STANDARD

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

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

Approved by ASHRAE and the American National Standards Institute on September 30, 2024, and by the Illuminating Engineering Society on August 27, 2024.

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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b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
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(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 ad simplifies the standard by deleting the terms "code official" and "building official" and replacing them with "authority having jurisdiction." It also updates the definition of "authority having jurisdiction" to be inclusive of the deleted terms.

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 ad to Standard 90.1-2022

Revise Section 3.2 as shown (I-P and SI).

[. . .]

authority having jurisdiction (AHJ): the agency, ~~or~~ agent, building official, code official, governmental entity, or designated authority responsible for administering and enforcing this standard.

[. . .]

~~***building official:*** the officer or other designated *authority having jurisdiction* charged with the administration and enforcement of this standard, or a duly authorized representative.~~

[. . .]

~~***code official:*** see *building official.*~~

[. . .]

Revise Section 4 as shown (I-P and SI).

[. . .]

4.1.2 Administrative Requirements. Administrative requirements relating to permit requirements, enforcement by the *authority having jurisdiction* (*AHJ*), locally adopted *energy* standards, interpretations, claims of exemption, and rights of appeal are specified by the *authority having jurisdiction*.

[. . .]

4.2.2.1 Construction Details. Compliance documents shall show all the pertinent data and features of the *building*, *equipment*, and *systems* in sufficient detail to permit a determination of compliance by the ~~*building official*~~ *AHJ* and to indicate compliance with the requirements of this standard.

4.2.2.2 Supplemental Information. Supplemental information necessary to verify compliance with this standard, such as calculations, worksheets, compliance forms, vendor literature, or other data, shall be made available when required by the ~~*building official*~~ *AHJ*.

[. . .]

4.2.4 Inspections. All *building construction*, *additions*, or *alterations* work subject to the provisions of this standard shall remain accessible and exposed for inspection purposes until approved in accordance with the procedures specified by the ~~*building official*~~ *AHJ*. The ~~*building official*~~ *AHJ*, upon notification, shall make the inspections set forth in Section 4.2.4.1 through 4.2.4.6.

[. . .]

4.2.4.6 Other Inspections. Other inspections related to mechanical, plumbing, lighting, and other *equipment* shall be inspected in accordance with the compliance path selected in Section 4.2.1 and approved documentation provided in Section 4.2.2, or as otherwise required by the ~~*building official*~~ *AHJ*.

[. . .]

4.2.5.1 Building Systems Verification and Testing Requirements. Verification or *functional performance testing* (*FPT*) to confirm compliance with required provisions of this standard shall be performed on *building systems*, controls, and the *building envelope*, as required by Sections 5.9.1, 6.9.1, 7.9.1, 8.9.1, 9.9.1, 10.9.1, 12.2(e), and G1.2.1(e). Where testing is required but specific *FPT* procedures are not specified in this standard, testing shall use *generally accepted engineering standards* acceptable to the ~~*building official*~~ *AHJ*.

[. . .]

4.2.5.1.2 FPT and Verification Documentation. The completed verification and *FPT* documentation shall include the results of the *FPT* and verification, be provided to the owner, and be retained with the project records. The *V&T providers* shall certify completion of required verification and *FPT* and include a plan for the completion of any deferred *FPT*, including climatic and other conditions required for performance of the deferred tests. A copy of verification and *FPT* documentation shall be submitted to the ~~*building official*~~ *AHJ* if requested.

4.2.5.2 Building Commissioning Requirements. *Commissioning* shall be performed in accordance with this section and Sections 5.9.2, 6.9.2, 7.9.2, 8.9.2, 9.9.2, 10.9.2, 12.2(e), and G1.2.1(f). *Commissioning* shall use ASHRAE/IES Standard 202 or other *generally accepted engineering standards* acceptable to the ~~*building official*~~ *AHJ*. *FPT* and verification requirements for *commissioning* are as stated in Section 4.2.5.1. *Commissioning* shall also document in sufficient detail compliance of the *building systems*, controls, and *building envelope* with required provisions of this standard. *Commissioning* requirements shall be incorporated into the *construction documents*.

