

Air Handling Checklist

September, 2007

Excerpted from Tools for Schools Indoor Air Quality (IAQ) Action Kit, Health Canada.
Original available on-line at http://www.hc-sc.gc.ca/ewh-semt/pubs/air/tools_school-outils_ecoles/index_e.html

Date: _____ Room/area: _____ School _____
Name: _____ Signature: _____

To be completed by:

- School maintenance/facilities staff
- Contract service providers

Read the entire Air Handling Checklist section in Health Canada's Tools for schools Action kit, including the sections: **How to Measure Airflow - Reference Information** and **Interpreting Indoor CO₂ Concentration Measurements**, pages 7-3 to 7-15.

Y = statement is correct, N = statement is incorrect, N/A = not applicable

Outdoor Air Intakes

Perform these activities for all outdoor air intakes while outside the building, and mark the results on the Air Handling Log for each unit.

- On a small floor plan, mark the locations of outdoor intakes, based on mechanical plans (if available) and observations made while performing these activities.
- Obtain chemical smoke (or a small piece of tissue paper or light plastic) before performing activity #3. For more information see "How to Measure Air Flow" in T for S checklist.
- Ensure that the ventilation system is on and operating in the "occupied" mode.

Activities:

Y N N/A

1. Ensure that the outdoor air intakes are unobstructed.

- ___ ___ ___ From outside the school building, checked the intakes for obstructions, such as debris, clogged screens, damage, or makeshift covers (e.g. boards or plastic).
- ___ ___ ___ Removed any obstructions.
- ___ ___ ___ Installed corrective devices if snowdrifts or leaves often block an intake.

Comments _____

2. Ensure that outdoor air intakes are clear of nearby pollutant sources.

- ___ ___ ___ At ground level, looked for dumpsters, loading docks, parking lots, and areas where cars or busses idle.
- ___ ___ ___ At roof level, looked for plumbing vents, exhaust outlets (such as kitchen, toilet, or laboratory exhaust fans), puddles on the roof, and mist from air-conditioning cooling towers.
- ___ ___ ___ Birds and other pests do not roost or inhabit the areas around the air intakes.
- ___ ___ ___ Resolved problems due to pollutants near intakes:
- ___ ___ ___ Removed sources, where possible (e.g., move a dumpster to another location).
- ___ ___ ___ Separated the source from the intake (e.g., add another pipe section to raise a nearby exhaust outlet above the intake).
- ___ ___ ___ Changed operating procedures (e.g., turn off vehicles instead of idling them at loading docks and bus stands).
- ___ ___ ___ Outdoor smoking areas are not near an intake.

Comments _____

3. Confirm that outdoor air is entering the system intake (visual indication)

- ___ ___ ___ Used chemical smoke (or a small piece of tissue or light plastic) to test whether air is flowing into the intake grille
- ___ ___ ___ Confirmed the operation and positions of intake dampers during all operating cycles.

Comments _____

System Cleanliness

Y N N/A

___ ___ ___ Read warnings on page 7-6 of IAQ Tools for Schools Kit.

Perform activities 4-12 as a set on each ventilation unit while in the room and the unit is open.

4. Inspect air filters on ventilation equipment.

- ___ ___ ___ Reviewed ventilation system filter components and specifications to ensure that the proper filters are being used.
- ___ ___ ___ Installed new filters as needed. Shut off ventilation system fans when replacing filters so that dirt will not blow downstream. Vacuumed the filter area before installing the new filter.
- ___ ___ ___ Confirmed that filters fit properly in their tracks, with no air leaks around the air filter.
- ___ ___ ___ Confirmed that filters are installed in the proper direction for airflow.

5. Ensure that condensate (condensed water, frost, or “fog”) drain pans are clean and drain properly.

- ___ ___ ___ Drain pans slant toward the drain so they do not collect and hold water.
- ___ ___ ___ Checked for traps and drains within the plenums and ducts. Ensured that they are flushed and filled with clean water on a regular basis.

6. Ensure that heating and cooling coils are clean.

- ___ ___ ___ Heating and cooling coils are clean.

7. Ensure that air handling units (air mixing chambers, coils, and fan blades) and duct interiors are clean.

- ___ ___ ___ Visually inspected the interior and exterior of all system components.
- ___ ___ ___ Noted that crawlspaces, tunnels and other areas may be used as ducts, or may be in contact with the ventilation airstream. I understand the system layout and inspected **all** areas.
- ___ ___ ___ Properly decommissioned and removed any unused system components.

8. Ensure that mechanical rooms are free of trash and chemicals

- ___ ___ ___ Checked mechanical rooms for unsanitary conditions, leaks, or spills.
- ___ ___ ___ Mechanical rooms and air mixing chambers are not used to store trash or chemical products or supplies.

Comments _____

System Controls

- ___ ___ ___ Air dampers are always at least partially open (minimum position) during occupied hours.
- ___ ___ ___ The minimum position provides an adequate amount of outdoor air for the occupants.

9. Gather controls information

- ___ ___ ___ Gathered and read any controls specifications, as-built mechanical drawings, and controls operations manuals (checked with the maintenance supervisor).
- ___ ___ ___ Contacted the system installer or HVAC maintenance contractor to obtain controls information that is missing.

10. Check clocks, timers, and seasonal switches

- ___ ___ ___ Summer-winter switches are in the right position.
- ___ ___ ___ Time clocks read the correct time.
- ___ ___ ___ Time clock settings fit the actual schedule of building use (night/weekend set-back and set-up).

