ADDENDA

ANSI/ASHRAE Addendum m to
ANSI/ASHRAE Standard 62.2-2013

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

Approved by the ASHRAE Standards Committee on October 13, 2015; by the ASHRAE Technology Council on October 19, 2015; and by the American National Standards Institute on November 2, 2015.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

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FOREWORD

This change integrates multifamily buildings into the rest of the standard rather than leaving them in a separate section. This makes it more clear that multifamily dwelling units and single-family homes are subject to the same requirements. No changes to the requirements themselves have been made.

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 m to Standard 62.2-2013

Revise Section 3 as shown. The remainder of Section 3 is unchanged.

dwelling unit, attached: a dwelling unit sharing demising walls, floors, ceilings or common corridors with another dwelling unit or occupiable space.

~~***multifamily building:*** a building containing multiple dwelling units.~~

Revise Section 4 as shown.

4. ~~WHOLE-BUILDING~~DWELLING UNIT VENTILATION

A ~~whole building~~ dwelling-unit ventilation system, complying with either Sections 4.1 through 4.5 or Section 4.6, shall be installed.

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

Exception: An intermittently operating ~~whole building~~ dwelling-unit mechanical ventilation system shall be permitted if the ventilation rate complies with Section 4.5. The system shall be designed for automatic operation.

4.1.1 Total Ventilation Rate. 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 or Equation 4.1b.

$$Q_{tot} = 0.03A_{floor} + 7.5(N_{br} + 1) \quad \text{(I-P)} \qquad (4.1a)$$

where

Q_{tot} = total required ventilation rate, cfm

A_{floor} = dwelling-unit floor area ~~of residence~~, ft^2

N_{br} = number of bedrooms (not to be less than 1)

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

where

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

A_{floor} = dwelling-unit floor area ~~of residence~~, m^2

N_{br} = number of bedrooms (not to be less than 1)

Exceptions: ~~Whole building~~ Dwelling-unit mechanical ventilation systems are not required if the authority having jurisdiction determines that window operation is a locally permissible method of providing ventilation and provided that at least one of the following conditions is met:

1. The building has no mechanical cooling and is in zone 1 or 2 of the climate zone map shown in Figure 9.1.
2. The building is thermally conditioned for human occupancy for less than 876 h per year.

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

	Bedrooms				
Floor Area, ft^2	**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 Ventilation Air Requirements, L/s (SI)

	Bedrooms				
Floor Area, m^2	**1**	**2**	**3**	**4**	**5**
<47	14	18	21	25	28
47–93	21	24	28	31	35
~~93~~94–139	28	31	35	38	42
140–186	35	38	42	45	49
~~186~~187–232	42	45	49	52	56
~~232~~233–279	49	52	56	59	63
~~279~~280–325	56	59	63	66	70
~~325~~326–372	63	66	70	73	77
~~372~~373–418	70	73	77	80	84
~~418~~419–465	77	80	84	87	91

4.1.2 Infiltration Credit. If a blower door test has been done, then a credit for estimated infiltration may be taken for nonattached dwelling units using the following procedure. Horizontally attached single-family dwelling units shall be permitted to utilize a blower door test result that includes common walls to take this credit, subject to the reduction factor A_{ext} in Equation 4.6.

Effective Annual Average Infiltration Rate (Q_{inf}). Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using the normalized leakage calculated from measurements of envelope leakage using either ASTM E779[1] or CGSB 149.10[2]. 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*.[3]

ASTM Procedure. To calculate the ELA from ASTM E779[1], the leakage area for pressurization and depressurization (using a 4 Pa reference pressure) shall be averaged using Equation 4.2:

$$ELA = (L_{press} + L_{depress})/2 \quad (4.2)$$

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 ELA from CGSB 149.10[2], the following modifications to the test procedure must be made: (a) all vents and intentional openings must be in the same configuration as specified in ASTM E779[1] (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), (b) height and floor area must be reported consistently with the definitions of this standard, and (c) the leakage area as calculated from the CGSB procedure must be converted using Equation 4.3:

$$ELA = 0.61 \cdot (0.4)^{n-0.5} \cdot L_{cgsb} \quad (4.3)$$

where

n = exponent measured from the CGSB 149.10[2]

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

Normalized Leakage. Normalized leakage shall be calculated using Equation 4.4:

$$NL = 1000 \cdot \frac{ELA}{A_{floor}} \cdot \left[\frac{H}{H_r}\right]^z \quad (4.4)$$

where

NL = normalized leakage

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

A_{floor} = floor area of residence, ft^2 (m^2)

H = vertical distance between the lowest and highest above-grade points within the pressure boundary, ft (m)

Hr = reference height, 8.2 ft (2.5 m)

z = 0.4 for the purpose of calculating the Effective Annual Infiltration Rate below

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

$$Q_{inf}(\text{cfm}) = \frac{NL \cdot wsf \cdot A_{floor}}{7.3} \quad \text{(I-P)} \quad (4.5a)$$

where

NL = normalized leakage

wsf = weather and shielding factor from Normative Appendix B

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

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

where

NL = normalized leakage

wsf = weather and shielding factor from Normative Appendix B

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

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

$$Q_{fan} = Q_{tot} - Q_{inf} \quad (4.6)$$

where

Q_{fan} = required mechanical ventilation rate, cfm (L/s)

Q_{tot} = total required ventilation rate, cfm (L/s)

Q_{inf} = may be no greater than $2/3 \cdot Q_{tot}$ (see Normative Appendix A for exceptions for existing buildings ~~and Section 8.2.1 for multifamily buildings~~)

A_{ext} = 1 for single family detached homes, or the ratio of exterior envelope surface area that is not attached to garages or other dwelling units to total envelope surface area for single family attached homes.

