

BC Building Code 2012

Section 9.32. Ventilation

9.32.1. General

9.32.1.1. Application

1) This Section applies to the ventilation of rooms and spaces in *residential occupancies* by natural ventilation and to self-contained mechanical ventilation systems serving only one *dwelling unit* or one *dwelling unit and a secondary suite*.

2) Mechanical ventilation systems other than self-contained systems serving single *dwelling units* shall conform to Part 6.

3) A *storage garage* for more than 5 motor vehicles shall be ventilated in accordance with Part 6.

9.32.1.2. Required Ventilation Provisions

1) Every *dwelling unit* shall incorporate provisions for non-heating-season ventilation in accordance with Subsection 9.32.2. and, if supplied with electrical power, provisions for heating season ventilation in accordance with Subsection 9.32.3.

9.32.2. Non-Heating-Season Ventilation

9.32.2.1. Required Ventilation

1) Rooms or spaces in *dwelling units* shall be ventilated during the non-heating season by

- a) natural ventilation in accordance with Article 9.32.2.2., or
- b) a mechanical ventilation system conforming to Part 6.

2) Where a habitable room or space is not provided with natural ventilation as described in Sentence (1), mechanical ventilation shall be provided to exhaust inside air from or to introduce outside air to that room or space at the rate of

- a) one-half air change per hour if the room or space is mechanically cooled during the non-heating season, or
- b) one air change per hour if it is not mechanically cooled during the non-heating season.

9.32.2.2. Natural Ventilation

1) The unobstructed openable ventilation area to the outdoors for rooms and spaces in residential buildings ventilated by natural means shall conform to Table 9.32.2.2.

Table 9.32.2.2.
Natural Ventilation Area
Forming Part of Sentence 9.32.2.2.(1)

Location		Minimum Unobstructed Area
Within <i>dwelling unit</i>	Bathrooms or water closet rooms	0.09 m ²
	Unfinished bathroom space	0.2% of the floor area
	Dining rooms, living rooms, bedrooms, kitchens, combined rooms, dens, recreation rooms and all other finished rooms	0.28 m ² per room or combination room

Other than within <i>dwelling unit</i>	Bathrooms or water closet rooms	0.09 m ² per water-closet
	Sleeping rooms	0.14 m ² per occupant
	Laundry rooms, kitchens, recreation rooms	4% of the floor area
	Corridors, storage rooms and other similar public rooms or spaces	2% of the floor area
	Unfinished basement space not used on a shared basis	0.2% of the floor area

2) Where a vestibule opens directly off a living or dining room within a *dwelling unit*, ventilation to the outdoors for such rooms may be through the vestibule.

3) Openings for natural ventilation other than windows shall be constructed to provide protection from the weather and insects.

4) Screening shall be of corrosion-resistant material.

9.32.3. Heating Season (Mechanical) Ventilation

(See Appendix A.)

9.32.3.1. Required Ventilation

1) Every *dwelling unit* that is supplied with electrical power shall be provided with a mechanical ventilation system complying with

- a) CAN/CSA-F326 "Residential Mechanical Ventilation Systems,"
- b) ~~a mechanical ventilation system designed in conformance to~~ Part 6, or
- c) other mechanical ventilation systems as described in this Subsection.

9.32.3.2. Design and Installation

1) Aspects of mechanical ventilation systems not specifically described in this Subsection shall be designed, constructed and installed in accordance with good practice such as described in the ASHRAE Handbooks and Standards, HRAI Digest, TECA Ventilation Guideline, Hydronics Institute Manuals and the SMACNA manuals.

9.32.3.3. Required Ventilation Capacity

- 1) Every *dwelling unit* shall be equipped with
 - a) a principal ventilation exhaust fan or ducted central ventilation system providing a minimum ventilation rate complying with Table 9.32.3.3.A, and
 - b) an exhaust fan with a ventilation rate conforming to Table 9.32.3.3.B in every kitchen and bathroom or water-closet room, except that such a fan is not required in the bathroom or water closet room served by the principle ventilation exhaust fan providing that it conforms to the minimum rates of Table 9.32.3.3.B.
- 2) Where make-up air is required by Article 9.32.3.8. for the principal ventilation exhaust fan, the maximum ventilation rate shall not exceed 55 l/s (110 cfm).

