ADDENDA

ANSI/ASHRAE Addendum i to
ANSI/ASHRAE Standard 62.1-2013

Ventilation for Acceptable Indoor Air Quality

Approved by the ASHRAE Standards Committee on January 23, 2016; by the ASHRAE Board of Directors on January 27, 2016; and by the American National Standards Institute on February 24, 2016.

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 Manager of Standards.

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SPECIAL NOTE

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

- *a. interpretation of the contents of this Standard,*
- *b. participation in the next review of the Standard,*
- *c. offering constructive criticism for improving the Standard, or*
- *d. permission to reprint portions of the Standard.*

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This addendum changes Appendix F, "Separation of Exhaust Outlets and Outdoor Air Intakes," from informative to normative. This addendum is for the purpose of making language in the standard mandatory in compliance with current ASHRAE requirements.

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 i to Standard 62.1-2013

Add a new definition to Section 3 as shown.

3. DEFINITIONS

equipment well: an area (typically on the roof) enclosed on three or four sides by walls that are less than 75% free area, and the lesser of the length and width of the enclosure is less than three times the average height of the walls. The free area of the wall is the ratio of area of the openings through the wall, such as openings between louver blades and undercuts, divided by the gross area (length times height) of the wall.

Modify Section 5.5.1 as shown.

5.5 Outdoor Air Intakes. Ventilation system outdoor intakes shall be designed in accordance with the following subsections.

5.5.1 Location. Outdoor air intakes (including openings that are required as part of a natural ventilation system) shall be located such that the shortest distance from the intake to any specific potential outdoor contaminant source shall be equal to or greater than the separation distance (a) listed in Table 5.5.1 or (b) the calculation method in Normative Appendix F.

Exception: Other ~~minimum~~ separation distances shall be permitted, provided it can be shown analytically that an equivalent or lesser rate of introduction of contaminants from outdoor sources will be attained.

~~***Note:*** Informative Appendix F presents an analytical method for determining the minimum separation distances based on dilution of outdoor contaminants.~~

Modify Informative Appendix F as shown.

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

~~**This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)**~~

NORMATIVE ~~INFORMATIVE~~ APPENDIX F SEPARATION OF EXHAUST OUTLETS AND OUTDOOR AIR INTAKES

F1. GENERAL

This appendix presents an alternative procedure for determining separation distance between outdoor air intakes and exhaust air and vent outlets. This analytical method can be used instead of Table 5.5.1.

Exhaust air and vent outlets, as defined in Table 5.5.1, shall be located no closer to outdoor air intakes, and operable windows, skylights, and doors, both those on the subject property and those on adjacent properties, than the minimum separation distance (L) specified in this section. The distance (L) is defined as the shortest "stretched string" distance measured from the closest point of the outlet opening to the closest point of the outdoor air intake opening or operable window, skylight, or door opening, along a trajectory as if a string were stretched between them.

F1.1 Application. Laboratory fume hood exhaust air outlets shall be in compliance with NFPA 45[5] and ANSI/AIHA Z9.5[6]. Nonlaboratory e~~E~~xhaust outlets and outdoor air intakes or other openings shall be separated in accordance with the following.

~~**Exception:** Laboratory fume hood exhaust air outlets shall be in compliance with NFPA 45-2004 and ANSI/AIHA Z9.5-2003.~~

F1.2 Outdoor Air Intakes. ~~Minimum~~ The minimum separation distance between exhaust air/vent outlets as defined in Table 5.5.1 and outdoor air intakes to mechanical ventilation systems or operable windows, skylights, and doors that are required as part of natural ventilation systems shall be equal to distance (L) determined in accordance with Section ~~F3~~ F2.

Exception: Separation distances do not apply when exhaust and outdoor air intake systems ~~do not~~ are controlled such that they cannot operate simultaneously.

F1.3 Other Building Openings. ~~Minimum~~ The minimum separation distance between building exhaust air/vent outlets as defined in Table 5.5.1 and operable openings to occupiable spaces shall be half of the distance (L) determined in accordance with Section ~~F3~~F2. ~~Minimum~~ The minimum separation distance between ~~high odor intensity or noxious or dangerous~~ either Class 3, Class 4, cooling tower, or combustion appliance/equipment exhaust air/vent outlets and operable openings to occupiable spaces shall be equal to the distance (L) determined in accordance with Section ~~F3~~F2.

