



ADDENDA

**ANSI/ASHRAE Addendum v to
ANSI/ASHRAE Standard 62.1-2022**

Ventilation and Acceptable Indoor Air Quality

Approved by ASHRAE and the American National Standards Institute on September 30, 2025.

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. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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Cognizant TC: 4.3, Ventilation Requirements and Infiltration
SPLS Liaison: Kenneth A. Monroe

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FOREWORD

ANSI/ASHRAE Standard 62.1 references a number of documents that are regularly updated by their cognizant bodies. Addendum v seeks to maintain references to the most recent relevant version of the referenced standards. In some cases, the cognizant authority has been changed or clarified to indicate the correct agency and the relevant references updated in the text for consistency. Review of the most recent references has also resulted in updates to design limits in Table 6-5.

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

Addendum v to Standard 62.1-2022

Update Section 3.1 as follows.

hazardous materials: any biological, chemical, radiological, or physical item or agent that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous chemicals are any chemicals that are classified as a health hazard or simple asphyxiant, in accordance with the Hazard Communication Standard (29 CFR 1910.1200), and any other particularly hazardous substances, including select carcinogens, reproductive toxins, and substances that have a high degree of acute toxicity. Hazardous biological agents are any pathogenic, allergenic, or toxigenic microorganisms, including BSL2-4 agents as defined in the ~~National Institute for Health's~~ U.S. Department of Health and Human Service's Biosafety in Microbiological and Biomedical Laboratories.

Update Section 5.4.1.4 as follows.

5.4.1.4 Laboratory Exhaust. Separation criteria for fume hood exhaust shall be in compliance with ANSI/~~AHA~~ASSP Z9.5.

Update Section 5.8.1 as follows.

5.8.1 Water Quality. Water purity shall meet or exceed potable water standards at the point where it enters the ventilation system, space, or water vapor generator. Water vapor generated shall contain no chemical additives other than those chemicals in a potable water system.

Exceptions to 5.8.1:

1. Water spray systems that use chemical additives that meet NSF/ANSI/~~CAN~~Standard 60.
2. Boiler water additives that meet the requirements of 21 CFR 173.310 and include automated dosing devices.

Update Section 5.14.2 as follows.

5.14.2 Exhaust ducts under positive pressure that convey Class 2 or Class 3 air shall not extend through ducts, plenums, or occupiable spaces other than the space from which the exhaust air is drawn.

Exception to 5.14.2: Exhaust ducts conveying Class 2 air and exhaust ducts conveying air from residential kitchen hoods that are sealed in accordance with ~~SMACNA~~Seal Class A as defined in ANSI/SMACNA 006.

Update Section 6.2.1.1.5 as follows.

6.2.1.1.5 Laboratories. Laboratory spaces that comply with all requirements of ANSI/~~AHA~~ASSP Z9.5 are not required to comply with the rates in Table 6-1.

Update Section 6.5.1 as follows.

6.5.1 Prescriptive Compliance Path. The design exhaust airflow shall be determined in accordance with the requirements in Tables 6-2 and 6-3.

Exception to 6.5.1: Laboratory spaces that comply with all requirements of ANSI/~~AHA~~ASSP Z9.5.

Update Table 6-5 as follows.

Table 6-5 Design Compounds, PM2.5, and Their Design Limits

| Compound or PM2.5 | Cognizant Authority | Design Limit |
|---------------------|--|--|
| Acetaldehyde | Cal EPA OEHHA CREL (June 2016) | 140 µg/m ³ |
| Acetone | AgBB LCI | 1,200 120,000 µg/m ³ |
| Benzene | Cal EPA OEHHA CREL (June 2016) | 3 µg/m ³ |
| Dichloromethane | Cal EPA OEHHA CREL (June 2016) | 400 µg/m ³ |
| Formaldehyde | Cal EPA CARB (2004) | 33 µg/m ³ |
| Naphthalene | Cal EPA OEHHA CREL (June 2016) | 9 µg/m ³ |
| Phenol | AgBB LCI | 70 µg/m ³ |
| Tetrachloroethylene | Cal EPA OEHHA CREL (June 2016) | 35 µg/m ³ |
| Toluene | Cal EPA OEHHA CREL (June 2016) | 300 420 µg/m ³ |
| Xylene, total | AgBB LCI | 500 µg/m ³ |
| Carbon monoxide | U.S. EPA NAAQS 40 CFR 50 | 9 ppm |
| PM2.5 | U.S. EPA NAAQS 40 CFR 50 (annual mean) | 9 µg/m ³ |
| Ozone | U.S. EPA NAAQS 40 CFR 50 | 70 ppb |
| Ammonia | Cal EPA OEHHA CREL (June 2016) | 200 µg/m ³ |