Table 9.32.3.3.A
Principal Exhaust Fan Ventilation Rate
 Forming Part of Clause 9.32.3.3.(1)(a)

Number of Bedrooms ⁽¹⁾	Minimum Ventilation Rate	
	l/s	
1	15	
2	22	
3	30	
4 or more	35	

Notes to Table 9.32.3.3.A

⁽¹⁾ A bedroom is considered as a room with a window conforming to Article 9.7.1.2., a closet, and an interior closing door.

Table 9.32.3.3.B
Bathroom/Kitchen Exhaust Ventilation Rate
 Forming Part of Clause 9.32.3.3.(1)(b)

Room	Exhaust Rate l/s	
	Intermittent	Continuous
Kitchen	40	N/A
Bathroom	25	10

9.32.3.4. Principal Exhaust Fan Control

- 1) The principal ventilation exhaust fan shall
 - a) be designed to run continuously, or
 - b) be controlled by an adjustable time control device capable of providing a minimum of two operating periods per day and a total operating time of 8 hrs per day and have a separate manual switch when serving both the principle ventilation exhaust function and a bathroom or water-closet room exhaust function.

9.32.3.5. Principal Exhaust Fan Capacity Rating

- 1) The principal ventilation exhaust fan capacity rating shall be based on air flow performance at 50 pa external static pressure as determined in accordance with
 - a) HVI 916 "Airflow Test Standard," or
 - b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

9.32.3.6. Principal Exhaust Fan Sound Rating

- 1) Wall and ceiling fans used as a principal ventilation exhaust fan shall not have a sound rating exceeding
 - a) 1.5 Sone when controlled by an adjustable time control device, or
 - b) 1.0 Sone when designed to run continuously.
- 2) The principal ventilation exhaust fan sound rating shall be determined by
 - a) HVI 915, "Procedure for Loudness Rating of Residential Fan Products," or

- b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

9.32.3.7. Kitchen/Bathroom Fan Capacity Ratings

- 1) Kitchen and bathroom exhaust fan capacity rating shall be based on air flow performance at 50 pa external static pressure as determined in accordance with
 - a) HVI 916 "Airflow Test Standard," or
 - b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

9.32.3.8. Required Make-up Air for Principal Exhaust Fan

- 1) Make-up ventilation air shall be provided from the outdoors ~~where~~ **to all dwelling units.**
 - ~~a) a dwelling unit contains a naturally aspirating fuel fired vented appliance that is subject to back drafting (See Appendix A), or~~
 - ~~b) the dwelling unit is located in an area where soil gas is deemed to be a problem and incorporates no soil gas mitigation system.~~
- ~~2) Where make-up ventilation air is required, it shall~~
 - ~~a) when not connected to a forced air heating duct system be sized in accordance with Table 9.32.3.8. for the rating of the principal exhaust fan installed, or~~
 - 2) When not connected to a forced air heating duct system make-up ventilation air shall be sized in accordance with Table 9.32.3.8. for the rating of the principal exhaust fan installed.
 - ~~b) when connected to the return air duct of a forced air heating appliance,~~
 - ~~i) have an outdoor air supply duct size of 100 mm diameter for smooth duct or 125 mm diameter for insulated flex duct or equivalent cross-sectional area, and~~
 - ~~ii) have the outdoor air supply duct connected not more than 5 m or, unless a flow control device is used, less than 3 m upstream of the return air connection to the furnace cabinet,~~
 - ~~iii) have the furnace air circulating fan interconnected with the principal ventilation exhaust fan, and~~
 - ~~iv) where the winter design temperature is colder than -10°C, have a duct provided with a motorized damper also interconnected with the principal ventilation exhaust fan.~~
 - 3) When connected to the return air duct of a forced air heating appliance make-up ventilation air shall,
 - a) have an outdoor air supply duct size of 100 mm diameter for smooth duct or 125 mm diameter for insulated flex duct or equivalent cross-sectional area, and
 - b) have the outdoor air supply duct connected
 - i) not more than 5 m or, unless a flow control device is used, less than 3 m upstream of the return air connection to the furnace cabinet, or
 - ii) not less than 3 m from the furnace cabinet where the outdoor air is supplied through an HRV, and
 - c) have the furnace air circulating fan interconnected with the principal ventilation exhaust fan.
 - 4) Except where make-up ventilation air is supplied through an HRV, where the winter design temperature is colder than -10°C the make-up ventilation air duct shall be provided with a motorized damper interconnected with the principal ventilation exhaust fan.
 - 5) Where make-up ventilation air is provided ~~as required in Clause 9.32.3.8.(1)(a),~~ in geographic areas where the winter design temperature is warmer than -10°C, it ~~shall~~ **may** be delivered by
 - a) high level wall or window sash inlets in each bedroom and one common area where
 - i) the heating system is not forced air,
 - ii) the floor area of the dwelling unit is not more than 167 m², and
 - iii) the dwelling unit contains not more than one storey including stories below grade, or
 - b) ducting into secondary areas such as a utility or storage room, or

