ANSI/ASHRAE/USGBC/IES Addenda f and l to

ANSI/ASHRAE/USGBC/IES
Standard 189.1-2009

Standard for the Design of High-Performance Green Buildings

Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2011; by the ASHRAE Board of Directors on June 29, 2011; by the USGBC Board of Directors on June 20, 2011; by the IES Board of Directors on June 27, 2011; and by the American National Standards Institute on August 12, 2011.

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. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site (www.ashrae.org), or in paper form from the ASHRAE Manager of Standards.

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ISSN 1041-2336

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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.

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FOREWORD

This addendum makes the following changes to the renewable energy requirements in Standard 189.1-2009:

- *In prescriptive Section 7.4.1.1, changes are made to the on-site renewable to be based on roof area rather than conditioned space. This results in a higher requirement for buildings more than one story than for one-story buildings.*
- *In mandatory Section 7.3.2, changes make the metric units consistent with the prescriptive section. An exception is added for buildings that meet the prescriptive section.*
- *In National Appliance Energy Conservation Act (NAECA) Section 7.4.3.1, changes are made to be consistent with other sections.*

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 f to Standard 189.1-2009

Modify the standard as follows.

7.3.2 On-Site Renewable Energy Systems. *Building project* design shall show allocated space and pathways for future installation of *on-site renewable energy systems* and associated infrastructure that provide the annual energy production equivalent of not less than 6.0 KBtu/ft^2 (20 kWh/m^2) for single-story buildings and not less than 10.0 kBtu/ft^2 (32 kWh/m^2) multiplied by the total *roof* area in ft^2 (m^2) for all other buildings. ~~*Building projects* shall provide for the future installation of *on-site renewable energy systems* with a minimum rating of 3.7 W/ft^2 or 13 Btu/h·ft^2 (40 W/m^2) multiplied by the total *roof* area in ft^2 (m^2). *Building projects* design shall show allocated space and pathways for installation of *on-site renewable energy systems* and associated infrastructure.~~

Exceptions:

1. Building projects that have an annual daily average incident solar radiation available to a flat plate collector oriented due south at an angle from horizontal equal to the latitude of the collector location less than 4.0 kWh/m^2·day, accounting for existing buildings, permanent infrastructure that is not part of the building project, topography, or trees~~, are not required to provide for future on-site renewable energy systems~~.
2. Building projects that comply with Section 7.4.1.1.

7.4.1.1 On-Site Renewable Energy Systems. *Building projects* shall contain *on-site renewable energy systems* that provide the annual energy production equivalent of not less than 6.0 KBtu/ft^2 (20 kWh/m^2) multiplied by the total *roof* area in ft^2 (m^2) ~~of *conditioned space*~~ for single-story buildings and not less than 10.0 kBtu/ft^2 (32 kWh/m^2) multiplied by the total *roof* area in ft^2 (m^2) for all other buildings~~.~~ The annual energy production shall be the combined sum of all *on-site renewable energy systems.*

Exception: Buildings that demonstrate compliance with both of the following are not required to contain *on-site renewable energy systems*:

1. An annual daily average incident solar radiation available to a flat plate collector oriented due south at an angle from horizontal equal to the latitude of the collector location less than 4.0 kWh/m^2·day, accounting for existing buildings, permanent infrastructure that is not part of the *building project*, topography, and trees~~., and~~
2. A commitment to ~~P~~purchase ~~of~~ renewable electricity products complying with the Green-e Energy National Standard for Renewable Electricity Products of at least 7 kWh/ft^2 (23,900 Btu/ft^2 or 75 kWh/m^2) of conditioned space each year until the cumulative purchase totals 70 kWh/ft^2 (750 kWh/m^2) of conditioned space.

