

ANSI/ASHRAE Addenda m, n, o, p, and t to
ANSI/ASHRAE Standard 62.2-2007



ASHRAE STANDARD

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

Approved by the ASHRAE Standards Committee on January 23, 2010; by the ASHRAE Board of Directors on January 27, 2010; and by the American National Standards Institute on January 28, 2010.

This standard is under continuous maintenance 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 Web site, <http://www.ashrae.org>, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada).

© Copyright 2010 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

ISSN 1041-2336



**American Society of Heating, Refrigerating
and Air-Conditioning Engineers, Inc.**
1791 Tullie Circle NE, Atlanta, GA 30329
www.ashrae.org

ASHRAE Standing Standard Project Committee 62.2
Cognizant TC: TC 4.3, Ventilation Requirements and Infiltration
SPLS Liaison: Robert G. Baker

Steven J. Emmerich, <i>Chair*</i>	Marquam C. George*	James A. Ranfone
Don T. Stevens, <i>Vice-Chair*</i>	Roger L. Hedrick*	Paul H. Raymer*
Terry M. Brennan*	Thomas P. Heidel	Armin Rudd
Bernardo Cardenal*	Richard John Karg*	Kenneth Sagan*
Roy R. Crawford*	Glenn P. Langan	Thomas R. Stroud
David C. Delaquila*	Joseph W. Lstiburek*	John M. Talbott*
Lance L. DeLaura	Michael R. Lubliner	Iain S. Walker*
S. Craig Drumheller	Jane Malone	Eric D. Werling*
Philip W. Fairey, III*	John P. Proctor*	Bruce A. Wilcox*
Paul Francisco*		Ted A. Williams*

*Denotes members of voting status when the document was approved for publication

ASHRAE STANDARDS COMMITTEE 2009–2010

Steven T. Bushby, <i>Chair</i>	Merle F. McBride
H. Michael Newman, <i>Vice-Chair</i>	Frank Myers
Robert G. Baker	Janice C. Peterson
Michael F. Beda	Douglas T. Reindl
Hoy R. Bohanon, Jr.	Lawrence J. Schoen
Kenneth W. Cooper	Boggarm S. Setty
K. William Dean	Bodh R. Subherwal
Martin Dieryckx	James R. Tauby
Allan B. Fraser	James K. Vallort
Katherine G. Hammack	William F. Walter
Nadar R. Jayaraman	Michael W. Woodford
Byron W. Jones	Craig P. Wray
Jay A. Kohler	Wayne R. Reedy, <i>BOD ExO</i>
Carol E. Marriott	Thomas E. Watson, <i>CO</i>

Stephanie C. Reiniche, *Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

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 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.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(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 revises and extends duct tightness requirements. The ventilation system requirements of this standard are intended to provide outdoor air to the home and remove pollutants, either as part of or independent of heating and/or cooling systems. Even if a forced air distribution system is independent of the ventilation system, the goal of the standard is not met if the forced air distribution system increases pollutant transport to the home whenever it operates. This is likely for air systems that include leaky ducts located in unconditioned spaces. Prior to this change, the standard only addressed this concern partially, in a general sense through Section 6.1 Transfer Air and with specific airtightness requirements only applicable to attached garages in Section 6.5 Garages.

This addendum moves the duct-tightness requirements for ducts in garages to a new subsection 6.5.2, and expands its coverage to all unconditioned spaces. It keeps the original prescriptive language regarding the air-tightness of the garage-house interface in subsection 6.5.1.

In order to clearly identify when this new provision applies for ducts in unconditioned crawlspaces, 6.5.2 refers to the pressure boundary and an additional clarification was added to the definition of pressure boundary.

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

Addendum m to 62.2-2007

Note: Revise the following definition in Section 3 as shown.

pressure boundary: primary air enclosure boundary separating indoor and outdoor air. 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.

Note: Revise Section 6.5 as shown. Addenda a and c of 62.2-2007 (included in the 2008 Supplement) made changes to Section 6.5 in the published standard. The 2008 Supplement is available for free download from the ASHRAE website at <http://www.ashrae.org/technology/page/132>.

