

Complaint Investigation Checklist

Indoor Air Quality

In the event of an indoor air quality complaint, use this checklist to review and eliminate sources of IAQ contaminants and identify the source of the issue. This checklist is based on the Environmental Protection Agency's *IAQ Tools for Schools Kit*.

		Yes	No	N/A	Comments
1	TALK TO THE INDIVIDUAL(S) WHO HAS THE CONCERN				
	a What do you see or smell?				
	b Where do you see or smell it?				
	c How long have you seen or smelled it?				
	d When does it occur?				
	e Is there anything occurring around you which may be the cause?				
	f How do you feel? Note: Be careful when asking this question – because we are not doctors, and we don't want to compromise medical privacy. We might ask this question if the response is useful in helping us diagnose the problem.				
2	GENERAL CLEANLINESS				
	a Offices are dusted and vacuumed regularly.				
	b Trash is removed daily.				
	c No food is stored in the office overnight.				
	d The room is free of pests and vermin.				
	e Only unscented, school-approved cleaners and air fresheners are used in rooms.				
3	EXCESS MOISTURE IN OFFICES				
	a There is no evidence of condensate on windows, windowsills, and window frames.				
	b Cold water pipes are free of condensate.				
	c Indoor surfaces of exterior walls are free of condensate.				
	d Areas around and under sinks are free of leaks.				
	e Lavatories are free of leaks.				
	f Checked ceiling tiles and walls for leaks (discoloration may indicate periodic leaks).				
	g There is no evidence of spills that did not get cleaned.				
	h Ensured that there are no signs of mold or mildew.				
4	THERMAL COMFORT				
	a Ensured moderate temperature (should generally be 72°F–76°F).				
	b Ensured that there are no signs of draftiness.				
	c Humidity is maintained at acceptable levels (between 30 and 60 percent).				

5	PRINTING/DUPLICATING EQUIPMENT	a	Checked for odors from equipment.						
		b	Ensured that equipment is maintained regularly (date of most recent servicing is usually documented on the machine).						
		c	Checked that equipment functions properly.						
		d	Ensured that duplicating equipment, printers, and copiers are located in a well-ventilated area, preferably in a separate room with an exhaust fan vented to the outside.						
6	HVAC SYSTEM	1	OUTDOOR AIR INTAKES						
		1a.	Marked locations of all outdoor air intakes on a small floor plan (for						
		1b.	Ensured that the ventilation system was on and operating in "occupied"						
			Activity 1: Obstructions						
		1c.	Ensured that outdoor air intakes are clear of obstructions, debris, clogs,						
		1d.	Installed corrective devices as necessary (e.g., if snowdrifts or leaves						
			Activity 2: Pollutant Sources						
		1e.	Checked ground-level intakes for pollutant sources (dumpsters, loading						
		1f.	Checked rooftop intakes for pollutant sources (plumbing vents; kitchen,						
		1g.	Resolved any problems with pollutant sources located near outdoor air						
			Activity 3: Airflow						
		1h.	Obtained chemical smoke (or a small piece of tissue paper or light						
		1i.	Confirmed that outdoor air is entering the intake appropriately.						
			2	SYSTEM CLEANLINESS					
					Activity 4: Air Filters				
		2a.	Replaced filters per maintenance schedule.						
		2b.	Shut off ventilation system fans while replacing filters (prevents dirt from						
		2c.	Vacuumed filter areas before installing new filters.						
		2d.	Confirmed proper fit of filters to prevent air from bypassing (flowing						
2e.	Confirmed proper installation of filters (correct direction for airflow).								
	Activity 5: Drain Pans								
2f.	Ensured that drain pans slant toward the drain (to prevent water from								
2g.	Cleaned drain pans.								
2h.	Checked drain pans for mold and mildew.								
	Activity 6: Coils								
2i.	Ensured that heating and cooling coils are clean.								
	Activity 7: Air-Handling Units, Unit Ventilators								
2j.	Ensured that the interior of air-handling unit(s) or unit ventilator (air-								
2k.	Ensured that ducts are clean.								
	Activity 8: Mechanical Rooms								
2l.	Checked mechanical room for unsanitary conditions, leaks, and spills.								
2m.	Ensured that mechanical rooms and air-mixing chambers are free of trash, chemical products, and supplies.								

