

ANSI/ASHRAE/ICC/USGBC/IES Addendum bd to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017

Standard for the Design of High-Performance Green Buildings

Except Low-Rise Residential Buildings

The Complete Technical Content of the International Green Construction Code®

Approved by ASHRAE and the American National Standards Institute on July 6, 2020; by the International Code Council on June 1, 2020; by the U.S. Green Building Council on June 3, 2020; and by the Illuminating Engineering Society on July 1, 2020.

These addenda were 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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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

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FOREWORD

Addendum bd updates normative references in Section 11 to their most recent, relevant version.

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 bd to Standard 189.1-2017

Modify Section 11 as shown (I-P and SI units).

11. NORMATIVE REFERENCES

Section numbers indicate where the reference occurs in this document.

Reference	Title	Section
Acoustical Society of America (ASA) 1305 Walt Whitman Road Suite 300 Melville, NY 11747-4300 (516) 576-2360; http://acousticalsociety.org		
ANSI/ASA S12.60-2009/ <u>Part 2 (R2014)</u>	Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 2: Relocatable Classroom Factors	8.3.3, 8.3.3.4
ANSI/ASA S12.60-2010/ <u>Part 1 (R2015)</u>	Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools	8.3.3
Air-Conditioning, Heating, and Refrigeration Institute (AHRI) 2111 Wilson Blvd, Suite 500 Arlington, VA 22201, United States 1-703-524-8800; www.ahrinet.org		
ANSI/AHRI 210/240- 2008 (with Addenda 1 and 2) <u>2017</u>	Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment	Appendix B
ANSI/AHRI 310/380- 2014 <u>2017</u>	Standard for Packaged Terminal Air-Conditioners and Heat Pumps (CSA-C744-14)	Appendix B
AHRI 340/360- 2015 (I-P) <u>2019</u>	Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment	Appendix B
ANSI/AHRI 1230- 2010 <u>2014</u> (with Addendum 21)	Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment	Appendix B
American Association of Radon Scientists and Technologists (AARST) 475 South Church Street, Suite 600 <u>527 N. Justice Street</u> Hendersonville, NC 28792 <u>28739</u> (800) 269-4174; http://aarst-nrpp.com/wp <u>https://standards.aarst.org/</u>		
ANSI/AARST RMS-LB- 2014 <u>2018</u>	Radon Mitigation Standards for Schools and Large Buildings	10.3.1.9, 10.3.2.1.4.4
American National Standards Institute (ANSI) 25 West 43rd Street New York, NY 20036, United States ±1-212-642-4900; www.ansi.org		
ANSI Z21.10.3- 2015 <u>2017</u>	Gas Water Heaters, Volume 3III, Storage Water Heaters with Input Ratings above 75,000 Btu/h, Circulating and Instantaneous	Appendix B
ANSI Z21.47- 2012 <u>2016</u>	Gas-Fired Central Furnaces	Appendix B

Reference	Title	Section
ANSI Z83.8-2013 <u>2016</u>	Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces	Appendix B
American Society for Healthcare Engineering of the American Hospital Association (ASHE) 155 N. Wacker Drive, Suite 400 Chicago, IL 60606 312-422-3800; www.ASHE.org		
2014 <u>2018</u> FGI Guidelines: Hospitals and Outpatient Facilities	Guidelines for Design and Construction of Hospitals and Outpatient Facilities	8.3.3
<u>2018 FGI Guidelines: Hospitals and Outpatient Facilities</u>	<u>Guidelines for Design and Construction of Outpatient Facilities</u>	<u>8.3.3</u>
2014 <u>2018</u> FGI Guidelines: Residential Health, Care and Support Facilities	Guidelines for Design and Construction of Residential Health, Care, and Support Facilities	8.3.3
ASHRAE 1791 Tullie Circle NE Atlanta, GA 30329, United States 1-404-636-8400; www.ashrae.org		
ANSI/ASHRAE Standard 55-2017 <u>plus Addenda a and b to Standard 55- 2017</u>	Thermal Environmental Conditions for Human Occupancy	8.3.2, 10.3.2.1.5
ANSI/ASHRAE Standard 62.1- 2016 <u>2019</u>	Ventilation for Acceptable Indoor Air Quality	3.2, 7.4.3.2, 7.4.3.8, 8.3, 10.3.1.5, 10.3.2.1.4
ANSI/ASHRAE Standard 62.2- 2016 <u>2019</u>	Ventilation and Acceptable Indoor Air Quality in Residential Buildings	8.3.1, 8.3.1.1, 8.3.1.5
ANSI/ASHRAE/IES Standard 90.1- 2016 <u>2019</u>	Energy Standard for Buildings Except Low-Rise Residential Buildings	3.1, 3.2, 5.3.6, 7.3.1, 7.4.1, 7.4.2, 7.4.3, 7.4.4, 7.4.5, 7.4.6, 7.4.7, 7.4.8, 8.3.1.10, 10.3.1.3.5, Appendix A, Appendix B, Appendix C
ANSI/ASHRAE Standard 111-2008(<u>RA 2017</u>)	Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems	8.3.1.2.2, 10.3.2.1.4, 10.3.2.1.4.6
ANSI/ASHRAE Standard 154- 2011 <u>2016</u>	Ventilation for Commercial Cooking Operations	7.4.3.8.1
ANSI/ASHRAE/ASHE Standard 170- 2013 <u>2017</u>	Ventilation of Health Care Facilities	8.3.1
ANSI/ASHRAE/ACCA Standard 180- 2012 <u>2018</u>	Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems	3.2, 10.3.2.2
ANSI/ASHRAE/IES Standard 202- 2013 <u>2018</u>	Commissioning Process for Buildings and Systems	10.3.1.2, 10.3.1.3
Association of Home Appliance Manufacturers (AHAM) 1111 19th Street NW, Suite 402 Washington, DC, 20036, United States 1-202-872-5955; www.aham.org		
ANSI/AHAM RAC-1- R 2015	Room Air Conditioners	Appendix B
ASTM International 100 Barr Harbor Dr. West Conshohocken, PA 19428-2959, United States 1-610-832-9585; www.astm.org		
ASTM C33/ <u>C33M-18</u>	Standard Specification for Concrete Aggregates	8.3.4.1.2
ASTM C919- 12 <u>19</u>	Standard Practice for Use of Sealants in Acoustical Applications.	8.3.3.1.1, 8.3.3.2.3.3, 8.3.3.3.2
ASTM C920- 11 <u>18</u>	Standard Specification for Elastomeric Joint Sealants	8.3.4.1.1
ASTM C1549- 09 (<u>2014</u>) <u>16</u>	Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer	5.3.5.4

