ADDENDA

ANSI/ASHRAE Addendum u to
ANSI/ASHRAE Standard 62.2-2010

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

Approved by the ASHRAE Standards Committee on January 26, 2013; by the ASHRAE Board of Directors on January 29, 2013; and by the American National Standards Institute on February 28, 2013.

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.

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or 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). For reprint permission, go to www.ashrae.org/permissions.

 ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of 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.

(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 simplifies compliance with the intermittent ventilation requirements of Section 4.5 if the duty cycle is three hours or less. Under the previous wording, designers of intermittent systems had to calculate a ventilation effectiveness factor even if operating the system 90% of the time with a duty cycle of one hour. This addendum returns to the three hour maximum duty cycle that was in the 2004 and 2007 editions of Standard 62.2 before the ventilation effectiveness factor must be reduced below 1.0. This will simplify compliance for 80% of the users of 62.2. It also addresses the use of two or more fans to provide the required ventilation rate.

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 u to Standard 62.2-2010

Add the following new definition to Section 3.

3. DEFINITIONS

time average airflow rate: the total volume of air provided during a period of time divided by the time period.

Modify Section 4 as shown. Note that these changes include those in published Addenda i and n to Standard 62.2-2010 currently available for free on the ASHRAE website at www.ashrae.org/standards-research--technology/standards-addenda. There are no changes to the remainder of Section 4.

4.1 Ventilation Rate. A mechanical exhaust system, supply system, or combination thereof shall be installed for each dwelling unit to provide continuous whole-building ventilation with outdoor air ~~each hour~~ at a rate not less specified in Section 4.1.1, Fan Ventilation Rate Method, or Section 4.1.2, Total Ventilation Rate Method.

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

4.2 System Type. The whole-~~house~~building mechanical ventilation system shall consist of one or more supply or exhaust fans and associated ducts and controls. Local exhaust fans shall be permitted to be part of a mechanical exhaust system. Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation if manufacturers' requirements for return air temperature are met. See Chapter 10 of Guideline 24[2] for guidance on selection of methods.

4.4 Control and Operation. The "fan on" switch on a heating or air-conditioning system shall be permitted as an operational control for systems introducing ventilation air through a duct to the return side of an HVAC system. Readily accessible override control must be provided to the occupant. Local exhaust fan switches and "fan on" switches shall be permitted as override controls. Controls, including the "fan-on" switch of a conditioning system, must be appropriately labeled.

~~**Exception:** An intermittently operating, whole house mechanical ventilation system may be used if the ventilation rate is adjusted, according to the exception to Section 4.5. The system must be designed so that it can operate automatically based on a timer. The intermittent mechanical ventilation system must operate at least once per day and must operate at least 10% of the time.~~

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

4.5.1 Intermittent ~~Delivered~~ Ventilation ~~Rate~~. When mechanical ventilation is provided at least once every 3 hours by a system of one or more fans, ~~T~~the ~~delivered~~ intermittent mechanical ventilation rate shall be calculated as the larger of the time-average ~~total~~ supply or ~~average total~~ exhaust airflow rate ~~during each hour of operation~~, and shall be no less than specified in Section 4.1.

~~**4.5.1**~~ **4.5.2 Extended Cycle Intermittent Ventilation.** ~~When the required average mechanical ventilation rate is not supplied during every hour of operation, the delivered ventilation is deemed sufficient when the effective mechanical ventilation rate complies with this section. The effective mechanical ventilation rate of an extended cycle intermittent system is the combination of the fan flow rate during the on-cycle, the fractional on-time, the cycle time, and the mechanical ventilation effectiveness as defined below. The fan flow rate required to achieve an effective mechanical ventilation rate that is equivalent to the continuous mechanical ventilation requirement is based on the principle of equivalent dose and shall be calculated from the following:~~ When mechanical ventilation is not provided at least once every 3 hours by a single fan system, the intermittent fan airflow rate (Q_{on}) shall be calculated from Equation 4.8. Fan cycle time (T_{cyc}) shall not exceed 24 hours. Where the fan airflow rate during the on-cycle varies with time, the time average airflow rate during each hour shall meet or exceed the intermittent mechanical ventilation requirement of Equation 4.8.