3	CONTROLS FOR OUTDOOR AIR SUPPLY			
3a.	Ensured that air dampers are at least partially open (minimum position).			
3b.	Ensured that minimum position provides adequate outdoor air for occupants.			
	Activity 9: Controls Information			
3c.	Obtained and reviewed all design inside/outside temperature and humidity requirements, controls specifications, as-built mechanical drawings, and controls operations manuals (often uniquely designed).			
	Activity 10: Clocks, Timers, Switches			
3d.	Turned summer-winter switches to the correct position.			
3e.	Set time clocks appropriately.			
3f.	Ensured that settings fit the actual schedule of building use (including night/weekend use).			
	Activity 11: Control Components			
3g.	Ensured appropriate system pressure by testing line pressure at both the occupied (day) setting and the unoccupied (night) setting.			
3h.	Checked that the line dryer prevents moisture buildup.			
3i.	Replaced control system filters at the compressor inlet based on the compressor manufacturer's recommendation (for example, when you blow down the tank).			
3j.	Set the line pressure at each thermostat and damper actuator at the proper level (no leakage or obstructions).			
	Activity 12: Outdoor Air Dampers			
3k.	Ensured that the outdoor air damper is visible for inspection.			
3l.	Ensured that the recirculating relief and/or exhaust dampers are visible for inspection.			
3m.	Ensured that air temperature in the indoor area(s) served by each outdoor air damper is within the normal operating range.			
3n.	Checked that the outdoor air damper fully closes within a few minutes of shutting off appropriate air handler.			
3o.	Checked that the outdoor air damper opens (at least partially with no delay) when the air handler is turned on.			
3p.	If in heating mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 85°F.			
3q.	If in cooling mode, checked that the outdoor air damper goes to its minimum position (without completely closing) when the room thermostat is set to 60°F and mixed air thermostat is set to 45°F.			
3r.	If the outdoor air damper does not move, confirmed the following items: The damper actuator links to the damper shaft, and any linkage set screws or bolts are tight. Moving parts are free of impediments (e.g., rust, corrosion) Electrical wire or pneumatic tubing connects to the damper actuator The outside air thermostat(s) is functioning properly (e.g., in the right location, calibrated correctly). <i>Proceed to Activities 13–16 if the damper seems to be operating properly.</i>			

Activity 13: Freeze Stats

3s. Disconnected power to controls (for automatic reset only) to test continuity across terminals.

OR

3t. Confirmed (if applicable) that depressing the manual reset button (usually red) trips the freeze stat (clicking sound indicates freeze stat was tripped).

3u. Assessed the feasibility of replacing all manual reset freeze-stats with automatic reset freeze-stats.

NOTE: HVAC systems with water coils need protection from the cold. The freeze-stat may close the outdoor air damper and disconnect the supply air when tripped. The typical trip range is 35°F to 42°F.

Activity 14: Mixed Air Thermostats

3v. Ensured that the mixed air stat for heating mode is set no higher than 65°F.

3w. Ensured that the mixed air stat for cooling mode is set no lower than the room thermostat setting.

Activity 15: Economizers

3x. Confirmed proper economizer settings based on design specifications or local practices.

NOTE: The dry-bulb is typically set at 65°F or lower.

3y. Checked that sensor on the economizer is shielded from direct sunlight

3z. Ensured that dampers operate properly (for outside air, return air, exhaust/relief air, and recirculated air), per the design specifications.

NOTE: Economizers use varying amounts of cool outdoor air to assist with the cooling load of the room or rooms. There are two types of economizers, dry-bulb and enthalpy. Dry-bulb economizers vary the amount of outdoor air based on outdoor temperature, and enthalpy economizers vary the amount of outdoor air based on outdoor temperature and humidity level.

