ANSI/ASHRAE Addenda a, b, e, f, and h to
ANSI/ASHRAE Standard 62.1-2007

ASHRAE ADDENDA

2008 SUPPLEMENT

Ventilation for Acceptable Indoor Air Quality

See Appendix for approval dates.

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ANSI/ASHRAE Addenda to ANSI/ASHRAE Standard 62.1-2007 Ventilation for Acceptable Indoor Air Quality

NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at www.ashrae.org.

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FOREWORD

This addendum addresses compliance issues that may result from unclear wording or phrasing. For example, local survey information in Section 4.3 is now mandatory rather than optional; Section 5.1 clarifies that natural ventilation systems are not subject to Section 6 requirements; Section 5.16 requires the designs that "limit" the migration of air from an attached parking garage to the adjacent occupiable spaces, rather than "minimize" it; and Section 17 allows some recirculation of Class 2 and Class 3 air in the process of recovering heat, rather than requiring reclassification of the air.

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 a to 62.1-2007

Revise Section 4.3 as follows:

4.3 Documentation. Documentation of the outdoor air quality investigation shall be reviewed with building owners or their representative and shall include the following as a minimum:

2. Local survey information~~, which may include the following~~:
(a) Date of observations
(b) Time of observations
(c) ~~Area surveyed~~ Site description
(d) Description of ~~nearby~~ facilities on site and on adjoining properties
(e) Observation of odors or irritants
(f) ~~Description~~ Observation of visible plumes or visible air contaminants
(g) Description of ~~nearby~~ sources of vehicle exhaust on site and on adjoining properties
(h) ~~Direction of prevailing winds~~ Identification of potential contaminant sources on the site and from adjoining properties

Revise Section 5.1 as follows:

5.1 Natural Ventilation. Natural ventilation systems are not subject to the requirements in Section 6. Use of natural ventilation systems ~~designed in accordance with this section~~ shall be permitted in lieu of or in conjunction with mechanical ventilation systems. Such natural ventilation systems shall be designed in accordance with the requirements of Section 5.1.1 and 5.1.2. **Exception ~~to 5.1~~:** An engineered natural ventilation system when approved by the authority having jurisdiction need not meet the requirements of ~~5.1.1 and 5.1.2~~ these sections.

Revise Section 5.2 as follows:

5.2 Ventilation Air Distribution. Ventilating systems shall be designed in accordance with the following~~:~~ requirements.

5.2.2 Plenum Systems. When the ceiling or floor plenum is used both to recirculate return air and to distribute ventilation air to ceiling-mounted or floor-mounted terminal units, the system shall be engineered such that each space is provided with its required minimum ventilation airflow. **Note:** ~~Direct~~ Systems with direct connection of ventilation air ducts to ~~ventilating~~ terminal units ~~is an alternate method of satisfying the intent of~~, for example, comply with this requirement.

Revise Section 5.4 as follows:

5.4 Ventilation System Controls. Mechanical ventilation systems shall include controls, manual or automatic, that enable the fan system to operate whenever the spaces served are occupied. The system shall be designed to maintain no less than the minimum outdoor airflow as required by Section 6 under any load condition. **Note:** Variable Air Volume (VAV) systems with fixed outdoor air damper positions shall comply with this requirement at minimum ~~supply~~ system primary airflow.

Revise Section 5.6.1 as follows:

5.6.1 Location. Outdoor air intakes~~,~~ (including doors and windows 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 listed in Table 5-1. **Exception:** Other minimum separation distances ~~are acceptable if~~ shall be permitted, provided it can be shown analytically that an equivalent or lesser rate of introduction of outdoor air contaminants will be attained**. Note:** Appendix F presents an ~~acceptable alternative~~ analytical method ~~of~~ for determining the minimum separation distances based on dilution of outdoor contaminants.

Revise Table 5-1 Notes as follows:

Note 1: Significantly contaminated exhaust is exhaust air with significant contaminant concentration, significant sensory-irritation intensity, or offensive odor.

