ADDENDA

ANSI/ASHRAE Addendum r to
ANSI/ASHRAE Standard 62.2-2010

Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 23, 2012; by the ASHRAE Board of Directors on June 27, 2012; and by the American National Standards Institute on July 26, 2012.

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FOREWORD

This addendum removes any credit for assumed infiltration. It does not change the overall target ventilation rate, and credit for measured infiltration is still allowed. The effect of this change is to ensure that each home will have the required minimum ventilation rate regardless of airtightness. This is especially important as homes are becoming commonly tighter than was assumed previously in 62.2. This change is consistent with the total ventilation rate method in the recently-published Addendum n and also with the recently-published addendum on multifamily buildings.

Note: *In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.*

Addendum r to Standard 62.2-2010

Revise Section 4 as shown below. Note that this addendum shows changes relative to Addendum n to Standard 62.2-2010. Addendum n to Standard 62.2-2010 is available for free download on the ASHRAE website at www.ashrae.org/standards-research--technology/standards-addenda.

4. WHOLE-BUILDING VENTILATION

4.1 Ventilation Rate. A mechanical exhaust system, supply system, or combination thereof shall be installed for each dwelling unit to provide whole-building ventilation with outdoor air each hour at a rate not less than specified in 4.1.1, ~~Fan Ventilation Rate Method, or 4.1.2,~~ Total Ventilation Rate ~~Method~~.

~~**4.1.1 Fan Ventilation Rate Method.** The mechanical ventilation rate shall be as specified in Table 4.1a or Table 4.1b or, equivalently, Equation 4.1a or Equation 4.1b, based on the floor area of the conditioned space and number of bedrooms.~~

$$~~Q_{fan} = 0.01A_{floor} + 7.5(N_{br} + 1)~~ \qquad ~~(4.1a)~~$$

~~where~~

~~Q_{fan} = fan flow rate, cfm~~

~~A_{floor} = floor area, ft^2~~

~~N_{br} = number of bedrooms; not to be less than one~~

$$~~Q_{fan} = 0.05A_{floor} + 3.5(N_{br} + 1)~~ \qquad (4.1b)$$

~~where~~

~~Q_{fan} = fan flow rate, L/s~~

~~A_{floor} = floor area, m^2~~

~~**Exceptions:** Whole-building mechanical systems are not required provided that at least one of the following conditions is met:~~

~~a. the building has no mechanical cooling and is in zone 1 or 2 of the IECC 2004 Climate Zone Map (see Figure 8.2), or~~

~~b. the building is thermally conditioned for human occupancy for less than 876 h per year,~~

~~*and* if the authority having jurisdiction determines that window operation is a locally permissible method of providing ventilation.~~

4.1.12 Total Ventilation Rate ~~Method~~. The total required ventilation rate (Q_{tot}) shall be as specified in Table 4.1a or Table 4.1b, or alternatively calculated using Equation 4.1a~~4.2a~~ or Equation 4.1b~~4.2b~~.

$$Q_{tot} = 0.03A_{floor} + 7.5(N_{br} + 1) \qquad (4.1a~~4.2a~~)$$

where

Q_{tot} = Total required ventilation rate, cfm

~~**TABLE 4.1a (I-P)**~~
~~**Ventilation Air Requirements, cfm**~~

~~Floor Area (ft2)~~	~~Bedrooms~~				
	~~0-1~~	~~2-3~~	~~4-5~~	~~6-7~~	~~>7~~
~~<1500~~	~~30~~	~~45~~	~~60~~	~~75~~	~~90~~
~~1501-3000~~	~~45~~	~~60~~	~~75~~	~~90~~	~~105~~
~~3001-4500~~	~~60~~	~~75~~	~~90~~	~~105~~	~~120~~
~~4501-6000~~	~~75~~	~~90~~	~~105~~	~~120~~	~~135~~
~~6001-7500~~	~~90~~	~~105~~	~~120~~	~~135~~	~~150~~
~~>7500~~	~~105~~	~~120~~	~~135~~	~~150~~	~~165~~

~~**TABLE 4.1b (SI)**~~
~~**Ventilation Air Requirements, L/s**~~

~~Floor Area (m2)~~	~~Bedrooms~~				
	~~0-1~~	~~2-3~~	~~4-5~~	~~6-7~~	~~>7~~
~~<139~~	~~14~~	~~21~~	~~28~~	~~35~~	~~42~~
~~139.1-279~~	~~21~~	~~28~~	~~35~~	~~42~~	~~50~~
~~279.1-418~~	~~28~~	~~35~~	~~42~~	~~50~~	~~57~~
~~418.1-557~~	~~35~~	~~42~~	~~50~~	~~57~~	~~64~~
~~557.1-697~~	~~42~~	~~50~~	~~57~~	~~64~~	~~71~~
~~>697~~	~~50~~	~~57~~	~~64~~	~~71~~	~~78~~

A_{floor} = Floor area of residence, ft^2

N_{br} = Number of bedrooms (to be not less than one)

$$Q_{tot} = 0.15A_{floor} + 3.5(N_{br} + 1) \qquad (4.1b\ \text{~~4.2b~~})$$

where

Q_{tot} = Total required ventilation rate, L/s

A_{floor} = Floor area of residence, m^2

Exceptions: Whole-building mechanical systems are not required provided that at least one of the following conditions is met:

a. the building has no mechanical cooling and is in zone 1 or 2 of the IECC 2004 Climate Zone Map (see Figure 8.2), or

b. the building is thermally conditioned for human occupancy for less than 876 h per year,

and if the authority having jurisdiction determines that window operation is a locally permissible method of providing ventilation.