Revise Section 4.2 as shown.

4.2 System Type. The ~~whole-building~~ dwelling-unit mechanical ventilation system shall consist of one or more supply or exhaust fans and associated ducts and controls. Local exhaust fans shall be permitted to be part of a mechanical exhaust system. Where local exhaust fans are used to provide ~~whole-building~~ dwelling-unit ventilation, the local exhaust airflow may be credited towards the ~~whole-building~~ dwelling-unit ventilation airflow requirement. Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation if manufacturers' requirements for return air temperature are met. See Chapter 10 of ASHRAE Guideline 24[4] for guidance on selection of methods.

Revise Section 4.5 as shown.

4.5 Intermittent Mechanical Ventilation. ~~Whole building~~ Dwelling-unit mechanical ventilation systems designed to provide intermittent ventilation shall comply with this section.

Revise Section 4.6 as shown.

4.6 Equivalent Ventilation. A ~~whole building~~ dwelling-unit ventilation system shall be designed and operated in such a way as to provide the same or lower annual exposure as would be provided by complying with Section 4.1. The calculations shall be based on a single zone with a constant contaminant emission rate. The manufacturer, specifier, or designer of the equivalent ventilation system shall certify that the system meets this intent and provide supporting documentation.

Revise Section 6.1 as shown.

6.1 Adjacent Spaces and Transfer Air. Measures shall be taken to minimize air movement across envelope components to ~~occupiable spaces~~ dwelling units from adjacent spaces such as garages, unconditioned crawlspaces, ~~and~~ unconditioned attics, and other dwelling units. Pressure boundary wall, ceiling, and floor penetrations shall be sealed, as shall any vertical chases adjacent to dwelling units. Doors between dwelling units and common hallways shall be gasketed or made substantially airtight. Supply and balanced ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors.

6.1.1 Compliance for Attached Dwelling Units. One method of demonstrating compliance with Section 6.1 shall be to verify a leakage rate below a maximum of 0.3 cfm per ft^2 (150 L/s per 100 m^2) of the dwelling unit envelope area (i.e., the sum of the area of walls between dwelling units, exterior walls, ceiling, and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTM-E779[1] or ANSI/ASTM-E1827[19]. The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent dwelling units.

Revise Section 6.6 as shown.

6.6 Ventilation Opening Area. Spaces shall have ventilation openings as listed below. Such openings shall meet the requirements of Section 6.8.

Exception: Attached dwelling units and ~~S~~spaces that meet the local ventilation requirements set for bathrooms in Section 5.

Revise Section 7 as shown.

7. AIR-MOVING EQUIPMENT

All air-moving equipment used to comply with this standard shall meet the following criteria.

7.1 Selection and Installation. Ventilation devices and equipment serving individual dwelling units shall be tested in accordance with ANSI/ASHRAE Standard 51/AMCA 210, *Laboratory Methods of Testing Fans for Aerodynamic Performance Rating*,[13] and ANSI/ AMCA Standard 300, *Reverberant Room Method for Sound Testing of Fans*,[14] and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI) (HVI 915, *Procedure for Loudness Rating of Residential Fan Products*[15]; HVI 916, *Air Flow Test Procedure*[16]; and HVI 920, *Product Performance Certification Procedure Including Verification and Challenge*[17]). Installations of systems or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions.

7.2 Sound Ratings for Fans. Ventilation fans shall be rated for sound at no less than the minimum airflow rate required by this standard, as noted below. These sound ratings shall be at a minimum of 0.1 in. w.c. (25 Pa) static pressure in accordance with the HVI procedures referenced in Section 7.1.

Exception: HVAC air handlers and remote-mounted fans need not meet sound requirements. To be considered for this exception, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways, and there must be at least 4 ft (1 m) of ductwork between the fan and the intake grille.

7.2.1 ~~Whole-Building~~ Dwelling-Unit Ventilation or Continuous Local Exhaust Fans. These fans shall be rated for sound at a maximum of 1.0 sone.

7.2.2 Demand-Controlled Local Exhaust Fans. Fans used to comply with Section 5.2 shall be rated for sound at a maximum of 3 sone, unless their maximum rated airflow exceeds 400 cfm (200 L/s).