Note 2: ~~Laboratory~~ Minimum distance listed does not apply to laboratory fume hood exhaust air outlets. Separation criteria for fume hood exhaust shall be in compliance with NFPA 45-~~1991~~[3] and ANSI/AIHA Z9.5-~~1992~~.[4]

Note 3: Noxious or dangerous exhaust is exhaust air with highly objectionable fumes or gases and/or exhaust air with potentially dangerous particles, bioaerosols, or gases at concentrations high enough to be considered harmful. Information on separation criteria for industrial environments can be found in the ACGIH Industrial Ventilation Manual 5 and in the ASHRAE Handbook—HVAC Applications.[6]

Note 4: Shorter separation distances ~~are~~ shall be permitted when determined in accordance with (a) ~~Chapter 7 of~~ ANSI Z223.1/NFPA 54-~~2002~~[7] for fuel gas burning appliances and equipment; (b) ~~Chapter 6 of~~ NFPA 31-~~2001~~[8] for oil burning appliances and equipment, or (c) ~~Chapter 7 of~~ NFPA 211-~~2003~~[9] for other combustion appliances and equipment.

Note 5: Distance measured to closest place that vehicle exhaust is likely to be located.

Note 6: ~~No minimum~~ Shorter separation distances shall be permitted where outdoor ~~applies to~~ surfaces ~~that~~ are sloped more than 45 degrees from horizontal or are less than 1 in. (3 cm) wide.

Note 7: Where snow accumulation is expected, ~~distance listed shall be increased by~~ the surface of the snow at the expected average snow depth constitutes the "other surface directly below intake."

Revise Section 5.6.4 as follows:

5.6.4 Snow Entrainment. Where climate dictates, outdoor air intakes that are part of the mechanical ventilation system shall be designed to manage water from ~~melted~~ snow which is blown or drawn into the system, as follows:

(a) Suitable access doors to permit cleaning of wetted surfaces shall be provided.

Revise Section 5.10.2 as follows:

5.10.2 Exfiltration. For a building, the ventilation system (s) shall be designed to ensure that the ~~design~~ minimum outdoor air intake ~~shall be greater than~~ exceeds the ~~design~~ maximum exhaust airflow ~~when~~ whenever the mechanical air-conditioning systems are dehumidifying. **Exception:** Where excess exhaust is required by process considerations and approved by the authority having jurisdiction, such as in certain industrial facilities. **Note:** Although individual zones within a building may be neutral or negative with respect to outdoors or to other zones, net positive mechanical intake airflow for the building as a whole reduces infiltration of untreated outdoor air.

Revise Section 5.12.2 as follows:

5.12.2 Finned-Tube Coil Selection for Cleaning. Individual finned-tube coils or multiple finned-tube coils in series without ~~adequate~~ intervening access space(s) of at least 18 in. (457 mm) shall be selected to result in no more than 0.75 in.wc (187 Pa) combined dry coil pressure drop ~~when dry coil~~ at 500 fpm (2.54 m/s) face velocity ~~is 500 fpm (2.54 m/s)~~. **Exception:** When access for cleaning of both upstream and downstream coil surfaces is provided as well as clear and complete instructions for access and cleaning of both upstream and downstream coil surfaces are provided.

Revise Section 5.13.2 as follows:

5.13.2 Obstructions. Air cleaners or ductwork obstructions, such as turning vanes, volume dampers, and duct offsets greater than 15 degrees, that are installed downstream of humidifiers or water spray systems, shall be located a distance equal to or greater than the absorption distance recommended by the humidifier or water spray system manufacturer. **Exception:** Equipment such as eliminators, coils, or evaporative media ~~may~~shall be permitted to be located within the absorption distance recommended by the manufacturer, provided a drain pan complying with the requirements of Section 5.11 is used to capture and remove any water that may drop out of the airstream due to impingement on these obstructions.

Revise Section 5.15.1 as follows:

Note: ~~Where~~ In localities where soils contain high concentrations of radon or other soil gas contaminants, the ~~local~~ authority having jurisdiction may ~~have~~ impose additional ~~requirements~~ measures, such as sub-slab depressurization.

Revise Section 5.16 as follows:

5.16 Buildings with Attached Parking Garages. In order to limit the entry of vehicular exhaust into occupiable spaces, buildings with attached parking garages shall be designed to:

1. maintain the garage pressure at or below the pressure of the adjacent occupiable spaces; or
2. use a vestibule to provide an airlock between the garage and the adjacent occupiable spaces; or
3. otherwise ~~be designed to minimize~~ limit migration of air from the attached parking garage into the adjacent occupiable spaces of the building in a manner acceptable to the authority having jurisdiction.

