



**BSR/ASHRAE/IES Addendum dj  
to ANSI/ASHRAE/IES Standard 90.1-2022**

**Public Review Draft**

# **Proposed Addendum dj to Standard 90.1-2022, Energy Standard for Sites and Buildings Except Low- Rise Residential Buildings**

**First Public Review (August 2025)  
(Draft Shows Proposed Changes to Current Standard)**

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## FOREWORD

This proposal, based on pool heater requirements proposed for California's 2025 energy code, requires that the primary heating system for pools to be efficient. The heating system must either be a heat pump pool heater, a condensing gas pool heater, a solar thermal water heater, a heating system that derives no less than 60 percent of its annual heating energy from on-site renewable energy or a system that derives no less than 40 percent of its heating energy from one of the above or site-recovered energy during the pool's coldest full month of operation. Natural gas or electric back-up heating systems are allowed in all cases. The proposal also includes mandatory minimum efficiency standards for pool heaters established by the U.S. Department of Energy.

Heat pump pool heaters, solar thermal heaters, condensing gas pool heaters and heaters that utilize site-recovered energy or on-site renewable energy are cost effective primary alternatives to conventional non-condensing gas-fired pool heaters which result in reduced energy use and lower monthly utility costs. A cost effectiveness analysis was conducted for heat pump pool heaters, solar pool heaters, and condensing gas pool heaters for indoor and outdoor pools heated seasonally and year-round in all climate zones and found that at least two of these systems are cost-effective in indoor or outdoor pools in Climate Zones 0 through 8.

Note: Portable electric spa was added as a definition in addendum bl

[https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20addenda/90\\_1\\_2022\\_bl\\_20250430.pdf](https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20addenda/90_1_2022_bl_20250430.pdf)

*[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]*

## Addendum dj to 90.1-2022

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Add new definitions as follows:

**solar-ready-zone:** a section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

**solar thermal pool heater:** an assembly of components designed to heat water converting incident solar radiation into thermal energy at the building site.

**spa:** a structure or product intended for the immersion of persons in temperature-controlled water for the purpose of relaxing, exercise, therapy or treatment; designed and manufactured to be connected to a circulation *system*; and not intended to be drained and filled with each use.

Revise text as follows:

**Table 7.4-1 Performance Requirements for Water-Heating Equipment—Minimum Efficiency Requirements (Continued)**

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Performance Required <sup>a</sup>	Test Procedure <sup>b,c</sup>
<u>Commercial <i>P</i>pool heaters, gas<sup>i</sup></u>	All		82% Et for commercial pool heaters, <u>gas</u> and for applications outside U.S. For U.S. applications, see footnote (g).	10 CFR 430 Appendix P
<u>Consumer <i>pool</i> heaters, gas<sup>j</sup></u>	All		82% Et <u>Before 5/31/2028</u>  $\frac{84(Q_{IN} + 491)}{Q_{IN} + 2,536}$ $\left[ \frac{84(Q_{IN} + 144)}{Q_{IN} + 690.5} \right]$ <u>On or after 5/31/2028</u> Where $Q_{IN}$ is the <u>input capacity, in Btu/h [W]</u>	<u>10 CFR 430 Appendix P</u>
<u>Commercial <i>H</i>heat pump <i>pool</i> heaters<sup>i</sup></u>	All	50°F [10°C] db 44.2°F [6.78°C] wb outdoor air 80.0°F [26.7°C] entering water	4.0 COP <sup>g</sup>	10 CFR 430 Appendix P
<u>Consumer electric <i>pool</i> heaters<sup>j</sup></u>	All	50°F [10°C] db 44.2°F [6.78°C] wb outdoor air 80.0°F [26.7°C] entering water  <u>Before 5/31/2028</u>  <u>High Air Temperature-Mid Humidity rating condition</u>  <u>On or after 5/31/2028</u>	4.0 COP <u>Before 5/31/2028</u>  <u>Integrated Thermal Efficiency not less than the following:</u> $\frac{600(PE)}{PE + 1,619}$ Where PE is the <u>active electrical power, in Btu/h</u> <u>On or after 5/31/2028</u>	<u>10 CFR 430 Appendix P</u>

g. *Water heaters* or gas *pool heaters* in this category or subcategory are regulated as consumer products by the U.S. DOE as defined in 10 CFR 430.

h. Where this standard is being applied to a building outside the U.S. and Canada and water heaters in this subcategory are being installed in that building, those water heaters shall meet the local efficiency requirements. If there are no local efficiency standards for residential water heaters, consideration should be given to using the U.S. DOE efficiency requirements shown in Informative Appendix F, Table F

i. Performance requirement is for commercial *pool heaters* and for applications outside of the U.S. Commercial *pool heaters* contain additional design modifications related to safety requirements for installation in commercial buildings and are not regulated as consumer products by the U.S. DOE as defined in 10 CFR 430.

j. *Pool heaters* in this category or subcategory are regulated as consumer products by the U.S. DOE as defined in 10 CFR 430.

Revise text as follows:

#### **7.4.5 Pools**

**7.4.5.1 Pool Heaters Electric switches and Ignition pilots.** Electric switches and ignition pilots shall comply with Section 7.4.5.1.1 through Section 7.4.5.1.2.