Reference	Title	Section
ASTM D1785-15e1	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120	8.3.4.1.3
ASTM D5197-09e116	Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)	8.4.2, 10.3.1.5
ASTM E90-09(2016)	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	8.3.3.1.1
ASTM E336-4419a	Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings	8.3.3.1.1, 10.3.1.1.5.1.2
ASTM E408-13(2019)	Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques	5.3.5.4
ASTM E492-09s(2016)e1	Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine	8.3.3.1.1
ASTM E779-4019	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	10.3.1.3.5
ASTM E1007-4419	Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission through Floor-Ceiling Assemblies and Associated Support Structures	8.3.3.1.1
ASTM E1643-4418a	Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs	8.3.4.1.1
ASTM E1745-4417	Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	8.3.4.1.1
ASTM E1827-11(2017)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door	10.3.1.3.5
ASTM E1918-06(2015)16	Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field	5.3.5.4
ASTM E2399/E2399M-4419	Standard Test Method for Maximum Media Density for Dead Load Analysis of Vegetative (Green) Roof Systems	5.3.5.5
Business and Institutional Furniture Manufacturer's Association (BIFMA)		
678 Front Avenue NW, Suite 150 Grand Rapids, MI 49504-5368, United States 1-616-285-3963; www.bifma.org; email@bifma.org		
ANSI/BIFMA e3-20142019	Furniture Sustainability Standard	8.4.2.5, 9.4.1.4.3
ANSI/BIFMA X7.1-2011 (R2016) FES Standard	Standard for Formaldehyde and TVOC Emissions of Low-Emitting Office Furniture Systems and Seating	8.4.2.5
California Air Resources Board (CARB)		
1001 "I" Street P.O. Box 2815 Sacramento, CA 95812, United States 1-916-322-2990; www.arb.ca.gov/homepage.htm		
CARB SCM for Architectural Coatings-20072019	California Air Resources Board (ARB) Suggested Control Measure for Architectural Coatings	8.4.2.2
California Department of Public Health (CDPH)		
Indoor Air Quality Section 850 Marina Bay Parkway Richmond, CA 94804, United States 1-510-620-2802; www.cdph.ca.gov/programs/IAQ and www.cal-iaq.org		
CDPH/EHLB/Standard Method-V1.1 (2010) V1.2 (2017)	Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers—Version 1-1.2	8.4.2, 8.5.2, Table 10.3.1.5, Appendix D