6.5 Airtightness Requirements

6.5.1.6.5 Garages. When an occupiable space adjoins a garage, the design must prevent migration of contaminants to the adjoining occupiable space. Air seal 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 the wall and ceiling assemblies separating the garage from the residence and its attic area shall be caulked, gasketed, weatherstripped, 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 in the garage 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 ~~return~~ ducts located outside the pressure boundary in garages shall have total air leakage of no more than 6% of total fan flow when measured at 0.1 in. w.c. (25 Pa) using California Title 24⁵ or equivalent. Method ~~DB~~ of ANSI/ASTM E1554¹⁰ may be used to meet this requirement. If the air handler and/or ducts are located in the garage, provided that the garage door shall be open to the outside when the duct leakage is tested and that supply and return leakage results are added to get the total system leakage.

(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 corrects an error in the values of Table 4.2 that were published in Addendum b to Standard 62.2-2007 currently posted on the ASHRAE website at <http://www.ashrae.org/technology/page/132>. Addendum b to 62.2-2007 was included in the 2008 Supplement.

Ventilation Effectiveness is a function of the ceiling height and occupant density (bedrooms per unit volume) of a dwelling. The values in current Table 4.2 in Addendum b were unintentionally based on a 3-bedroom house with 2500 ft² of floor area and 8-foot ceilings but was intended to be based on a small dwelling to be sufficiently conservative. The table is being corrected based on a more “typical” 3-bedroom house with 1764 ft² and 8-ft ceilings. When this table was generated under the erroneous previous conditions, the ventilation effectiveness for all cases with cycle times of 6 or fewer hours was greater than 0.93, so a value of 1.00 was allowed for these cases for simplicity. However, the minimum cycle time for no required correction has been reduced to 4 to meet this same criterion.

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 n to 62.2-2007

Note: Delete Table 4.2 that was updated in Addendum b

TABLE 4.2—Ventilation Effectiveness for Intermittent Fans

Fractional On-Time, <i>f</i>	Cycle Time, <i>T_{cyc}</i> (hours)			
	0 to 6	8	12	24
0.1	1.00	0.87	0.65	*
0.2	1.00	0.90	0.76	*
0.3	1.00	0.93	0.83	*
0.4	1.00	0.95	0.88	0.46
0.5	1.00	0.96	0.92	0.68
0.6	1.00	0.98	0.95	0.81
0.7	1.00	0.99	0.97	0.90
0.8	1.00	0.99	0.99	0.96
0.9	1.00	1.00	1.00	0.99
1.0	1.00	1.00	1.00	1.00

*Condition not allowed since no amount of intermittent ventilation will provide equivalent indoor air quality.

Note: Insert new Table 4.2 as follows:

TABLE 4.2 Ventilation Effectiveness for Intermittent Fans

Fractional On-Time, <i>f</i>	Cycle Time, <i>T_{cyc}</i> (hours)			
	0 to 4	8	12	24
0.1	1.00	0.79	*	*
0.2	1.00	0.84	0.56	*
0.3	1.00	0.89	0.71	*
0.4	1.00	0.92	0.81	0.20
0.5	1.00	0.94	0.87	0.52
0.6	1.00	0.97	0.92	0.73
0.7	1.00	0.98	0.96	0.86
0.8	1.00	0.99	0.98	0.94
0.9	1.00	1.00	1.00	0.99
1.0	1.00	1.00	1.00	1.00

*Condition not allowed since no amount of intermittent ventilation will provide equivalent indoor air quality.

(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 deletes the provision limiting pressure drop through the HVAC system filter in Section 6.7. Filter manufacturers typically do not make this type of pressure drop information available, so it is difficult to enforce this requirement. In addition, excessive filter pressure drop would have a bigger impact on energy efficiency or equipment reliability than indoor air quality.

