BSR/ASHRAE/IES Addendum b
to ANSI/ASHRAE/IES Standard 90.2-2024

Public Review Draft

Proposed Addendum b to Standard 90.2-2024, High-Performance Energy Design of Residential Buildings

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

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FOREWORD

This proposal provides a number of changes to Section 5 Additions and Alterations.

- First, it corrects the prescriptive tables to reflect the currently used metrics for space heating and cooling and water heating equipment. Updated values harmonize with the highest, non-advanced efficiency tier set by the Consortium for Energy Efficiency (CEE^{SM}) for residential equipment, so consumers can reap the benefits of energy efficient equipment while also qualifying for utility incentives. In addition, this also introduces Demand Response requirements to the Standard via industry-recognized test procedures, which may be able to aid energy savings and carbon reduction. The SI table was also corrected to show proper SI units that align with the IP table.
- Second, it adds the No-Additional Energy Option currently available to additions, to the alterations section as an alternate compliance path.
- Third, it modifies the prescriptive requirements for a Substantial Energy Alteration to remove HVAC and water heating requirements which enables efficiency tradeoffs in the ERI calculation

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by <u>underlining</u> (for additions) and ~~strikethrough~~ (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 b to 90.2-2024

Modify Section 3.2 as follows

<u>COP_H/COP2</u>	<u>coefficient of performance – heating</u>
<u>COP_C</u>	<u>coefficient of performance – cooling</u>
<u>SCOP</u>	<u>seasonal coefficient of performance</u>
EER<u>/EER2</u>	energy efficiency ratio
HSPF<u>/HSPF2</u>	heating seasonal performance factor
SEER<u>/SEER2</u>	seasonal energy efficiency ratio
UEF	*uniform energy factor*

Modify Table 5-1 as follows (I-P)

Table 5-1 Central Air Conditioner and Heat Pump Specifications (I-P)

Equipment Type	~~SEER~~ SEER2	~~EER~~ EER2	~~HSPF~~ HSPF2	COP	COP2 at 5°F[a]	Capacity Ratio at 5°F/ 47°F (%)[b]	SCOP	COP *H*	Additional Demand Response Requirements	Test Procedure
Central Air Conditioners										
Split	~~16~~ 17.0	~~13~~ 12.0							Meets AHRI 1380	AHRI 210/240
Packaged	16	~~12~~ 11.5							Meets AHRI 1380	AHRI 210/240
Heat Pumps										
Air source: Split ~~rated capacity below 50,000 Btuh~~ (Path A)	16	~~13~~ 9.8	~~9.0~~ 8.5		1.75	65			Meets AHRI 1380	AHRI 210/240
Air source: Split ~~rated capacity at or above 50,000 Btuh~~ (Path B)	16	~~13~~ 11.0	~~8.5~~ 8.0		1.75	50			Meets AHRI 1380	AHRI 210/240
Air source: Packaged	~~16~~ 15.2	~~12~~ 10	~~8.2~~ 7.2		1.75	45			Meets AHRI 1380	AHRI 210/240
Geothermal closed loop: Water-to-air		17.1		3.6						ISO 13256-1
Geothermal open loop: Water-to-air		21.1		4.1						ISO 13256-1
Geothermal closed loop: Water-to-water		16.1		3.1						ISO 13256-2
Geothermal open loop: Water-to-water		20.1		3.5						ISO 13256-2
Direct geoexchange to Air (DGX)		16.0		3.6						AHRI 870
Direct geoexchange to Water (DGX)		15.0		3.1						AHRI 870

a. Equipment shall perform the U.S. Department of Energy Controls Verification Procedure (CVP) where applicable, to confirm that the above performance metrics measure at the Appendix M1 low ambient test point at 5°F are achieved by the native controls operating as they would in a residential building. The CVP requirement is inapplicable to equipment within single-speed and two-stage compressors.
b. Heating capacity ratio is calculated as the heating capacity at 5°F to the heating capacity at 47°F, which for variable-capacity systems is the $H1_{Nom}$ heating capacity and for all other systems is the $H1_{Full}$ heating capacity.

