ADDENDA

ANSI/ASHRAE/IES Addendum aq to
ANSI/ASHRAE/IES Standard 90.1-2022

Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on April 14, 2025; by the American National Standards Institute on May 9, 2025; and by the Illuminating Engineering Society on April 16, 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 (https://www.ashrae.org/continuous-maintenance).

The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

 ISSN 1041-2336

www.ansi.org

SPECIAL NOTE

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.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
d. permission to reprint portions of the Standard.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

Addendum aq increases the required on-site rated capacity from 0.5 W/ft^2 to 0.75 W/ft^2. These changes are to ANSI/ASHRAE/IES Standard 90.1-2022 including Addendum k. This addendum fixes unit conversion errors in Table 10.5.1.3 and defines the units used in the equation for TRE$_{OFF}$, the total off-site renewable energy. The addendum also updates the reference to the Green-e standard for qualifying RECs to the latest version.

A cost-effectiveness evaluation was conducted comparing the installed cost of a photovoltaic system with a capacity of 0.75 ft^2 applied to the areas of the three largest floors for the ASHRAE prototypes for all climate zones. The first cost of the photovoltaic system divided by the annual operating cost savings was less than the scalar ratio threshold and thus was cost effective. The energy cost savings value is conservative as it does not include any value for electricity that might be exported.

Informative 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 aq to Standard 90.1-2022

Modify Section 10.5 as shown.

10.5 Prescriptive Compliance Path

10.5.1 Renewable Energy Resources. *Buildings* shall be served by *renewable energy resources* in accordance with either Section 10.5.1.1 or Section 10.5.1.2 or a combination thereof in accordance with Section 10.5.1.2.

Exception to 10.5.1:

1. *Buildings* or *additions* in which the sum of the *gross conditioned floor area* of the three largest floors of the *building* or *addition* is less than 10,000 ft^2 (930 m^2).
2. *Buildings* or *additions* in Climate Zone 8.

~~2~~3. *Alterations*.

~~3~~4. Projects meeting the requirements of Section 10.5.1.4.

10.5.1.1 On-Site Renewable Energy Capacity. The building *site* shall have *equipment* for *on-site renewable energy* with a rated output capacity of not less than ~~0.50~~ 0.75 W/ft^2 or ~~1.7~~ 2.6 Btu/h/ft^2 (8.1 W/m^2) multiplied by the sum of the *gross conditioned floor area* for all floors up to the three largest floors.

Note: The I-P edition has two capacity values as shown above. SI includes only the 8.1 W/m^2.

Exceptions to 10.5.1.1: *Buildings* complying with Section 10.5.1.3 and not less than one of the following:

1. *Buildings* located where an unshaded flat plate collector oriented toward the equator and tilted at an angle from horizontal equal to the latitude receives an annual daily average incident solar radiation less than 1.1 kBtu/ft^2·day.
2. *Buildings* where more than 80% of the *roof* area is covered by any combination of planters, vegetated *space*, *skylights*, occupied *roof* deck, or *equipment* other than renewable energy systems.
3. *Buildings* where more than 50% of *roof* area is shaded from direct-beam sunlight by natural objects or by *structures* that are not part of the *building* for more than 2500 annual hours between 8:00 a.m. and 4:00 p.m.

10.5.1.2 Off-Site Community Renewable Energy. Renewable energy shall be procured for the *building* from a local *community renewable energy facility* in accordance with Sections 10.5.1.3. The *community renewable energy facility* shall be located within the same electric utility provider service territory as the *site* and comply with one or more of the following:

a. The *community renewable energy facility* is located within the same county or an adjacent county.

b. The *community renewable energy facility* is located within 60 mi (100 km) of the *site*.

Table 10.5.1.3 Annual Off-Site Renewable Energy Requirement (I-P and SI)

Climate Zone	Annual Off-Site Renewable Energy, kWh/W or kBtu/(Btu/h)
1A, 2B, 3B, 4B 5B and 3C	1.75 ~~(5.971)~~
0A, 0B, 1B, 2A,3A and 6B	1.55 ~~(5.289)~~
4A, 4C, 5A, 5C, 6A, ~~and~~ 7, and 8	1.35 ~~(4.606)~~

Table 10.5.1.3 Annual Off-Site Renewable Energy Requirement (SI)

Climate Zone	Annual Off-Site Renewable Energy, kWh/W
1A, 2B, 3B, 4B 5B and 3C	1.75
0A, 0B, 1B, 2A,3A and 6B	1.55
4A, 4C, 5A, 5C, 6A, ~~and~~ 7, and 8	1.35

