ANSI/ASHRAE/ICC/USGBC/IES Addendum ah to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2020

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 April 28, 2023; by the International Code Council on March 23, 2023; by U.S. Green Building Council on March 29, 2023; and by the Illuminating Engineering Society on April 5, 2023.

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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ASHRAE® ICC INTERNATIONAL CODE COUNCIL® U.S. GREEN BUILDING COUNCIL USGBC® IES Approved American National Standard ANSI www.ansi.org

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FOREWORD

Addendum ah provides corrections, revisions, and clarity to some sections and deletes others.

- *Exception to 7.4.1.1: The name of the referenced Green-e standard has changed. An informative note has been added for building projects outside the U.S. and Canada.*
- *Section 7.4.2.5 Air Curtains. This has been deleted because it is covered by ASHRAE Standard 90.1, which is more accurate and comprehensive and has been updated.*
- *Section 7.4.2.9 Building Envelope Trade-Off Option. The provision has been clarified.*
- *Section 7.4.3.1.1 Water-Cooled Centrifugal Chiller Packages Efficiency Adjustment. This has been deleted because it is covered by Standard 90.1, which is more accurate and has been updated.*
- *Section 7.4.3.10 Mechanical System Performance Path. This is new to Standard 90.1-2022. It is a mechanical system trade-off path and incorporates the Total System Performance Ratio (TSPR). Similar to how the Building Envelope Trade-Off Path is handled in Standard 189.1, the TSPR from Standard 90.1 would need to be modified in order to be used to comply with Standard 189.1.*
- *Table C1.1(5) Building Envelope penetrations. The revision makes the performance path agree with the prescriptive path, which was not done when the requirement was added to the standard.*

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

Addendum ah to Standard 189.1-2020

Revise Section 7 as shown (sections not shown are not changed by this addendum).

7.4.1.1 Renewable Energy Systems.

[. . .]

Exception to 7.4.1.1: Building projects that demonstrate to the AHJ that they cannot comply with Section 7.4.1.1 shall contract for renewable electricity products complying with the Green-e Renewable Energy ~~National~~ Standard for ~~Renewable Electricity~~ Canada and the United States ~~products~~ of not less than 1.2 MWh/ft2 (12.6 MWh/m2) of gross floor area of conditioned spaces and semiheated spaces, or an amount equal to 100% of the modeled annual energy use multiplied by 20 years, whichever is less. A combination of renewable electricity products and renewable energy systems shall be permitted to demonstrate compliance. RECs shall be tracked per Section 10.9.8.

Informative Note: *Building projects* outside of Canada and the United States should use controlling standards for REC products, where available.

[. . .]

7.4.2.2 Mechanical Equipment Penetration Requirements. Where the total area of penetrations from mechanical equipment listed in ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-4, exceeds 2% of the opaque above-grade *wall* area, the mechanical equipment penetration area shall be calculated as a separate assembly with a published U-factor ~~value~~ for that equipment or a default U-factor of 0.5 Btu/h·ft^2·°F (3 W/m^2·K) in accordance with ANSI/ ASHRAE/IES Standard 90.1, Section 5.5.3(b). Where Exception 2 to ANSI/ASHRAE/IES Standard 90.1 Section 5.5.3 is used for compliance, the penetration shall be considered to be the same class of construction as an adjacent *wall*.

[. . .]

~~**7.4.2.5 Air Curtains.** Where air curtains are provided at *building entrances* or *building entrance* vestibules, for the distance from the air-curtain discharge nozzle to the floor, the air curtain unit shall produce a minimum velocity of 6.6 ft/s (2.0 m/s) in accordance with ANSI/AMCA 220 and be installed in accordance~~

~~with manufacturer's instructions. *Automatic* controls shall be provided that will operate the air curtain with the opening and closing of the door. Air curtains and their controls shall comply with Section 10.3.2.1.~~

[. . .]

7.4.2.9 Building Envelope Trade-Off Option. The *building envelope* trade-off option in ANSI/ASHRAE/IES Standard 90.1, Section 5.6, shall not be used for compliance with Section 7.4.2 ~~apply unless~~ except where the ~~procedure~~ trade-off option incorporates the modifications and additions to ANSI/ASHRAE/IES Standard 90.1 required ~~noted~~ in Section 7.4.2.

[. . .]