F1.4 Additional Limitations for Noxious or Dangerous Air. ~~Minimum~~ The minimum separation distance between exhausts located less than 65 ft (20 m) vertically below outdoor air intakes or operable windows and doors shall be equal to a horizontal separation only as determined in accordance with Section ~~F3~~ F2; no credit may be taken for any vertical separation.

F1.5 Equipment Wells. Exhaust air outlets that terminate in an equipment well that also encloses an outdoor air intake shall meet the separation requirements of this section and, in addition, shall either

a. terminate at or above the highest enclosing wall and discharge air upward at a velocity exceeding 1000 fpm (5 m/s) or
b. terminate 3 ft (1 m) above the highest enclosing wall (with no minimum velocity).

Exception: ~~Low contaminant or intensity air.~~ Exhaust air designated as Class 1 or Class 2.

~~For the purpose of this section, an equipment well is an area (typically on the roof) enclosed on three or four sides by walls that are less than 75% free area, and the lesser of the length and width of the enclosure is less than three times the average height of the walls. The free area of the wall is the ratio of area of the openings through the wall, such as openings between louver blades and undercuts, divided by the gross area (length times height) of the wall.~~

F1.6 Property Lines. ~~Minimum~~ The minimum separation distance between exhaust air/vent outlets and property lines shall be half of the distance (L) determined in accordance with Section ~~F3~~F2. ~~For significant contaminant or odor intensity exhaust air, where the property line abuts a street or other public way, no minimum separation is required if exhaust termination is 10 ft (3 m) above grade.~~

Exception: For Class 3, Class 4, or combustion appliance/equipment exhaust air, where the property line abuts a street or other public way, no minimum separation is required if exhaust termination is at least 10 ft (3 m) above grade.

F2. DETERMINING DISTANCE *L*

The minimum separation ~~Separation~~ distance (L) shall be determined using ~~any~~ one of the following three approaches:

a. A value ~~Use the values~~ of L in Table F2-1 shall be used.
b. The value of ~~Calculate~~ L ~~in accordance with~~ shall be determined using Equation F2-1 or F2-2.

$$L = 0.09 \cdot \sqrt{Q} \cdot (\sqrt{DF} - U/400) \text{ in feet} \quad \text{(I-P)} \qquad \text{(F-1)}$$

$$L = 0.04 \cdot \sqrt{Q} \cdot (\sqrt{DF} - U/2) \text{ in meters} \quad \text{(SI)} \qquad \text{(F-2)}$$

where

Q = exhaust airflow rate ~~volume~~, cfm (L/s). For gravity vents, such as plumbing vents, use an exhaust rate of 150 cfm (75 L/s). For flue vents from fuel-burning appliances, assume a value of 250 cfm per million Btu/h (0.43 L/s per kW) of combustion input (or obtain actual rates from the combustion appliance manufacturer).

U = exhaust air discharge velocity, fpm (m/s). As shown in Figure F2-1, U shall be determined using Table F2-3.

DF = dilution factor, which is the ratio of outdoor airflow to entrained exhaust airflow in the outdoor air intake. The minimum dilution factor shall be determined as a function of exhaust air class in Table F2-2.

For exhaust air composed of more than one class of air, the dilution factor shall be determined by averaging the dilution factors by the volume fraction of each class using equation F2-3:

$$DF = \sum(DF_i \cdot Q_i)/\sum Q_i \qquad \text{(F-3)}$$

where

DF_i = dilution factor from Table F2-2 for class i air. ~~and~~

Q_i ~~is the~~ = volumetric flow rate of class i air in the exhaust airstream.

~~U = exhaust air discharge velocity, fpm (m/s). As shown in Figure F2-1, U shall have a positive value when the exhaust is directed away from the outdoor air intake at an angle that is greater than 45 degrees from the direction of a line drawn from the closest exhaust point the edge of the intake; U shall have a negative value when the exhaust is directed toward the intake bounded by lines drawn from the closest exhaust point the edge of the intake; and U shall be set to zero for other exhaust air directions regardless of actual velocity. U shall be set to 0 in Equation F2-1 for vents from gravity (atmospheric) fuel-fired appliances, plumbing vents, and other nonpowered exhausts, or if the exhaust discharge is covered by a cap or other device that dissipates the exhaust airstream. For hot gas exhausts such as combustion products, an effective additional 500 fpm (2.5 m/s) upward velocity shall be added to the actual discharge velocity if the exhaust stream is aimed directly upward and unimpeded by devices such as flue caps or louvers.~~

c. When the above options do not represent the proposed design, then an exceptional calculation method shall be used to calculate the value of L if approved by ~~Determine L using any calculation or test procedure approved by~~ the authority having jurisdiction. It must be shown ~~that shows~~ that the proposed design will result in dilution factors that are no less than ~~equivalent or greater dilution factors than~~ those specified in Table F2-2.

