ADDENDA

ANSI/ASHRAE Addendum h to
ANSI/ASHRAE Standard 62.2-2019

Ventilation and Acceptable Indoor Air Quality in Residential Buildings

Approved by ASHRAE and the American National Standards Institute on April 29, 2022.

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FOREWORD

Addendum h improves consistency in use of terminology and better organizes several sections. Several changes are made to better accommodate multifamily applications, such as by defining "corridor" and using "dwelling unit" consistently. Where terms are no longer used in the standard, definitions have been removed.

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 h to Standard 62.2-2019

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

3. DEFINITIONS

[. . .]

adjacent space: space inside the building, outside of and adjoining the dwelling-unit boundary.

[. . .]

air, indoor: air ~~in an occupiable space~~ enclosed by the dwelling-unit boundary.

air, outdoor: air from outside the building ~~taken into a ventilation system or air from outside the building that enters through infiltration or natural ventilation openings~~.

~~***air, transfer:*** air moved from one occupiable space to another, usually through doorways or grilles.~~

air, ventilation: outdoor air delivered to ~~a space~~ the dwelling unit that is intended to dilute airborne contaminants.

[. . .]

~~***conditioned space****: the part of a building that is capable of being thermally conditioned for the comfort of occupants.~~

[. . .]

corridor: a space adjacent to the dwelling unit that defines and provides a path of egress.

[. . .]

~~***dwelling unit air barrier:*** a durable, air-impermeable material or combination of such materials that is installed at the dwelling unit envelope and continuously sealed to resist the passage of air through the dwelling unit envelope.~~

dwelling unit, attached: a dwelling unit that is adjacent to another dwelling unit or any space covered by ASHRAE Standard 62.1 ~~sharing demising walls, floors, ceilings, or common corridors with another dwelling unit or occupiable space~~.

dwelling unit, horizontally attached: an attached dwelling unit that does not have a common floor/ceiling assembly ~~not sharing ceilings or floors~~ with other dwelling units or spaces covered by ASHRAE Standard 62.1, ~~occupiable spaces, public garages, or commercial spaces~~.

[. . .]

~~***envelope area, dwelling unit:*** the sum of the areas of the ceilings, floors, and walls that separate the conditioned space of a dwelling unit from the exterior and from adjacent interior spaces.~~

exhaust ~~flow~~ airflow, net: ~~flow~~ airflow through an exhaust system minus the compensating outdoor airflow through any supply system that is interlocked to the exhaust system.

exhaust system: one or more fans that remove air from the ~~building~~ dwelling unit, causing outdoor air to enter by ventilation inlets or normal leakage paths through the dwelling-unit boundary ~~building envelope~~.

floor area: all above- and below-grade finished areas as defined in ANSI Standard Z765~~, except that~~ and unfinished below-grade, occupiable spaces ~~areas inside the pressure boundary shall be included as floor area~~.

habitable space: ~~building~~ space within the dwelling unit intended for ~~continual human occupancy; such space generally includes areas used for~~ living, sleeping, ~~dining~~ eating, ~~and~~ or cooking but ~~does~~ not ~~generally include~~ including bathrooms, toilet rooms, hallways, storage areas, closets, or utility rooms.

~~***heating degree-day:*** the difference in temperature between the outdoor mean temperature over a 24 h period and a given base temperature of a building space; that is, for heating degree-day base 65°F (18°C), for any one day, when the mean temperature is less than 65°F (18°C), there are as many heating degree-days as degrees Fahrenheit (Celsius) temperature difference between the mean temperature for the day and 65°F (18°C). Annual heating degree-days are the sum of the heating degree-days over a calendar year.~~

[. . .]

infiltration: uncontrolled inward leakage of air through the dwelling-unit boundary ~~cracks and interstices in any building element and around windows and doors of a building~~.

[. . .]

mechanical ventilation: ~~the active process of supplying air to or removing air from an indoor space~~ ventilation by powered equipment such as motor-driven fans and blowers but not by devices such as wind-driven turbine ventilators and mechanically operated windows.

mechanical ventilation, balanced: ventilation provided where the total supply fan ~~flow~~ airflow is within 20% of the total exhaust fan ~~flow~~ airflow and provided simultaneously.

natural ventilation: ventilation occurring as a result of only natural forces, such as wind pressure or differences in air density, through intentional openings in the dwelling-unit boundary such as open windows and doors.

nontransient occupancy: occupancy of a dwelling unit ~~or sleeping unit~~ for more than 30 days.

