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

Public Review Draft

Proposed Addendum v to Standard 62.1-2022, Ventilation and Acceptable Indoor Air Quality

First Public Review (July 2025)
(Draft shows Proposed Changes to Current Standard)

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ASHRAE, 180 Technology Parkway, Peachtree Corners, Georgia 30092

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FOREWORD

Standard 62.1 refences a number of documents that are regularly updated by their cognizant bodies. This proposed addendum 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.

Note that review of the most recent references has resulted in updates to design limits in Table 6-5.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum v to 62.1-2022

Update Section 3.1 as shown below.

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 CFR1910.1200), 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 shown below.

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

Update Section 5.8.1 as shown below.

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 shown below.

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 shown below.

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

Update Table 6-5 as shown below.

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 8~~C~~REL ~~(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 Section 6.5.1 as shown below.

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/~~AIHA~~ASSP Z9.5.

Update Section 7.1.5 as shown below.

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

a. 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"
b. All sections of SMACNA's *Fibrous Glass Duct Construction Standards*
c. NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*
d. NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*

Update Table 7-1 as shown below.

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 9. Normative References as shown below.

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-~~15~~23 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
Section 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~~

~~Section 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

Requirements for the Indoor Air Quality in Buildings: Healthrelated Evaluation Procedure for Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products (September 2024)

California Air Resources Board
1001 I Street
Sacramento, CA 95812

California Air Resources Board. 2004. *Indoor Air Quality Guideline No. 1, Formaldehyde in the Home.* August. Sacremento, CA.

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://fgiguidelines.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

The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (February 2015)
Section Table 6-5

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
Section 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
Section 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
Section 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
Section 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
Section 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, Unites 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

International Electrotechnical Commission
3 rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
+41-22-919-0211; www.iec.ch/homepage

~~UL~~ 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
Section 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
Section 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
Section 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)
Section 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.)
Section Table 7-1

U.S. Government Printing Office (USGPO)
732 North Capitol St~~reet.~~ 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 shown below.

B1.1 Application. Laboratory fume hood exhaust air outlets shall be in compliance with NFPA 45 and ANSI/~~AIHA~~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~~2015~~ TLVs and BEIs—Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (Section 6)
Section 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
Section Informative Appendix K

ASHRAE RP-1009 (2001) Simplified Diffuser Boundary Conditions for Numerical Room Airflow Models
Section Normative Appendix C

ASHRAE RP-1373 (2009) Air Distribution Effectiveness with Stratified Air Distribution Systems Section 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
Section Informative Appendix K

Wiley & Sons

Etheridge, D.W., and M. Sandberg (1996) Building Ventilation: Theory and Measurement, Vol. 50
Section 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
Section 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.
Section: 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
Section: Informative Appendix E