Update Table 7-1 as follows.

Table 7-1 Allowed Laboratory Test Methods

| Compound | Allowed Test Methods |
|--|--|
| VOCs except formaldehyde, acetaldehyde and acetone | ISO 16000-6; EPA IP-1, EPA TO-17; ISO 16017-1; ISO 16017-2; ASTM D6345-10 |
| Formaldehyde | ISO 16000-3; EPA TO-11A; EPA IP-6; ASTM D5197 or testing method that is compliant with the California Air Resources Board's (CARB) § 93120 |
| Acetaldehyde and acetone | ISO 16000-3; EPA TO-11A; EPA IP-6; ASTM D5197, EPA TO-17 |
| Carbon monoxide | ISO 4224; EPA IP-3 |

Update Section 7.1.5 as follows.

7.1.5 Air Duct System Construction. Air duct systems shall be constructed in accordance with the following standards, as applicable:

- The following sections of ANSI/SMACNA 006, *HVAC Duct Construction Standards—Metal and Flexible*:
 - Section S1.9 of Section 1.3.1, “Duct Construction and Installation Standards”
 - Section 7.4, “Installation Standards for Rectangular Ducts Using Flexible Liner”
 - Section 3.5, “Flexible Duct Installation Standards”
 - Section 3.6, “Specification for Joining and Attaching Flexible Duct”
 - Section 3.7, “Specification for Supporting Flexible Duct”
 - Sections S6.1, S6.3, S6.4, and S6.5 of Section 9.1, “Casing and Plenum Construction Standards”
- All sections of SMACNA's *Fibrous Glass Duct Construction Standards*
- NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*
- NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*

Update Section 9, “Normative References,” as follows.

Air Conditioning, Heating and Refrigeration Institute (AHRI)
 2311 Wilson Blvd., Arlington, VA 22201
 (+1)-703-524-8800; www.ahrinet.org

AHRI 1060 (~~2018~~2023)

Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment

Section 5.13.3.2.5, 5.13.3.3.2

Air Movement and Control Association International, Inc. (AMCA)

30 West University Drive

Arlington Heights, IL 60004-1893, United States

1-847-394-0150; www.amca.org

AMCA 500-L-1523

Laboratory Methods of Testing Louvers for Rating

Section 5.4.2

AMCA Publication 511-21 (Rev. 12-22)

Certified Ratings Program — Product Rating Manual for Air Control Devices

Section 5.4.2

ANSI/AMCA Standard 550-22

Test Method for High Velocity Wind Driven Rain Resistant Louvers

Section 5.4.2.1

~~American Industrial Hygiene Association (AIHA)~~

~~3141 Fairview Park Drive, Suite 777~~

~~Falls Church, VA 22042, United States~~

~~(703) 849-8888; www.aiha.org~~

American Society of Safety Professionals (ASSP)

520 N Northwest Highway

Park Ridge, IL 60068

1-847-699-2929; www.assp.org

ANSI/AIHA~~ASSP~~ Z9.5-2012~~2022~~

Standard for Laboratory Ventilation

Section 5.4.1.4, 6.2.1.1.5, 6.5.1, B1.1

ASHRAE

~~1791 Tullie Circle NE~~

~~Atlanta, GA 30329, United States~~

180 Technology Parkway NW

Peachtree Corners, GA 30092

1-404-636-8400; www.ashrae.org

ANSI/ASHRAE Standard 41.2-~~2022~~(2018)