~~***occupiable space:*** any enclosed space inside the pressure boundary and intended for human activities, including but not limited to all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas.~~

~~***pressure boundary***~~ ***dwelling-unit boundary:*** primary air enclosure boundary separating ~~indoor and outdoor air~~ the air in the dwelling unit from all other air. This is sometimes referred to as the "air barrier" or "enclosure." ~~For example, a volume that has more leakage to the outside than to the conditioned space would be considered outside the pressure boundary. Exposed earth in a crawlspace or basement shall not be considered part of the pressure boundary.~~

dwelling-unit boundary area: the total surface area of the dwelling-unit boundary.

[. . .]

~~***sealed:*** all edges, joints, openings, and penetrations of the dwelling-unit air barrier materials are treated in a permanent manner that will resist the passage of air.~~

~~***sleeping unit:*** a room or space in which people sleep that can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.~~

[. . .]

supply system: ~~one or more fans~~ a mechanical ventilation system that ~~supply~~ supplies ~~outdoor~~ ventilation air directly to the ~~building~~ dwelling unit, causing indoor air to leave by normal leakage paths through the ~~building envelope~~ dwelling-unit boundary.

[. . .]

toilet room: a room ~~space~~ containing a toilet, water closet, urinal, or similar sanitary ~~service~~ plumbing fixture and, frequently, a lavatory but not a bathtub, shower, spa, or similar source of moisture.

utility room: laundry, ~~lavatory,~~ or other ~~utility~~ room, that is not a kitchen, toilet room, or bathroom, containing sinks or washing equipment.

ventilation: the process of supplying outdoor air to or removing indoor air from a dwelling unit by natural or mechanical means. Such air may or may not have been conditioned.

Revise Section 4.1.2 as shown. Tables remain unchanged and are omitted here for brevity.

4.1.2 Infiltration Credit. If a blower door test has been performed, then a credit for estimated infiltration may be taken for detached dwelling units using either the procedure in Section 4.1.2.1 or 4.1.2.2. Attached dwelling units other than horizontally attached shall not be permitted to take an infiltration credit. Horizontally attached dwelling units shall be permitted to use a blower door test result to take this credit, subject to the reduction factor A_{ext} in Equation 4-2. If this credit is taken, then the Required Mechanical Ventilation Rate (Q_{fan}) shall be calculated using Equation 4-2:

$$Q_{fan} = Q_{tot} - \Phi(Q_{inf} \times A_{ext}) \quad (4\text{-}2)$$

where

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

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

Q_{inf} = infiltration, cfm (L/s) (see Normative Appendix A for exceptions for existing buildings)

A_{ext} = 1 for detached dwelling units; otherwise, for horizontally attached dwelling units, the ratio of ~~exterior envelope surface~~ dwelling-unit boundary area that is not attached to garages or other dwelling units to total ~~envelope surface~~ dwelling-unit boundary area

Φ = 1 for balanced mechanical ventilation systems, and Q_{inf}/Q_{tot} otherwise

Exception to 4.1.2: Where Q_{fan}, calculated for unbalanced mechanical ventilation, is less than or equal to 15 cfm (7 L/s), a dwelling-unit ventilation system is not required.

4.1.2.1 Effective Annual Average Infiltration Rate (Q_{inf}) Using a Single-Point Envelope Leakage Test. Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using a single-point test at 50 Pa from ASTM E1827 or ANSI/RESNET/ICC Standard 380. The Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using Equation 4-3:

$$Q_{inf} = 0.052 \times Q_{50} \times \text{wsf} \times (H/H_r)^z \quad (4\text{-}3)$$

where

Q_{inf} = estimated infiltration rate, cfm (L/s)

Q_{50} = leakage rate at 50 Pa depressurization or pressurization, cfm (L/s)

wsf = weather and shielding factor from Normative Appendix B

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

H_r = reference height, 8.2 ft (2.5 m)

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

4.1.2.2 Effective Annual Average Infiltration Rate (Q_{inf}) Using a Multipoint Envelope Leakage Test. Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using the normalized leakage calculated from measurements of envelope leakage using a multipoint test from either ASTM E779 or CGSB 149.10.

