

# ADDENDA

**ANSI/ASHRAE/IES Addendum cm to  
ANSI/ASHRAE/IES Standard 90.1-2019**

# **Energy Standard for Buildings Except Low-Rise Residential Buildings**

Approved by ASHRAE and the American National Standards Institute on July 29, 2022, and by the Illuminating Engineering Society on July 26, 2022.

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 (<https://www.ashrae.org/continuous-maintenance>).

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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.

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- participation in the next review of the Standard,
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## FOREWORD

*Addendum cm updates Section 12, "Normative References."*

**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 cm to Standard 90.1-2019

**Modify Section 12 as shown (I-P and SI).**

Reference	Title
<b>Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201</b>	
AHRI 210/240- <del>(2017)</del> with addendum 1	Unitary Air Conditioning and Air-Source Heat Pump Equipment (applicable before 1/1/2023)
AHRI 210/240-2023 <u>(2020)</u>	Unitary Air Conditioning and Air-Source Heat Pump Equipment (applicable on or after 1/1/2023)
AHRI 310/380- <del>(2017)</del>	Packaged Terminal Air-Conditioners and Heat Pumps
AHRI 340/360- <del>(I-P/2022)</del> <sup>49</sup>	Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment
<u>ANSI/AHRI 365- (I-P/2009)</u> <u>ANSI/AHRI 366 (SI/2009)</u>	Commercial and Industrial Unitary Air-Conditioning Condensing Units
<del>ANSI/AHRI 390-2003</del> <u>(I-P/2021)</u>	Performance Rating of Single Packaged Vertical Air-Conditioners and Heat Pumps
ANSI/AHRI 400 <u>(I-P/2015)</u>	Performance Rating of Liquid-to-Liquid Heat Exchangers
ANSI/AHRI 460 <u>(2005)</u>	Remote Mechanical Draft Air Cooled Refrigerant Condensers
AHRI 550/590 <u>(I-P/2020)</u> <u>AHRI 551/591 (SI/2020)</u>	Performance Rating of Water-chilling and Heat-Pump Water-heating Packages Using the Vapor Compression Cycle
AHRI 560 <u>(2018/2000)</u>	Absorption Water Chilling and Water Heating Packages
ANSI/AHRI Standard 910 <u>(I-P/2014)</u> <u>ANSI/AHRI 911 (SI/2014)</u>	Performance Rating of Indoor Pool Dehumidifiers
ANSI/AHRI Standard 920 <u>(I-P/2015)</u> <u>ANSI/AHRI Standard 921 (SI/2015)</u>	Performance Rating of DX-Dedicated Outdoor Air System Units
ANSI/AHRI 1160 <u>(I-P/2014)</u> with addendum 1 <u>ANSI/AHRI 1161(SI/2014) with addendum 1</u>	Performance Rating of Heat Pump Pool Heaters
ANSI/AHRI 1200 <u>(I-P/2013)</u> <u>ANSI/AHRI 1201(SI/2013)</u>	Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets
ANSI/AHRI 1230 <u>(I-P/2014)</u> with Addendum 1	Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment
AHRI Standard 1250- <del>2014</del> <u>(I-P/2020)</u>	Performance Rating of Walk-In Coolers and Freezers
AHRI Standard 1360 <u>(I-P/2017)</u> <u>AHRI Standard 1360 (SI/2017)</u>	Performance Rating of Computer and Data Processing Room Air Conditioners
<del>BTS 2000 rEV 06-07</del>	<del>Testing Standard Method to Determine Efficiency of Commercial Space-Heating Boilers</del>