11. Check pneumatic control system components

- ___ ___ ___ Tested the line pressure at both the occupied (day) setting and the unoccupied (night) setting to determine whether the overall system pressure is appropriate.
- ___ ___ ___ The line dryer is preventing moisture build-up.
- ___ ___ ___ Checked the control system filters. The filter at the compressor inlet is changed periodically in keeping with the compressor manufacturer’s recommendations (e.g., when you blow down the tank).

Y N N/A

- ___ ___ ___ The line pressure at each thermostat and damper actuator is at the proper level (no leakage or obstructions).
 ___ ___ ___ Repaired or replaced defective components.

12. Check outdoor air damper operation

The air temperature in the indoor area(s) served by an outdoor air damper must be within the normal operating range. Ensure that the outdoor air damper is visible for your inspection.

- ___ ___ ___ Turned off the air handler connected to the outdoor air damper and confirmed that the damper fully closes within a few minutes.
 ___ ___ ___ Turned on the air handler and confirmed that the outdoor air damper opens (at least partially) with little or no delay.
 ___ ___ ___ Set the room thermostat at least 5degreesC above and then below the current room temperature. Observed the damper for movement (damper should go to its design set-point position).
 ___ ___ ___ Confirmed that the damper actuator is linked to the damper shaft and that any linkage set screws and bolts are tight.
 ___ ___ ___ Confirmed that rust or corrosion is not preventing free movement.
 ___ ___ ___ Confirmed that either electrical wires or pneumatic tubing is connected to the damper actuator.
 ___ ___ ___ Reset thermostats to appropriate temperatures.

Proceed to Activities 13-16 if the damper seems to operate properly.

NOTE: The minimum damper setting may need to be adjusted using a nut or a knob, to create a larger damper opening.

Perform activities 13-16 as required in specific situations:

13. Confirm freeze-stat condition

HVAC systems with water coils need protection from freezing. The freeze stat may close the outdoor air damper and disconnect the supply air when tripped. (The typical trip range is 2 to 5 degrees C).

- ___ ___ ___ If the freeze-stat has a manual reset button (usually red), depress the button. If a click is heard, the freeze-stat was probably tripped. Consider replacing manual reset freeze-stats with automatic freeze-stat resets.
 ___ ___ ___ If the freeze-stat has an automatic reset, disconnect power to the controls and test for continuity across the terminals.

14. Check mixed air thermostat.

- ___ ___ ___ The mixed air stat for heating mode is set no higher than 18degreesC (typically 13 to 18C).
 ___ ___ ___ The mixed air stat for cooling mode is set no lower than the room thermostat setting.

15. Check air economizer setting

- ___ ___ ___ Confirmed proper settings based on design specifications or local practices (dry-bulb setting is typically 18degrees C or lower).
 ___ ___ ___ The sensor is shielded from direct sunlight.

16. Confirm that fans operate continuously during occupied periods

- ___ ___ ___ If the fan shuts off when the thermostat is satisfied, changed the control cycle to prevent under-ventilation.
 ___ ___ ___ Noted any complaints of drafts or cold temperatures.

Comments _____

Air Distribution

Perform activities 17-21 as required in specific situations:

17. Check air distribution. Verify that the air pathways in the original ventilation system design continue to function:

- Check to see whether operable windows have been replaced by windows that can't be opened.
 Check to see whether passive gravity relief ventiation systems and transfer grilles between rooms and corridors are functioning. If they are closed off or blocked to meet modern fire codes, consult with a professional engineer for remedies. (Consult with fire department)

Comments _____

Y N N/A

- ___ ___ ___ Every occupied space has a supply of outdoor air (mechanical system or operable windows). If the building relies on passive ventilation, ensured occupants are aware of how ventilation can be provided.
- ___ ___ ___ Supplies and returns are open and unblocked. If outlets have been blocked intentionally to correct drafts or discomfort, investigated, corrected, and re-opened the vents.
- ___ ___ ___ In areas with no source of outside air, modified the HVAC system to correct the problem.
- ___ ___ ___ Checked for barriers, such as room dividers, large freestanding blackboards or displays, or bookshelves that could block the movement of air in the room, especially obstacles that block air vents.

18. Check air flow direction - building pressure

First confirm that the system is operating on the occupied cycle and that outdoor wind is less than 10km per hour.

- ___ ___ ___ Used chemical smoke to determine whether air flows out of the building through leaks in nearby windows, doors, or other cracks and holes in exterior walls (pressurized interior).
- ___ ___ ___ Used chemical smoke to determine whether air flows out of the building through below-grade cracks and holes such as floor joints or pipe openings (pressurized interior).

Comments _____

Exhaust Systems**19. Confirm that exhaust fans are operating**

- ___ ___ ___ Used chemical smoke to confirm that air is flowing into exhaust grilles.

20. Verify that local exhaust fans remove enough air to eliminate odours and chemical fumes.

- ___ ___ ___ If the fan is intended to exhaust the entire room, stood outside the room with the door slightly open and used chemical smoke to confirm that air is being drawn into the room from locations both high and low in the door opening.
- ___ ___ ___ If the fan is running but air isn't flowing toward the exhaust intake (or not enough air to do the job) checked for the following possibilities:
- The backdraft damper at the exhaust outlet does not open;
 - obstructions in the ductwork;
 - leaky or disconnected ductwork;
 - broken fan belt;
 - motor running backwards; or
 - design problems (e.g. undersized fan).

21. If the exhaust fan is located close to the contaminant source, rather than on the roof, and exhaust air is ducted through the building under positive pressure

- ___ ___ ___ Confirmed that the exhaust ductwork is sealed and in good condition. Made any repairs permanent and took other measures that help ensure there will be adequate outdoor air in the future.

Comments _____

Perform activities 22-24 as described in the Tools for Schools Kit pages 7-11 to 7-14 on all units when airflow measurement equipment is available.

See separate log sheet