Revise Section 5.17 as follows:

5.17.1 Classification. Air (return, transfer, or exhaust air) leaving each space or location shall be designated at an expected air-quality classification not less than that shown in Table 5-2, Table 6-1, ~~Table 5-2~~ or Table ~~5-3~~ 6-4 or as approved by the authority having jurisdiction. ~~The classification for air from~~ Air leaving spaces or locations that are not listed in

Table 5-2, Table 6-1, ~~Table 5-2~~ or Table ~~5-3~~ 6-4 shall be designated with the same ~~as the~~ classification as ~~for~~ air from the most similar space or location listed ~~space type that is most similar~~ in terms of occupant activities and building construction. **Exception:** ~~Classification of air~~ Air from ~~smoking~~ spaces where ETS is present ~~is not addressed~~. (Classification of air from spaces where ETS is present is not addressed. Spaces that are expected to include ~~smoking~~ ETS do not have a classification listed in Table 6-1.)

Note: Classifications in Table 5-2, Table 6-1, ~~Table 5-2~~ and Table ~~5-3~~ 6-4 are based on relative contaminant concentration using the following subjective criteria:

- Class 1: Air with low contaminant concentration, low sensory-irritation intensity, and inoffensive odor.
- Class 2: Air with moderate contaminant concentration, mild sensory-irritation intensity, or mildly offensive odors. Class 2 air also includes air that is not necessarily harmful or objectionable but that is inappropriate for transfer or recirculation to spaces used for different purposes.
- Class 3: Air with significant contaminant concentration, significant sensory-irritation intensity, or offensive odor.
- Class 4: Air with highly objectionable fumes or gases or with potentially dangerous particles, bioaerosols, or gases, at concentrations high enough to be considered harmful.

5.17.2 Re-designation.

5.17.2.1 Air Cleaning. If air leaving a space or location passes through an air-cleaning system, re-designation of the cleaned air ~~may be reclassified~~ to a cleaner classification shall be permitted, using the subjective criteria noted above, with the approval of the authority having jurisdiction.

~~**5.17.2.2 Energy Recovery.** Class 2 air may be re-designated as Class 1 air in the process of recovering energy when it is diluted with outdoor air such that no more than 10% of the resulting airstream is Class 2 air. Class 3 air may be re-designated as Class 1 air in the process of recovering energy shall be permitted provided the air when it is diluted with outdoor air such that no more than 5% of the resulting airstream is Class 3 air.~~

5.17.2.2~~3~~ Transfer. A mixture of air that has been transferred through or returned from spaces or locations with ~~more than one classification~~ different air classes shall ~~of space must~~ be re-designated with the highest classification ~~appropriate for the part of the mixture that has the highest contaminant concentration~~ among the air classes mixed. **Note:** ~~For example, air returned from both a Class 1 and a Class 2 space served by a common system must be designated as Class 2 air.~~ For example, mixed return air to a common system serving both a Class 1 space and a Class 2 space is designated as Class 2 air.

5.17.2.3 Ancillary Spaces. Re-designation of Class 1 air to Class 2 air shall be permitted for Class 1 "spaces that are ancillary to Class 2 spaces". Note: For example, an office within a restaurant may be designated as a space ancillary to a Class 2 space thus enabling the office to receive Class 2 air.

5.17.3 Recirculation Limitations. When the Ventilation Rate Procedure of Section 6 is used to determine ventilation airflow values, recirculation of air shall be limited in accordance with the requirements of this section.

5.17.3.1 Class 1 Air. ~~Class 1 air may be recirculated or transferred to any space.~~ Recirculation or transfer of Class 1 air to any space shall be permitted.

5.17.3.2 Class 2 Air. ~~Class 2 air may be recirculated within the space of origin. Class 2 air may be transferred or recirculated to other Class 2 or Class 3 spaces utilized for the same or similar purpose or task and involving the same or similar pollutant sources. Class 2 air may be recirculated or transferred to Class 4 spaces.~~

5.17.3.2.1 Recirculation of Class 2 air within the space of origin shall be permitted.

5.17.3.2.2 Recirculation or transfer of Class 2 air to other Class 2 or Class 3 spaces shall be permitted, provided the other spaces are used for the same or similar purpose or task and involve the same or similar pollutant sources as the Class 2 space.

5.17.3.2.3 Transfer of Class 2 air to toilet rooms shall be permitted.

5.17.3.2.4 Recirculation or transfer of Class 2 air to Class 4 spaces shall be permitted.

5.17.3.2.5 Class 2 air shall not be recirculated or transferred to Class 1 spaces.

~~**Note:** Spaces that are normally Class 1 may be identified as "Spaces ancillary to Class 2 spaces" and as such classified as Class 2 spaces as permitted in Table 6-1.~~

Exception: When using any energy recovery device, recirculation from leakage, carryover or transfer from the exhaust side of the energy recovery device is permitted. Recirculated Class 2 air shall not exceed 10% of the outdoor air intake flow.

