ADDENDA

ANSI/ASHRAE/IES Addendum u 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 30, 2021, and by the Illuminating Engineering Society on June 9, 2021.

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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FOREWORD

Addendum u updates Section 11 to address the budget HVAC systems economizer requirements and requirements for determining budget HVAC equipment capacities for the purpose of evaluating when prescriptive requirements in Section 6 apply to the energy cost budget when thermal zones are combined as a part of simplifying the energy modeling process.

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 u to Standard 90.1-2019

Modify Section 11.5.2 as shown (I-P and SI units).

11.5.2 ***HVAC Systems.*** The *HVAC system* type and related performance parameters for the *budget building design* shall be determined from Figure 11.5.2, the *system* descriptions in Table 11.5.2-1 and accompanying notes, and the following rules:

a. **Budget *Building Systems* Not Listed.** Components and parameters not listed in Figure 11.5.2 and Table 11.5.2-1 or otherwise specifically addressed in this subsection shall be identical to those in the *proposed design*.

Exception to 11.5.2(a): Where there are specific requirements in Sections 6.4 and 6.5, the component *efficiency* in the *budget building design* shall be adjusted to the lowest *efficiency* level allowed by the requirement for that component type.

b. **Minimum *Equipment Efficiency*.** All HVAC and *service water-heating equipment* in the *budget building design* shall be modeled at the minimum *efficiency* levels, both part load and full load, in accordance with Sections 6.4 and 7.4 based on the budget *system* type determined following Section 11.5.2(j) and capacity determined following Section 11.5.2(i). Chillers shall use Path A efficiencies as shown in Table 6.8.1-3.

c. **Supply Fan *Energy* in Certain Package *Equipment*.** Where *efficiency* ratings include supply fan *energy*, the *efficiency* rating shall be adjusted to remove the supply fan *energy*. For Budget *System* Types 3, 4, 6, 8, 9, 10, and 11, calculate the minimum $COP_{nfcooling}$ and $COP_{nfheating}$ using the equation for the applicable performance rating as indicated in Tables 6.8.1-1, 6.8.1-2, ~~through~~ 6.8.1-4, and 6.8.1-15. ~~Where multiple *HVAC zones* are combined into a single *thermal block* in accordance with Table 11.5.1, the efficiencies for budget System Types 6, 8, and 10 taken from Tables 6.8.1-1 through 6.8.1-4, shall be based on 9,000 Btu/hr2.6 kW equipment capacity for *residential spaces* otherwise it shall be based on the capacity of the *thermal block* divided by the number of *HVAC zones*. Budget System Types 3, 4, 9, and 11 efficiencies taken from Table 6.8.1-1 through 6.8.1-4 shall be based on the cooling equipment capacity of a single floor when grouping identical floors in accordance with Table 11.5.1.~~ Where a full- and part-load *efficiency* rating is provided in Tables 6.8.1-1, 6.8.1-2, ~~through~~ 6.8.1-4, and 6.8.1-15, the full-load equation below shall be used:

[. . .]

e. **Economizers.** All b ~~B~~udget *building systems* as listed in Table 11.5.2-1 shall have *air economizers* ~~or *fluid economizers*, the same as in the *proposed design*,~~ in accordance with Section 6.5.1 and Section 11.5.2(i). The high-limit shutoff shall be in accordance with Table 11.5.2-4.

[. . .]

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

11.5.1, 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 (2.6 kW).
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) [. . .]

Modify Table 11.5.2-1, Footnote (e) as shown (I-P and SI).

e. [. . .]
~~Except during economizer operation, t~~The tower shall be controlled to maintain a cooling tower leaving water temperature, where weather permits, per Table 11.5.2-5, floating up to the design leaving water temperature for the cooling tower. *Pump system power* for each pumping *system* shall be the same as the *proposed design*; if the *proposed design* has no condenser water pumps, the *budget building design* pump power shall be 19 W/gpm (301 kW/1000 L/s) (equal to a pump operating against a 60 ft (18 m) head, 60% combined impeller and motor *efficiency*). Each chiller shall be modeled with separate condenser water and chilled-water pumps interlocked to operate with the associated chiller.

Delete Table 11.5.2-4 as shown (I-P and SI).

~~**Table 11.5.2-4 Economizer High-Limit Shutoff**~~

~~**Economizer Type**~~	~~**High-Limit Shutoff**~~
~~Air~~	~~Table 6.5.1.1.3~~
~~Fluid (integrated)~~	~~When its operation will no longer reduce *HVAC system energy*~~

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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.

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7/21