[. . .]

4.2.5.2.1 Commissioning Activities Prior to Building Permit Issuance. The following activities shall be completed prior to issuance of a *building* permit:

a. A copy of the *commissioning* plan shall be submitted to the owner. A copy of the *commissioning* plan shall be submitted with the *building* permit application if requested by the ~~*building official*~~ *AHJ*.

[. . .]

4.2.5.2.2 Project Commissioning Documents. Project *commissioning* documents shall comply with ASHRAE/IES Standard 202 or other *generally accepted engineering standards* acceptable to the ~~*building official*~~ *AHJ*. The *commissioning provider* shall certify completion of the required *commissioning process* and provide the following documents to the owner and design teams:

[. . .]

4.2.5.3 Activities Prior to Building Occupancy. Before issuance of a certificate of occupancy, the *V&T providers* or *commissioning provider* shall complete the following activities:

[. . .]

c. The owner shall provide the ~~*building official*~~ *AHJ* with one of the following:
   1. A letter of transmittal acknowledging that the *building* owner or owner's authorized agent has received and accepted all required verification documentation, *FPT* documentation, and required preliminary *commissioning* report.
   2. A copy of the reports listed in Section 4.2.5.3(b), if requested by the ~~*building official*~~ *AHJ.*

[. . .]

Revise Section 5 as shown (I-P and SI).

[. . .]

5.1.5.1 United States Locations. For locations in the United States and its territories, use ASHRAE Standard 169, Table B-1, "U.S. Climate Zones by State and County," to determine the assigned climate zone and, where required, the assigned climate zone letter.

Exception to 5.1.5.1: If there are recorded historical climatic data available for a *construction site*, they may be used to determine compliance if approved by the ~~*building official*~~ *authority having jurisdiction (AHJ)*.

[. . .]

5.1.6.3 *Spaces* shall be assumed to be *conditioned spaces* and shall comply with the requirements for *conditioned spaces* at the time of *construction*, regardless of whether mechanical or electrical *equipment* is included in the *building* permit application or installed at that time.

Exception to 5.1.6.3: A *space* may be designated as either a *semiheated space* or an *unconditioned space* only if approved by the ~~*building official*~~ *AHJ*.

[. . .]

5.4.3.1.4 Measured Air Leakage. Where measured *air leakage* is used for compliance, the rate of *air leakage* of the *building envelope* shall not exceed 0.35 cfm/ft^2 under a pressure differential of 75 Pa (0.30 in. of water), with this *air leakage* rate normalized by the sum of the above-*grade* and below-*grade building envelope* areas of the *conditioned space* and *semiheated space* and in accordance with this section.

[. . .]

c. Where the measured *air leakage* rate exceeds 0.35 cfm/ft^2 but does not exceed 0.45 cfm/ft^2, a diagnostic evaluation, such as a smoke tracer or infrared imaging, shall be conducted while the *building* is pressurized, and any leaks noted shall be sealed if such sealing can be made without destruction of *existing building* components. In addition, a visual inspection of the air barrier shall be conducted, and any leaks noted shall be sealed if such sealing can be made without destruction of *existing building* components. An additional report identifying the corrective actions taken to seal leaks shall be submitted to the ~~*code official*~~ *AHJ* and the *building* owner and shall be deemed to satisfy the requirements of this section.

[. . .]

5.5.3 Opaque Elements. For all *opaque* elements, compliance with Tables 5.5-0 through 5.5-8 for each *class of construction* as described in Normative Appendix A, Sections A2 through A8 shall be demonstrated by one of the following two methods:

a. Providing a minimum *rated R-value of insulation* added to the assembly equal to or greater than the insulation minimum *R-value* required of each insulation component.
b. Providing insulation such that the maximum *U-factor*, *C-factor*, or *F-factor* for the entire assembly is not exceeded as determined by one of the following:
   1. Precalculated values in accordance with Normative Appendix A, Section A1.1.
   2. Applicant-determined values in accordance with Normative Appendix A, Section A1.2 where such values are approved by the ~~*code official*~~ *AHJ*.