5.17.3.3 Class 3 Air. ~~Class 3 air may be recirculated within the space of origin.~~

5.17.3.3.1 Recirculation of Class 3 air within the space of origin shall be permitted.

5.17.3.3.2 Class 3 air shall not be recirculated or transferred to any other space.

Exception: When using any energy recovery device, recirculation from leakage, carryover or transfer from the exhaust side of the energy recovery device is permitted. Recirculated Class 3 air shall not exceed 5% of the outdoor air intake flow.

5.17.4 Documentation. Design documentation shall indicate the justification for classification of air from any occupancy category, airstream or location not listed in Table 5-2, Table 6-1, ~~Tables 5-2 or 6-1~~or Table 6-4.

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FOREWORD

This addendum addresses compliance issues that may result from unclear wording or phrasing. All changes are viewed by the committee as editorial:

- *Informative Appendix C: The text is changed to indicate that the percentages presented are percent-difference values, rather than percent-change values.*
- *Informative Appendix D: Editorial text improvements that emphasize that the equations are only for single-zone systems and increase consistency with Section 6. Also, replaced "air change effectiveness" (e) with "zone air change effectiveness" (Ez) to be consistent with Section 6.*
- *Informative Appendix F: In Tables F-1 and F-2, added air classification numbers per Section 5.17. These were always intended to be replaced by Air Class when that addendum was published, but the change was not picked up. Also, reformatted Table F-1 to match Table F-2, and moved units from title to table.*

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 b to 62.1-2007

Revise Informative Appendix C as follows:

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INFORMATIVE APPENDIX C
RATIONALE FOR MINIMUM PHYSIOLOGICAL REQUIREMENTS FOR RESPIRATION AIR BASED ON CO_2 CONCENTRATION

Revise the ninth paragraph as follows:

The oxygen consumption rate is 0.36 L/min when the activity level is 1.2 met. For ventilation at a rate of 15 cfm (429 L/m) and an activity level of 1.2 met units, the room oxygen level will be reduced from an outdoor concentration of 20.95% to 20.8520.9%, ~~Thus the oxygen content of the room is reduced from 21% to 20.9%~~, a percent change of ~~only~~ 0.48% [(20.95-20.85)/20.95] ~~0.5%~~. Unlike oxygen, carbon dioxide is generated as a result of activity. At 1.2 met, the carbon dioxide indoors is raised from the outdoor background of 0.03% to 0.1%, a percent change of 230%. Thus measuring the ~~dilution~~ increase of carbon dioxide is clearly more significant than measuring the ~~replacing~~ decrease of oxygen.

REFERENCES

C-2. *ASHRAE Handbook—20051985 Fundamentals Volume*, Chapter 8. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., Atlanta, GA 30329. 20051985.

Revise Informative Appendix D as follows:

(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.)

INFORMATIVE APPENDIX D
ACCEPTABLE MASS BALANCE EQUATIONS FOR USE WITH INDOOR AIR QUALITY PROCEDURE

When applying the Indoor Air Quality Procedure from Section 6.3, mass balance analysis may be employed to determine outdoor air ventilation requirements to control indoor contaminant levels. ~~The equations in~~ Table D-1 ~~are acceptable for performing such~~ presents mass balance equations for analysis ~~in~~ of single-zone systems.

Move existing "Quantities" and "Subscripts" into a table and revise as follows:

~~***Quantities***~~

~~*A, B = filter location*~~
~~*V = volumetric flow*~~
~~*C = contaminant concentration*~~
~~*e = air change effectiveness*~~
~~*Ef = filter efficiency*~~
~~*Fr = flow reduction factor*~~
~~*N = contaminant generation rate*~~
~~*R = recirculation flow factor*~~

~~***Subscripts***~~

~~*o = outdoor*~~
~~*r = return*~~
~~*s = space*~~

Symbol or Subscript	Definition
A, B	*filter location*
V	*volumetric flow*
C	*contaminant concentration*
E_z	*zone air distribution effectiveness*
E_f	*filter efficiency*

F_r	*design flow reduction fraction ~~factor~~*
N	*contaminant generation rate*
R	*recirculation flow factor*
Subscript: o	*outdoor*
Subscript: r	*return*
~~Subscript: s~~	*~~space~~*
Subscript: b	*breathing*
Subscript: z	*zone*

Figure D.l shows a representative single-zone system. A filter may be located in the recirculated airstream (location A) or in the supply (mixed) airstream (location B).

