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2020:B12

Date: August 25, 2020

Memorandum to: Directors of Education
Secretaries/Treasurers of School Authorities

From: Nancy Naylor
Deputy Minister of Education

Subject **Optimizing Air Quality in Schools**

We would like to recognize the extensive work that has been underway by all school boards during the summer months to prepare ventilation systems in schools to maximize air quality.

This memo is intended to provide guidance on the allocation of the $50M in additional funding for air quality and ventilation. These funds are available effectively immediately to support the re-opening of schools. We would like to request that school boards expedite the use of these funds to optimize your ventilation systems prior to the start of the school year. The ministry appreciates that some of the initiatives may require additional time, but we ask that every effort is made to bring the benefits of these investment online by Thanksgiving.

The ministry is also taking this opportunity to share appendices outlining Air Quality Best Practice Considerations and Air Quality Checklist Examples. We would like to thank the school board facility specialists for their review and feedback. The attached appendices reflect their input.

We look forward to working closely with you on this important initiative.

Sincerely,

Nancy Naylor
Deputy Minister

Copy: School Business Officials
Facilities Managers

Appendix A: Air Quality Best Practice Considerations

School boards are expected to employ multiple strategies to support healthy and safe learning environments for students and staff.

The information below provides an overview of best practices that can be considered for optimizing air quality in schools.

School boards should review applicability, with qualified persons, in the context of their school facilities and related building systems (including manufacturer recommendations). Note that school occupancy levels should be taken into consideration when reviewing systems.

Context

Measures to help reduce transmission risk in indoor settings include:

1. **Ventilation:** Increasing the flow of outdoor/fresh air for diluting the concentration of any infectious particles.
2. **Filtration:** Filtering air to remove infectious particles.

School boards should develop a plan to optimize air quality in schools that would provide information on how to address issues related to ventilation and filtration, which could include:

- Working with qualified persons to evaluate existing building systems, ventilation and filtration.
- Verifying ventilation and filtration performance through commissioning and/or testing by qualified persons.
- Reviewing and updating recommended maintenance measures for air handling systems (including inspection and replacement of filters, if applicable).

Best Practice Considerations

In addition to reviewing applicability, with qualified persons, in the context of their school facilities and related building systems (including manufacturer recommendations), schools boards should also ensure that implemented measures do not introduce new health hazards to the setting, for example:

- Do not open windows and doors if doing so poses safety or health risk, e.g., risk of falling, triggering asthma symptoms, risk of bees/wasps, to students and staff.
- Do not prop open fire doors to increase ventilation and/or reduce exposure to frequently touched door handles.

1. Ventilation Measures

Note that ventilation measures should also be reviewed in the context of the performance and operation of other heating/cooling systems to ensure other systems are operating optimally and room temperatures are not compromised.

The following measures aim to increase the flow of outdoor/fresh air to dilute the concentration of any infectious particles. Applicability of each measure will vary depending on the situation.

- Air Dilution

  Ventilate indoor environments with outdoor air to dilute air exhaled by students and staff by:
  - Reviewing and optimizing the outdoor air ratio of HVAC systems as much as possible.
  - Opening windows and operating exhaust fans, if applicable.

- Assess Building Design

  Assess relevant strategies based on building design:

  a. For buildings/rooms that rely on natural ventilation: open windows, if safe to do so (assess to prevent re-entry of building exhaust)

  b. For buildings/rooms that rely on mechanical ventilation:
     - Assess air supply (review outdoor air ventilation rate and increase where possible, adjust/optimize demand control ventilation if required and as much as practically feasible to increase outdoor/fresh air).
     - Assess exhaust systems (review to ensure exhaust air is not re-entering the building
       e.g., windows, science labs, washrooms).

- Run Ventilation System for Longer Periods

  Consider keeping systems running longer hours (e.g., 2 hours prior to occupant entry with consideration to school and child care start-times and 2 hours post occupancy with similar considerations). This may require adjustment of C02 sensors to prevent early system shutoff.

- Assess Air Recirculation

  If practical or possible, bypass energy recovery ventilation systems that recirculate/mix exhaust air back into the outdoor air supply.

2. Filtration Measures

The following measures aim to filter air to remove infectious particles and should be reviewed with a qualified person familiar with your facilities. Applicability of each measure will vary depending on the situation.

- Filter Inspection & Maintenance
  - Inspect filters to make sure they are installed and fit correctly.
  - Maintain and change filters based on filter and equipment manufacturer's recommendation.
    - Assess to ensure that the highest rated filter is being utilized in relation to system specifications.

- Air Filtration

  Increase the level of air filtration where possible, for example:
  - Improve central air and maintain HVAC filters according to operational procedures.
  - Consider increasing frequency of filter changes to maintain overall performance.
  - Check that sufficient airflow can be maintained based on HVAC design criteria.
  - Consider using pleated filters to increase filtration surface area.