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

$$\text{ELA} = (L_{press} + L_{depress})/2 \quad (4\text{-}4)$$

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, 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 (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.
c. The leakage area as calculated from the CGSB procedure must be converted using Equation 4-5:

$$\text{ELA} = 0.61 \times (0.4)^{n-0.5} \times L_{cgsb} \quad (4\text{-}5)$$

where

n = exponent measured from the CGSB 149.10

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

Normalized Leakage. Normalized leakage shall be calculated using Equation 4-6:

$$\text{NL} = 1000 \times \frac{\text{ELA}}{A_{floor}} \times \left[\frac{H}{H_r}\right]^z \quad (4\text{-}6)$$

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~~ dwelling-unit boundary, ft (m)

H_r = reference height, 8.2 ft (2.5 m)

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

Effective Annual Average Infiltration Rate (Q_{inf}). Effective Annual Average Infiltration Rate (Q_{inf}) shall be calculated using Equation 4-7a (I-P) or 4-7b (SI):

$$Q_{inf}(\text{cfm}) = \frac{\text{NL} \times \text{wsf} \times A_{floor}}{7.3} \quad (4\text{-}7a)$$

where

NL = normalized leakage

wsf = weather and shielding factor from Normative Appendix B

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

$$Q_{inf}(\text{L/s}) = \frac{\text{NL} \times \text{wsf} \times A_{floor}}{1.44} \quad (4\text{-}7b)$$

where

NL = normalized leakage

wsf = weather and shielding factor from Normative Appendix B

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

Revise Section 4.1.4.3 as shown.

4.1.4.3 Airflow Rate. The minimum airflow rate passing through the filter is shown in Equation 4-9:

$$Q_{fr} = f_{fr} Q_{tot} \quad (4\text{-}9)$$

where Q_{fr} is the time average airflow rate of filtered, recirculated air delivered by the air-handling system. The period of time for averaging the airflow shall not exceed one day. If the period exceeds 12 hours, controls shall be provided to ensure that the system also provides at least 10% of Q_{fr} every 12-hour period.

Revise Section 4.1.4.4 as shown.

4.1.4.4 Installation and Maintenance. All filters shall be readily accessible ~~from within the occupiable space~~. Filters shall be installed using methods to minimize air bypass. In addition to the instruction and labeling requirements of Section 6.2, the filter designation required to meet the filtration requirements for this system shall be prominently displayed on or near the filter housing access door.

Revise Section 4.2 as shown.

4.2 System Type. The dwelling-unit mechanical ventilation system shall consist of one or more supply or exhaust fans and associated ducts and controls. Exhaust-only ventilation systems are not permitted for newly constructed attached dwelling units that open directly to an enclosed~~, common~~ corridor. Local exhaust fans shall be permitted to be part of a mechanical exhaust system. Where local exhaust fans are used to provide dwelling-unit ventilation, the local exhaust airflow may be credited toward the dwelling-unit ventilation airflow requirement, except in attached dwelling units of new construction that open directly to an enclosed~~, common~~ corridor. Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation if manufacturer requirements for return air temperature are met.

Revise Section 4.3 as shown.

4.3 Airflow Measurement. The mechanical ventilation airflows required by this section ~~is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the mechanical ventilation system as installed and~~ shall be measured according to the ventilation equipment manufacturer installation instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation ~~fan's~~ system's ~~inlet~~ terminals/grilles~~, outlet terminals/grilles,~~ or in the connected ventilation ducts. Balanced mechanical ventilation system airflow shall be the average of the supply fan and exhaust fan airflows. Ventilation airflow of systems with multiple operating modes shall be tested in all modes designed to meet this section.

Revise Section 5.4 as shown. The remainder of Section 5.4 is unchanged.