Variable-air-volume (VAV) single-zone systems reduce the circulation rate when the thermal load is ~~satisfied~~ lower than the design load. This is accounted for by a design flow reduction fraction ~~factor~~ F_r.

A mass balance equation for the contaminant-of-concern may be written and used to determine the required outdoor airflow or the ~~space~~ breathing zone contaminant concentration for ~~each of~~ the various system arrangements. ~~The various~~ Eight permutations for ~~the~~ air-handling and single-zone air distribution systems are described in Table D-l. ~~There are eight variations~~. The mass balance equations for computing the required outdoor airflow and the ~~space~~ breathing-zone contaminant concentration at steady-state conditions for each single-zone system are presented in Table D-l.

If the allowable ~~space~~ breathing zone contaminant concentration ~~contamination~~ is specified, the equations in Table D-l may be solved for the zone outdoor airflow rate V_{oz}. When the zone outdoor airflow rate is specified, the equations may be solved for the resulting breathing zone contaminant concentration ~~as shown in Table D-l.~~

While the calculation methods in this appendix are based on single-zone systems and steady-state analysis, calculation methods ~~exist~~ that account for ~~multizone~~ multiple-zone and transient effects are also available.[D-1]

Replace the existing equations in Table D-1 with the following:

TABLE D-1 Required Outdoor Air or ~~Space~~ Breathing-Zone Contaminant Concentration with Recirculation and Filtration for Single-Zone Systems

Required Recirculation Rate				
Filter Location	**Flow**	**Outdoor Airflow**	**Required Zone Outdoor Airflow (V_{oz} in Section 6)**	**~~Space~~ Breathing Zone Contaminant Concentration**
None	VAV	100%	$V_{oz} = \frac{N}{E_z F_r (C_{bz} - C_o)}$	$C_{bz} = C_o + \frac{N}{E_z F_r V_{oz}}$
A	Constant	Constant	$V_{oz} = \frac{N - E_z R V_r E_f C_{bz}}{E_z (C_{bz} - C_o)}$	$C_{bz} = \frac{N + E_z V_{oz} C_o}{E_z (V_{oz} + R V_r E_f)}$
A	VAV	Constant	$V_{oz} = \frac{N - E_z F_r R V_r E_f C_{bz}}{E_z (C_{bz} - C_o)}$	$C_{bz} = \frac{N + E_z V_{oz} C_o}{E_z (V_{oz} + F_r R V_r E_f)}$
A	VAV	Proportional*	$V_{oz} = \frac{N - E_z F_r R V_r E_f C_{bz}}{E_z F_r (C_{bz} - C_o)}$	$C_{bz} = \frac{N + E_z F_r V_{oz} C_o}{F_r E_z (V_{oz} + R V_r E_f)}$
B	Constant	Constant	$V_{oz} = \frac{N - E_z R V_r E_f C_{bz}}{E_z [C_{bz} - (1 - E_f)(C_o)]}$	$C_{bz} = \frac{N + E_z V_{oz} (1 - E_f) C_o}{E_z (V_{oz} + R V_r E_f)}$
B	VAV	100%	$V_{oz} = \frac{N}{E_z F_r [C_{bz} - (1 - E_f)(C_o)]}$	$C_{bz} = \frac{N + E_z F_r V_{oz} (1 - E_f) C_o}{E_z F_r V_{oz}}$
B	VAV	Constant	$V_{oz} = \frac{N - E_z F_r R V_r E_f C_{bz}}{E_z [C_{bz} - (1 - E_f)(C_o)]}$	$C_{bz} = \frac{N + E_z V_{oz} (1 - E_f) C_o}{E_z (V_{oz} + F_r R V_r E_f)}$
B	VAV	Proportional	$V_{oz} = \frac{N - E_z F_r R V_r E_f C_{bz}}{E_z F_r [C_{bz} - (1 - E_f)(C_o)]}$	$C_{bz} = \frac{N + E_z F_r V_{oz} (1 - E_f) C_o}{E_z F_r (V_{oz} + R V_r E_f)}$

* Proportional indicates that the outdoor airflow varies with the supply airflow, such that the outdoor airflow is equal to the design value times the flow reduction fraction, F_r.

Revise Informative Appendix F as follows:

(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.)

