

Residential Ventilation Issues  
by Dara Bowser & Bob Allison

## Woodstove/Fireplace Installation in an Existing Home: What Happens to the Ventilation System??

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.

### When was the Permit Issued for the Original Building?

When considering which ventilation rules apply, the ventilation requirements at the time of construction of the building into which the solid fuel appliance will be installed can be used to determine the ventilation system requirements:

- 1) After July 1st, 1993: Use the current version of the OBC, (O.Reg. 403/97)
- 2) Between October 1st, 1990 until June 30th, 1993: Use the OBC 1990, (O.Reg. 413/90)
- 3) Prior to October 1st, 1990: No specific requirements for ventilation triggered by woodstove installation.

### Current Code: (O.Reg. 403/97)

Where the ventilation system is designed according to Subsection 9.32.3, an HRV must be installed as well as a CO (carbon monoxide) detector. Both the HRV and the CO detector must be installed according to the specific rules found in 9.32.3.

Alternatively, the ventilation system can be evaluated for compliance using the Part 6 approach, for which the appropriate standard is CSA F326. In a retro-fit situation, CSA F326 will call for a maximum depressurization of 5 Pa when

certain combinations of exhaust equipment are operated (called the *critical exhaust condition*). For details on F326 requirements, skip to the "F326" section near the end of this article.

### OBC 1990: (O.Reg. 413/90)

During the period when this code-version was in effect, OBC section 9.32 contained a requirement for outside air intakes which were sized based on the flow of exhaust air. A table of intake air opening sizes is located on page A-53 of appendix to the 1990 OBC, however a more useable table (which gives duct diameters and maximum lengths) can be found on page 2-7 of the now out-of-print "Complying with Residential Ventilation Requirements of the 1990 OBC" (published by ONHWP.)

As an alternative to these (usually quite large) "holes in the wall" a depressurization test may be carried out to verify that the 5 Pa limit is not exceeded. As the 1990 Code does not give specific guidance as to the test procedure to be used, it is best to use the F326 procedure.

**Prior to October 1st, 1990:** There are no specific requirements for fresh air intakes, carbon monoxide detectors or depressurization testing. In situations where things are not clear, there are two "catch-all" sentences which can be used if there is a concern about the safety of a particular situation with respect to the installation of a ventilation system and a combustion appliance. 9.33.1.1.(3)

**HRV DEPRESSURIZATION TEST REPORT**

NOTE: This test is for code-compliance of the ventilation system only. This is not a combustion, permit, test or a fuel-appliance test.

**COMBUSTION APPLIANCE**

1.  capacity  Limited  On at TVOC  On at CBC

2.  capacity  Limited  On at TVOC  On at CBC

3.  capacity  Limited  On at TVOC  On at CBC

4.  capacity  Limited  On at TVOC  On at CBC

5.  capacity  Limited  On at TVOC  On at CBC

6.  capacity  Limited  On at TVOC  On at CBC

**DEPRESSURIZATION TEST**

1. Depressurization Limit Pa

2. Depressurization Limit Pa

3. Depressurization Limit Pa

4. Depressurization Limit Pa

5. Depressurization Limit Pa

6. Depressurization Limit Pa

**DEPRESSURIZATION TEST RESULTS**

(a) min (a) = Pa (a)

(b) min (b) = Pa (b)

Largest of (a) or (b) = Dep. @ TVOC Pa

(a) min (a) = Pa (a)

(b) min (b) = Pa (b)

Largest of (a) or (b) = Dep. @ CBC Pa

**CERTIFICATION**

The dwelling unit and systems at the time of test:

conforms  does not conform

to the depressurization requirements of CSA F326.

Tester:

Name: \_\_\_\_\_

HRV Certification #: \_\_\_\_\_

Signature: \_\_\_\_\_

requires that modifications to an existing heating, ventilating or air conditioning system conform to the current code. 6.2.4.12.(1) requires that a ventilating system that exhaust air to the outside be provided with make-up air so that the operation of other exhaust or combustion equipment is not affected.

### Carbon Monoxide Detectors

CO detectors are always a good idea when ever there are combustion appliances in a home or if there is an attached garage. If the CO detector is installed to meet the requirements of subsection 9.32.3. then there are more specific rules:

- certified according to CAN/CGA-6.19 (look for CSA or ULcmark), or UL-2034 (look for UL mark)
- Hard-wired without disconnect
- located in the same rooms as solid-fuel appliance, mounted on or near the ceiling (freshly spilled combustion products tend to rise to the ceiling)
- inter-connected with smoke-alarm or audible in sleeping area of home with intervening doors closed.

### CSA F326

Rather than call for an HRV and a CO detector, the CSA F326 standard calls for a maximum of 5 Pa depressurization under specific exhaust conditions (called the *critical exhaust condition*). If the house has a depressurization of more than 5 Pa, then make-up air openings must be installed so that the exhaust conditions does not exceed 5 Pa. This can be verified by calculation or test, but for an existing house the test is much more forgiving. The test procedures and a reporting form are set out in the *HRAI Residential Mechanical Ventilation Manual* (See illustration). The reporting form may also be obtained directly from the HRAI. The test procedure itself is well established and is used extensively for R-2000 homes where solid fuel appliances are installed. Persons who carry an HRAI "VENTD" (Ventilation Design) certification are usually capable of performing the test, providing they have access to the correct type of pressure-measurement equipment. Certified R-2000 Air-tightness testers, Energuide Home Energy

Evaluators and some CWETs (Certified Wood Energy Technicians) are also capable of doing these tests. A list of VENTD certified person is available by mail or from HRAI's website (see box below).

The HRAI Ventilation Manual also contains a procedure for calculating the required size make-up air opening should the house fail the first test.

It is worthwhile noting that CSA F326 may or not require that an HRV be provided. CSA F326 allows "exhaust only" type systems, however it is much more difficult to meet the 5 Pa depressurization criteria if the ventilation is the "exhaust only" type.

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