- Portable Air Filtration Units

  Portable air filtration units (e.g., with HEPA filters) can be considered where ventilation is insufficient or where outdoor/fresh air introduction cannot be achieved by other means.
  - Such devices and their placement should be carefully selected e.g., based on the size of the room, ensuring air does not flow directly from one person to another and air intake is not directly from the floor.
  - If portable units are used, ensure that the units are cleaned and maintained.

Appendix B: Air Quality Checklist Examples

Review the best practices checklists below with qualified persons and assess in the context of existing building systems and their operations. These checklists serve as examples. Applicability will vary depending on the situation. Other sources of information include reviewing manufacturer recommendations.

- **Summer Checklist prior to Fall Start of Classes**
  Examples of HVAC-related measures:
  - ☐ Review air distribution conditions of existing spaces.
  - ☐ Review existing indoor air quality issues.
  - ☐ Review control sequences to verify existing systems are operating to maintain ventilation, temperature, and humidity conditions as designed for occupied areas.

- **Startup Checklist for HVAC Systems Prior to Occupancy**
  Includes recommendations to review, maintain and monitor HVAC systems, for example:

HVAC Systems Checklist	
Consider operating mechanical systems in occupied mode for a period of one week prior to students returning under normal operating hours. Endeavour to maintain proper school indoor air temperature and humidity levels to maintain occupant comfort.	☐
Assess air intakes and exhaust discharge outlets to prevent/limit re-entry of exhaust air.	☐
Review and update existing standards for frequency of filter replacement & type of filters to be utilized.	☐
If Demand-Controlled Ventilation (DCV) systems using Carbon Dioxide (CO2) sensors are installed, trend and monitor on an ongoing basis.	☐
Review and update, if required, scheduled maintenance protocols.	☐
Consider re-adjusting start time of HVAC systems to two hours prior to occupant entry with consideration to school and child care start-times and two hours post occupancy with similar considerations.	☐
Review air distribution conditions of existing spaces (look for covered diffusers, blocked return grilles, overly closed supply diffusers/registers and return/exhaust grilles.	☐

- **Best Practices: Ongoing/Daily/Monthly/Annual Maintenance**
  Checklist to consider at various frequencies during the academic year. A few examples of the many HVAC-related measures are listed below:

A. Ongoing / Daily Maintenance

System reviews to undertake on an ongoing basis	
Review control sequences to verify systems are operating as designed to maintain required ventilation and temperature in occupied areas.	☐
Maintain proper indoor air temperature to maintain human comfort.	☐
Verify filtration in all mechanical equipment: verify filters installed correctly and are being maintained.	☐
If Demand-Controlled Ventilation (DCV) systems using CO2 sensors are installed, trend and monitor.	☐
Perform initial air flush of all spaces prior to occupancy (e.g., two hours prior to occupant entry with consideration to school and child care start-times and two hours post occupancy with similar considerations).	☐

B. Monthly Maintenance

Air Handling Units: Monthly	
Check for particulate accumulation on filters, replace filter as needed.	☐
Check for particulate accumulation on outside air intake screens.	☐
Check the control system and devices for evidence of improper operation.	☐
Check variable-frequency drive for proper operation.	☐
Check drain pans for cleanliness, proper slope and drainage.	☐
Check P-trap.	☐
Verify control dampers operate properly.	☐
Confirm AHU is bringing in outdoor air and removing exhaust air as intended.	☐
Verify filters are installed correctly and reasonably clean.	☐
Review condition and cleanliness of coils and heat recovery wheels in air handling equipment.	☐
Roof Top Units: Monthly	
Check for particulate accumulation on outside air intake screens and filters. Replace filter as needed.	☐
Check P-trap.	☐
Check drain pans for cleanliness and proper slope.	☐
Check the control system and devices for evidence of improper operation.	☐
Check variable frequency drive for proper operation.	☐
Check refrigerant system for leaks.	☐
Check for evidence of leaks on gas heat section heat-exchanger surfaces.	☐
For fans with belt drives, inspect belts and adjust as necessary.	☐
Verify control dampers operate properly.	☐
Unitary and Single Zone Equipment: Monthly	
For example: Wall Hung Units, Unit Ventilators, Mini-Splits, Packaged Terminal Air Conditioners, Water-Source Heat Pumps, Fan Coil Units	
Check for particulate accumulation on filters, replace or wash filter as needed.	☐
Check P-trap.	☐
Check drain pans for cleanliness and proper slope.	☐
Check the control system and devices for evidence of improper operation.	☐
Verify control dampers operate properly.	☐

C. Annual Maintenance

Pumps: Annually	
Inspect pumps and associated electrical components for proper operation.	☐

Appendix C: Eligible Expenses

Eligible expenses for the new $50M in funding:

- Upgrading current air filters to the highest possible MERV and increasing the frequency in which filters are replaced to ensure maximum airflow (filters and installation costs);

- Performing recommissioning of current HVAC system to optimize air circulation and pressure, ensuring systems are meeting performance targets; and

- Purchasing portable air filtration systems with high-efficiency particulate air (HEPA) filters for classrooms that have limited air ventilation/fresh air options.