5.4 Airflow Measurement. The airflow required by this section is the quantity of indoor air exhausted by the ventilation system as installed and shall be measured according to the ventilation equipment manufacturer instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation ~~fan's~~ system's ~~inlet~~ terminals/grilles~~, outlet terminals,~~ or in the connected ventilation ducts.

Exception to 5.4: Manufacturer design criteria or the prescriptive requirements of Table 5-3 shall be permitted in place of a measurement. When using Table 5-3, the airflow rating according to Section 7.1 shall meet or exceed a static pressure of 0.25 in. of water (62.5 Pa). Use of Table 5-3 is limited to duct systems not exceeding 25 ft (8 m) in length, duct systems with no more than three (3) elbows, and duct systems with exterior termination fittings having a hydraulic diameter greater than or equal to the minimum duct diameter and not less than the hydraulic diameter of the fan outlet.

Table 5-1 Demand-Controlled Local ~~Ventilation~~ Exhaust Airflow Rates

Application	Airflow
Enclosed kitchen	• Vented range hood (including appliance-range hood combinations): 100 cfm (50 L/s) • Other kitchen exhaust fans, including downdraft: 300 cfm (150 L/s) or a capacity of 5 ach
Nonenclosed kitchen	• Vented range hood (including appliance-range hood combinations): 100 cfm (50 L/s) • Other kitchen exhaust fans, including downdraft: 300 cfm (150 L/s)
Bathroom	50 cfm (25 L/s)

Table 5-2 Continuous Local ~~Ventilation~~ Exhaust Airflow Rates

Application	Airflow
Enclosed kitchen	5 ach, based on kitchen volume
Bathroom	20 cfm (10 L/s)

[. . .]

Revise Section 6 as shown.

6. OTHER REQUIREMENTS

6.1 Adjacent Spaces and Transfer Air. Measures shall be taken to minimize air movement across ~~envelope components to~~ the dwelling-unit~~s~~ boundary from adjacent spaces, such as garages, unconditioned crawlspaces, unconditioned attics, and other dwelling units. ~~Pressure~~ Dwelling-unit 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 mechanical ventilation systems shall be designed and constructed to provide ventilation air directly from the outdoors. Balanced mechanical ventilation system airflow shall be the average of the supply fan and exhaust fan flows.

6.1.1 ~~Compliance for~~ Attached Dwelling Units. Attached dwelling units, except existing units as described in Normative Appendix A, Section A6, shall demonstrate compliance with Section 6.1 by verifying a leakage rate less than or equal to 0.2 cfm per ft^2 (100 L/s per 100 m^2) of the dwelling-unit ~~envelope~~ boundary area by means of a blower door test at a test pressure of 50 Pa. Testing shall be conducted in accordance with ANSI/RESNET/ICC Standard 380. For horizontally attached ~~single-family~~ dwelling units that are being evaluated for the infiltration credit in Section 4.1.2, the procedure specified in Section 4.1.2 shall be an alternative to the procedure of this section.

[Note: The sections addressing garages and space-conditioning system ducts have been moved from Sections 6.5.1 and 6.5.2. Strikethrough and underline format are only applied to changes within the text that has been moved.]

6.~~5~~.1.2 Garages. ~~When~~ Where a garage is adjacent to the dwelling unit ~~an occupiable space adjoins a garage~~, the design ~~must~~ shall prevent migration of contaminants through the dwelling-unit boundary ~~to the adjoining occupiable space~~. ~~Air seal the w~~ Walls, ceilings, and floors that separate garages from the ~~occupiable space~~ dwelling unit shall be air sealed. To be considered air sealed, all joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other sources of air leakage through wall and ceiling assemblies separating the garage from the ~~residence~~ dwelling unit and its attic area shall be caulked, gasketed, weather stripped, wrapped, or otherwise sealed to limit air movement. Doors between garages and the dwelling unit ~~occupiable spaces~~ shall be gasketed or made substantially airtight with weather stripping.