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 o to 62.2-2007

Note: Delete the last sentence in Section 6.7 as follows:

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, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*.⁶ 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. ~~The filter shall be selected and sized to operate at a clean pressure drop no greater than 0.1 in. w.c. (25 Pa) unless the equipment is designed or selected to accommodate any additional pressure drop imposed by the filter selection (i.e., greater than 0.1 in. w.c. [25 Pa]).~~

(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

Builders and code authorities using 62.2-2007 are unsure which systems can use the prescriptive sizing approach and which systems need to measure airflow. For some systems the current requirements are ambiguous as to which air flow must be measured. This addendum moves the requirements in Section 7.3 to the relevant sections (Sections 4 and 5) to help clarify the application of the airflow measurement requirements.

Based on their experience, many SSPC 62.2 members believe that it is necessary to measure the ventilation airflow of every whole house ventilation system to make sure it is installed and functioning correctly. Outdoor ventilation airflow sufficient to meet the standard in systems such as central fan integrated systems must be measured in heating mode, cooling mode and all other modes for which they are intended to operate.

The committee feels that simple local exhaust systems meeting the prescriptive criteria need not be measured to comply with the standard.

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 p to 62.2-2007

Note: Delete Section 7.3 and renumber Section 7.4 as required.

7.3 — Airflow Rating. The airflows required by this standard refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measuring device. Alternatively, the airflow rating at a pressure of 0.25 in. w.c. (62.5 Pa) may be used, provided the duct sizing meets the prescriptive requirements of Table 7.1 or manufacturer's design criteria.

Note: Add a new Section 4.3 and renumber the existing Sections 4.3, 4.4 and 4.5 as required.

4.3 Airflow Measurement. The airflow required by this section is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the ventilation system as installed and shall be measured using a flow hood, flow grid, or other airflow measuring device. Ventilation airflow of systems with multiple operating modes shall be tested in all modes designed to meet this section.

Note: Add a new Section 5.4 as follows:

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 using a flow hood, flow grid, or other airflow measuring device. **Exception:** The airflow rating, according to Section 7.1, at a pressure of 0.25 in. w.c. (62.5 Pa) may be used, provided the duct sizing meets the prescriptive requirements of Table 7.1 or manufacturer's design criteria.

(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 updates the normative references in Section 9 of the standard.

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 t to 62.2-2007

Note: Revise the references in Section 9 as follows: Addendum a of 62.2-2007 (included in the 2008 Supplement) added reference 10 to Section 9 in the published standard. The 2008 Supplement is available for free download from the ASHRAE website at <http://www.ashrae.org/technology/page/132>.

9. REFERENCES

1. ANSI/ASHRAE Standard 136-1993 (RA 2006), *A Method of Determining Air Change Rates in Detached Dwellings*.
2. NFPA 54-2002/ANSI Z223.1-2002, *National Fuel Gas Code*. National Fire Protection Association and American Gas Association, Quincy, MA, and Washington, D.C.
3. NFPA 31-2001/2006, *Standard for the Installation of Oil-Burning Equipment*. National Fire Protection Association, Quincy, MA.
4. NFPA 211-2000/2006, *Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances*, National Fire Protection Association, Quincy, MA.
5. California Energy Commission (2001). California Title 24 Standards, ACM Manual, Appendix F, Sections 4.3.8.2.1 and 4.3.7.2.
6. 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.
7. HVI 915-06, ~~*Procedure for Loudness Testing and Rating*~~ *Procedure of Residential Fan Products*. Home Ventilating Institute, Arlington Heights, IL.
8. HVI 916-0509, ~~*Air-Flow Test Procedure*~~. Home Ventilating Institute, Arlington Heights, IL.
9. HVI 920-0509, ~~*Product Performance Certification Procedure*~~ *Including Verification and Challenge*. Home Ventilating Institute. Arlington Heights, IL.
10. ANSI/ASTM E1554-0307, *Standard Test Methods for Determining External Air Leakage of Air Distribution Systems by Fan Pressurization*. ASTM International, West Conshohocken, PA.

**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.