

CLEARING THE AIR

Residential Ventilation Issues by Dara Bowser & Bob Allison

What is the Status of "Mixing Boxes" Under Section 9.32?

A "Mixing Box" is a sheet metal box with a duct connected from the outside to the return air of the furnace. A second duct is connected from the warm air supply of the furnace to the box. The concept is that air from outside is introduced into the return air of the furnace and the warm air duct will warm the air so that the temperature of the return air to the furnace, after mixing with outside air, will not fall below the minimum temperature recommended by the furnace manufacturer.

Occasionally, these devices will be installed: -

- to provide part of the ventilation requirements for the home, or
- to provide make-up air for spillage susceptible combustion appliances, or
- in place of a "Heat Recovery Ventilator (HRV)" where an HRV is required by OBC sentence 9.32.3.8.(6).

Ventilation Requirements ?

The only ventilation devices which are recognized under OBC section 9.32 are rated. For example, fans are required to be rated according to CAN/CSA C-260 and HRV's according to CAN/CSA 439-M. [See sentences 9.32.3.9.(1) and 9.32.3.11.(2)]. Usually, rated fans or HRVs are tested and listed in the HVI Certified Ventilation Products Catalogue www.HVI.org. "Mixing Boxes" are not rated under any standard. Therefore mixing boxes are not able to provide any part of the OBC 9.32 ventilation requirements.

Make -Up Air for a Part 6 Ventilation Design?

If a residential ventilation design is carried out under Part 6, the ventilation standard to be used is CSA F326 [See clause 6.2.1.1.(1)(c)]. According to CSA F326, if a spillage-susceptible appliance is installed, the ventilation system must not cause more than a negative 5 Pa air pressure imbalance.. This requirement can be proven by calculation or by test. The calculations and tests are set out in the HRAI Ventilation Manual. The manual does not contain a method by which mixing boxes may be designed. If a mixing box were to be relied upon to provide the required make-up air it could only be accepted on the basis of an actual depressurization test by a qualified person.

Installation in Place of an HRV required because of a Solid Fuel Appliance?

Sentences 9.32.3.8.(2) and (6) requires that if a solid fuel appliance is installed a heat recovery

ventilator and CO detector must be installed and the HRV balanced. Sentence 9.32.3.11. Requires that any HRV be rated according to CAN/CSA 439-M and have minimum efficiency rating. Mixing boxes have no ratings. Sentence 9.32.3.11.(10) of the OBC requires that the flows actually be balanced on site. The flows for a mixing box cannot be balanced.

Mixed Air Temperature

Mixing boxes are supposed to warm up incoming air, but this only occurs when the furnace burner is on. If the return air temperature is too low when the furnace is in "continuous circulation" mode, then the furnace heat exchanger will be cold and there will be excessive condensation inside the heat exchanger at start-up. A mixing box cannot supply heat during the burner off cycle so it is no better than an outside air intake duct. A qualified ventilation designer can select the correct size of outside air intake duct using established design methods.

Review

Mixing boxes are often attached to warm air furnace systems and should be considered as an "after-market accessory", but certainly not part of the ventilation system. We know of no reason that such a device could be considered a hazard, but if it is relied upon to relieve negative pressure in the building, then the only method that a building official has of accepting this is to ask for a depressurization test by a qualified person.

There is no part of the OBC 9.32 or CSA F326 which would allow such a device to be accepted as part of the ventilation system, or to replace the function of an HRV.

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