ADDENDA

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

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

Approved by ASHRAE and by the American National Standards Institute on October 31, 2025; and by the Illuminating Engineering Society on October 21, 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).

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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
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FOREWORD

Gas-fired heat pumps for space heating are an emerging technology that can reduce natural gas or propane consumption for users who choose this technology. This equipment can achieve a coefficient of performance (COP) greater than 100%, even in cold temperatures, which exceeds even the most efficient boilers. The existing language in the standard does not recognize gas-fired heat pumps in either Section 6.5.4.8, which requires higher than minimum efficiencies for large capacity systems, or the energy credits in Section 11.5.2.2, "Improved HVAC Performance."

Addendum dl,

- *adds CSA/ANSI Z21.40.4-CSA 2.94 as a testing method for gas-fired heat pumps, with the rating point at 17°F;*
- *inserts text into Section 6.5.4.8 that allows the use of gas-fired heat pumps to meet the requirements of that section; and*
- *expands Section 11.5.2.2 to allow the use of gas-fired heat pumps and increases the maximum heating improvement from 20% to 30%.*

This addendum provides an additional path to meet high-efficiency gas heating requirements and does not increase the cost of construction unless users select gas-fired heat pumps.

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 dl to Standard 90.1-2022

Modify Section 6.4.7 as shown (I-P and SI).

6.4.7 Performance Rating Requirements for Equipment without Minimum Efficiency Requirements ~~System Components~~. The *equipment* listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed.

Table 6.4.7 Performance Rating Procedures for Equipment without Minimum Efficiency Requirements ~~System Components~~

Equipment	Rating Procedure
Plate-type liquid-to-liquid heat exchangers	AHRI 400
Fin-and-tube heating and cooling coils (hydronic and DX)	AHRI 410
Exhaust air energy recovery heat exchangers	AHRI 1060
Gas-fired heat pumps	The rated COP at 17°F (–8.3°C) outdoor air temperature when tested and rated in accordance with CSA/ANSI Z21.40.4-CSA 2.94

Modify Section 6.5.4.8 as shown ((I-P and SI).

6.5.4.8 Buildings with High-Capacity Space-Heating Gas Boiler or Gas-Fired Hydronic Heat-Pump Systems. New *buildings* with gas hot-water *boiler systems* or gas-fired heat-pump hydronic systems, or a combination thereof, for *space* heating with a total *system* input of ~~at least~~ not less than 1,000,000 Btu/h (290 kW) but not more than 10,000,000 Btu/h (2900 kW) shall comply with Sections 6.5.4.8.1 and 6.5.4.8.2. Individual gas boilers with input capacity less than 300,000 Btu/h (87 kW) shall not be included in the calculations of the total system input or total system efficiency.

Exceptions to 6.5.4.8:

1. Where 25% of the annual *space* heating requirement is provided by *on-site renewable energy*, *site-recovered energy*, or heat recovery chillers.
2. *Space heating boilers* or gas-fired hydronic heat pumps installed in individual *dwelling units*.

3. Where 50% or more of the design heating load is served using perimeter convective heating, radiant ceiling panels, or both.
4. ~~Individual gas boilers with input capacity less than 300,000 Btu/h [87 kW] shall not be included in the calculations of the total system input or total system efficiency.~~

6.5.4.8.1 Boiler and Gas-Fired Hydronic Heat-Pump Efficiency. Systems with a single ~~G~~gas hot-water boiler or gas-fired hydronic heat pump shall have a minimum thermal efficiency (E_t) of 90% when rated in accordance ~~with the test procedures in Table 6.8.1-6.~~ with the following:

a. *Boilers* shall be rated in accordance with the test procedures in Table 6.8.1-6.
b. Gas-fired hydronic heat pumps shall be rated in accordance with Section 6.4.7, and the rated COP, expressed as a percent, shall be the E_t of that equipment.

Systems with multiple boilers, gas-fired hydronic heat pumps, or combinations thereof, are allowed to meet this requirement if the space heating input provided by equipment with thermal efficiency (E_t) above and below 90% provides an input capacity-weighted average thermal efficiency of at least 90%. For boilers rated only for combustion efficiency, the calculation for the input capacity-weighted average thermal efficiency shall use the combustion efficiency value.