6.1.3~~5.2~~ Space-Conditioning System Ducts. All air distribution joints located outside the ~~pressure~~ dwelling-unit boundary shall be sealed. HVAC systems that serve spaces within the dwelling-unit boundary ~~occupiable space~~ shall not be designed to supply air to or return air from the garage. HVAC systems that include air handlers or ducts located outside the dwelling-unit ~~pressure~~ boundary shall have total air leakage of no more than 6% of total fan airflow when measured at 0.1 in. of water (25 Pa) using California Title 24 or equivalent. Method D of ASTM E1554 may be used to meet this requirement. If the air handler, ducts, or both are located in the garage, the garage door shall be open to the outside when the duct leakage is tested.

6.2 Instructions and Labeling. Information on the ventilation design and/or ventilation systems installed, instructions on their proper operation to meet the requirements of this standard, and instructions detailing any required maintenance (similar to that provided for HVAC systems) shall be provided to the owner and the occupant of the dwelling unit. Controls shall be labeled as to their function (unless that function is obvious, such as toilet exhaust fan switches).

6.3 Clothes Dryers. Clothes dryers shall be exhausted directly to the outdoors.

Exception to 6.3: Condensing dryers plumbed to a drain.

6.4 Combustion and Solid-Fuel-Burning Appliances

6.4.1 Combustion and solid-fuel-burning appliances must be provided with adequate combustion and ventilation air and installed in accordance with manufacturer installation instructions, NFPA 31, NFPA 54/ANSI Z223.1, NFPA 211, or other equivalent code acceptable to the building official.

6.4.2 Where atmospherically vented combustion appliances or solid-fuel-burning appliances are located inside the dwelling-unit ~~pressure~~ boundary, the total net exhaust airflow of the two largest exhaust fans (not including a summer cooling fan intended to be operated ~~only when~~ in conjunction with windows or other ~~air inlets are open~~ openings) shall not exceed 15 cfm per 100 ft^2 (75 L/s per 100 m^2) of ~~occupiable space~~ floor area when in operation at full capacity. If the designed total net

airflow exceeds this limit, the net exhaust airflow must be reduced by reducing the exhaust airflow or providing compensating outdoor air. Gravity or barometric dampers in nonpowered exhaust makeup air systems shall not be used to provide compensating outdoor air. Atmospherically vented combustion appliances do not include direct-vent appliances. Combustion appliances that pass safety testing performed according to ANSI/BPI-1200 shall be deemed as complying with Section 6.4.2.

[Note: The sections addressing garages and space-conditioning system ducts have been moved from Sections 6.5.1 and 6.5.2 to Sections 6.1.2 and 6.1.3.]

~~**6.5 Airtightness Requirements**~~

~~**6.5.1 Garages.** When an occupiable space adjoins a garage, the design must prevent migration of contaminants to the adjoining occupiable space. Air seal the walls, ceilings, and floors that separate garages from occupiable space. To be considered air sealed, all joints, seams, penetrations, openings between door assemblies and their respective jambs and framing, and other sources of air leakage through wall and ceiling assemblies separating the garage from the residence and its attic area shall be caulked, gasketed, weather stripped, wrapped, or otherwise sealed to limit air movement. Doors between garages and occupiable spaces shall be gasketed or made substantially airtight with weather stripping.~~

~~**6.5.2 Space Conditioning System Ducts.** All air distribution joints located outside the pressure boundary shall be sealed. HVAC systems that serve occupiable space shall not be designed to supply air to or return air from the garage. HVAC systems that include air handlers or ducts located outside the pressure boundary shall have total air leakage of no more than 6% of total fan flow when measured at 0.1 in. of water (25 Pa) using California Title 24 or equivalent. Method D of ASTM E1554 may be used to meet this requirement. If the air handler, ducts, or both are located in the garage, the garage door shall be open to the outside when the duct leakage is tested.~~

6.~~6~~5 Ventilation Opening Area. Spaces shall have ventilation openings as listed in the following subsections. Such openings shall meet the requirements of Section 6.8.

Exception to 6.~~6~~5: Attached dwelling units and spaces that meet the local ventilation requirements set for bathrooms in Section 5.

6.~~6~~5.1 Habitable Spaces. Each habitable space shall be provided with ventilation openings with an openable area not less than 4% of the floor area or less than 5 ft^2 (0.5 m^2).