Activity 16: Fans

3aa. Ensured that all fans (supply fans and associated return or relief fans) that move outside air indoors continuously operate during occupied hours (even when room thermostat is satisfied) .

NOTE: If fan shuts off when the thermostat is satisfied, adjust control cycle as necessary to ensure sufficient outdoor air supply.

4 AIR DISTRIBUTION

Activity 17: Air Distribution

- 4a. Ensured that supply and return air pathways in the existing ventilation system perform as required.
- 4b. Ensured that passive gravity relief ventilation systems and transfer grilles between rooms and corridors are functioning.
NOTE: If ventilation system is closed or blocked to meet current fire codes, consult with a professional engineer for remedies.
- 4c. Made sure every occupied space has supply of outdoor air (mechanical system or operable windows).
- 4d. Ensured that supply and return vents are open and unblocked
NOTE: If outlets have been blocked intentionally to correct drafts or discomfort, investigate and correct the cause of the discomfort and reopen the vents.
- 4e. Modified the HVAC system to supply outside air to areas without an outdoor air supply.
- 4f. Modified existing HVAC systems to incorporate any room or zone layout and population changes.
- 4g. Moved all barriers (for example, room dividers, large free-standing blackboards or displays, bookshelves) that could block movement of air in the room, especially those blocking air vents.
- 4h. Ensured that unit ventilators are quiet enough to accommodate classroom activities.
- 4i. Ensured that classrooms are free of uncomfortable drafts produced by air from supply terminals.

Activity 18: Pressurization in Buildings

NOTE: To prevent infiltration of outdoor pollutants, the ventilation system is designed to maintain positive pressurization in the building. Therefore, ensure that the system, including any exhaust fans, is operating on the "occupied" cycle when doing this activity.

- 4j. Ensured that air flows out of the building (using chemical smoke) through windows, doors, or other cracks and holes in exterior wall (for example, floor joints, pipe openings).

5 EXHAUST SYSTEMS**Activity 19: Exhaust Fan Operation**

- 5a. Checked (using chemical smoke) that air flows into exhaust fan grille(s)
If fans are running but air is not flowing toward the exhaust intake, check for the following:
- *Inoperable dampers*
 - *Obstructed, leaky, or disconnected ductwork*
 - *Undersized or improperly installed fan*

Activity 20: Exhaust Airflow

NOTE: Prevent migration of indoor contaminants from areas such as bathrooms, kitchens, and labs by keeping them under negative pressure (as compared to surrounding spaces).

- 5b. Checked (using chemical smoke) that air is drawn into the room from adjacent spaces.
Stand outside the room with the door slightly open while checking airflow high and low in the door opening (see "How to Measure Airflow").
- 5c. Ensured that air is flowing toward the exhaust intake

Activity 21: Exhaust Ductwork

- 5d. Checked that the exhaust ductwork downstream of the exhaust fan (which is under positive pressure) is sealed and in good condition.

6 QUANTITY OF OUTDOOR AIR**Activity 22: Outdoor Air Measurements and Calculations**

NOTE: Refer to "How to Measure Airflow" for techniques.

- 6a. Measured the quantity of outdoor air supplied (22a) to each ventilation unit.
- 6b. Calculated the number of occupants served (22b) by the ventilation unit under consideration.
- 6c. Divided outdoor air supply (22a) by the number of occupants (22b) to determine the existing quantity of outdoor air supply per person (22c).

Activity 23: Acceptable Levels of Outdoor Air Quantities

- 6d. Compared the existing outdoor air per person (22c) to the recommended levels in Table 1.
- 6e. Corrected problems with ventilation units that supplied inadequate quantities of outdoor air to ensure that outdoor air quantities (22c) meet the recommended levels in Table 1.

Fill out maintenance checklist and report deficiencies.