c) other acceptable methods that will temper the air before it reaches the living, eating and sleeping areas.

~~4) Where make-up ventilation air is provided as indicated in Clause 9.32.3.8.(1)(a) in geographic areas where the winter design temperature is colder than -10°C, it shall be delivered as described in Sentence (3) with the addition of heat.~~

5) Systems or ducts designed to provide combustion and/or dilution air for fuel burning appliances shall not be used to supply make-up air for ventilation systems.

Table 9.32.3.8.
Passive Make-up Air Opening Size
 Forming Part of Sentence 9.32.3.8.(2)

Maximum Exhaust Ventilation Rate	Minimum Make-up Air Duct Size	
	Vent Area	Vent Dia.
l/s	cm ²	mm
8	47	80
12	66	90
15	85	100
17	95	110
20	114	120
25	142	130
30	170	150
35	199	160
40	227	170
45	255	180
50	284	190
55	312	200
60	340	210

9.32.3.9. Exhaust and Make-up Air Ducts

- 1) Exhaust ducts serving wall or ceiling exhaust fans shall be sized in accordance with Table 9.32.3.9.
- 2) Exhaust ducts shall discharge directly to the outdoors.
- 3) Where an exhaust duct passes through or is located adjacent to an unheated space, the duct shall be insulated to not less than RSI 0.75.
- 4) Where a ventilation air supply duct passes through a heated space the duct shall be insulated to not less than RSI 0.75 and provided with an effective vapour barrier.
- 5) Where an exhaust duct exceeds 30 m in total equivalent length, using an equivalent length of 10 m for the exterior hood and 3 m for each 90 degree elbow, the duct shall be increased to the next diameter.

- 6) Ductwork for range hoods and range-top fans shall
 - a) be of noncombustible, corrosion-resistant material,
 - b) lead directly to the outdoors with no connections to other exhaust fans or ducts, and
 - c) be equipped with a grease filter at the intake end.

Table 9.32.3.9.
Minimum Exhaust Duct Size
Required for a Wall or Ceiling Exhaust Fan
 Forming Part of Article 9.32.3.9.

Maximum Exhaust Fan Ventilation Rate, l/s	Minimum <i>Exhaust Duct</i> Dia, mm	
	Smooth Duct	Flexible Duct
10	75	100
25	100	125
45	125	150
70	150	175

9.32.3.10. Protection from Weather

1) Outdoor air intakes and exhaust outlets shall be shielded from the weather, birds and rodents with hoods incorporating a screen of corrosion-resistant material with openings of 6 to 12 mm.

9.32.3.11. Exhaust Fan Installation

1) Installation of exhaust fans shall be in accordance with manufacturer's instructions for minimizing noise and vibration transmission and achieving the required sound rating.

9.32.3.12. Accessibility

- 1) Ventilation equipment shall be accessible for inspection, maintenance, repair and cleaning.
- 2) Except where the kitchen exhaust grille is located at least 1.2 m horizontally from the range, kitchen exhaust ducts shall be designed and installed so the entire duct can be cleaned where the duct is not equipped with an intake filter.

9.32.3.13. Ventilation Ducts

1) Except as required by Sentence 9.32.3.9.(6), ventilation air ducts serving general exhaust and supply ventilation air are permitted to be of combustible material.