6.~~6~~5.2 Toilet Rooms and Utility Rooms. Toilet rooms and utility rooms shall be provided with natural ventilation openings with an openable area not less than 4% of the room floor area or less than 1.5 ft^2 (0.15 m^2).

Exceptions to 6.~~6~~5.2:

1. Utility rooms with a dryer exhaust duct.
2. Toilet compartments in bathrooms.

[Note: The section addressing minimum filtration has been moved to follow the air inlet section. The section numbering remains the same.]

~~**6.7 Minimum Filtration.** Mechanical systems that supply air to an occupiable space through ductwork exceeding 10 ft (3 m) in length and through a thermal conditioning component, except evaporative coolers, shall be provided with a filter having a designated minimum efficiency of MERV 6 or better when tested in accordance with ANSI/ASHRAE Standard 52.2, or a minimum particle size efficiency of 50% in the 3.0 to 10 µm range in accordance with AHRI Standard 680. The system shall be designed such that all recirculated and mechanically supplied outdoor air is filtered before passing through the thermal conditioning components. The filter shall be located and installed in such a manner as to facilitate access and regular service by the owner.~~

~~**6.7.1 Filter Pressure Drop.** New mechanical and distribution systems covered by Section 6.7 shall be designed to accommodate the clean-filter pressure drop as rated using AHRI Standard 680 for the system design flow. The filter locations shall be labeled with the design airflow and maximum allowable clean-filter pressure drop. The label shall be visible to a person replacing the filter.~~

6.~~6~~8 Air Inlets. Air inlets that are part of the ventilation design shall be located a minimum of 10 ft (3 m) from known sources of contamination such as a stack, vent, exhaust hood, or vehicle exhaust. The intake shall be placed so that entering air is not obstructed by snow, plantings, or other material. Forced air inlets shall be provided with rodent/insect screens (mesh not larger than 1/2 in. [13 mm]).

Exceptions to 6.~~6~~8:

1. Ventilation openings in the wall may be as close as a stretched-string distance of 3 ft (1 m) from sources of contamination exiting through the roof or dryer exhausts.

2. No minimum separation distance shall be required between windows and local exhaust outlets in kitchens and bathrooms.
3. Vent terminations covered by and meeting the requirements of the *National Fuel Gas Code* (NFPA 54/ANSI Z223.1) or equivalent.
4. Where a combined exhaust/intake termination is used to separate intake air from exhaust air originating in a living space other than kitchens, no minimum separation distance between these two openings is required. For these combined terminations, the exhaust air concentration within the intake airflow shall not exceed 10% as established by the manufacturer.

6.6~~8~~.1 Ventilation Openings. Operable windows, skylights, through-the-wall inlets, window air inlets, or similar devices shall be readily accessible to occupants. Where openings are covered with louvers or otherwise obstructed, openable area shall be based on the free, unobstructed area through the opening.

[Note: The section addressing minimum filtration has been moved to follow the air inlet section. The section numbering remains the same. Strikethrough and underline format are only applied to changes within the text that has been moved.]

6.7 Minimum Filtration. Mechanical systems that supply air to the dwelling unit ~~an occupiable space~~ through ductwork exceeding 10 ft (3 m) in length and through a thermal conditioning component, except evaporative coolers, shall be provided with a filter having a designated minimum efficiency of MERV 6 or better when tested in accordance with ANSI/ASHRAE Standard 52.2, or a minimum particle size efficiency of 50% in the 3.0 to 10 µm range in accordance with AHRI Standard 680. The system shall be designed such that all recirculated and mechanically supplied outdoor air is filtered before passing through the thermal conditioning components. The filter shall be located and installed in such a manner as to facilitate access and regular service by the owner.

6.7.1 Filter Pressure Drop. New mechanical and distribution systems covered by Section 6.7 shall be designed to accommodate the clean-filter pressure drop as rated using AHRI Standard 680 for the system design airflow. The filter locations shall be labeled with the design airflow and maximum allowable clean-filter pressure drop. The label shall be visible to a person replacing the filter.

6.~~9~~ 8 Carbon Monoxide Alarms. A carbon monoxide alarm shall be installed in each dwelling unit in accordance with NFPA 72, *National Fire Alarm and Signaling Code*, and shall be consistent with requirements of applicable laws, codes, and standards.