**7.4.5.1.1 Electric switches.** *Pool heaters* shall be equipped with a *readily accessible* on/off switch to allow shutting off the heater without adjusting the *thermostat* setting. *Operation of such switch shall not change the setting of the heater thermostat.*

**7.4.5.1.2 Ignition pilots.** *Pool heaters* fired by natural gas shall not have continuously burning pilot lights.

Add new section as follows:

**7.4.5.3. Primary heating system efficiency.** The primary *pool heating systems* shall comply with Section 7.4.5.3.1. *Supplementary and back-up heating systems* shall not be required to comply with Section 7.4.5.3.1. *Supplementary and back-up heating system* controls shall comply with Section 7.4.5.3.4.

**7.4.5.3.1 Primary heating system.** The primary *pool heating system*, or the primary source of heat for the *hydronic system* that heats the *pool*, shall be one of the following.

1. A heat pump *pool heater*. Where a supplemental heater is installed, the primary heat pump *pool heater* shall be sized in accordance with Section 7.4.5.3.2.
2. A *solar thermal pool heater* with a solar collector surface area equivalent to 65 percent or more of the *pool* surface area.  
**Exception to 7.4.5.3.1 (2):** A *pool* heated only by a *solar thermal pool heater*.
3. A commercial gas *pool heater* with a rating that is not less than 90 percent  $E_t$  or a consumer gas *pool heater* with an *equipment* rating that is not less than 90 percent TEI. Where a supplemental heater is installed for an outdoor or partially outdoor *pool*, the primary gas *pool heater* shall be sized in accordance with 7.4.5.3.3.
4. A *system* that derives 60 percent or more of annual water heating *energy* from *on-site renewable energy*. *On-site renewable energy* installed to meet this requirement shall be in addition to the requirements in Section 10.5.1 and Section 11.5.
5. A *system* that derives, during the daily average outdoor temperature and humidity conditions corresponding to the mean day during the *pool's* coldest full month of operation, not less than 40 percent of its daily heating *energy* from one or a combination of heat pump *pool heaters*, *solar thermal pool heaters*, *on-site renewable energy*, or *site-recovered energy*.

#### **Exception to 7.4.5.3:**

1. *Portable electric spas*.
2. *Heating systems* for indoor *pools* in Climate Zone 8.
3. *Heating systems* for fully or partially outdoor *pools* in Climate Zones 4 to 8.
4. Where the surface area of *pools* is greater than 15,000 square feet [1,400 m<sup>2</sup>]
5. *Pool slides* that do not end in a Class D-3 catch pool.
6. *Heating systems* dedicated to permanent *spa* applications in buildings where *solar-ready zones* meet one of the following requirements:

6.1. The *solar-ready zone* area is a contiguous area less than 65% of the permanent *spa* surface area.

6.2 Where no area for a *solar-ready zone* exists.

6.3 Where more than 50 percent of the solar-ready zone is shaded from direct-beam sunlight by natural objects or by structures for more than 2,500 annual hours between 8:00 a.m and 4:00 p.m.

7. Heating *systems* which are used to prevent freezing and are not set to heat the water above 50°F [10°C].

**7.4.5.3.2 Heat pump pool heater sizing.** Where a supplemental heater is installed, the design loads for the purpose of sizing *systems* and *equipment* for heat pump *pool* heaters serving as primary heating *systems* for indoor *pools* shall comply with one or both of the following:

1. Heat pump *pool* heaters shall be sized in accordance with the manufacturer's published sizing guidelines.
2. Heat pump *pool* heaters without manufacturer's published sizing guidelines shall be sized in accordance with *generally accepted engineering standards*, or the 2023 ASHRAE Handbook-HVAC Applications, 2021 ASHRAE Handbook-Fundamentals or 2020 ASHRAE Handbook-HVAC Systems and Equipment.

Where a supplemental heater is installed, the design loads for the purpose of sizing *systems* and *equipment* for heat pump *pool* heaters serving as primary heating *systems* for fully or partially outdoor *pools* shall comply with one or more of the following:

1. Heat pump *pool* heaters shall be sized to meet or exceed the manufacturer's published sizing guidelines, specific to the *pool* size and temperature conditions being proposed, without supplemental heating.
2. Heat pump *pool* heaters shall provide, while the outdoor dry bulb air temperature is 50°F[10°C], the wet bulb temperature is 44.2°F[6.78°C], and the entering water temperature is 80.0°F[26.7°C], a heat output not less than 127 Btu/hr per square foot [400 W per square meter] of outdoor *pool* surface area.
3. Heat pump *pool* heaters shall provide, during the daily average outdoor temperature and humidity conditions corresponding to the mean day during the *pool's* coldest full month of operation, a heat output of 40 percent or more of the heat loss calculated for those weather conditions and operating *pool* water temperature.

**7.4.5.3.3 Primary gas pool heater sizing.** Where a supplemental heater is installed, gas *pool* heaters serving as primary heating *systems* for outdoor or partially outdoor *pools* shall provide, during the daily average outdoor temperature and humidity conditions corresponding to the mean day during the *pool's* coldest full month of operation, a heat output no less 40 percent of the heat loss calculated for those weather conditions and operating *pool* water temperature.

**7.4.5.3.4 Control of supplementary pool heating systems.** *Pool* heating *systems* with an internal or an external supplementary *pool* heating *system* shall have controls that prevent supplemental heat operation where the heating load can be met by the primary *pool* heating *system* alone. Supplementary heat shall be permitted to operate when the water temperature is not less than 0.5°F [0.3K] below the water temperature setpoint.