Standard Methods for Air Velocity and Airflow Measurement

Table 8-1

ANSI/ASHRAE Standard 52.2-~~(2017)~~

Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

Section 5.5, 6.1.4.1, 6.1.4.2

ANSI/ASHRAE Standard 111-~~2024~~2008 (RA 2017)

Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems

Section 7.2.2, Table 8-1

ANSI/ASHRAE/ASHE Standard 170-~~2021~~(2017)

Ventilation for Health Care Facilities

Section 6.2.1

ANSI/ASHRAE Standard 188-~~2021~~(2018)

Legionellosis: Risk Management for Building Water Systems

Section 5.20

ASTM International

100 Barr Harbor Dr.

West Conshohocken, PA 19428-2959, United States

1-610-832-9585; www.astm.org

ASTM C1338-19-(2014)

Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings

Section 5.11.1

ASTM D3273-21-(2016)

Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

Section 5.11.1

~~ASTM D6345-98 (2010)~~

~~Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air~~

~~Table 7-1~~

ASTM D5197-21-(2016)

Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)

Section Table 7-1

Ausschuss zur gesundheitlichen Bewertung von Bauprodukten (AgBB)

The Umweltbundesamt

Wörlitzer Platz 1, 06844 Dessau-Roßlau, Germany

<https://www.umweltbundesamt.de/en/topics/health/commissions-working-groups/committee-for-health-related-evaluation-of-building>

September 2024

Requirements for the Indoor Air Quality in Buildings: Health-Related Evaluation Procedure for Emissions of Volatile Organic Compounds (VOC, VOC and SVOC) from Building Products

Table 6-5

California Air Resources Board (CARB)

1001 I Street

Sacramento, CA 95812

August 2004

Indoor Air Quality Guideline No. 1, Formaldehyde in the Home

Table 6-5

Chartered Institution of Building Services Engineers (CIBSE)

222 Balham High Road

London

SW12 9BS

United Kingdom

+44 (0)20 8675 5211; www.cibse.org

CIBSE AM10 (2005)

Natural Ventilation in Non-Domestic Buildings

Section 6.4.1.6.2

Facility Guidelines Institute (FGI)

<https://fgiguideelines.org>

~~2018~~2022

Guidelines for Design and Construction of Outpatient Facilities

Section 3.1

Office of Environmental Health Hazard Assessment (OEHHA)

California Environmental Protection Agency

1001 I Street, Sacramento, CA 95814

1-916-764-0955; www.oehha.ca.gov

February 2015

The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments

Table 6-5

International Organization for Standardization (ISO)

ISO Central Secretariat, ~~1 rue de Varembee, Case postale 56~~

~~CH-1211 Geneva 20, Chemin de Blandonnet 8~~

CP 401

1214 Vernier (Geneva)

Switzerland

+41-22-749-01-11; www.iso.org

ISO 4224:~~(2000)~~

Ambient air—Determination of carbon monoxide—Non-dispersive infrared spectrometric method

Table 7-1

ISO 16000-3:~~2022~~(~~2011~~)

Indoor air—Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air—Active sampling method

Table 7-1

ISO 16000-6:~~2021~~(~~2011~~)

Indoor air—Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID

Table 7-1

ISO 16017-1:~~(2000)~~

Indoor, ambient and workplace air—Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography—Part 1: Pumped sampling

Table 7-1

ISO 16017-2:~~(2003)~~

Indoor, ambient and workplace air—Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography—Part 2: Diffusive sampling

Table 7-1

ISO 16890:~~(2016)~~

Air Filters for General Ventilation

Section 5.5, 6.1.4.1, 6.1.4.2

National Fire Protection Association (NFPA)

1 Battery March Park

Quincy, MA 02169-7471

United States

1-617-770-0700; www.nfpa.org

ANSI Z223.1/NFPA 54 (~~2018~~2024)

National Fuel Gas Code

Section 5.4.1.2

NFPA 31 (~~2016~~2024)