INFORMATIVE APPENDIX F
SEPARATION OF EXHAUST OUTLETS AND OUTDOOR AIR INTAKES

TABLE F-1 Minimum Separation Distance, ~~L, in ft (m)~~

~~Significant Contaminant or Odor Intensity~~	~~Noxious or Dangerous Particles~~
~~15 (5)~~	~~30 (10)~~

Exhaust Air Class (See Section 5.17)	**Separation Distance, *L, ft (m)***
Significant contaminant or odor intensity (Class 3)	15 (5)
Noxious or dangerous particles (Class 4)	30 (10)

TABLE F-2 Minimum Dilution Factors

Exhaust Air Class (See Section 5.17)	**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 F2.

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FOREWORD

The purpose of this addendum is to bring up to date the references to industry standards and documents within the body of Standard 62.1-2007, particularly in Section 9.

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 e to Standard 62.1-2007

Revise Section 5.6.2 as follows:

5.6.2 Rain Entrainment. Outdoor air intakes that are part of the mechanical ventilation system shall be designed to manage rain entrainment in accordance with any one of the following:

a. Limit water penetration through the intake to 0.07 oz/ft^2·h (21.5 g/m^2·h) of inlet area when tested using the rain test apparatus described in Section 58 of UL 1995.[12]
b. Select louvers that limit water penetration to a maximum of 0.01 oz/ft^2 (3 g/m^2) of louver-free area at the maximum intake velocity. This water penetration rate shall be determined for a minimum 15-minute test duration when subjected to a water flow rate of 0.25 gal/min (16 mL/s) as described under the Water Penetration Test in AMCA 500-L-~~99~~07[13] or equivalent. Manage the water that penetrates the louver by providing a drainage area and/or moisture removal devices.
c. Select louvers that restrict wind-driven rain penetration to less than 2.36 oz/ft^2·h (721 g/m^2·h) when subjected to a simulated rainfall of 3 in. (75 mm) per hour and a 29 mph (13 m/s) wind velocity at the design outdoor air intake rate with the air velocity calculated based on the louver face area.

Note: This performance corresponds to Class A (99% effectiveness) when rated according to AMCA 511-~~99~~07[14] and tested per AMCA 500-L-~~99~~07.[13]

Revise Section 9 as follows:

9. REFERENCES

[1]*National Primary and Secondary Ambient Air Quality Standards*, Code of Federal Regulations, Title 40 Part 50 (40 CFR 50), as amended July 1, 2004. U.S. Environmental Protection Agency, (http://www.epa.gov/air/criteria.html, accessed June 25, 2005).

[2]*HVAC Air Duct Leakage Test Manual,* First Edition, 1985. Sheet Metal and Air Conditioning Contractors' Association, Inc. (SMACNA), Chantilly, VA.

[3]*NFPA-45-~~1991~~2004, Standard on Fire Protection for Laboratories Using Chemicals.* National Fire Protection Association, Quincy, MA.

[4]*ANSI/AIHA Z9.5-~~1992~~2003, Standard for Laboratory Ventilation.* American Industrial Hygiene Association, Fairfax, VA.

[5]*Industrial Ventilation: A Manual of Recommended Practice,* ~~23rd~~26th Edition, ~~1988~~2007. American Conference of Governmental Industrial Hygienists (ACGIH), Committee on Industrial Ventilation, Lansing, MI.

[6]*~~2003~~2007 ASHRAE Handbook. Heating, Ventilating, and Air-Conditioning Applications.* American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.

[7]*ANSI Z223.1/NFPA-54-~~2002~~2006, National Fuel Gas Code.* National Fire Protection Association, Quincy, MA.

[8]*NFPA-31-~~2001~~2006, Installation of Oil-Burning Equipment.* National Fire Protection Association, Quincy, MA.

[9]*NFPA-211-~~2003~~2006, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*. National Fire Protection Association, Quincy, MA.

[10]*UL 181, Factory-Made Air Ducts and Air Connectors*, ~~9th~~10th Edition, ~~1996~~2005. Underwriters' Laboratories, Inc., Northbrook, IL.

[11]*ASTM C 1338-00, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings*. American Society for Testing and Materials, West Conshohocken, PA.

[12]*UL 1995, Heating and Cooling Equipment,* ~~2nd~~3rd Edition, ~~1995~~2005. Underwriters Laboratories, Inc., Northbrook, IL.

[13]*AMCA 500-L-~~99~~07, Laboratory Methods of Testing Louvers for Rating.* Air Movement and Control Association International, Inc. Arlington Heights, IL.

