

ADDENDA

**ANSI/ASHRAE/IES Addendum cs 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 June 30, 2022, and by the Illuminating Engineering Society on June 10, 2022.

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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FOREWORD

Addendum cs makes two changes to Section 11.

- *Table 11.5.1(11) now requires service hot-water heating systems to meet the requirements of Sections 7.4 and 7.5. The addition of Section 7.5 was previously omitted from body of the text.*
- *Section 11 now specifies that the budget building must be modeled to meet the requirements of Section 6.5.4.8 for high-capacity space-heating gas boilers.*

This addendum clarifies the requirements of Section 11 and has no cost impact.

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

Addendum cs to Standard 90.1-2019

Modify the Section 11 as shown (I-P).

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:

- Budget Building Systems not Listed.** Components and parameters not listed in Figure 11.5.2 and Table 11.5.2-2 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.

- 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, 6.5.4.8, ~~and 7.4~~, and 7.5 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.

Table 11.5.2-1 Budget System Descriptions (I-P)

System No.	System Type	Fan Control	Cooling Type	Heating Type
[...]				

[...]

- Fossil Fuel Boiler:** For *systems* using purchased hot water or steam, the *boilers* are not explicitly modeled and hot-water or steam costs shall be based on actual utility rates. Otherwise, the *boiler* plant shall use the same *fuel* as the *proposed design* and shall be natural draft. The *budget building design boiler* plant shall be modeled with a single *boiler* if the *budget building design* plant load is 600,000 Btu/h or less and with two equally sized *boilers* for plant capacities exceeding 600,000 Btu/h. *Boilers* shall be staged as required by the load. For *boiler systems* meeting the requirements of Section 6.5.4.8, the hot-water supply temperature shall be modeled at 170°F design supply temperature and 120°F return temperature. For all other boiler systems, Hot-water supply temperature shall be modeled at 180°F design supply temperature and 130°F return temperature. *Piping* losses shall not be modeled in either *building* model. Hot-water supply water temperature shall be *reset* in accordance with Section 6.5.4.4. *Pump system power* for each pumping *system* shall be the same as for the *proposed design*; if the *proposed design* has no hot-water pumps, the *budget building design* pump power shall be 19 W/gpm (equal to a pump operating against a 60 ft head, 60% combined impeller and motor *efficiency*). The hot-water *system* shall be modeled as primary-only with continuous variable flow. Hot-water pumps shall be modeled as riding the pump curve or with variable-speed drives when required by Section 6.5.4.2.

[...]

Modify the Section 11 as shown (SI).

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 11.5.2-2 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, 6.5.4.8, and 7.4, and 7.5 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

Table 11.5.2-1 Budget System Descriptions (SI)

<i>System No.</i>	<i>System Type</i>	<i>Fan Control</i>	<i>Cooling Type</i>	<i>Heating Type</i>
[...]				

[...]

- f. **Fossil Fuel Boiler:** For *systems* using purchased hot water or steam, the *boilers* are not explicitly modeled and hot-water or steam costs shall be based on actual utility rates. Otherwise, the *boiler* plant shall use the same *fuel* as the *proposed design* and shall be natural draft. The *budget building design boiler* plant shall be modeled with a single *boiler* if the *budget building design* plant load is 176 kW or less and with two equally sized *boilers* for plant capacities exceeding 176 kW. *Boilers* shall be staged as required by the load. For *boiler systems* meeting the requirements of Section 6.5.4.8, the hot-water supply temperature shall be modeled at 77°C design supply temperature and 49°C return temperature. For all other boiler systems, the hot-water supply temperature shall be modeled at 82°C design supply temperature and 54°C return temperature. Piping losses shall not be modeled in either *building* model. Hot-water supply water temperature shall be *reset* in accordance with Section 6.5.4.4. Pump system power for each pumping system shall be the same as for the *proposed design*; if the *proposed design* has no hot-water pumps, the *budget building design* pump power shall be 301 kW/1000 L/s (equal to a pump operating against a 18 m head, 60% combined impeller and motor *efficiency*). The hot-water system shall be modeled as primary-only with continuous variable flow. Hot-water pumps shall be modeled as riding the pump curve or with variable-speed drives when required by Section 6.5.4.2.

[...]

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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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