9.32.3.14. Interior Distribution

- 1) Except for dwelling units described in Clause 9.32.3.8.(3)(a), ventilation air shall be distributed to each bedroom and at least one common area by
 - a) a forced-air heating system conforming to Clause 9.32.3.8.(2)(b) with or without heat recovery,
 - b) a ducted central re-circulating ventilation system that
 - i) draws air from each bedroom and delivers it to a common area, or
 - ii) draws air from a common area and delivers it to each bedroom, or
 - c) a heat recovery ventilation system delivering air to each bedroom and each storey not containing a bedroom.

- 2) In a ducted central re-circulating ventilation system that draws air from each bedroom and delivers it to a common area the outdoor air intake shall be
 - a) downstream of all the bedrooms, and
 - b) upstream of the fan and common area.
- 3) In a ducted central re-circulating ventilation system that draws air from a common area and delivers it to each bedroom the outdoor air intake shall be
 - a) downstream of the common area, and
 - b) upstream of all the bedrooms.
- 3) Any heat recovery unit shall have at least one exhaust intake on the ceiling or high on a wall.
- 2) To facilitate ventilation air transfer in dwelling units described in Clause 9.32.3.8.(3)(a), interior doors shall be undercut a minimum of 12 mm or the rooms shall be provided with a transfer grille of equivalent area.

9.32.4. Additional Protection Against Depressurization

9.32.4.1. Protection Requirements

- 1) Additional make-up air for the actual appliance exhaust rate shall be provided for any appliance which discharges air to the exterior at an installed rate exceeding 0.5 air change per hour when it is located within a *dwelling unit* that
 - a) contains a vented appliance that is subject to back drafting (Naturally Aspirating Fuel Fired Vented Appliance) (See A-9.32.3.8.(1)(a) in Appendix A), or
 - b) is located in an area where soil gas is deemed to be a problem and incorporates no soil gas mitigation system.
- 2) Where additional make-up air is required for appliances described in Sentence (1), it shall be provided by
 - a) supply ducts sized in conformance with Table 9.32.3.8. for requirements of 60 l/s or less, or
 - b) a supply fan rated to deliver outdoor air at the rate of the installed exhaust appliance.
- 3) The supply fan as required in Clause (2)(b) shall be interconnected with the exhaust fan for which make-up air is required.
- 4) The outdoor air required by Sentence (3) shall be
 - a) tempered to at least 1°C before being introduced to a normally unoccupied area of the *dwelling unit*, or
 - b) tempered to at least 12°C before being introduced to occupied areas either by passive transfer grille or directly from outside.

9.32.4.2. Carbon Monoxide Alarms

(See Appendix A.)

- 1) This Article applies to every *building* that contains a *residential occupancy* and that also contains
 - a) a fuel-burning appliance, or
 - b) a *storage garage*.
- 2) Carbon monoxide alarms required by this Article shall
 - a) conform to CSA 6.19, "Residential Carbon Monoxide Alarming Devices,"
 - b) be equipped with an integral alarm which satisfies the audibility requirements of CSA 6.19, "Residential Carbon Monoxide Alarming Devices,"
 - c) have no disconnect switch between the overcurrent device and the carbon monoxide alarm, where the carbon monoxide alarm is powered by the *dwelling unit's* electrical system, and
 - d) be mechanically fixed at a height recommended by the manufacturer.
- 3) Where a fuel-burning *appliance* is installed in a *suite of residential occupancy*, a carbon monoxide alarm shall be installed either inside each bedroom, or if outside, within 5 m, measured following corridors and doorways, of each bedroom door.

- 4) Where a fuel-burning *appliance* is installed in a *service room* that is not in a *suite of residential occupancy*, a carbon monoxide alarm shall be
- a) either inside each bedroom, or if outside, within 5 m, measured following corridors and doorways, of each bedroom door in every *suite of residential occupancy* that shares a wall or floor/ceiling assembly with the *service room*, and
 - b) in the *service room*.
- 5) Where a *storage garage* is located in a *building* containing a *residential occupancy*, a carbon monoxide alarm shall be installed either inside each bedroom, or if outside, within 5 m, measured following corridors and doorways, of each bedroom door in every *suite of residential occupancy* that shares a wall or floor/ceiling assembly with the *storage garage*.