Reference	Title
<b>Air Movement and Control Association International (AMCA)</b> <b>30 West University Drive, Arlington Heights, IL 60004-1806</b>	
ANSI/AMCA 208-18	Calculation of the Fan Energy Index
<u>ANSI/AMCA 220-21</u>	<u>Laboratory Methods of Testing Air Curtains for Aerodynamic Performance Ratings</u>
ANSI/AMCA Standard 230-15	Laboratory Methods of Testing Air Circulating Fans for Rating and Certification
ANSI/AMCA Standard 500-D-18	Laboratory Methods of Testing Dampers for Rating
<b>American Architectural Manufacturers Association (AAMA)</b> <b><u>Fenestration and Glazing Industry Alliance (FGIA)</u></b> <b>1900 E. Golf Rd, Suite 1250, Schaumburg, IL 60173-4268</b>	
<b>Canadian Standards Association (CSA)</b> <b>178 Rexdale Blvd., Toronto, On, Canada M9W 1R3</b>	
<b>Window and Door Manufacturers Association (WDMA)</b> <b>2025 M Street, NW, Suite 800, Washington, DC 20036</b>	
AAMA/WDMA/CSA 101/1.S.2/A440-17	NAFS-North American Fenestration Standard/Specification for Windows, Doors, and Skylights
<b>American National Standards Institute (ANSI)</b> <b>1899 L Street, NW, 11th Floor, Washington, DC 20036</b>	
ANSI Z21.10.3-2017/CSA 4.3-2017	Gas-Fired Water Heaters, Volume III, Storage Water Heaters
ANSI Z21.47- <del>2016</del> <u>2021</u> /CSA 2.3- <del>2016</del> <u>2021</u>	Gas-Fired Central Furnaces
ANSI Z83.8-2016/CSA 2.6-2016 ( <u>R2021</u> )	Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters And Gas-Fired Duct Furnaces
<b>American Society of Mechanical Engineers (ASME)</b> <b>Two Park Avenue, New York, NY 10016-5990</b>	
ASME A17.1- <del>2019</del> <u>2016</u> /CSA B44-16	Safety Code for Elevators and Escalators
<b>ASHRAE</b> <b><del>1791 Tullie Circle, NE, Atlanta, GA 30329</del></b> <b><u>180 Technology Parkway, Peachtree Corners, GA 30092</u></b>	
ANSI/ASHRAE Standard 55- <del>2017</del> <u>2020</u>	Thermal Environmental Conditions for Human Occupancy
ANSI/ASHRAE Standard 62.1-2019 <del>6</del> (with Addenda b, c, d, e, f, g, h, j, k, o, q, r, u, v, w, z)	Ventilation for Acceptable Indoor Air Quality
ANSI/ASHRAE/IESNA Standard 90.1-2007	Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/ASHRAE/IESNA Standard 90.1-2010	Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/ASHRAE/IESNA Standard 90.1-2013	Energy Standard for Buildings Except Low-Rise Residential Buildings
<u>ANSI/ASHRAE/IES Standard 90.1-2016</u>	<u>Energy Standard for Buildings Except Low-Rise Residential Buildings</u>
<u>ANSI/ASHRAE/IES Standard 90.1-2019</u>	<u>Energy Standard for Buildings Except Low-Rise Residential Buildings</u>
ANSI/ASHRAE/IESNA Standard 90.4-2019 <del>6</del> (with Addenda a and b)	Energy Standard for Data Centers
ANSI/ASHRAE Standard 127- <del>2020</del> <u>12</u>	Method of Testing for Rating <u>Air-Conditioning Units Serving Data Center (DC) and Other Information Technology Equipment (ITE) Spaces</u> <del>Computer and Data Processing Room Unitary Air Conditioners</del>
ANSI/ASHRAE Standard 140- <del>2017</del> -2020	<del>Standard</del> Method of Test for the Evaluating <u>ion of Building Energy Analysis-Computer Programs</u> <u>Performance Simulation Software</u>
ANSI/ASHRAE Standard 154-2016 Ventilation for Commercial Cooking Operations	ANSI/ASHRAE Standard 154-2016 Ventilation for Commercial Cooking Operations
ANSI/ASHRAE Standard 169-2013	Climatic Data for Building Design Standards

