

The configuration of the air distribution ductwork serving Western's indoor rooms that are designed for occupancy by multiple people are configured such that they include multiple supply outlets and return inlets that promotes air mixing without inducing strong directional airflow.

4

Recommendation 4: HVAC System Operation

Western University's WES is a current generation, networked, direct digital building automation system that monitors and controls the HVAC systems within facilities. The system controls the indoor space conditions to the design setpoints around the clock and issues automated alerts to FM staff if monitored parameters drift out of the acceptable ranges. These alerts are actively monitored and corrective action is taken as required.

Through the automation system, the control strategy has been revised to only setback to unoccupied when the facilities are empty. The spaces are flushed between occupancy periods through scheduling and the HVAC systems are scheduled to operate two extra hours both before and after their normal schedule to further flush the facilities. Western's HVAC systems are designed to limit the possibility of air re-entering its facilities.

5

Recommendation 5: System Commissioning

Western's FM operations staff perform ongoing, regular preventative maintenance on the HVAC systems to keep them in good working order, to ensure that they continue to operate as designed and to achieve the full possible performance from the systems.

During the time of reduced occupancy and in preparation for a full return to in-person classes and operations, Western has taken the additional step of assessing the ventilation in a series of its representative spaces and classrooms to ensure that its maintenance and operations activities are keeping the systems measurably within their original design parameters. Over sixty individual spaces are currently being assessed across buildings representing the full range of ages on campus. The results of these assessments will inform Western if further actions are required. A follow up article on these outcomes will be shared in later August.