Standard for the Installation of Oil-Burning Equipment

Section 5.4.1.2

NFPA 45 (~~2015~~2024)

Standard on Fire Protection for Laboratories Using Chemicals

Section B1.1

NFPA 90A (~~2018~~2024)

Standard for the Installation of Air-Conditioning and Ventilating Systems

Section 7.1.5

NFPA 90B (~~2018~~2024)

Standard for the Installation of Warm Air Heating and Air-Conditioning Systems

Section 7.1.5

NFPA 211 (~~2019~~2024)

Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances

Section 5.4.1.2

~~National Institutes of Health (NIH)~~

~~9000 Rockville Pike, Bethesda, Maryland 20892~~

~~(301) 496-4000; www.nih.gov~~

U.S. Department of Health and Human Services

200 Independence Avenue, SW, Washington, DC 20201

1-877-696-6775; www.hhs.gov

2020

Biosafety in Microbiological and Biomedical Laboratories

Section 3.1

NSF International

789 Dixboro Road

Ann Arbor, MI 48105, United States

1-734-769-8010; www.nsf.org; info@nsf.org

NSF/ANSI/CAN Standard 60-2024 (2016)

Drinking Water Treatment Chemicals—Health Effects

Section 5.8.1

Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

4201 Lafayette Center Drive

Chantilly, VA 20151, United States

1-703-803-2980

Fibrous Glass Duct Construction Standards, ~~7th~~8th Edition (~~2003~~2021)

Section 7.1.5

ANSI/SMACNA 006-2020 (2006)

HVAC Duct Construction Standards—Metal and Flexible, ~~3rd~~4th Edition

Section ~~5.14.2~~, 7.1.5

ANSI/SMACNA 016- (2012)

HVAC Air Duct Leakage Test Manual, 2nd Edition

Section ~~5.14.2~~

Underwriters Laboratories, LLC. (UL)

333 Pfingsten Road

Northbrook, IL 60062, United States

1-847-272-8800; www.ul.com; cec.us@us.ul.com

ANSI/UL 181 Ed. 11- (2013)

Factory-Made Air Ducts and Air Connectors, 11th Edition

Section 5.11.1, 5.11.2

ANSI/UL 1995 Ed. 5- (2015)

Heating and Cooling Equipment, 5th Edition

Section 5.4.2, 5.4.3

ANSI/UL 2998 Ed. 3-2020 (2016)

Environmental Claim Validation Procedure (ECVP) for Zero Ozone Emissions from Air Cleaners

Section 5.9.1

~~UL 60355-2-40~~

~~Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers, 4th Edition~~

Section ~~5.4.2~~

International Electrotechnical Commission (IEC)

3 rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland

+41-22-919-0211; www.iec.ch/homepage

IEC 60355-2-40:2022

Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, 4th Edition

Section 5.4.2

United States Environmental Protection Agency (EPA)

Ariel Rios Building

1200 Pennsylvania Avenue, NW

Washington, DC 20460, United States

~~1-919-541-0800~~ 1-202-564-4700; www.epa.gov

ENERGY STAR® 1-888-782-7937

~~WaterSense 1-866-987-7367 and 1-202-564-2660~~

EPA IP-1 (1990)

Determination of Volatile Organic Compounds (VOCs) in Indoor Air in Compendium of Methods for the Determination of Air Pollutants in Indoor Air

Table 7-1

EPA IP-3 (1990)

Determination of Carbon Monoxide (CO) or Carbon Dioxide (CO₂) in Indoor Air in Compendium of Methods for the Determination of Air Pollutants in Indoor Air

Table 7-1

EPA IP-6 (1990)

Determination of Formaldehyde or other Aldehydes in Indoor Air in Compendium of Methods for the Determination of Air Pollutants in Indoor Air

Table 7-1

EPA TO-11A (1999)

Determination of Formaldehyde in Ambient Air Using Adsorbent Cartridge Followed by High Performance Liquid Chromatography (HPLC) [Active Sampling Methodology] in Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (Second Edition)

Table 7-1

EPA TO-17 (1999)

Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes in Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (Second Ed.)