Reference	Title
ANSI/ASHRAE/ASHE Standard 170-2021 <del>17</del>	Ventilation of Health Care Facilities
ANSI/ASHRAE/ACCA Standard 183-2007 (RA 2020 <del>17</del> )	Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings
<u>ASHRAE/IES Standard 202-2018</u>	<u>Commissioning Process for Buildings and Systems</u>
<b>Association of Home Appliance Manufacturers (AHAM)</b> <b>1111 19th Street NW, Suite 402, Washington, DC 20036</b>	
ANSI/AHAM HRF-1-2016	Energy and Internal Volume of Refrigerating Appliances
ANSI/AHAM RAC-1- <del>R2015</del> <u>20</u>	Room Air Conditioners
<b>ASTM International</b> <b>100 Barr Harbor Dr., West Conshohocken, PA 19428-2959</b>	
ASTM C90-16A	Standard Specification for Loadbearing Concrete Masonry Units
ASTM C177-19 <del>3</del>	Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmittance Properties by Means of the Guarded-Hot-Plate Apparatus
ASTM C272/C272M-18	Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions
ASTM C518- <del>17</del> <u>21</u>	Standard Test Method for Steady-State Thermal Transmittance Properties by Means of the Heat Flow Meter Apparatus
ASTM C835-06 (2013) e1	Standard Test Method for Total Hemispherical Emittance of Surfaces up to 1400°C
ASTM C1224- <del>15</del> <u>(2020)</u>	Standard Specification for Reflective Insulation for Building Applications
ASTM C1363-19 <del>1</del>	Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
<u>ASTM C1371-15</u>	<u>Standard Test Method for Determination of Emittance of Materials Near Room Temperature using Portable Emissometers.</u>
<u>ASTM C1549-16</u>	<u>Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer</u>
ASTM D1003- <del>21</del> <u>13</u>	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
ASTM E283/ <u>E283M-19</u> <del>04</del> (2012)	Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E408-13 <u>(2019)</u>	Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
ASTM E779- <del>19</del> <u>20</u> <del>18</del>	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
ASTM E972-96 <u>(2021</u> <del>2013</del> )	Standard Test Method for Solar Photometric Transmittance of Sheet Materials Using Sunlight
ASTM E1677- <del>11</del> <u>19</u>	Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls
ASTM E1680-16	Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
ASTM E1827- <u>11</u> (2017)	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
ASTM E1980-11 <u>(2019)</u>	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces
ASTM E2178- <del>21a</del> <u>13</u>	Standard Test Method for Air Permeance of Building Materials

Reference	Title
ASTM E2357-18	Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
<b>Cool Roof Rating Council (CRRC)</b> <b>2435 N. Lombard St. Portland, OR 97217 United States</b>	
ANSI/CRRC S100- <del>(2021)</del> <u>46</u>	Standard Test Methods for Determining Radiative Properties of Materials
<b>Cooling Technology Institute (CTI)</b> <b>3845 Cypress Creek Parkway, Suite 420, Houston, TX 77068; P.O. Box 681807, <u>Houston, TX 77268</u></b>	
CTI ATC-105 (19)	Acceptance Test Code for Water Cooling Towers
CTI ATC-105DS (18)	Acceptance Test Code for Dry Fluid Coolers
CTI ATC-105S (11)	Acceptance Test Code for Closed-Circuit Cooling Towers
CTI ATC-106 (11)	Acceptance Test Code for Mechanical Draft Evaporative Vapor Condensers
CTI STD-201 RS <del>(4721)</del>	Performance Rating of Evaporative Heat Rejection Equipment
<b>Door and Access Systems Manufacturers Association (DASMA)</b> <b>1300 Sumner Avenue, Cleveland, OH 44115-2851</b>	
ANSI/DASMA 105- <del>2020</del> <u>47</u>	Test Method for Thermal Transmittance and Air Infiltration of Garage Doors
<b>Illuminating Engineering Society (IES)</b> <b>120 Wall <del>st</del> Street, Floor 17, New York, NY 10005-4001</b>	
ANSI/IES RP-28- <del>2016</del> <u>2020</u>	<u>Lighting and the Visual Environment for Senior Living Recommended Practice: Lighting And The Visual Environment For Older Adults And The Visually Impaired</u>
<b>International Organization for Standardization (ISO) ISO Central Secretariat</b> <b>BIBC II Chemin de Blandonnet 8, CP 401, <del>1214</del> Vernier, Geneva, Switzerland</b>	
ISO 9050 (2003)	Glass in Building—Determination of Light Transmittance, Solar Direct Transmittance, Total Solar Energy Transmittance, Ultraviolet Transmittance and Related Glazing Factors
ANSI/AHRI/ASHRAE/ISO 13256-1:1998 ( <del>R2015</del> <u>2021</u> )	Water-Source Heat Pumps—Testing and Rating for Performance—Part 1: Water-to-Air and Brine-to-Air Heat Pumps
ANSI/AHRI/ASHRAE/ISO 13256-2:1998 ( <del>R2015</del> <u>2021</u> )	Water-Source Heat Pumps—Testing and Rating for Performance—Part 2: Water-to-Water and Brine-to-Water Heat Pumps
<u>ISO 25745-2:2015</u>	<u>Energy Performance of Lifts, Escalators and Moving Walks—Part 2: Energy Calculation and Classification for Lifts (Elevators)</u>
<b>National Electrical Manufacturers Association (NEMA)</b> <b>1300 N. 17th Street, Suite 900, Arlington, VA 22209</b>	
ANSI/NEMA MG 1-2016, <u>with 2021 Revisions</u>	Motors and Generators
<b>National Fenestration Rating Council (NFRC)</b> <b>6305 Ivy Lane, Suite 140, Greenbelt, MD 20770-6323</b>	
ANSI/NFRC 100- <del>2020</del> <u>2017</u>	Procedure for Determining Fenestration Product U-Factors
ANSI/NFRC 200- <del>2020</del> <u>2017</u>	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence
<u>ANSI/NFRC 203-2020</u> <del>2017</del>	Procedure for Determining Visible Transmittance of Tubular Daylighting Devices
NFRC 300- <del>2020</del> <u>2017</u>	Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems
NFRC 301- <del>2020</del> <u>2017</u>	<u>Standard Test Method for Emittance of <del>Specular Surfaces Using Spectrometric Measurements</del> Glazing Products</u>
ANSI/NFRC 400- <del>2020</del> <u>2017</u>	Procedure for Determining Fenestration Product Air Leakage