Reference	Title	Section
Canadian General Standards Board Place du Portage III, 6B1 11 Laurier Street Gatineau, Quebec K1A 1G6 Canada 819-956-0425 www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html		
CAN/CGSB 149.40-M862019	Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method	10.3.1.3.5
Cooling Technology Institute (CTI) 3845 Cypress Creek Parkway, Suite 420, Houston, TX 77068 PO Box 681807 Houston, TX 77268 1-281-583-4087; www.cti.org		
CTI ATC-105 (00)(19)	Acceptance Test Code for Water Cooling Towers	Appendix B
CTI STD-201RS (45)(19)	Standard for the Certification of Water Cooling Tower Thermal Performance	Appendix B
International Organization for Standardization (ISO) ISO Central Secretariat, 1 rue de Varembee, Case postale 56 CH-1211 Geneva 20, Switzerland Chemin de Blandonnet 8 CP 401 - 1214 Vernier, Geneva, Switzerland +41-22-749-01-11; www.iso.org		
ISO 16890 (2016)	<u>Air Filters for General Ventilation</u>	<u>8.3.1.3</u>
ISO 21930-20072017	Sustainability in Buildings Construction and Civil Engineering Works — <u>Core Rules for Environmental Product Declarations of Building Construction Products and Services</u>	9.4.1.4
ISO/IEC-17025-2005 (Reviewed 2010)2017	General Requirements for the Competence of Testing and Calibration Laboratories	8.4.2
ISO/IEC Guide 59-19942019	<u>ISO and IEC Code of Good Recommended Practices for Standardization by National Bodies</u>	9.4.1.3.1
National Electrical Manufacturers Association (NEMA) 1300 North 17th Street, Suite 900 Rosslyn, VA 22209, United States 1-703-841-3200; www.nema.org		
ANSI/NEMA MG 1-20092016 (with 2018 supplements)	Motors and Generators	7.4.3.1
National Fenestration Rating Council (NFRC) 6305 Ivy Lane, Suite 140, Greenbelt, MD 20770-6323 1-301-589-1776; www.nfrc.org		
ANSI/NFRC 200-20142017	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence	3.2
NSF International 789 Dixboro Road Ann Arbor, MI 48105, United States 734-769-8010; www.nsf.org; info@nsf.org		
NSF/ANSI 44-20162018	Residential Cation Exchange Water Softeners	6.3.5
NSF/ANSI 58-20162018	Reverse Osmosis Drinking Water Treatment Systems	6.3.6
NSF/ANSI 140-20152019	Sustainability Assessment for Carpet	9.4.1.4.3
NSF/ANSI 332-2015	Sustainability Assessment for Resilient Floor Coverings	9.4.1.4.3
NSF/ANSI 336-2011-2018	Sustainability Assessment for Commercial Furnishings Fabric	9.4.1.4.3

Reference	Title	Section
NSF/ANSI 342-2014 <u>2019</u>	Sustainability Assessment for Wallcovering Products	<u>9.4.1.4.3</u>
NSF/ANSI 347-2012 <u>2018</u>	Sustainability Assessment for Single Ply Roofing Membranes	<u>9.4.1.4.3</u>
NSF/ANSI 350-2017 <u>2018</u>	On-Site Residential and Commercial Water Reuse Systems	6.3.7
Tile Council of North America 100 Clemson Research Boulevard Anderson, SC 29625, United States 864-646-8453; www.tcnatile.com; info@tileusa.com		
ANSI A138.1-2011	Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials	<u>9.4.1.4.3</u>
<u>UL Environment and Safety</u> <u>333 Pfingsten Road</u> <u>Northbrook, IL 60062, United States</u> <u>1-847-272-8800; www.ul.com; cec.us@us.ul.com</u>		
<u>UL 100-2016</u>	<u>Standard for Sustainability for Gypsum Boards and Panels</u>	<u>9.4.1.4.3</u>
<u>UL 102-2012</u>	<u>Standard for Sustainability for Door Leafs</u>	<u>9.4.1.4.3</u>
Underwriters Laboratories Inc. (UL) 333 Pfingsten Road Northbrook, IL 60062, United States <u>1-847-272-8800; www.ul.com; cec.us@us.ul.com</u>		
UL 100-2016	Standard for Sustainability for Gypsum Boards and Panels	9.4.1.4.3
UL 102-2012	Standard for Sustainability for Door Leafs	9.4.1.4.3
UL 727-2006 <u>2018</u>	Standard for <u>Safety for</u> Oil-Fired Central Furnaces	Appendix B
UL 731-2012 <u>2018</u>	Standard for <u>Safety for</u> Oil-Fired Unit Heaters	Appendix B
United States Congress Washington, DC 20515, United States 1-202-224-3121; http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf and www.govtrack.us/data/us/bills/text/110/h/h6.pdf https://www.congress.gov/bill/110th-congress/house-bill/6/text		
United States Department of Agriculture (USDA) BioPreferred Program 1400 Independence Avenue, SW Washington, DC 20250, United States 1-202-720-2791; www.biopreferred.gov		
7 CFR Part 3201 Subpart B, (Includes Rounds 1–7) August 29, 2011; Round 8, April 4, 2012; Round 9, November 19, 2012; Round 10, June 11, 2013	Guidelines for Designating Biobased Products for Federal Procurement; Designated Items	9.4.1.3
<u>7 CFR Part 3202</u>	<u>Voluntary Labeling Program for Biobased Products</u>	<u>9.4.1.3</u>
United States Environmental Protection Agency (USEPA) Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, DC 20460, United States 1-919-541-0800; www.epa.gov ENERGY STAR[®] ±1-888-782-7937 WaterSense ±1-866-987-7367 and ±1-202-564-2660		
Version 1.0, August 1, 2012 <u>2.0, January 1, 2019</u>	ENERGY STAR Program Requirements for Uninterruptible Power Supplies	7.4.7
Version 1.0, March 4, 2010 <u>1.1, July 26, 2018</u>	WaterSense Specification for Showerheads	6.3.2.1
Version 1.0, October 1, 2007	WaterSense Tank-Type High-Efficiency Lavatory Faucet Specification	6.3.2.1
Version 1.2, July 1, 2004 <u>2.0, July 7, 2020</u>	ENERGY STAR Program Requirements for Room Air Cleaners	7.4.7
Version 1.2, June 2, 2014	WaterSense Tank-Type High-Efficiency Toilet Specification	6.3.2.1