~~**7.4.3.1.1 Water-Cooled Centrifugal Chiller Packages Efficiency Adjustment**~~

~~a. **For Water-Cooled Centrifugal Units Rated per AHRI Standard 550/590 (I-P).** Equipment not designed for operation at AHRI Standard 550/590 test conditions of 44.00°F leaving and 54.00°F entering chilled-fluid temperatures, and with 85.00°F entering and 94.30°F leaving condenser-fluid temperatures, shall have maximum full-load (FL) kW/ton and part-load rating requirements adjusted using the following equations:~~

$$FL_{adj} = FL/K_{adj}$$

$$PLV_{adj} = IPLV/K_{adj}$$

$$K_{adj} = A \times B$$

~~where~~

~~FL = full-load kW/ton value from ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-3~~

~~FL_{adj} = maximum full-load kW/ton rating, adjusted for nonstandard conditions~~

~~IPLV = IPLV value from ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-3~~

~~PLV_{adj} = maximum *NPLV* rating, adjusted for nonstandard conditions~~

~~$A = 0.000000145920 \times (LIFT)^4 - 0.0000346496 \times (LIFT)^3 + 0.00314196 \times (LIFT)^2 - 0.147199 \times (LIFT) + 3.93073$~~

~~$B = 0.0015 \times LvgEvap + 0.934$~~

~~LIFT = LvgCond – LvgEvap~~

~~LvgCond = full-load condenser leaving fluid temperature, °F~~

~~LvgEvap = full-load evaporator leaving temperature, °F~~

~~The FL_{adj} and PLV_{adj} values are only applicable for centrifugal chillers meeting all of the following full-load design ranges:~~

- ~~36.00°F ≤ LvgEvap ≤ 60.00°F~~
- ~~LvgCond ≤ 115.00°F~~
- ~~20.00°F ≤ LIFT ≤ 80.00°F~~

~~Centrifugal chillers designed to operate outside of these ranges are not covered by this standard.~~

~~b. **For Water-Cooled Centrifugal Units Rated per AHRI Standard 551/591 (SI)**. Equipment not designed for operation at AHRI Standard 551/591 test conditions of 7.00°C leaving and 12.00°C entering chilled-fluid temperatures, and with 30.00°C entering and 35.00°C leaving condenser-fluid temperatures, shall have maximum full-load (FL) COP and part-load rating requirements adjusted using the following equations:~~

$$FL_{adj} = FL \times K_{adj}$$

$$PLV_{adj} = IPLV \times K_{adj}$$

$$K_{adj} = A \times B$$

~~where~~

~~FL = full-load COP value from ANSI/ASHRAE/IES Standard 90.1,~~

~~Table 6.8.1-3~~

~~FL_{adj} = minimum full-load COP rating, adjusted for nonstandard conditions~~

~~IPLV = IPLV value from ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-3~~

~~PLV_{adj} = minimum *NPLV* rating, adjusted for nonstandard conditions~~

~~$A = 0.00000153181 \times (LIFT)^4 - 0.000202076 \times (LIFT)^3 + 0.0101800 \times (LIFT)^2 - 0.264958 \times LIFT + 3.93073$~~

~~$B = 0.0027 \times LvgEvap + 0.982$~~

~~LIFT = LvgCond – LvgEvap~~

~~LvgCond = full-load condenser leaving fluid temperature, °C~~

~~LvgEvap = full-load evaporator leaving temperature, °C~~

~~The FL_{adj} and PLV_{adj} values are only applicable for centrifugal chillers meeting all of the following full-load design ranges:~~

- ~~2.20°C ≤ LvgEvap ≤ 15.60°C~~
- ~~LvgCond ≤ 46.00°C~~
- ~~11.00°C ≤ LIFT ≤ 44.00°C~~

~~Centrifugal chillers designed to operate outside of these ranges are not covered by this standard.~~

[. . .]

7.4.3.10 Mechanical System Performance Path The Mechanical System Performance Path in ANSI/ASHRAE/IES Standard 90.1, Section 6.6.2, shall not be used for compliance with Section 7.4.3 except where the path incorporates the modifications and additions to ANSI/ASHRAE/IES Standard 90.1 required in Section 7.4.3.

[. . .]

Revise Section 11 as shown.

11. NORMATIVE REFERENCES

Reference	Title	Section
[. . .]		
Air Movement and Control Association International, Inc. 30 West University Drive Arlington Heights, IL 60004-1893, United States 1-847-394-0150; www.amca.org		
[. . .]		
~~ANSI/AMCA 220-05 (R2012)~~	~~Laboratory Methods of Testing Air Curtain Units for Aerodynamic~~	~~7.4.2.5~~
[. . .]		
Green-e c/o Center for Resource Solutions 1012 Torney Ave., Second Floor San Francisco, CA 94129, United States 1- 415-561-2100; www.green-e.org		
Version 1.0, July 7, 2017	Green-e Renewable Energy ~~National~~ Standard for ~~Renewable Electricity~~ Canada and the United States	10.9.8
[. . .]		

Revise Table C1.1 as shown.

Table C1.1 Modifications and Additions to ANSI/ASHRAE/IES Standard 90.1, Appendix G, Table G3.1

Proposed Building Performance	Baseline Building Performance
[. . .]	
5. Building Envelope When the total area of penetrations from mechanical equipment listed in ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-4, exceeds ~~1~~2% of the opaque above-grade *wall* area, the mechanical equipment penetration area shall be calculated as a separate assembly with a published U-factor for that equipment or a default U-factor ~~*U-factor*~~ of 0.5 Btu/h·ft^2·°F (3 W/m^2·K).	No modifications
[. . .]	

[. . .]

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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.

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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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