Modify Table 5-1 as follows (SI)

Table 5-1 Central Air Conditioner and Heat Pump Specifications (SI)

Equipment Type	~~SEER~~ SEER	~~EER~~ EER	~~HSPF~~ SCOP – Colder Climate	COP_H	COP2 at 8.33°C[a]	Capacity Ratio at -15°C/ 8.33°C (%)[b]	~~SCOP~~	COP_C	Additional Requirements	Test Procedure
Central Air Conditioners										
Split	~~16~~ 4.98	~~13~~ 3.52					~~3.81~~		Meets AHRI 1380	EN 14825
Packaged	~~16~~ 4.69	~~12~~ 3.37					~~3.52~~		Meets AHRI 1380	EN 14825
Heat Pumps										
Air Source: Split rated capacity below 12~~14.7~~ kW	~~16~~ 4.69	~~13~~ 2.87	~~9.0~~ 2.49		1.75	65	~~3.81~~		Meets AHRI 1380	EN 14825
Air Source: Split rated capacity at or above 12~~14.7~~	~~16~~ 4.69	~~13~~ 3.22	~~8.5~~ 2.34		1.75	50			Meets AHRI 1380	EN 14825

kW										
Air source: Packaged	~~16~~ 4.45	~~12~~ 2.93	~~8.2~~ 2.11		1.75	45	~~3.52~~		Meets AHRI 1380	EN 14825
Geothermal Closed Loop: Water-to-air		~~17.1~~		3.6				5.01		ISO 13256-1
Geothermal Open Loop: Water-to-air		~~21.1~~		4.1				6.18		ISO 13256-1
Geothermal Closed Loop: Water-to-water		~~16.1~~		3.1				4.72		ISO 13256-2
Geothermal Open Loop: Water-to-water		~~20.1~~		3.5				5.89		ISO 13256-2
Direct geoexchange to Air (DGX)		~~16~~		3.6				4.69		AHRI 871
Direct geoexchange to Water (DGX)				3.1				4.40		AHRI 871

a. Equipment shall perform the U.S. Department of Energy Controls Verification Procedure (CVP) where applicable, to confirm that the above performance metrics measure at the Appendix M1 low ambient test point at 5°F are achieved by the native controls operating as they would in a residential building. The CVP requirement is inapplicable to equipment within single-speed and two-stage compressors.
b. Heating capacity ratio is calculated as the heating capacity at 15°C to the heating capacity at 8.33°C, which for variable-capacity systems is the $H1_{Nom}$ heating capacity and for all other systems is the $H1_{Full}$ heating capacity.

Modify Table 5-2 and 5-3 as follows

Table 5-2 Gas Fired Heating Equipment ~~Furnace and Gas Boiler~~ Specifications

Equipment Type	AFUE	COP(47)
Gas-fired furnaces	~~□95%~~ □97%	
Gas-fired boilers	~~□90%~~ □95%	
Gas-fired Heat Pump[a]	□120%	□1.2
Gas-fired Heat Pump Boilers[b]	□120%	□1.2

a. Tested to ANSI Z21.40.4,
b. Tested to ANSI Z21.40.1, and Tested to ANSI Z21.40.1A

Table 5-3 *Water Heater* Minimum Efficiency

Equipment Type	~~EF~~ UEF	COP_H
Gas storage *water heaters* Medium Draw Pattern	□0.81	
Gas storage *water heaters* High Draw Pattern	□0.86	
Gas tankless *water heaters*	□0.95 ~~with electronic ignitions~~	
Electric storage *water heaters (Integrated)*~~(□55 gal [210 L])~~	□3.3 and meets AHRI 1430[a]	
~~Electric Storage *Water Heaters* (>55 gal [210 L])~~	~~□2.2 and meets AHRI 1430~~	
Electric Storage *water heaters* (Split Systems)	□2.2 and meets AHRI 1430[a]	
Commercial Heat Pump *water heaters*		□3.0

a. AHRI 1430 is only applicable to water heaters with a nominal storage capacity greater than or equal to forty gallons and less than or equal to 120 gallons