~~$L = 0.09 \cdot \sqrt{Q} \cdot (\sqrt{DF} - U/400)$ in feet (I-P) (F-1)~~

~~$L = 0.04 \cdot \sqrt{Q} \cdot (\sqrt{DF} - U/2)$ in meters (SI) (F-2)~~

TABLE F2-1 Minimum Separation Distance

Exhaust Air Class (See Section 5.16)	Separation Distance, L, ft (m)
Significant contaminant or odor intensity (Class 3)	15 (5)
Noxious or dangerous particles (Class 4)	30 (10)

TABLE F2-2 Minimum Dilution Factors

Exhaust Air Class (See Section 5.16)	Dilution Factor (DF)
Significant contaminant or odor intensity (Class 3)	15
Noxious or dangerous particles (Class 4)	50*

*Does not apply to fume hood exhaust. See Section F1.1.

TABLE F2-3 Exhaust Air Discharge Velocity

Exhaust Direction/Configuration	Exhaust Air Discharge Velocity (*U*) Modifier
Exhaust is directed away from the outdoor air intake at an angle that is greater than 45 degrees from the direction of a line drawn from the closest exhaust point the edge of the intake	***U*** given a positive value
Exhaust is directed toward the intake bounded by lines drawn from the closest exhaust point the edge of the intake	***U*** given a negative value
Exhaust is directed at an angle between the two above cases	***U*** is zero
Vents from gravity (atmospheric) fuel-fired appliances, plumbing vents, and other nonpowered exhausts, or if the exhaust discharge is covered by a cap or other device that dissipates the exhaust airstream	***U*** is zero
Hot gas exhausts such as combustion products if the exhaust stream is aimed directly upward and unimpeded by devices such as flue caps or louvers	Add 500 fpm (2.5 m/s) upward velocity to ***U***

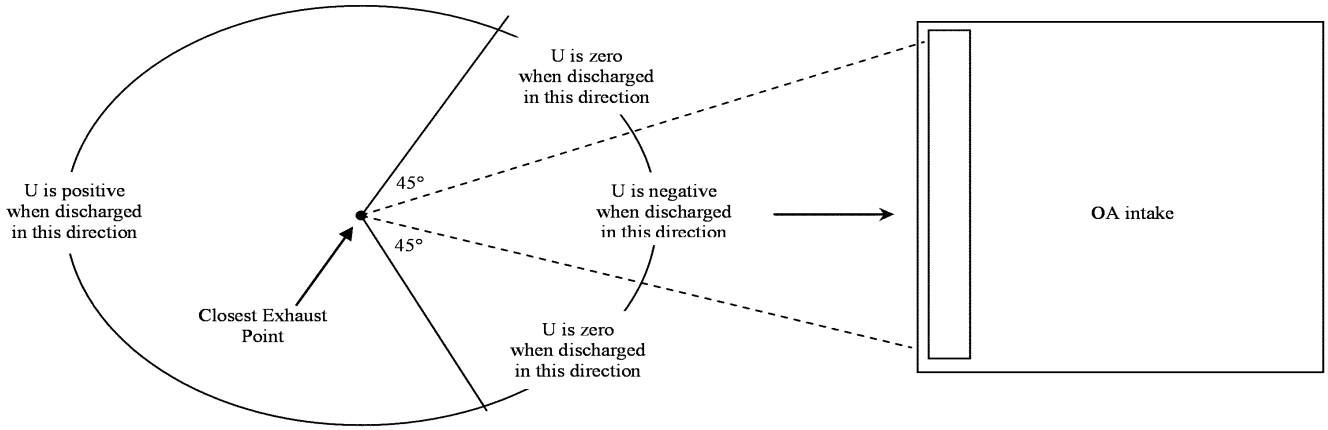

FIGURE F2-1 Exhaust air discharge velocity (U).

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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