Exceptions to 5.5.3:

1. For *opaque* assemblies not complying with the *classes of construction* as described in Normative Appendix A, Sections A2 through A8, compliance with the maximum *U-factors* for the "attic and other" or "wood frame and other" *opaque* element conditions in Tables 5.5-0 through 5.5-8 shall be demonstrated by testing or calculations representative of the designed assembly in accordance with Normative Appendix A, Section A9.1 where approved by the ~~*code official*~~ *AHJ*.

[. . .]

Revise Section 6.5.3.1.2 as shown (I-P and SI).

[. . .]

6.4.3.1.2 Dead Band. Where used to *control* both heating and cooling, zone *thermostatic controls* shall be capable of and configured to provide a temperature range or *dead band* of at least 5°F within which the supply of heating and cooling *energy* to the zone is shut off or reduced to a minimum.

Exceptions to 6.4.3.1.2:

1. *Thermostats* that require *manual* changeover between heating and cooling modes.
2. Special occupancy or special applications where wide temperature ranges are not acceptable (such as retirement homes, *process applications*, museums, some areas of hospitals) and are approved by the *authority having jurisdiction* (*AHJ*).

[. . .]

6.5.3.1.2 Fan Motor Selection

a. For each fan less than 6 *bhp*, the selected fan motor shall be no larger than the first available motor with a *nameplate rating* greater than 1.5 times the *fan bhp*.
b. For each fan 6 *bhp* and larger, the selected fan motor shall be no larger than the first available motor with a *nameplate rating* greater than 1.3 times the *fan bhp*.

The *fan bhp* must be indicated on the design documents to allow for compliance verification by the ~~*building official*~~ *AHJ*.

[. . .]

Revise Section 10.5.1.4 (added by published Addendum k) as shown (I-P and SI)

[. . .]

Exceptions to 10.4.6.1:

1. *Alterations* where the total combined added or replaced compressor motor power is less than the average per-compressor power of all compressors in the *system*.
2. *Alterations* where all added or replaced compressors are VSD compressors and the compressed air *system* includes primary storage of at least 3 gal/acfm of the largest trim compressor.

3. Compressed air *systems* that have been approved by the *authority having jurisdiction* (*AHJ*) as having demonstrated that the *system* serves loads for which typical air demand fluctuates less than 10%.
4. *Alterations* of existing compressed air *systems* that include one or more centrifugal compressors.

[. . .]

10.5.1.4 Renewable Energy Certificate Purchase. Where it can be demonstrated to the ~~code official~~*AHJ* 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.

[. . .]

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

[. . .]

12.1.3 Envelope Limitation. For new *buildings* or *additions*, the *building* Energy Cost Budget Method results shall not be submitted for *building* permit approval to the *authority having jurisdiction* (*AHJ*) prior to submittal for approval of the *building envelope* design.

[. . .]

12.5.2 HVAC Systems. The *HVAC system* type and related performance parameters for the *budget building design* shall be determined from Figure 12.5.2, the *system* descriptions in Table 12.5.2-1 and accompanying notes, and the following rules:

[. . .]

i. **Equipment Capacities.** The *equipment* capacities for the *budget building design* shall be sized proportionally to the capacities in the *proposed design* based on sizing runs, i.e., the ratio between the capacities used in the annual simulations and the capacities determined by the sizing runs shall be the same for both the *proposed design* and *budget building design*. Where multiple *HVAC zones* are combined into a single *thermal block* or modeled as identical *thermal blocks* to which multipliers are applied in accordance with Table 12.5.1, the *equipment* capacities for the *budget building design* shall be determined as follows:
   1. For budget *system* Types 8 and 10, *equipment* capacity shall be 9000 Btu/h.
   2. For budget system Types 5, 6, 7, 9, and 11, equipment capacity shall be based on the load of the thermal block divided by the number of combined HVAC zones.
   3. For budget system Types 1, 2, 3, and 4, equipment capacity shall be based on the total load of all associated thermal blocks, including multipliers, divided by the total number of corresponding HVAC systems specified in the design documents.