Table 7-1

U.S. Government Printing Office (USGPO)

732 North Capitol Street, NW

Washington, DC 20401

~~1-202-512-1800~~; www.gpo.gov

~~21 CFR 173.310 (2018)~~

Secondary Direct Food Additives Permitted in Food for Human Consumption—Boiler Water Additives

Section 5.8.1

29 CFR 1910.1200

Hazard Communication Standard

Section 3.1

~~40 CFR 50 (2018)~~

National Primary and Secondary Ambient Air Quality Standards

~~Section 4.1.1, Table 6-5, Table 6-6, 6.1.4.1, 6.1.4.2~~

Update Normative Appendix B as follows.

B1.1 Application. Laboratory fume hood exhaust air outlets shall be in compliance with NFPA 45 and ANSI/ASHRAE ASSP Z9.5. Nonlaboratory exhaust outlets and outdoor air intakes or other openings shall be separated in accordance with the following.

Update Informative Appendix P as shown below.

American Conference of Governmental Industrial Hygienists (ACGIH)

3640 Park 42 Drive

Cincinnati, OH

~~1-(513)-742-2020~~; www.acgih.org

~~2017-2025~~

TLVs and BEIs—Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (Section 6)

Table 6-6

~~Air Movement and Control Association International (AMCA)~~

~~30 W University Dr.~~

~~Arlington Heights, IL 60004~~

~~(847) 394-0150; www.amca.org~~

~~AMCA 511 (Rev. 2016)~~

~~Certified Ratings Program—Product Rating Manual for Air Control Devices~~
~~Section 5.4.2~~

ASHRAE

~~1791 Tullie Circle NE~~

~~Atlanta, GA 30329~~

~~180 Technology Parkway NW~~

~~Peachtree Corners, GA 30092~~

~~(800) 527-4723/1-404-636-8400; www.ashrae.org~~

~~2017-2021~~ ASHRAE Handbook—Fundamentals

Informative Appendix K

ASHRAE RP-1009 (2001)

Simplified Diffuser Boundary Conditions for Numerical Room Airflow Models

Normative Appendix C

ASHRAE RP-1373 (2009)

Air Distribution Effectiveness with Stratified Air Distribution Systems

Normative Appendix C

ASHRAE Standard 55-~~2023~~-(2020)

Thermal Environmental Conditions for Human Occupancy

Section H1.2.7

Chartered Institution of Building Services Engineers (CIBSE)

222 Balham High Road

London

SW12 9BS

United Kingdom

+44 (0)20 8675 5211; www.cibse.org

CIBSE AM10 (2005)

Natural Ventilation in Non-Domestic Buildings

Informative Appendix K

Wiley & Sons

Etheridge, D.W., and M. Sandberg (1996)

Building Ventilation: Theory and Measurement, Vol. 50

Informative Appendix K

Energy and Buildings 65:516–22

von Grabe, J. (2013)

Flow resistance for different types of windows in the case of buoyancy ventilation

Informative Appendix K

International Journal of Environmental Research and Public Health 11(11):11753–71.

Ahn, J.H., J.E. Szulejko, K.H. Kim, Y.H. Kim, and B.W. Kim (2014)

Odor and VOC emissions from pan frying of mackerel at three stages: Raw, well-done, and charred

Informative Appendix N

National Institute of Standards and Technology (NIST)

100 Bureau Dr.

Gaithersburg, MD 20899

1-(301)-975-2000; www.nist.gov

Dols, W. S. and B. J. Polidoro (2020)

CONTAM User Guide and Program Documentation. Version 3.4. NIST Technical Note 1887, Revision 1.

Informative Appendix F

U.S. Government Printing Office (USGPO)

732 North Capitol Street NW

Washington, DC 20401

1-202-512-1800; www.gpo.gov

40 CFR 50 (May 6, 2024)

National Primary and Secondary Ambient Air Quality Standards

Informative Appendix E

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.

ASHRAE · 180 Technology Parkway · Peachtree Corners, GA 30092 · www.ashrae.org

About ASHRAE

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