Reference	Title
<b>National Fire Protection Association (NFPA)</b> <b>1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101</b>	
NFPA 70- <del>2020</del> 2014	National Electric Code
NFPA 96- <del>2021</del> 2017	Ventilation Control and Fire Protection of Commercial Cooking Operations
<b>Telecommunications Industry Association (TIA)</b> <b>1320 North Courthouse Road, Suite 200</b>	
ANSI/TIA-942-REV <del>A</del> B, July 12, 2017	Telecommunication Infrastructure Standard for Data Centers
<b>Underwriters Laboratories, Inc. (UL)</b> <b>333 Pfingsten Rd., Northbrook, IL 60062</b>	
UL 181A- <del>2013</del> 2021	Closure Systems for Use with Rigid Air Ducts and Air Connectors
UL 181B- <del>2013</del> 2021	Closure Systems for Use with Flexible Air Ducts and Air Connectors
UL 727-2018	UL Standard for Safety—Oil Fired Central Furnaces
UL 731- <del>2018</del> 2021	UL Standard for Safety—Oil-Fired Unit Heaters
<b>U.S. Department of Defense</b> <b>3010 Defense Pentagon, Washington, DC 20301</b>	
MIL-P-17639F (1996)	Pumps, Centrifugal, Miscellaneous Service, Naval Shipboard Use
MIL-P-17840C (1986)	Pumps, Centrifugal, Close-Coupled, Navy Standard (For Surface Ship Application)
MIL-P-17881D (1972)	Pumps, Centrifugal, Boiler Feed (Multi-Stage)
MIL-P-18472 (1989)	Pumps, Centrifugal, Condensate, Feed Booster, Waste Heat Boiler, and Distilling Plant
MIL-P-18682D	Pump, Centrifugal, Main Condenser Circulating, Naval Shipboard
<del>ISO 25745-2:2015</del>	<del>Energy Performance of Lifts, Escalators and Moving Walks— Part 2: Energy Calculation and Classification for Lifts (Elevators)</del>
<b>U.S. Department of Energy (DOE)</b> <b>1000 Independence Avenue, SW, Washington, DC 20585</b>	
10 CFR Part 430, App N	Uniform Test Method for Measuring the Energy Consumption of Furnaces
10 CFR 431 Subpart K, App A	Uniform Test Method for Measuring the Energy Consumption of Distribution Transformers
<u>10 CFR Part 430 Subpart B App U</u>	<u>Uniform Test Method for Measuring the Energy Consumption of Ceiling Fans</u>
10 CFR Part 431, Subpart B, App B	Uniform Test Method for Measuring Nominal Full-Load Efficiency of Electric Motors
10 CFR Part 431, Subpart Y	Pumps: Definitions, Energy Conservation Standards, and Uniform Test Method of the Measurement of Energy Consumption of Pumps
42 USC 6831, et seq., Public Law 102-486	Energy Policy Act of 1992, EPACT 2005, and EISA 2007
<b>U.S. Security and Exchange Commission (SEC)</b> <b>100 F Street, NE, Washington, DC 20549</b>	
The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System	The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System, April 7, 2003
<b>U.S. Nuclear Regulatory Commission</b> <b>One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738</b>	
10 CFR Part 50	Domestic Licensing of Production and Utilization Facilities

## **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 NW · Peachtree Corners, GA 30092 · [www.ashrae.org](http://www.ashrae.org)**

## **About ASHRAE**

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As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

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