Reference	Title	Section
Version 2.0, February 1, 2013 <u>3.0, January 2, 2018</u>	ENERGY STAR Program Requirements for Commercial Ice Makers	6.3.2.5, 7.4.7
Version 2.0, June 25, 2012 <u>February 1, 2013</u>	ENERGY STAR Program Requirements for Commercial Dishwashers	6.3.2.5, 7.4.7
Version 2.0, June 26, 2013 <u>3.0, October 11, 2019</u>	ENERGY STAR Program Requirements for Imaging Equipment	7.4.7
Version 2.0, May 9, 2013 <u>February 2, 2014</u>	ENERGY STAR Program Requirements for Water Coolers	7.4.7
Version 2.0, May 29, 2015 <u>2.2, August 15, 2019</u>	ENERGY STAR Program Requirements for Luminaires	7.4.7.3
Version 3.0, April 1, 2012 <u>4.0, June 15, 2018</u>	ENERGY STAR Program Requirements for Residential Ceiling Fans	7.4.7
Version 3.0, December, 20, 2013 <u>October 1, 2014</u>	ENERGY STAR Program Requirements for Boilers	7.4.7
Version 3.0, July 18, 2014 <u>3.2, April 16, 2015</u>	ENERGY STAR Program Requirements for Residential Water Heaters	7.4.7
Version 3.0, October 1, 2012 <u>5.0 October 31, 2019</u>	ENERGY STAR Program Requirements for Dehumidifiers	7.4.7
Version 3.0, October 1, 2014 <u>4.0, March 27, 2017</u>		
Version 3.1, January 1, 2012 <u>3.2, April 16, 2015</u>	ENERGY STAR Program Requirements for Geothermal Heat Pumps	7.4.7
Version 3.1, March 1, 2013 <u>4, April 29, 2020</u>	ENERGY STAR Program Requirements for Refrigerated Beverage Vending Machines	7.4.7
Version 3.2, April 1, 2012 <u>4.1, October 1, 2015</u>	ENERGY STAR Program Requirements for Residential Ventilating Fans	7.4.7
Version 4.0, February 20, 2015 <u>4.1, October 26, 2015</u>	ENERGY STAR Program Requirements and Criteria for Room Air Conditioners	7.4.7
Version 4.0, June 13, 2011 <u>4.1, February 1, 2013</u>	ENERGY STAR Program Requirements for Furnaces	7.4.7
Version 5.0, May 13, 2016 <u>5.1, January 1, 2018</u>	ENERGY STAR Program Requirements for Set-Top Boxes	7.4.7
Version 6.0, April 29, 2015 <u>January 1, 2016</u>	ENERGY STAR Program Requirements Product Specification for Residential Dishwashers	6.3.2.2, 7.4.7
Version 6.1, August 12, 2014 <u>7.1, November 16, 2018</u>	ENERGY STAR Program Requirements for Computers	7.4.7
Version 7.0, May 2016 <u>8.0, January 28, 2020</u>	ENERGY STAR Program Requirements for Displays	7.4.7
Version 7.0, October 30, 2015 <u>8.0, March 1, 2019</u>	ENERGY STAR Program Requirements for Televisions	7.4.7
Version 7.1, May 20, 2015 <u>8.0, February 5, 2018</u>	ENERGY STAR Program Requirements for Clothes Washers	6.3.2.2, 7.4.7

**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.

Standard 189.1 and the International Green Construction Code

Standard 189.1 serves as the complete technical content of the International Green Construction Code® (IgCC). The IgCC creates a regulatory framework for new and existing buildings, establishing minimum green requirements for buildings and complementing voluntary rating systems. For more information, visit www.iccsafe.org.

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Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

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