~~**Exception:** HVAC air handlers and remote-mounted fans need not meet sound requirements. To be considered for this exception, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways, and there must be at least 4 ft (1 m) of ductwork between the fan and the intake grille.~~

7.3 Exhaust Ducts ~~Multibranch Exhaust Ducting.~~

7.3.1 Multiple Exhaust Fans Using One Duct. Exhaust fans in separate dwelling units shall not share a common exhaust duct. If more than one of the exhaust fans in a single dwelling unit shares a common exhaust duct, each fan shall be equipped with a back-draft damper to prevent the recirculation of exhaust air from one room to another through the exhaust ducting system.

7.3.2 Single Exhaust Fan Ducted to Multiple Inlets. Where exhaust inlets are commonly ducted across multiple dwelling units, one or more exhaust fans located downstream of the exhaust inlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.

7.4 Supply Ducts. Where supply outlets are commonly ducted across multiple dwelling units, one or more supply fans located upstream of all the supply outlets shall be designed and intended to run continuously, or a system of one or more backdraft dampers shall be installed to isolate each dwelling unit from the common duct when the fan is not running.

Delete Section 8 in its entirety.

8. MULTIFAMILY BUILDINGS

8.1 Summary. This section provides requirements for multifamily residential buildings. Multifamily buildings shall meet all the requirements of this standard, except as modified in this section.

8.2 Whole-Building Mechanical Ventilation. For multifamily buildings, the term "building" in Section 4 refers to a single dwelling unit.

8.2.1 Ventilation Rate. The required dwelling unit mechanical ventilation rate, Q_{fan}, shall be the rate in Section 4.1.1 or, equivalently, the rate from Tables 8.2.1a or 8.2.1b. The required mechanical ventilation rate shall not be reduced as described in Section 4.1.2.

8.2.2 Other Spaces. Corridors and other common areas within the conditioned space shall be provided with ventilation at a rate of 0.06 cfm per ft^2 (30 L/s per 100 m^2) of floor area.

8.2.3 Mixed-Use Buildings. Nonresidential spaces in mixed use buildings shall meet the requirements of ANSI/ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*.[18]

8.3 Parking Garage Exhaust. Common parking garages adjoining occupiable spaces shall be provided with exhaust ventilation at a rate of 0.4 cfm per ft^2 (200 L/s per 100 m^2) of floor area.

Exception: Parking garages with at least two walls that are at least 50% open to the outside.

8.4 Other Requirements

8.4.1 Transfer Air. Measures shall be taken to minimize air movement across envelope components separating dwelling units, including sealing penetrations in the common walls, ceilings, and floors of each unit and by sealing vertical chases adjacent to the units. All doors between dwelling units and common hallways shall be gasketed or made substantially airtight.

8.4.1.1 Compliance. One method of demonstrating compliance with Section 8.4.1 shall be to verify a leakage rate below a maximum of 0.3 cfm per ft^2 (150 L/s per 100 m^2) of the dwelling unit envelope area (i.e., the sum of the area of walls between dwelling units, exterior walls, ceiling, and floor) at a test pressure of 50 Pa by a blower door test conducted in accordance with either ANSI/ASTM E779, *Standard Test Method for Determining Air Leakage Rate By Fan Pressurization*,[1] or ANSI/ASTM E1827, *Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door*.[19] The test shall be conducted with the dwelling unit as if it were exposed to outdoor air on all sides, top, and bottom by opening doors and windows of adjacent dwelling units.

8.5 Air-Moving Equipment

8.5.1 Exhaust Ducts. Exhaust fans in separate dwelling units shall not share a common exhaust duct. Exhaust inlets from more than one dwelling unit may be served by a single exhaust fan downstream of all the exhaust inlets if the fan is designed and intended to run continuously or if each inlet is equipped with a back-draft damper to prevent cross-contamination when the fan is not running.

8.5.2 Supply Ducts. Supply outlets to more than one dwelling unit may be served by a single fan upstream of all the supply outlets if the fan is designed and intended to run continuously or if each supply outlet is equipped with a back-draft damper to prevent cross-contamination when the fan is not running.

TABLE 8.2.1a
Dwelling Unit Ventilation Air Requirements, cfm (I-P)

	Bedrooms				
Floor Area, ft^2	**1**	**2**	**3**	**4**	**>5**
<500	30	40	45	55	60
500–1000	45	55	60	70	75
1001–1500	60	70	75	85	90
1501–2000	75	85	90	100	105
2001–2500	90	100	105	115	120
2501–3000	105	115	120	130	135
3001–3500	120	130	135	145	150
>3501	135	145	150	160	165

TABLE 8.2.1b
Dwelling Unit Ventilation Air Requirements, L/s (SI)

	Bedrooms				
Floor Area, m^2	**1**	**2**	**3**	**4**	**>5**
<46	14	19	21	26	28
47–93	21	26	28	33	35
94–139	28	33	35	40	42
140–186	35	40	42	47	50
187–232	42	47	50	54	57
233–279	50	54	57	61	64
280–325	57	61	64	68	70
>326	63	68	70	75	78

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.

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