Appendix A

A-9.32.3. Heating Season (Mechanical) Ventilation. Mechanical ventilation requirements in the British Columbia Building Code have evolved from a simple requirement in the 1970's that exhaust fans be incorporated in electrically heated houses, to more recent editions requiring automatically controlled exhaust systems sized by occupancy determined by the number of bedrooms in the dwelling unit. The fundamental approach of the Code for a minimum residential ventilation system is to have both a low volume principal exhaust fan operated by an adjustable time control device in addition to manually controlled exhaust fans located in all bathrooms and kitchens. Natural air leakage of the building envelope provides make-up ventilation air, unless the dwelling unit contains vented appliances that are subject to back drafting or soil gas is a potential problem within the dwelling unit, in which case additional make-up air must be supplied from the exterior. This edition contains a detailed Appendix note describing the conditions that can lead to an “appliance that is subject to back drafting.”

A-9.32.3. Heating Season (Mechanical) Ventilation. With modern construction materials and techniques, residential buildings have become progressively more draft free which reduces uncontrolled air exchange. Where a higher level of indoor air quality is desired beyond that provided by Subsection 9.32.3, the designer may wish to apply CAN/CSA-F326. Compliance with this standard requires use of a continuous run fully distributed supply and exhaust system. The following examples illustrate how the requirements for heating season mechanical ventilation requirements can be met. The dwelling unit used in all of the examples is a house that has two storeys with 100 m² on each floor, 3 bedrooms, 2 bathrooms and an open fireplace in the living room. The principal ventilation exhaust fan and a bathroom fan are shown as one fan unit because it is more practical to choose one fan which can meet both principal and bath exhaust requirements. That fan is controlled by both an interval timer and manual switching.

Examples A and B

Because the example dwelling unit contains an open fireplace which is considered a naturally aspirating fuel fired vented appliance (NAFFVA), make-up air is required for the principal exhaust fan. Applicable code requirements for each type of system are described below followed by unique requirements and illustrations for each example.

The following code references apply to A and B type systems:

- 9.32.3.3.(1)(a) Principal ventilation exhaust fan or ducted central ventilation system with minimum rating of 30 l/s for 3 bedroom dwelling unit. (Table 9.32.3.3.A.)

- 9.32.3.3.(2) Principal ventilation exhaust fan also has a maximum rating of 55 l/s since the dwelling requires make-up air due to an open fireplace.
- 3. 9.32.3.4.(1)(a) Principal ventilation exhaust fan controlled by time control device, except for ducted central ventilation systems where 9.32.3.4, (1)(b) allows continuously running principal ventilation exhaust fans.
- 4. 9.32.3.6 (1) Except for centrally ducted systems, principal ventilation system fans must be sound rated at 1.5 Sones or less.
- 9.32.3.3.(1)(b) Additional exhaust required in kitchen, bathrooms and water closets can be met with either individual exhaust fans or centrally ducted systems (or both) as long as minimum exhaust ratings are met: Kitchen at 40 l/s and Bathrooms at 25 l/s for intermittent fan operation and 20 L/s for continuous centrally ducted systems. (Table 9.32.3.3.B.)
- 9.32.3.5.(1), 9.32.3.7.(1) All fans are air flow rated at 50 pa , except ducted central systems which are flow rated at 100 pa.
- 9.32.3.9.(1), (2) and (3) Exhaust ducts for all fans shall be sized to Table 9.32.3.9, discharge directly to the outdoors, and be insulated to not less than RSI 0.75 where the duct passes through unconditioned space.
- 9.32.3.13.(1) The range hood exhaust duct must be sheet metal (non-combustible); the exhaust ducts for other fans may be combustible material.
- 9.32.4.1.(5) Since the dwelling unit contains fuel burning appliances, carbon monoxide detectors must be installed in each bedroom.
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Example A illustrates a non-distributed ventilation system which can be used with any type of heating system. Because the house has a natural aspirating fuel fired vented appliance (open fireplace), this system requires passive make-up air for the principal ventilation exhaust fan.

In addition to the applicable Code references listed above that are common to Example A and Example B, the following would also apply:

Items 1-9 for A and B Examples, and

- 9.32.3.8.(1), (2)(a), (3), (4) A 150 mm passive make-up air opening is required for the 30 l/s fan used. Special tempering of this air would be required in locations where the winter design is colder than minus 10°C. The make-up air in this case is provided to a storage room in the basement.