[14]*AMCA 511-~~99~~07, Certified Ratings Program—Product Rating Manual for Air Control Devices*. Air Movement and Control Association International, Inc. Arlington Heights, IL.

[15]*ANSI/ASHRAE Standard 52.2-~~1999~~2007, Method of Testing General Ventilation Air- Cleaning Devices for Removal Efficiency by Particle Size.* American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.

[16]*ANSI/ASHRAE 129-1997 (RA 02), Measuring Air Change Effectiveness.* American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.

[17]*ANSI/SMACNA 006-2006 HVAC Duct Construction Standards--Metal and Flexible*, ~~2nd~~3rd Edition, ~~1995~~2005. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), Chantilly, VA.

[18]*Fibrous Glass Duct Construction Standards*, ~~6th~~7th Edition, ~~1992~~2003. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), Chantilly, VA.

[19]*NFPA-90A-2002, Standard for the Installation of Air-Conditioning and Ventilating Systems*. National Fire Protection Association, Quincy, MA.

[20]*NFPA-90B-~~2002~~2006, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.* National Fire Protection Association, Quincy, MA.

[21]*ASHRAE Standard 111-1988, Practices for Measurement, Testing, Adjusting, and Balancing of Building, Heating, Ventilation, Air-Conditioning and Refrigeration Systems*. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.

[22]*HVAC Systems. Testing, Adjusting and Balancing*, 3rd Edition, 2002. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA), Chantilly, VA.

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FOREWORD

This addendum addresses an issue raised by interpretation IC 62.1-2004-03, clarifying the meaning of "pool deck area" and associated outdoor air flow rate 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 f to Standard 62.1-2007

Revise the Item-Specific Note C in Table 6-1 as follows:

ITEM-SPECIFIC NOTES FOR TABLE 6-1

C Rate does not allow for humidity control. Additional ventilation or dehumidification may be required to remove moisture. "Deck area" refers to the area surrounding the pool that would be expected to be wetted during normal pool use, i.e., when the pool is occupied. Deck area that is not expected to be wetted shall be designated as a space type (for example, "spectator area").

(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

Table 4-1 has become out of date due to changes in the US ambient air quality regulations. This addendum relocates Table 4-1 to the new Informative Appendix J and makes appropriate wording changes in Section 4.1. In this way, changes to the NAAQS can be incorporated quickly, without need for public review and processing.

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 62.1-2007

Modify Section 4.1 as follows:

4.1 Regional Air Quality. The status of compliance with national ambient air quality standards shall be determined for the geographic area of the building site. ~~In the United States, compliance status shall be either in "attainment" or "nonattainment" with the *National Ambient Air Quality Standards* (NAAQS)[1] for each pollutant shown in Table 4-1. In the United States, areas with no EPA compliance status designation shall be considered "attainment" areas.~~

Insert new Section 4.1.1 as follows:

4.1.1 In the United States, compliance status shall be in either "attainment" or "nonattainment" with the *National Ambient Air Quality Standards* (NAAQS)[1] ~~for each pollutant shown in Table 4-1~~. In the United States, areas with no EPA compliance status designation shall be considered "attainment" areas.

Note: The *National Ambient Air Quality Standards* (NAAQS) are shown in Informative Appendix J, Table J-1.

Delete Table 4-1:

~~**TABLE 4-1 National Primary Ambient Air Quality Standards for Outdoor Air as Set by the U.S. Environmental Protection Agency**~~

~~Contaminant~~	~~Long Term~~ ~~Concentration Averaging~~ ~~µg/m³~~	~~ppm~~		~~Short Term~~ ~~Concentration Averaging~~ ~~µg/m³~~	~~ppm~~	
~~Sulfur dioxide~~	~~80~~	~~0.03~~	~~1 year[b]~~	~~365~~	~~0.14~~	~~24 hours[a]~~
~~Particles (PM 10)~~	~~50~~	~~—~~	~~1 year[b,g]~~	~~150~~	~~—~~	~~24 hours[a]~~
~~Particles (PM 2.5)~~	~~15~~	~~—~~	~~1 year[b,e]~~	~~65~~	~~—~~	~~24 hours[f]~~
~~Carbon monoxide~~				~~40,000~~ ~~10,000~~	~~35~~ ~~9~~	~~1 hour[a]~~ ~~8 hours[a]~~
~~Oxidants (ozone)~~					~~0.08~~ ~~0.12~~	~~8 hours[e]~~ ~~1 hour[h]~~
~~Nitrogen dioxide~~	~~100~~	~~0.053~~	~~1 year[b]~~			
~~Lead~~	~~1.5~~	~~—~~	~~3 months[d]~~			