Modify Section 11.5.2.2 as shown (I-P and SI).

11.5.2.2 Improved HVAC Performance. To achieve these credits, *equipment* shall provide HVAC performance improvement in accordance with Section 11.5.2.2.2, 11.5.2.2.3, 11.5.2.2.4, 11.5.2.2.5, or 11.5.2.2.6. *Equipment* shall also meet applicable requirements of Sections 6.4 and 6.5. Credits shall be as shown in Section 11.5.3 or as specified in each subsection for *building* use types where base credits are included in Section 11.5.3 tables. Use of multiple credits from this section shall be allowed.

11.5.2.2.1 H01: HVAC System Performance Improvement (Reserved)

11.5.2.2.2 H02: HVAC Heating Performance Improvement. To achieve this credit, *space* heating *equipment* shall exceed the minimum heating *efficiency* requirements by 5% or more than listed in the tables in Section 6.8.1. The measure *energy* credit for heating *efficiency* improvement (EC*HE*) shall be determined as follows:

$$EC_{H02\_adj} = EC_{H02\_base} \times \frac{EI_{heat}}{0.05}$$

where

EC_{H02_adj} = *energy* credits achieved for heating *efficiency* improvement

EC_{H02_base} = H02 base e*nergy* credit from Section 11.5.3

EI_{heat} = ~~lesser of~~ the percentage improvement (as a fraction) above minimum *efficiency* requirements or ~~20% (0.20)~~ 30% (0.30). Where heating *equipment* with different minimum efficiencies are included in the *building*, a heating capacity weighted-average improvement shall be used. Where *electric resistance* primary heating or *reheat* is included in the *building*, it shall be included in the weighted-average improvement with an EI_{heat} of 0. Supplemental gas and electric heat for heat-pump *systems* shall be excluded from the weighted EI_{heat}. ~~For heat pumps rated at multiple ambient temperatures, use the *efficiency* at 47°F.~~

~~Gas-fired *boiler systems* that are required to meet provisions of Section 6.5.4.8 shall use the minimum *system efficiency* (HM_{min}) as defined in Section 6.5.4.8.1. Gas-fired *boiler systems* that are required to meet provisions of Section 6.5.4.8 shall use the minimum *system efficiency* as defined in Section 6.5.4.8.1.~~

For metrics that increase as *efficiency* increases, EI_{heat} shall be calculated as follows:

$$EI_{heat} = \frac{HM_{des}}{HM_{min}} - 1$$

where

HM_{des} = design heating *efficiency* metric, part-load or annualized, where available. For electric heat pumps rated at multiple ambient temperatures, use the *efficiency* at 47°F (8.3°C). Gas-fired hydronic heat pumps shall be rated in accordance with Section 6.4.7.

HM_{min} = minimum required heating *efficiency* metric, part-load or annualized ~~where available from~~ in Section 6.8.1 for equipment other than gas-fired heat pumps. HM_{min} for gas-fired heat pumps shall be the same as for a boiler or furnace of the same input rating. For electric heat pumps rated

at multiple ambient temperatures, use the *efficiency* at 47°F (8.3°C). Where gas-fired *boiler systems* or gas-fired hydronic heat-pump systems are required to meet provisions of Section 6.5.4.8, the minimum *system efficiency* HM_{min} shall be the minimum E_t required in Section 6.5.4.8. ~~or Informative Appendix F~~

Informative Note: An example of an annualized or part-load heating efficiency is AFUE rather than E_t or E_c. Where only one efficiency rating is provided for equipment in Section 6.8.1 ~~or Informative Appendix F~~, use that metric.

Modify Section 13 as shown (I-P and SI).

Reference		Section
[. . .]		
~~Canadian Standards Association (CSA)~~CSA Group **178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3**		
CSA/ANSI Z21.40.4/CSA 2.94.-2023	Performance Testing and Rating of Gas-Fired Air Conditioning and Heat Pump Appliances	Table 6.4.7
[. . .]		

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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