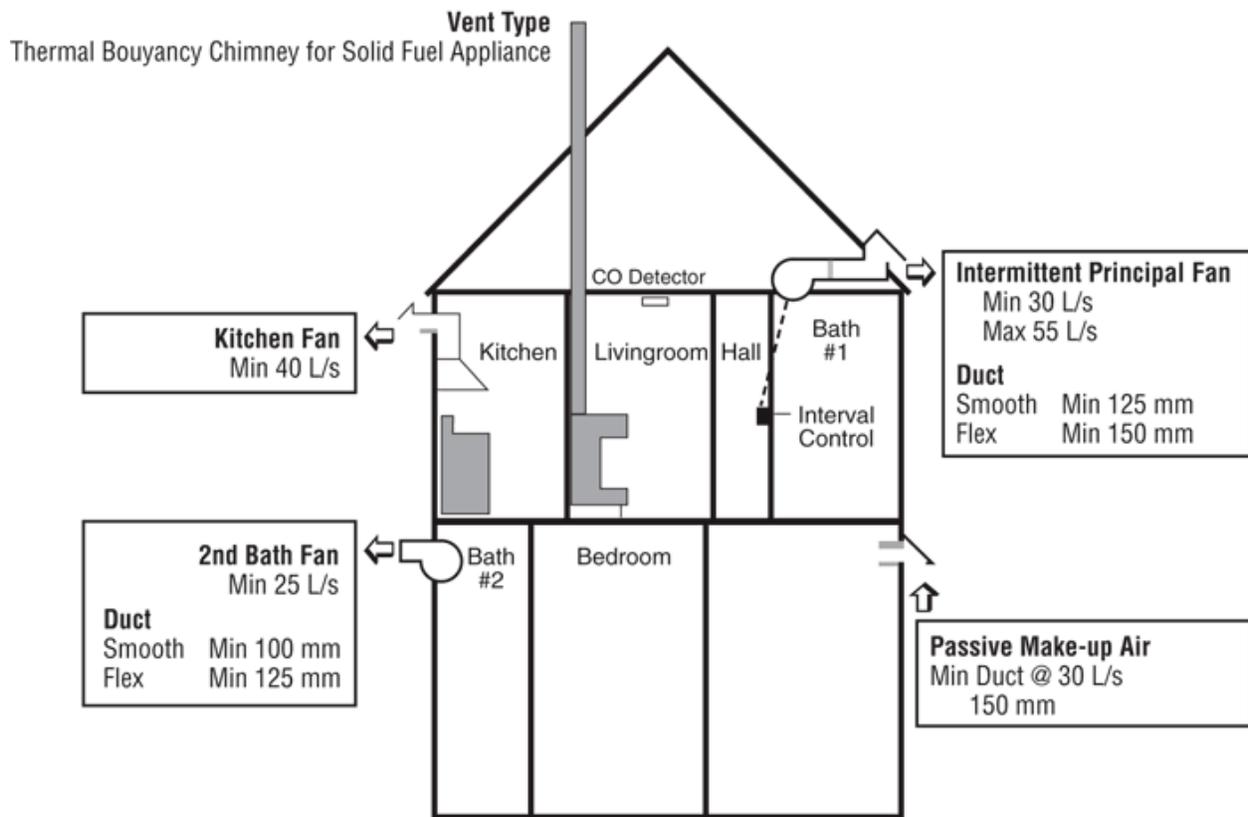


Figure A-9.32.3. -A

A: Non-distributed Mechanical Ventilation with any Heating System

Example B illustrates a distributed ventilation system applicable to any forced air heated dwelling unit. Because the house has a natural aspirating fuel fired vented appliance (open fireplace and likely a gas-fired service water heater), active make-up air for the principal ventilation exhaust fan is required. In addition to the applicable Code references listed above that are common to Example A and Example B, the following would also apply:

Items 1-9 for A and B Examples, and

- 9.32.3.8.(1), (2)(b) and (4). A 100 mm duct from the outdoors is connected not less than 3 m nor more than 5 m upstream of the furnace's return air plenum unless a flow control device is used (in which case it can be connected closer to the furnace). This duct draws in replacement air when the furnace blower is started. The interval control must be wired to start the principal exhaust fan, start the furnace air circulation blower and, in cold climates, open the electrically controlled outdoor air damper.
- 9.32.3.9.(4). Air intake duct, where it passes through conditioned space, must be insulated to minimum RSI 0.75 with vapour barrier.