Revise Section 7.4.2 as shown.

7.4.2 Single Exhaust Fan Ducted to Multiple Exhaust 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.

Revise Normative Appendix A as shown. The remainder of Normative Appendix A is unchanged.

(This is a normative appendix and is part of the standard.)

NORMATIVE APPENDIX A
EXISTING BUILDINGS

[. . .]

A2. DWELLING-UNIT MECHANICAL VENTILATION RATE

The required mechanical ventilation rate (Q_{fan}) shall be the rate Q_{tot} in Section 4.1.1 plus the required additional airflow calculated in accordance with Section A3. If the airtightness of the ~~building envelope~~ dwelling-unit boundary has been measured, the required mechanical ventilation rate may be reduced as described in Section 4.1.2. In these cases, Section A3 shall be applied before Section 4.1.2 when determining the final mechanical ventilation rate.

[. . .]

A5. DWELLING-UNIT AIR SEALING

Dwelling units that are undergoing alterations where between 15% and 80% of the wall area of the dwelling-unit boundary ~~envelope wall area~~ is altered shall comply with Section 6.1.1 or with Sec-

tions A5.1 through A5.4. Dwelling units where at least 80% of the wall area of the dwelling-unit boundary ~~envelope wall area~~ is altered shall comply with Section 6.1.1.

A5.1 The spaces around readily accessible penetrations through the dwelling-unit ~~air barrier~~ boundary, including but not limited to the following, shall be sealed:

a. Vent and pipe penetrations, including those from water piping, drain waste and vent piping, HVAC piping, and sprinkler heads
b. Electrical penetrations, including those for receptacles, lighting, communications wiring, and smoke alarms
c. HVAC penetrations, including those for ventilation systems ~~fans and for exhaust, supply, transfer, and return air ducts~~

A5.2 Accessible leaks and gaps in the dwelling-unit ~~air barrier~~ boundary shall be sealed, including but not limited to the intersections of baseboard trim and floor, the intersections of walls and ceilings, around window trim and dwelling-unit doors, and the termination points of internal chases in attics and crawlspaces.

[. . .]

Revise Normative Appendix C as shown. The remainder of Normative Appendix C is unchanged.

(This is a normative appendix and is part of the standard.)

NORMATIVE APPENDIX C
RELATIVE EXPOSURE

[. . .]

C2.2.2.1 Wind-Driven ~~Flow~~ Airflow. The wind speed shall be converted to site wind speed using the wind speed multiplier (G) from Table C-1 and Equation C-3.

$$U = GU_{met} \tag{C-3}$$

The wind-driven airflow shall be calculated using Equation C-4:

$$Q_w = C \times C_w(sU)^{2n} \tag{C-4}$$

where shelter factor s is taken from Table C-2, and the wind coefficient (C_w) is taken from Table C-3a (I-P) or C-3b (SI).

The values for a flue shall be used whenever there is an open fireplace or combustion device that takes its combustion air from within the dwelling-unit boundary ~~conditioned space~~ (e.g., furnace, water heater or woodstove).

C2.2.2.2 Stack-Driven ~~Flow~~ Airflow. The stack-driven airflow shall be calculated using Equation C-5:

$$Q_s = CC_s(|T_{in} - T_{out}|)^n \tag{C-5}$$

where the stack coefficient C_s is taken from Table C-4a (I-P) or C-4b (SI), and T_{in} is assumed to be 68°F (20°C).

C2.2.2.3 Total Infiltration ~~Flow~~ Airflow. The total infiltration airflow shall be calculated using Equation C-6:

$$Q_{inf,\,i} = \sqrt{Q_w^2 + Q_s^2} \tag{C-6}$$

[. . .]

Add the following reference to Section 9 as shown.

Reference	Title	Section
[. . .]		
ASHRAE **~~1791 Tullie Circle, N.E.~~180 Technology Pkwy.** **~~Atlanta, GA 30329~~Peachtree Corners, GA 30092** **(800) 527-4723; www.ashrae.org**		
ANSI/ASHRAE Standard 62.1-2019	Ventilation for Acceptable Indoor Air Quality	3
[. . .]		

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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As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

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