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A Strong and Healthy Start:
Safety and Health Guidance for Vermont Schools
FAQ 8: Heating, Ventilation and Air Conditioning (HVAC)

The Vermont Agency of Education (AOE) has released joint guidance with the Vermont Department of Health on safely reopening schools. This document, A Strong and Healthy Start: Safety and Health Guidance for Vermont Schools, provides health guidance to school administrators and school personnel as they plan and implement the reopening of schools for the 2020-21 School Year in the context of COVID-19.

This Frequently Asked Questions document responds to follow up questions from educators and administrators and is intended to clarify and expand on the guidance

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Q1. Our school has a unique layout, architecture or an outdated HVAC setup. What should we do?

Districts and schools should work with an HVAC profession/consultant who can be familiarized with the school's particular system and layout.

As an example, a classroom could have a supply vent in it with the return/exhaust vent in the hallway. That is an example of when it would not be a good idea to shut the classroom door. Another example is that a fan or portable HEPA air purifier intending to reduce risk could be obstructing or interfering with the direction of airflow from HVAC. And, although recommendations exist on the types of filters (for example, HEPA with a MERV 17 rating), some systems aren't able to handle the more advanced filters and installing them could cause the overall system not to function properly.

Efficiency Vermont has compiled a list of HVAC experts for consultation.

Q2. What funds are available for schools to perform HVAC modifications?

The Vermont General Assembly developed the School Indoor Air Quality Grant Program and allocated $6.5 million of Coronavirus Relief Fund monies to Efficiency Vermont to administer a program that provides funds to schools. The Program is expected to assist Vermont schools with indoor air quality projects such as repairing, maintaining and upgrading HVAC systems in response to COVID-19 following ASHRAE and CDC guidelines.

Q3. What goals should schools have in mind for their HVAC systems to decrease risk of spreading COVID-19?

The US Centers for Disease Control (CDC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) have provided guidelines that are summarized on

page 4 of Efficiency Vermont's School Indoor Air Quality Grant Program description. The guidelines with these specific targets to maintain indoor air quality:

- Six air changes per hour (ACH) (at least 2 ACH for supplemental in-room systems)
- Capture a minimum of 75% of airborne viruses (MERV 13 or higher filtration)
- 30% more ventilation air than is specified in ASHRAE Standard 62.1-2016
  (Note: Ventilation air is a measurement of both outside air and exhaust air)

HVAC performance targets are higher for the recommended isolation area of a school, with 6-10 ACH, MERV 14, and 100% outdoor air.

The CDC acknowledges that making these changes on such a short timeline will be challenging for most schools and advises that "implementation should be guided by what is feasible, practical, acceptable, and tailored to the needs of each community."

Efficiency Vermont recommends that schools prioritize taking the following actions:

1. Install, modify, or perform maintenance on existing ventilation and filtration systems
2. Modify control sequences to meet industry recommendations and calibrate sensors
3. Implement supplemental equipment where needed
   (Note: this includes equipment such as portable HEPA filtration units.)
4. Regularly check indoor air quality using monitors, which will be provided to schools through this program
   (Note: this includes monitors such as carbon monoxide detectors.)
5. Create isolation zones for nurse rooms

Considerations should be given to noise generated by existing, and newly installed, equipment. The Acoustical Society of America recommends maximum background noise exposure levels of 35 dB for unoccupied core-learning spaces in permanent school buildings, as well as a maximum reverberation time of 0.6–0.7 seconds (depending on classroom volume)

This article, recently published in *Environment International*, contains some good information and insight: How can airborne transmission of COVID-19 indoors be minimized?

Q4. Under what conditions can air conditioning or fans be used?

The Health and Safety guidance suggests that windows should be opened frequently when air conditioning is not in use and details the specific use of box fans to enhance natural ventilation by blowing fresh outdoor in to the classroom via one window and indoor air out of the classroom via another window. It notes that the use of fans in a closed room would simply recirculate the same indoor air without any benefit in reducing airborne virus. This also applies to most window air conditioning units.

The Health and Safety guidance also includes detailed instructions on suggested modifications to building HVAC systems to improve outdoor air ventilation and improve HVAC filtration.

Air conditioning can be used according to this guidance at the discretion of the superintendent or independent school head, or a designated staff member, such as a facilities manager.

Q5. The entire HVAC section [of the Health and Safety Guidance] just says "follow these recommendations." How do we know our schools have done any of this?

We encourage districts and schools to share the steps that they have taken to ensure the safety of their school community with their staffs. Any questions or concerns should be directed to district and/or school leadership.