$$Q_{on} \geq Q_{fan}/(\varepsilon f) \qquad (4.8)$$

where

Q_{on} = intermittent fan airflow rate during the on-cycle

Q_{fan} = continuous mechanical ventilation air requirement (from Table 4.1a or 4.1b or Equation 4.1a or 4.1b)

ε = mechanical ventilation effectiveness (from Table 4.2)

f = fractional on time, defined as the on-time for one cycle divided by the cycle time

Table 4.2 also requires the calculation of the required turnover, N, as follows:

$$N = 12.8 \cdot Q_{fan} \cdot T_{cyc}/A_{floor} \quad \text{I-P} \quad (4.9a)$$

where

Q_{fan} = mechanical ventilation air requirement (from Table 4.1a or Equation 4.1a), cfm

T_{cyc} = fan cycle time, defined as the total time for one off-cycle and one on-cycle, h

A_{floor} = floor area, ft^2

$$N = 2.51 \cdot Q_{fan} \cdot T_{cyc}/A_{floor} \quad \text{SI} \quad (4.9b)$$

where

Q_{fan} = mechanical ventilation air requirement (from Table 4.1b or Equation 4.1b), L/s

T_{cyc} = fan cycle time, defined as the total time for one off-cycle and one on-cycle, h

A_{floor} = floor area, m^2

~~The maximum allowable cycle time is 24 hours.~~

For values not listed, use the next higher value for N or the next lower value for f. Linear interpolation ~~is allowed~~shall be permitted.

~~Switching between periods of intermittent mechanical ventilation and continuous or different periods of intermittent mechanical ventilation is acceptable. Cycle times and fractional on-times can vary from one intermittent cycle to the next as long as each cycle consists of an off period followed by an on period with a ventilation rate that meets the above criteria. If the fan flow rate during the on cycle varies with time, the average rate during each hour must meet or exceed the intermittent mechanical ventilation requirement of Equation 4.9.~~

TABLE 4.2 Mechanical Ventilation Effectiveness (ε) for Intermittent Fans

Fractional On-Time, f	Turnover, N														
	0.0	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	12	20	40	100+
0.00	1.00	0.95	0.88	0.78	0.60	0.00									
0.05	1.00	0.96	0.90	0.81	0.67	0.41	0.00								
0.10	1.00	0.96	0.91	0.83	0.72	0.55	0.21	0.00							
0.15	1.00	0.96	0.92	0.85	0.76	0.63	0.44	0.18	0.00						
0.20	1.00	0.97	0.93	0.87	0.79	0.69	0.56	0.40	0.03	0.00					
0.25	1.00	0.97	0.94	0.89	0.82	0.74	0.64	0.53	0.26	0.02	0.00				
0.30	1.00	0.98	0.95	0.90	0.85	0.78	0.71	0.62	0.42	0.24	0.00				
0.35	1.00	0.98	0.95	0.92	0.87	0.82	0.76	0.69	0.54	0.39	0.14	0.00			
0.40	1.00	0.98	0.96	0.93	0.89	0.85	0.80	0.75	0.63	0.52	0.32	0.02	0.00		
0.45	1.00	0.99	0.97	0.94	0.91	0.88	0.84	0.79	0.70	0.61	0.45	0.21	0.00		
0.50	1.00	0.99	0.97	0.95	0.93	0.90	0.87	0.83	0.76	0.69	0.57	0.37	0.13	0.00	0.00
0.60	1.00	0.99	0.98	0.97	0.96	0.94	0.92	0.90	0.86	0.81	0.74	0.61	0.45	0.27	0.14
0.70	1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.94	0.92	0.90	0.85	0.78	0.68	0.55	0.46
0.80	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.98	0.97	0.96	0.94	0.90	0.85	0.77	0.70
0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.97	0.96	0.93	0.88
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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.