   Unmet load hours for the *proposed design* or *baseline building designs* shall not exceed 300 hours (of the 8760 hours simulated). The *unmet load hours* for the *proposed design* shall not exceed the *unmet load hours* for the *budget building design*. Alternatively, *unmet load hours* exceeding these limits may be approved by the ~~*building official*~~ *AHJ*, provided that sufficient justification is given indicating that the accuracy of the simulation is not significantly compromised by these unmet loads.

[. . .]

12.7.2 Permit Application Documentation. Compliance shall be documented and submitted to the ~~*building official*~~ *AHJ*. The information submitted shall include the following:

[. . .]

p. Simulation input files for the *budget building design* and the *proposed design* shall be made available if requested by the ~~*building official*~~ *AHJ*.

[. . .]

Revise Normative Appendix G as shown (I-P and SI).

[. . .]

G1.1 Performance Rating Method Scope. This appendix offers an alternative path for minimum standard compliance in accordance with Section 4.2.1.1 when administered by ~~a *building official*~~ an *authority having jurisdiction* (*AHJ*). It is also provided for those who wish to use this appendix to quantify performance that exceeds the requirements of this standard when administered by a *rating authority* and not seeking minimum standard compliance in accordance with Section 4.2.1.1. It shall be used for evaluating the performance of all such *proposed designs*, including *alterations* and *additions* to *existing buildings*, except designs with no

mechanical *systems*. In the case where this appendix is administered solely by ~~a~~ an ~~*building official*~~ *AHJ* to determine compliance with this standard in accordance with Section 4.2.1.1, all references to "*rating authority*" shall be replaced with "~~*building official*~~ *AHJ*."

[. . .]

G1.3.2 Application Documentation. The following documentation shall be submitted to the *rating authority:*

[. . .]

s. Simulation input files for the *budget building design* and the *proposed design* shall be made available if requested by the ~~*building official*~~ *AHJ.*

[. . .]

Revise Informative Appendix H as shown (I-P and SI).

[. . .]

H5.3 Commissioning Plan (See Section 4.2.5.2.2). The *commissioning* plan is a document developed by a *commissioning provider* that supports the *energy efficiency* goals of Standard 90.1 by clarifying the *commissioning* activities throughout the design and *construction* process and how they are integrated into design team and contractor activities. The *commissioning* plan is also useful in providing the ~~*building official*~~ *authority having jurisdiction* (*AHJ*) with assurance that required *commissioning* activities will be performed.

[. . .]

H5.8 Preliminary Commissioning Report (See Section 4.2.5.2.2). A preliminary *commissioning* report is provided by the *commissioning provider* and includes the results of the *commissioning* activities up to the time of occupancy. The results of *FPT* and other verification is included. The preliminary *commissioning* report supports the *energy efficiency* goals of Standard 90.1 by identifying that control sequences related to energy efficiency are working properly, the commissioning plan is useful in providing the ~~*building official*~~ *AHJ* with assurance that required are in place, where the ~~*building official*~~ *AHJ* may not have to time or expertise to investigate proper operation. Issues that are unresolved are also identified, as are items that will be tested after occupancy.

[. . .]

Revise Normative Appendix L as shown (I-P and SI)

[. . .]

L2.1.6 TSPR Submittals. Where $TSPR_p$ and $TSPR_r$ are used to demonstrate compliance in accordance with Section 6.6.2, documentation shall be provided to the ~~*building official*~~ *authority having jurisdiction* (*AHJ*) including the following:

[. . .]

L3.2 TSPR Simulation Program. All components of the *proposed design* for blocks served by *HVAC systems* using this method shall be explicitly modeled by the *simulation program*. The ~~*code official*~~ *AHJ* shall be per- mitted to approve a *simulation program* for a specified application or limited scope.

L3.2.1 Minimum Capability. The *simulation program* shall be approved by the ~~*code official*~~ *AHJ* and shall, at a minimum, have the ability to **explicitly** model all of the following:

[. . .]

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.

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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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