



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

**Public Review Draft**

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

**First Public Review (September 2024)  
(Draft Shows Proposed Changes to Current Standard)**

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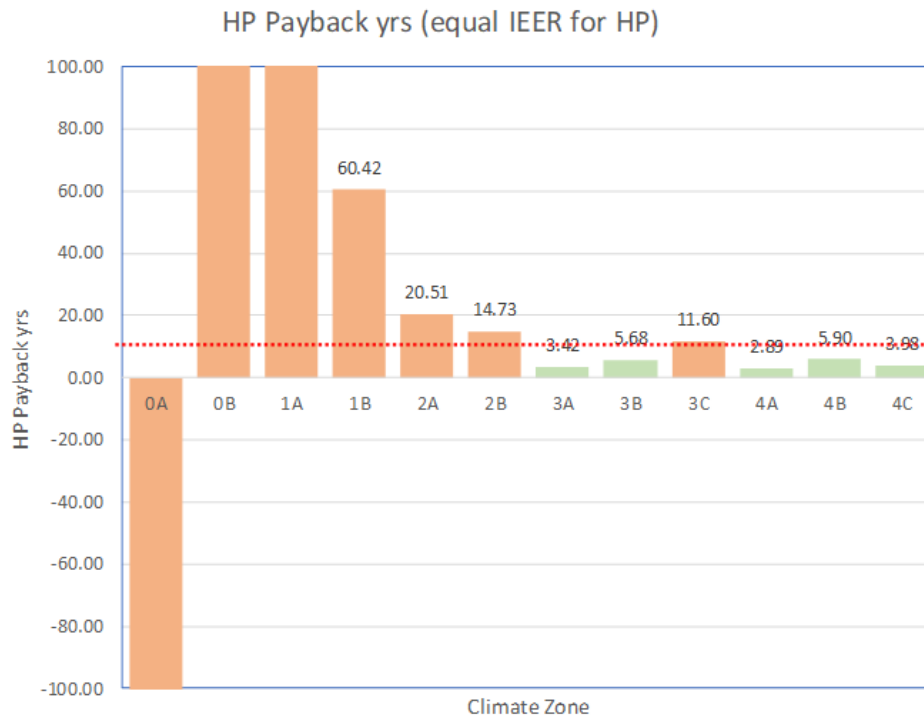
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## FOREWORD

Section 12 requires that when the proposed design is a single-zone HVAC systems using electricity for heating, the baseline HVAC system must be a packaged heat pump. But there is no such requirement in Section 6 so it is possible to comply prescriptively using a single-zone AC unit with electric resistance heat. If the AC unit already has compressor-based cooling, it can be readily converted to a heat pump at relatively low cost. Depending on the design, this can reduce the efficiency in cooling, which is why the cooling efficiencies in Table 6.8.1 for non-DOE covered heat pumps is lower than that for cooling-only or gas furnace heating AC units. Because of this reduction in efficiency, using these larger heat pumps in cooling dominated climates can result in higher overall energy costs and poor payback periods. For DOE covered equipment, the efficiencies are the same, requiring that manufacturers compensate for 4-way valve losses etc. with addition heat transfer area or other design options.

Life cycle cost analysis shows the following for DOE-covered heat pumps with a cooling capacity of not less than 65,000 Btu/h for the prototype small office building assuming no outdoor air economizers since units are largely below the economizer threshold:



*[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 ak to 90.1-2022**

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### ***Modify Sections 6.3.2 c and e. as follows:***

c. Cooling (if any) shall be provided by a unitary packaged or split-system air conditioner that is either air-cooled or evaporatively cooled, with *efficiency* meeting the requirements shown in Table 6.8.1-1 (air conditioners), Table 6.8.1-2 (heat pumps), or Table 6.8.1-4 (packaged *terminal units*, ~~and~~ single-packaged vertical units, ~~and~~ room air conditioners and heat pumps) for the applicable *equipment* category. Cooling *equipment* shall also comply with Section 6.4.1.4.

e. Heating (if any) shall be provided by a unitary packaged or split-system heat pump that meets the applicable efficiency requirements shown in Table 6.8.1-2 (heat pumps) or Table 6.8.1-4 (*packaged terminal units*, ~~and~~ single-packaged vertical air conditioners, and room air conditioners and heat pumps), a fuel-fired furnace that meets the applicable efficiency requirements shown in Table 6.8.1-5 (furnaces, duct furnaces, and unit heaters), ~~an electric resistance heater~~, or a baseboard system connected to a boiler that meets the applicable efficiency requirements shown in Table 6.8.1-6 (boilers). Heating equipment shall also comply with Section 6.4.1.4.

### **Exceptions to 6.3.2(e):**

1. Where air conditioners with a rated cooling capacity of not less than 65,000 Btu/h are used, electric resistance heating shall be allowed in Climate Zones 0A, 0B, 1A, 1B, 2A, and 2B.
2. Supplemental electric resistance heating in the HVAC zone shall be permitted where the heating system is a heat pump.
3. Uncooled spaces shall be permitted to use electric resistance heating.
4. Electric radiant heating shall be permitted in spaces with a ceiling height of not less than 15 feet.

*Add Section 6.5.12 as follows:*

**6.5.12 HVAC zones cooled by a single-zone unitary packaged, split-system, packaged terminal, or room air conditioner shall not use electric resistance heating.**

### **Exceptions to 6.5.12:**

1. Supplemental electric resistance heating in the HVAC zone shall be permitted where the heating system is a heat pump.
2. Air conditioners with a rated cooling capacity of not less than 65,000 Btu/h in climate zones 0A, 0B, 1A, 1B, 2A, and 2B.
3. Electric radiant heating shall be permitted in spaces with a ceiling height of not less than 15 feet.