Modify Section 5 as follows

5. ADDITIONS AND ALTERATIONS

5.1 Additions. *Additions* to existing *dwelling units* shall comply with either Section 5.1.1 or Section 5.1.2.

5.1.1 Prescriptive Compliance. Additions shall comply with Section 5.1.1(a) through (d):

a. Envelope assemblies: All new envelope *assemblies* comprising the *addition* shall meet or exceed the envelope *assembly* characteristics of Table 6-3 and Table 7-2.
b. Heating and cooling systems: New heating, cooling, and duct systems that are part of the *addition* shall comply with Section 7.2 and either Table 5-1 or Table 5-2.
c. *Service water heating* systems: New *service water heating* systems that are part of the *addition* shall comply with Section 7.4 and Table 5-3.
d. Lighting: New lighting systems that are part of the *addition* shall comply with Section 7.5.

5.1.2 Performance Alternative. The *building* shall comply with either Section 5.1.2.1 or 5.1.2.2.

5.1.2.1 No-Additional-Energy Option. The *addition* shall comply on a performance basis where the annual equivalent energy use of the *addition* and the existing *dwelling unit*, taken together, is less than or equal to the annual equivalent energy use of the existing *dwelling unit*, where the equivalent energy use for fossil fuels is calculated as follows:

kWh*eq* = (Btu*fossil* × 0.40)/3412 [I-P] (5-1)

kWh*eq* = (MJ*fossil* × 0.40)/3.6 [SI] (5-1)

Informative Note: This option may be preferable when the *addition* is small as compared to the existing *building*.

5.1.2.2 Combined Energy Rating Index (ERI) Option. The *addition* shall comply if the combined *building—addition* plus existing structure—meets the *ERI* in Table 5-4.

Informative Note: This option may be more appropriate when the *addition* is large as compared to the existing *building*.

5.2 Alterations. *Alterations* to existing *dwelling units* shall be such that the altered *dwelling unit* uses no more energy than the existing *dwelling unit* prior to its *alteration*. ~~*Alterations* to existing *dwelling units* shall comply with Sections 5.2.1 through 5.2.4.~~ Alterations shall comply with Sections 5.2.1 or 5.2.2

5.2.1 Prescriptive Compliance Alterations to existing dwelling units shall comply with Sections 5.2.1.1 through 5.2.1.4.

~~**5.2.1**~~ **5.2.1.1 Envelope Assemblies.** All new envelope *assemblies* comprising the *alteration* shall meet or exceed the envelope *assembly* characteristics of Table 6-3 and Table 7-2.

~~**5.2.2**~~ **5.2.1.2 Heating and Cooling Systems.** New heating, cooling, and duct systems that are part of the *alteration* shall comply with Section 7.2 and either Table 5-1 or Table 5-2.

~~**5.2.3**~~ **5.2.1.3 Service Water Heating Systems.** New *service water heating* systems that are part of the *alteration* shall comply with Section 7.4 and Table 5-3.

~~**5.2.4**~~ **5.2.1.4 Lighting.** The *alteration* of lighting systems, including the replacement of *light sources* plus *ballast*, power supplies, and *drivers,* in any *building space* or exterior area shall comply with the requirements in Section 7.5 applicable to that *space* or area. Such *alterations* shall include all *luminaires* and *controls* that are added, replaced, or removed. *Alterations* do not include routine maintenance or repair situations.

Exception to ~~5.2.4~~ 5.2.1.4: *Alterations* that involve less than 10% of the connected lighting load in a *space* or area need not comply with these requirements provided the *alteration* does not increase the installed connected lighting load.

5.2.2 No-Additional-Energy Option Alterations to existing dwelling units shall comply with Section 5.2.1.1, 5.2.1.4 and the alteration shall comply on a performance basis where the annual equivalent energy use of the alteration and the existing dwelling unit, taken together, is less than or equal to the annual equivalent energy use of the existing dwelling unit, where the equivalent energy use for fossil fuels is calculated in accordance with Equation 5-1.

5.3 Substantial Energy Alterations. *Substantial energy alterations* to existing *dwelling units* shall comply with the requirements of Section ~~5.2~~ 5.2.1.1, 5.2.1.4 and shall be planned, designed, and constructed to achieve the *ERI* by climate zone shown in Table 5-4.

Exception to 5.3: *Multifamily buildings* and *townhouses*.