10.5.1.3 Off-Site Renewable Energy Procurement. Off-site renewable energy shall be procured for *buildings* in accordance with Sections 10.5.1.3.1 and 10.5.1.3.2 and shall be not less than the total off-site renewable energy determined as follows:

~~$TRE_{OFF} = [(REN_{OFF} \times 0.50\ W/ft2 \times FLRA) - IRE_{ON}] \times 15$~~

I-P edition:

$$TRE_{OFF} = ([0.75\ W/ft^2 \times FLRA] - IRE_{ON}) \times REN_{OFF} \times 15$$

or

$$TRE_{OFF} = ([2.6\ Btu/h/ft^2 \times FLRA] - IRE_{ON}) \times REN_{OFF} \times 15$$

where

TRE_{OFF} = total off-site renewable energy to be procured in kWh or kBtu

REN_{OFF} = annual off-site renewable energy requirement ~~of renewable system capacity~~ from Table 10.5.1.3, kWh/W per year or kBtu/(Btu/h) per year

FLRA = the sum of the *gross conditioned floor area* of the three largest floors, ft^2

IRE_{ON} = ~~annual~~ *on-site renewable energy* generation installed capacity in W or Btu/h ~~quantity in accordance with Section 10.5.1.1~~

SI edition:

$$TRE_{OFF} = ([8.1\ W/m^2 \times FLRA] - IRE_{ON}) \times REN_{OFF} \times 15$$

where

TRE_{OFF} = total off-site renewable energy to be procured in kWh

REN_{OFF} = annual off-site renewable energy requirement ~~of renewable system capacity~~ from Table 10.5.1.3, kWh/W per year

FLRA = the sum of the *gross conditioned floor area* of the three largest floors, m^2

IRE_{ON} = ~~annual~~ *on-site renewable energy* generation installed capacity in W ~~quantity in accordance with Section 10.5.1.1~~

10.5.1.3.1 Off-Site Renewable Energy Procurement Paths. The *building* owner shall procure and be credited for not less than the total amount of off-site renewable energy required by Section 10.5.1.3, using one or more of the following:

a. A *community renewable energy facility* for projects complying with Section 10.5.1.2
b. A *physical renewable energy power purchase agreement* for projects qualifying for an exception to Section 10.5.1.1
c. A *financial renewable energy power purchase agreement* for projects qualifying for an exception to Section 10.5.1.1

d. An off-site renewable energy system owned by the *building* property owner for projects qualifying for an exception to Section 10.5.1.1

Generation sources shall be located where the energy can be delivered to the building *site* by any of the following:

a. Direct connection to the off-site renewable energy facility
b. The local utility or distribution entity
c. An interconnected electrical or pipeline network where energy delivery capacity between the generator and the building *site* is available

10.5.1.3.2 Off-Site Renewable Energy Contract Terms. The total off-site renewable energy shall be delivered or credited to the building *site* under an energy contract with a duration of not less than ten years. The contract shall be structured to survive a partial or full transfer of ownership of the *building* property.

10.5.1.4 Renewable Energy Certificate Purchase. Where it can be demonstrated to the code official that the requirements of Sections 10.5.1.1 through 10.5.1.3 or a combination of the three cannot be met, either in part or full, and prior to the issuance of the certificate of occupancy, the *building* owner shall document a contract for delivery of *renewable energy certificates* certified in compliance with the Green-e® Renewable Energy Standard for Canada and the United States, or an equivalent *approved* standard, equal to three times the amount of total off-site renewable energy calculated in accordance with Section 10.5.1.3.

Informative Note: For building projects located in nations other than Canada or the United States, use the Green-e® Standard for that nation, or equivalent *approved* standard.

10.5.1.5 Energy Certificate Documentation. The property owner or owner's authorized agent shall demonstrate that for an *on-site renewable energy system* or off-site renewable energy *system* required by Section 10.5.1, either no *RECs* are associated with the renewable energy system, or the following provisions for *RECs* have been met:

a. The *RECs* are retained and retired by or on behalf of the property owner or tenant for a period of not less than ten years.
b. The *RECs* are created within a 12-month period of the use of the *REC*.
c. The *RECs* are from a generating asset placed in service no more than five years before the issuance of the *building*'s certificate of occupancy.

Modify Section 13 as shown.

Reference		Section
Green-e® c/o Center for Resource Solutions 1012 Torney Ave., Second Floor, San Francisco, CA 94129		
Green-e® Version 4.3 (2024)	Green-e Renewable Energy Standard for Canada and the United States	10.5.1.4

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

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.

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.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous edition. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

IMPORTANT NOTICES ABOUT THIS STANDARD

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.

5/25