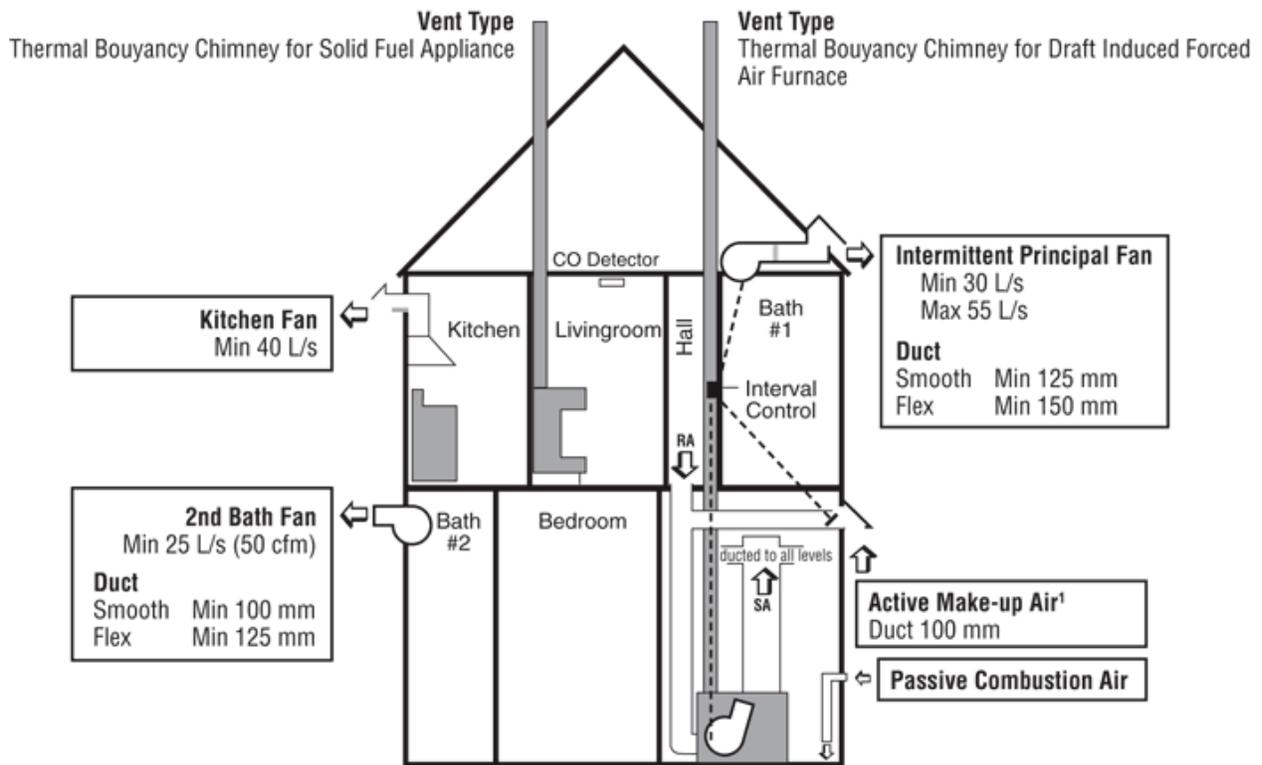


Figure A-9.32.3. -B

B: Distributed Ventilation with a Forced-Air Heating System

Note to Figure A-9.32.3. -B

- (1) The interval control must be wired so the exhaust fan and furnace fan (and the motorized damper where winter design temp < -10°C) will all start simultaneously.

