

ANSI/ASHRAE Standard 62.1-2010

(Supersedes ANSI/ASHRAE Standard 62.1-2007)

Includes ANSI/ASHRAE addenda listed in Appendix J



ASHRAE STANDARD

Ventilation for Acceptable Indoor Air Quality

See Appendix J for approval dates by the ASHRAE Standards Committee the ASHRAE Board of Directors, and the American National Standards Institute.

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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site at www.ashrae.org/technology.

(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

ANSI/ASHRAE Standard 62.1-2010 is the latest edition of Standard 62.1. The 2010 edition combines Standard 62.1-2007 and the 20 approved and published addenda to the 2007 edition, thereby providing an easy-to-use consolidated standard. Specific information on the contents of each addendum and approval dates for each addendum are included in Informative Appendix J at the end of this standard.

First published in 1973 as Standard 62, Standard 62.1 is now updated on a regular basis using ASHRAE's continuous maintenance procedures. According to these procedures, Standard 62.1 is continuously revised by addenda that are publicly reviewed, approved by ASHRAE and ANSI, and published in a Supplement approximately 18 months after each new edition of the standard, or in a new, complete edition of the standard, published every three years.

Standard 62.1 has undergone some key changes over the years, reflecting the ever-expanding body of knowledge, experience, and research related to ventilation and air quality. While the purpose of the standard has remained consistent—to specify minimum ventilation rates and other measures intended to provide indoor air quality that is acceptable to human occupants and that minimizes adverse health effects—the means of achieving this goal have evolved. In its first edition the standard adopted a prescriptive approach to ventilation by specifying both minimum and recommended outdoor airflow rates to obtain acceptable indoor air quality for a variety of indoor spaces. In its 1981 edition, the standard reduced minimum outdoor airflow rates and introduced an alternative performance-based approach, the Indoor Air Quality (IAQ) Procedure, which allowed for the calculation of the amount of outdoor air necessary to maintain the levels of indoor air contaminants below recommended limits. Today the standard still retains the two procedures for ventilation design, the IAQ Procedure and the Ventilation Rate Procedure (VRP).

In its 1989 edition, and in response to a growing number of buildings with apparent indoor air quality problems, the standard increased minimum outdoor airflow rates significantly and introduced a requirement for finding outdoor air intake flow requirements for multiple-zone, recirculating systems. The 1999 and 2001 editions made several minor changes and clarifications that did not impact the minimum required outdoor airflow rates. In its 2004 edition—the last time the standard was published in its entirety—the standard modified the IAQ Procedure to improve enforceability, but more significantly, it modified the Ventilation Rate Procedure, changing both the minimum outdoor airflow rates and the procedures for calculating both zone-level and system-level outdoor airflow rates. The 2007 edition of the standard provided

some significant updates, but the changes primarily focused on usability and clarity.

The 2010 edition of the standard revises and improves it in several ways. A number of changes remove inconsistencies within the standard and improve clarity. Significant changes include:

- *Deletes Section 6.2.9, which had addressed ventilation in areas with smoking. Ventilation for such spaces is no longer covered by the standard.*
- *Provides minimum requirements to clarify when ventilation systems must be operated.*
- *Relocates natural ventilation requirements to a new Section 6.4, adding a prescriptive Natural Ventilation Procedure to the existing Ventilation Rate Procedure in Section 6.2 and IAQ Procedure in Section 6.3. The standard also now requires that most buildings designed to meet the natural ventilation requirements include a mechanical ventilation system designed to meet the VRP or IAQ Procedure requirements; mechanical system operation must be activated whenever conditions preclude operation of the natural ventilation system (e.g., due to thermal comfort, noise, security, or other issues).*
- *Relocates Table 6-4 and other requirements related to exhaust systems to a new Section 6.5, since exhaust requirements apply to all buildings, regardless of the procedure used to determine outdoor air intake flow rates.*
- *Revises the IAQ Procedure to make it more robust. In Informative Appendix B, provides a table of volatile organic compounds that designers might want to consider as possible contaminants of concern. To encourage designers to consider "additivity" (a basic consideration in the prescriptive VRP) when applying the IAQ Procedure, some guidance from the ACGIH has been included in the informative text.*
- *Adds additional requirements related to the design of demand-controlled ventilation systems.*
- *Revises requirements for separation of outdoor air intakes from exhaust and relief air outlets by using Classes of Air already defined in the standard rather than descriptions of the air quality.*
- *Adds some occupancy categories to the ventilation rate table (Table 6-1) and revises ventilation rates for a few occupancy categories.*
- *Deletes ventilation requirements for health care spaces since they are now covered by ASHRAE/ASHE Standard 170-2008, Ventilation of Health Care Facilities.*
- *Adds minimum filtration requirements related to PM_{2.5}, and changes minimum air cleaning requirements related to ozone to reflect changes in the U.S. EPA's ozone reporting procedures. Table 4-1 is moved to an informative appendix to facilitate updates when the EPA makes changes to the NAAQS.*