~~[a] Not to be exceeded more than once per year.~~
~~[b] Annual arithmetic mean.~~
~~[e] The 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.~~
~~[d] Three-month period is a calendar quarter.~~
~~[e] 3-year average of the annual arithmetic mean.~~
~~[f] The 3-year average of the 98th percentile of 24-hour concentrations.~~
~~[g] The annual arithmetic mean.~~
~~[h] (1) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is 1, as determined by Appendix H (40CFR 50). (2) The 1-hour NAAQS will no longer apply to an area one year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004. (40 CFR 50.9; see Federal Register of April 30, 2004 [69 FR 23996]).~~

Add the following new informative appendix:

(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.)

INFORMATIVE APPENDIX J
NATIONAL AMBIENT AIR QUALITY STANDARDS

For locations within the United States, the following table shows the ambient air quality standards that determine the regional air quality status of "attainment" or "non-attainment" for the building location.

TABLE J-1 National Ambient Air Quality Standards (NAAQS)[1]

Pollutant	Primary Stds.	Averaging Times	Secondary Stds.
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[(1)]	None
	35 ppm (40 mg/m^3)	1-hour[(1)]	None
Lead	1.5 µg/m^3	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM_{10})	Revoked[(2)]	Annual[(2)] (Arith. Mean)	
	150 µg/m^3	24-hour[(3)]	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual[(4)] (Arith. Mean)	Same as Primary
	35 µg/m^3	24-hour[(5)]	
Ozone	0.08 ppm	8-hour[(6)]	Same as Primary
	0.12 ppm	1-hour[(7)] (Applies only in limited areas)	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arith. Mean)	—
	0.14 ppm	24-hour[(1)]	—
	—	3-hour[(1)]	0.5 ppm (1300 µg/m^3)

(1) Not to be exceeded more than once per year.
(2) Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).
(3) Not to be exceeded more than once per year on average over three years.
(4) To attain this standard, the three-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
(5) To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).
(6) To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1, as determined by Appendix H. (b) As of June 15, 2005, the EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) areas.

(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.)

APPENDIX
18-MONTH SUPPLEMENT
ADDENDA TO ANSI/ASHRAE STANDARD 62.1-2007

This supplement includes Addenda a, b, e, f, and h to ANSI/ASHRAE Standard 62.1-2007. The following table lists each addendum and describes the way in which the standard is affected by the change. It also lists the ASHRAE and ANSI approval dates for each addendum.

Addendum	Section(s) Affected	Description of Changes*	ASHRAE Standards Committee Approval	ASHRAE BOD Approval	ANSI Approval
a	4.3 Documentation; 5.1 Natural Ventilation; 5.2 Ventilation Air Distribution; 5.4 Ventilation System Controls; 5.6.1 Location; 5.6.4 Snow Entrainment; 5.10.2 Exfiltration; 5.12.2 Finned-Tube Coil Selection for Cleaning; 5.13.2 Obstructions; 5.16 Buildings with Attached Parking Garages; 5.17 Air Classification and Recirculation	This addendum provides a general cleanup of Standard 62.1-2007, adding clarity and removing errors and inconsistencies. No significant new requirements were added.	6/21/08	6/25/08	6/26/08
b	Informative Appendices C, D, and F	This addendum addresses compliance issues that may result from unclear wording or phrasing in Appendices C, D, and F.	6/23/07	6/27/07	6/28/07
e	5.6.2 Rain Entrainment; 9 References	This addendum updates the references to industry standards and documents within the body of Standard 62.1-2007, particularly in Section 9.	1/19/08	1/23/08	6/26/08
f	Table 6-1 Item Specific Note C	This addendum clarifies the meaning of "pool deck area" and associated outdoor airflow rate requirements.	1/19/08	1/23/08	6/26/08
h	4.1 Regional Air Quality; Table 4-1 National Primary Ambient Air Quality Standards for Outdoor Air as Set by the U.S. Environmental Protection Agency; new Informative Appendix J	Table 4-1 has become out of date due to changes in the U.S. ambient air quality regulations. This addendum relocates Table 4-1 to a new informative appendix and makes appropriate wording changes in Section 4.1.	1/19/08	1/23/08	6/26/08

* These descriptions may not be complete and are provided for information only.

NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at http://www.ashrae.org.

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.