Appendix D: Air Quality and Ventilation Funding

Board ID	Board Name	Board Allocation ($)
1	District School Board Ontario North East	293,100
2	Algoma District School Board	416,400
3	Rainbow District School Board	449,100
4	Near North District School Board	356,200
5.1	Keewatin-Patricia District School Board	170,900
5.2	Rainy River District School Board	111,400
6.1	Lakehead District School Board	293,800
6.2	Superior-Greenstone District School Board	148,200
7	Bluewater District School Board	452,800
8	Avon Maitland District School Board	402,900
9	Greater Essex County District School Board	846,400
10	Lambton Kent District School Board	678,400
11	Thames Valley District School Board	1,810,200
12	Toronto District School Board	6,918,600
13	Durham District School Board	1,439,500
14	Kawartha Pine Ridge District School Board	882,200
15	Trillium Lakelands District School Board	532,000
16	York Region District School Board	2,588,000
17	Simcoe County District School Board	1,078,400
18	Upper Grand District School Board	845,000
19	Peel District School Board	2,991,300
20	Halton District School Board	1,239,500
21	Hamilton-Wentworth District School Board	1,162,000
22	District School Board of Niagara	1,019,300
23	Grand Erie District School Board	764,100
24	Waterloo Region District School Board	1,467,400
25	Ottawa-Carleton District School Board	1,681,500
26	Upper Canada District School Board	860,700
27	Limestone District School Board	568,100
28	Renfrew County District School Board	284,900
29	Hastings & Prince Edward District School Board	447,100
30.1	Northeastern Catholic District School Board	102,000
30.2	Nipissing-Parry Sound Cath District School Board	100,900
31	Huron-Superior Catholic District School Board	156,700
32	Sudbury Catholic District School Board	176,400
33.1	Northwest Catholic District School Board	50,700
33.2	Kenora Catholic District School Board	42,900
34.1	Thunder Bay Catholic District School Board	210,300
34.2	Superior North Catholic District School Board	77,700
35	Bruce-Grey Catholic District School Board	124,500
36	Huron-Perth Catholic District School Board	158,300
37	Windsor-Essex Catholic District School Board	454,500

Board ID	Board Name	Board Allocation ($)
38	London District Catholic School Board	523,800
39	St. Clair Catholic District School Board	227,000
40	Toronto Catholic District School Board	2,024,700
41	Peterborough Victoria Northumberland and Clarington Catholic District School Board	367,900
42	York Catholic District School Board	1,027,000
43	Dufferin-Peel Catholic District School Board	1,702,200
44	Simcoe Muskoka Catholic District School Board	500,400
45	Durham Catholic District School Board	471,100
46	Halton Catholic District School Board	582,000
47	Hamilton-Wentworth Cath District School Board	567,800
48	Wellington Catholic District School Board	207,000
49	Waterloo Catholic District School Board	500,800
50	Niagara Catholic District School Board	552,300
51	Brant Haldimand Norfolk Catholic District School Board	279,800
52	Catholic District School Board of Eastern Ontario	354,400
53	Ottawa Catholic District School Board	958,500
54	Renfrew County Catholic District School Board	194,800
55	Algonquin and Lakeshore Catholic District School Board	350,400
56	Conseil scolaire de district du Nord-Est de l'Ontario	69,100
57	Conseil scolaire public du Grand Nord de l'Ontario	149,500
58	Conseil scolaire Viamonde	509,500
59	Conseil des écoles publiques de l'Est de l'Ontario	390,300
60.1	Conseil scolaire de district catholique des Grandes Rivières	336,700
60.2	Conseil scolaire de district catholique Franco-Nord	107,300
61	Conseil scolaire district catholique du Nouvel-Ontario	370,000
62	Conseil scolaire de district catholique des Aurores boréales	35,800
63	Conseil scolaire catholique Providence	291,500
64	Conseil scolaire catholique MonAvenir	541,300
65	Conseil scolaire de district catholique de l'Est ontarien	370,100
66	Conseil scolaire de district catholique du Centre-Est de l'Ontario	562,700
-	James Bay Lowlands Secondary School Board	5,000
-	Moose Factory Island District School Area Board	5,000
-	Moosonee District School Area Board	5,000
-	Penetanguishene Protestant Separate School Board	5,000