4.1.2 Infiltration Credit. If a blower door test has been done then a credit for estimated infiltration may be taken using the following procedure.

Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using the normalized leakage calculated from measurements of envelope leakage using either ASTM E779-10 or CGSB 149.10-M86. The authority having jurisdiction may approve other means of calculating effective leakage area (*ELA*), such as the RESNET Mortgage Industry National Home Energy Systems Standard.XX

ASTM Procedure. To calculate the effective leakage area from the ASTM E779-10 standard, the leakage area for pressurization and depressurization (using a 4 Pa reference pressure) shall be averaged using Equation 4.2~~4.3~~.

$$ELA = (L_{press} + L_{dpress})/2 \qquad (4.2\ \text{~~4.3~~})$$

where

ELA = Effective leakage area, ft^2 (m^2)

L_{press} = Leakage area from pressurization, ft^2 (m^2)

$L_{depress}$ = Leakage area from depressurization, ft^2 (m^2)

CGSB Procedure. To calculate the effective leakage area from CAN/CGSB-149.10-M86, the following modifications to the test procedure must be made: (1) all vents and intentional openings must be in the same configuration as specified in the ASTM standard (i.e., HVAC dampers and registers should be in the normal operating position; fireplace and other dampers should be closed unless they are required for test operation), (2) height and floor area must be reported consistently with the definitions of this standard, and (3) the leakage area as calculated from the CGSB procedure must be converted using Equation 4.3~~4.4~~:

$$ELA = 0.61 \cdot (0.4)^{n-0.5} \cdot L_{cgsb} \qquad (4.3\ \text{~~4.4~~})$$

where

n = Exponent measured from the CGSB standard

L_{cgsb} = CGSB leakage area, as modified above, (ft^2) [m^2]

Normalized Leakage. *Normalized leakage* shall be calculated using Equation 4.4~~4.5~~:

$$NL = 1000 \cdot \frac{ELA}{A_{floor}} \cdot \left[\frac{H}{Hr}\right]^z \qquad (4.4\ \text{~~4.5~~})$$

where

NL = Normalized leakage

Hr = Reference height, (8.2 ft) [2.5 m]

H = Vertical distance from lowest above grade floor to highest ceiling, ft (m)

z = 0.4 for the purpose of calculating the following effective annual average infiltration rate

TABLE 4.1a (I-P)
Ventilation Air Requirements, cfm

Floor Area, ft^2	Bedrooms				
	1	2	3	4	5
≤500	30	38	45	53	60
501–1000	45	53	60	68	75
1001–1500	60	68	75	83	90
1501–2000	75	83	90	98	105
2001–2500	90	98	105	113	120
2501–3000	105	113	120	128	135
3001–3500	120	128	135	143	150
3501–4000	135	143	150	158	165
4001–4500	150	158	165	173	180
4501–5000	165	173	180	188	195

TABLE 4.1b (SI)
Ventilation Air Requirements, L/s

Floor Area, m^2	Bedrooms				
	1	2	3	4	5
≤47	14	18	21	25	28
47–93	21	24	28	31	35
93–139	28	31	35	38	42
140–186	35	38	42	45	49
186–232	42	45	49	52	56
232–279	49	52	56	59	63
279–325	56	59	63	66	70
325–372	63	66	70	73	77
372–418	70	73	77	80	84
418–465	77	80	84	87	91

Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using Equation 4.5a~~4.6a~~ or Equation 4.5b~~4.6b~~.

$$Q_{inf}(cfm) = \frac{NL \cdot wsf \cdot A_{floor}}{7.3} \qquad (4.5a\text{~~4.6a~~})$$

where

NL = Normalized leakage

wsf = Weather and shielding factor from Normative Appendix X

A_{floor} = Floor area of residence, ft^2

$$Q_{inf}(L/s) = \frac{NL \cdot wsf \cdot A_{floor}}{1.44} \qquad (4.5b\text{~~4.6b~~})$$

where

A_{floor} = Floor area of residence, m^2

Required Mechanical Ventilation Rate (Q_{fan}) shall be calculated using Equation 4.6~~4.7~~.

$$Q_{fan} = Q_{tot} - Q_{inf} \qquad (4.6\text{~~4.7~~})$$

where

Q_{fan} = Required mechanical ventilation rate, (cfm) [L/s]

Q_{inf} may be no greater than $2/3 \cdot Q_{tot}$. See Appendix A for exceptions for existing buildings.

~~If Q_{fan} is less than or equal to zero then no whole-building ventilation fan is required.~~

Add the following reference to Section 9:

9. REFERENCES

XX RESNET. 2011. *Mortgage Industry National Home Energy Rating Systems Standard*. Residential Energy Services Network.

Revise Section A2 in Normative Appendix A as shown below. Note that this addendum shows changes relative to Addendum n to Standard 62.2-2010. Addendum n to Standard 62.2-2010 is available for free download on the ASHRAE website at www.ashrae.org/standards-research--technology/standards-addenda.

A2. WHOLE-BUILDING MECHANICAL VENTILATION RATE

If Section 4.1.1 is used to determine the fan flow requirement, then the required mechanical ventilation rate, Q_{fan}, shall be the rate in Section 4.1.1 plus the required additional airflow calculated in accordance with Section A3.

If Section 4.1.2 is used to determine the fan flow requirement, then the required additional airflow calculated in accordance with Section A3 shall be added to Q_{tot} prior to application of Q_{inf}. For existing buildings, if Q_{fan} is less than or equal to zero then no whole-building ventilation fan is required.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.