

CLEARING THE AIR

Residential Ventilation Issues

by Dara Bowser & Bob Allison

Woodstove/Fireplace Installation in an New Home: What are the Ventilation System Options??

The following article reviews the requirements for Ventilation and/or Make-up air which arise due to the installation of a Woodstove or fireplace (a.k.a. Solid Fuel Appliance). Other equally important requirements exist for the installation of the appliance itself and the chimney attached to it, however these are not treated in this article.

PART 6 OR PART 9?

Once it has been determined that a solid fuel appliance is to be installed in the new home, the next question to be asked is whether the system design will be carried out according to Part 9 (Section 9.32) or Part 6 (CSA F326 according to Sentence 6.2.1.1. and 6.2.2.1.(3)).

PART 6 (CSA F326)

The design approach of the ventilation system under Section 9.32 and CSA F326 are substantially different when a solid fuel device is present. CSA F326 takes a performance approach, requiring that the home and ventilation system meet the depressurization limits set out in that standard. Compliance can be shown by carrying out a calculation according to the procedure set out in the **HRAI Ventilation Manual (Design Procedure Guide Section G2.4 Imbalance at Critical Exhaust Condition)** prior to construction. The manual contains form W-3C which may be used as a submittal sheet showing the details of this calculation. **Such a calculation should only be carried out by individuals who are certified to the "HRAI Ventilation Design" (VENTD) level.** A list of VENTD certified person is available by mail or from HRAI's website (see box at end of article).

Compliance can also be demonstrated by an on-site test after construction. This test is also set out in the HRAI Ventilation Manual and is associated with a reporting form which becomes a compliance certificate when completed by the tester. A copy of this form and more detailed discussion of the test is contained in last installment of "Clearing the Air" (OBOA Journal June 1999).

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PART 9 (SUBSECTION 9.32.3):

Where the ventilation system is designed according to this subsection, the home is designated as "Type II" according to sentence 9.32.3.1(2)(b), if there are no other chimney-connected appliances. (CHIMNEY should be taken to include masonry, A-vent, B-vent, C-vent and L-vent designations.) Type II Homes are required to be equipped with an HRV and a CO (carbon monoxide) detector. (Ref: sentences 9.32.3.8.(2) and (6)).

Both the HRV and the CO detector must be installed according to the specific rules which are found in 9.32.3.8. for CO detectors and 9.32.3.11. For HRV's.

It should be noted that this set-up will not prevent the woodstove from back-spilling in all circumstances. If there is a large exhaust appliance in operation or if the house is more airtight or smaller and the clothes dryer is in operation sufficient negative pressure can be generated so that the woodstove or fireplace will reverse it's draft into the house. If the fire is in the die-down stage, spillage is easier to induce because the cooler flue gases do not produce such a high thermal draft up the chimney as when the fire is burning hot. This can be a direct threat to life

IMBALANCE @ CEC (Critical Exhaust Condition)
For Systems with Single-Burner Gas Appliance

W-3C

1. FLOOR AREA: Total Floor Area: sq ft

2. APPLIANCE: Type: Input: Btu/hr New Factor: Existing: Btu/hr New Factor:

3. DEPRESSURIZATION CRITERIA: Depressurization Limit @ CEC: Flow Factor:

4. ALLOWABLE NET EXHAUST: Floor Area: sq ft x ACH50: x Flow Factor: ALLOWABLE net Exhaust @ CEC: cfm

5. STUDY NET EXHAUST: TVOC Exhaust: cfm TVOC Supply: cfm Other Exhaust: cfm Other Supply: cfm Net Exhaust: cfm Net Supply: cfm

6. REQUIRED MAKE-UP AIRFLOW: ACTUAL Net Exhaust @ CEC: cfm ALLOWABLE Net Exhaust @ CEC: cfm REQUIRED MAKE-UP AIRFLOW @ CEC: cfm

7. DEPRESSURIZATION CRITERIA: REQUIRED NOT REQUIRED

8. SIGNATURE:

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safety due to the high CO content of the flue gases and the relative lack of odour and colour..

The CO detector serves as a warning device in these instances, which is why it is required to be located in the same room as the appliance, close to the ceiling. Unlike a "cold CO incident" as one might experience with CO leakage from a garage, the CO from a wood appliance should rise first to the ceiling because the spillage gases will be warmer than the room in general.

We sometimes hear that an HRV will "bring in air" for appliances such as woodstoves and fireplaces, but this is essentially incorrect. An HRV brings only as much air as it exhausts and cannot provide air for a combustion appliance, or a large exhaust appliance such as a kitchen exhaust or clothes dryer. An HRV will however, provide the basic background ventilation required (Principle Ventilation Capacity) without imposing a negative pressure on the house. This allows the wood-burning appliance to be used on a more or less continuous basis as is often the case in rural and remote communities. If the ventilation system was an "Exhaust Only" type however, the wood-burning appliance may not be able to be operated at the same time as the ventilation system. The home owner would then be faced with the awkward choice of heat or ventilation but not both.

SUMMARY & CONCLUSION

The combination of HRV and CO Detector provides a simple, prescriptive system for ventilation design which allows the home owner to use the wood-burning appliance at the same time as ventilation is being provided, and to provide a warning if some other appliance or event causes the wood-burning appliance to spill. This type of approach is most appropriate in rural and remote communities where persons with sophisticated design and testing abilities may not be available. Due to the manner in which the code is written however, we often see this requirement applied to a large, sophisticated home with a decorative wood-burning appliance that is not required to heat the home on an ongoing basis. The reason for this is that the "HRV+CO detector" is very often the most convenient compliance route. To be sure, this approach requires that the homeowner learn how to operate their house

and ventilation system so that problems do not occur. This is somewhat different from the F326 approach which requires an automatic system, specialist design and testing and very often, automated make-up air equipment.

It has been said that "Type II" rules are a somewhat arbitrary penalty for installing solid-fuel appliances. On the contrary, the code requirements are designed to allow the required continuous ventilation at the same time as the wood-burning appliances is in use. The CO detector provides a warning system if the homeowner operates their house in a way that causes the solid fuel appliance to spill.

Note: The book commonly known as the **ONHWP Ventilation Red book** (*Complying with Residential Ventilation Requirements of the 1990 OBC*) is now out of print. ONHWP has no plans to reprint the book.

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NOTE: Although this column has appeared under the title "HRAI Commentary" in the past, readers should note that HRAI no longer endorses the content. The opinions expressed in this column are those of the writers and do not reflect the views of HRAI, OBOA or any other agency, corporation or individual.