A-9.32.3.8.(1)(a) Naturally Aspirating Fuel-Fired Vented Appliance (NAFFVA). NAFFVA, typically appliances with draft hoods, are subject to back drafting when a negative pressure condition occurs in the dwelling. The following tables describe the conditions under which Clause 9.32.3.8.(1)(a) applies:

Table A-9.32.3.8.A Vent Safety — Natural Gas and Propane			
Fuel Type	Natural Gas and Propane		
Vent Type	Power Vent ⁽³⁾	Direct Vent ⁽³⁾	Thermal Buoyancy Chimney ⁽²⁾

Appliance Type	Furnace Boiler HWT Fireplace	HWT Fireplace Heater	Mid-Efficient F/A Furnace or Boiler ⁽⁵⁾	Drafthood Boiler HWT ⁽⁴⁾
Special Conditions				Located in Air-Barriered room ⁽¹⁾
Classification	Non NAFFVA		NAFFVA	Non NAFFVA
9.32.3.8.(1)(a) applies	NO		YES	NO

Notes to Table A-9.32.3.8.A

- (1) Mechanical room must be air-barriered from remainder of house with no access from within house. Room must be lined with panel products with sealed joints and all pipe and wire penetrations sealed. Effectively, the room must be finished before equipment is installed and holes drilled for pipes and wires. This option is not available for forced air furnaces as it not possible to effectively seal the ducts.
- (2) Thermal buoyancy chimneys must be within the heated envelope of the house to provide acceptable venting performance.
- (3) Any power vented appliance with pressurized vent (1 pipe) or sealed combustion (2 pipe) or direct vent appliance (fireplace, heater or HWT) are Non-NAFFVA.
- (4) Mid-efficient (draft induced) appliances are considered NAFFVA with the exception of a boiler or HWT located in an air-barriered room.
- (5) This category applies only to mid-efficient forced air furnaces and boilers equipped with induced draft fans and exhaust proving switch.

Table A-9.32.3.8.B Vent Safety — Oil and Solid Fuel						
Fuel Type	Oil			Solid		
Vent Type	Thermal Buoyancy Chimney ⁽²⁾		Direct Vent	Thermal Buoyancy Chimney ⁽²⁾		
Appliance Type	Boiler HWT ⁽⁴⁾	F/A Furnace Boiler HWT ⁽³⁾⁽⁴⁾	F/A Furnace Boiler HWT	Boiler	F/A Furnace Boiler HWT Fireplace Heater Stove	Outside Boiler
Special Conditions	Located in Air- Barriered			Located in Air- Barriered room ⁽¹⁾		

	room ⁽¹⁾					
Classification	Non NAFFVA	NAFFVA	Non NAFFVA	Non NAFFVA	NAFFVA	
9.32.3.8.(1)(a) applies	NO	YES	NO	NO	YES	NO

Notes to Table A-9.32.3.8.B

- (1) Mechanical room must be air-barriered from remainder of house with no access from within house. Room must be lined with panel products with sealed joints and all pipe and wire penetrations sealed. Effectively, the room must be finished before equipment is installed and holes drilled for pipes and wires. This option is not available for forced air furnaces as it not possible to effectively seal the ducts.
- (2) Thermal buoyancy chimneys must be within the heated envelope of the house to provide acceptable venting performance.
- (3) Oil-fired HWT, boilers and furnaces equipped with blocked vent switches.
- (4) Sealed combustion kits can be added to oil-fired appliances but they switch to interior combustion air if intake is blocked and rely on barometrically dampered thermal buoyancy chimneys so they are considered NAFFVA.

A-9.32.4.2. Carbon Monoxide Alarms. Carbon monoxide (CO) is a colourless, odourless gas that can build up to lethal concentrations in an enclosed space without the occupants being aware of it. Thus, where an enclosed space incorporates or is near a potential source of CO, it is prudent to provide some means of detecting its presence.

Dwelling units have two common potential sources of CO:

- fuel-fired space- or water-heating equipment within the dwelling unit or in adjacent spaces within the building, and
- attached storage garages.

Most fuel-fired heating appliances do not normally produce CO and, even if they do, it is normally conveyed outside the building by the appliance's venting system. Nevertheless, appliances can malfunction and venting systems can fail. Therefore, the provision of appropriately placed CO alarms can improve safety in the dwelling unit is a relatively low-cost back-up safety measure.

Similarly, although Article 9.10.9.16. requires that the walls and floor/ceiling assemblies separating attached garages from dwelling units incorporate an air barrier system, there have been several instances of CO from garages being drawn into houses, which indicates that a fully gas-tight barrier is difficult to achieve. When the attached storage garage is located at or below the elevation of the living space, winter season stack action will generate a continuous pressure between the garage and the dwelling unit. This pressure is capable of transferring potentially contaminated air into the house. The use of exhaust fans in the dwelling unit may further increase this risk.