For more specific information on these changes and on other revisions made to the standard by other addenda, refer to Informative Appendix J at the end of this standard. Users of

the standard are encouraged to use the continuous maintenance procedure to suggest changes for further improvements. A form for submitting change proposals is included in the back of this edition. The project committee for Standard 62.1 will take formal action on all change proposals received.

1. PURPOSE

1.1 The purpose of this standard is to specify minimum ventilation rates and other measures intended to provide indoor air quality that is acceptable to human occupants and that minimizes adverse health effects.

1.2 This standard is intended for regulatory application to new buildings, additions to existing buildings, and those changes to existing buildings that are identified in the body of the standard.

1.3 This standard is intended to be used to guide the improvement of indoor air quality in existing buildings.

2. SCOPE

2.1 This standard applies to all spaces intended for human occupancy except those within single-family houses, multi-family structures of three stories or fewer above grade, vehicles, and aircraft.

2.2 This standard defines requirements for ventilation and air-cleaning system design, installation, commissioning, and operation and maintenance.

2.3 Additional requirements for laboratory, industrial, health care, and other spaces may be dictated by workplace and other standards, as well as by the processes occurring within the space.

2.4 Although the standard may be applied to both new and existing buildings, the provisions of this standard are not intended to be applied retroactively when the standard is used as a mandatory regulation or code.

2.5 This standard does not prescribe specific ventilation rate requirements for spaces that contain smoking or that do not meet the requirements in the standard for separation from spaces that contain smoking.

2.6 Ventilation requirements of this standard are based on chemical, physical, and biological contaminants that can affect air quality.

2.7 Consideration or control of thermal comfort is not included.

2.8 This standard contains requirements, in addition to ventilation, related to certain sources, including outdoor air, construction processes, moisture, and biological growth.

2.9 Acceptable indoor air quality may not be achieved in all buildings meeting the requirements of this standard for one or more of the following reasons:

a. because of the diversity of sources and contaminants in indoor air;

- b. because of the many other factors that may affect occupant perception and acceptance of indoor air quality, such as air temperature, humidity, noise, lighting, and psychological stress;
- c. because of the range of susceptibility in the population; and
- d. because outdoor air brought into the building may be unacceptable or may not be adequately cleaned.

3. DEFINITIONS (SEE FIGURE 3.1)

acceptable indoor air quality: air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction.

air-cleaning system: a device or combination of devices applied to reduce the concentration of airborne contaminants, such as microorganisms, dusts, fumes, respirable particles, other particulate matter, gases, and/or vapors in air.

air conditioning: the process of treating air to meet the requirements of a conditioned space by controlling its temperature, humidity, cleanliness, and distribution.

air, ambient: the air surrounding a building; the source of outdoor air brought into a building.

air, exhaust: air removed from a space and discharged to outside the building by means of mechanical or natural ventilation systems.

air, indoor: the air in an enclosed occupiable space.

air, makeup: any combination of outdoor and transfer air intended to replace exhaust air and exfiltration.

air, outdoor: ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

air, recirculated: air removed from a space and reused as supply air.

air, return: air removed from a space to be then recirculated or exhausted.

air, supply: air delivered by mechanical or natural ventilation to a space, composed of any combination of outdoor air, recirculated air, or transfer air.

air, transfer: air moved from one indoor space to another.

air, ventilation: that portion of supply air that is outdoor air plus any recirculated air that has been treated for the purpose of maintaining acceptable indoor air quality.

breathing zone: the region within an occupied space between planes 3 and 72 in. (75 and 1800 mm) above the floor and more than 2 ft (600 mm) from the walls or fixed air-conditioning equipment.

cognizant authority: an agency or organization that has the expertise and jurisdiction to establish and regulate concentration limits for airborne contaminants; or an agency or