7.4.3.1 Minimum Equipment Efficiencies. Projects shall comply with one of the following:

a. **EPAct baseline.** Products shall comply with the minimum efficiencies addressed in the National Appliance Energy Conservation Act (NAECA), Energy Policy Act (EPAct), and the Energy Independence and Security Act (EISA).

b. **Higher Efficiency.** Products shall comply with the greater of the ENERGY STAR requirements in Section 7.4.7.3 and the values in Normative Appendix C. These requirements supersede the requirements in Tables 6.8.1A to 6.8.1J of ANSI/ASHRAE/IESNA Standard 90.1. The building project shall comply with Sections 7.4.1.1 and 7.4.5.1 with the following modifications:

1. The on-site renewable energy systems required in Section 7.4.1.1 shall provide an annual energy production of not less than 4.0 kBtu/ft^2 (13 kWh/m^2) multiplied by the total *roof* area in ft^2 (m^2) for single-story buildings and not less than 7.0 kBtu/ft^2 (22 kWh/m^2) multiplied by the total *roof* area in ft^2 (m^2) for all other buildings.
2. The peak load reduction systems required in Section 7.4.5.1 shall be capable of reducing electric peak demand by not less than 5% of the projected peak demand.

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FOREWORD

This addendum clarifies the heat island reduction provisions in Section 5.3.2.1 by treating porous pavers and open-graded aggregate as separate categories from paving materials.

Open-graded (uniform-sized) aggregate, permeable pavement, permeable pavers, and porous pavers (open-grid pavers) mitigate the heat island effect due to lower heat absorption capacity as compared to conventional paving materials. SRI provides meaningful results for heat island reduction only when flat, non-porous surfaces are measured. Studies have shown that porous and permeable pavement systems store less energy and therefore less heat when exposed to sun over an extended period of time. The heat is not absorbed and therefore not emitted back into the environment. This results in lower daytime and nighttime temperatures.

Percolation rate is used as a criterion in Section 5.4.1.1 of the standard and is a surrogate for the porosity that provides the lower heat absorption capacity. The LEED Green Building Rating System requires open-grid pavement systems to be a minimum 50% pervious. Standard 189.1-2009 defines open-graded aggregate materials as having 30%–40% air voids and porous pavers (open-grid pavers) having at least 40% of surface area with openings filled with sand, gravel, other porous materials, or vegetation.

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 l to Standard 189.1-2009

Modify Section 5.3.2.1 as follows:

5.3.2.1 Site Hardscape. The *site hardscape* includes roads, sidewalks, courtyards, and parking lots but not the constructed building surfaces and not any portion of the *site hardscape* covered by photovoltaic panels generating electricity or other *solar energy systems* used for space heating or water heating. At least 50% of the *site hardscape* shall be provided with one or any combination of the following:

a. existing trees and vegetation or new *bio-diverse plantings* of *native plants* and *adapted plants* located to provide shade within five years of issuance of the final certificate of occupancy. The effective shade coverage on the *hardscape* shall be the arithmetic mean of the shade coverage calculated at 10 a.m., noon, and 3 p.m. on the summer solstice.

b. paving materials with a minimum initial *SRI* of 29. ~~*This also applies to porous pavers (open grid pavers)* and *open graded (uniform sized) aggregate* materials~~. A default *SRI* value of 35 for new concrete without added color pigment is allowed to be used instead of measurements.

c. *open-graded (uniform-sized) aggregate*, *permeable pavement*, *permeable pavers*, and *porous pavers (open-grid pavers). Permeable pavement* and *permeable pavers* shall have a percolation rate of not less than 2 gal/min·ft^2 (100 L/min·m^2).

~~e.~~ d. shading through the use of structures, provided that the top surface of the shading structure complies with the provisions of Section 5.3.2.3.

~~d.~~ e. parking under a building, provided that the *roof* of the building complies with the provisions of Section 5.3.2.3.

~~e.~~ f. buildings or structures that provide shade to the *site hardscape*. The effective shade coverage on the *hardscape* shall be the arithmetic mean of the shade coverage calculated at 10 a.m., noon, and 3 p.m. on the summer solstice.

Exception: *Building projects* in *climate zones* 6, 7, and 8.

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.