

**ERRATA SHEET FOR  
ANSI/ASHRAE/IES STANDARD 90.1-2016 (I-P Edition)  
Energy Standard for Buildings Except Low-Rise Residential Buildings**

**April 9, 2025**

The corrections listed in this errata sheet apply to ANSI/ASHRAE/IES Standard 90.1-2016, I-P Edition. The first printing is identified on the outside back cover of the standard as “Product code: 86274 10/16”. Shaded items have been added since the previously published errata sheet dated June 15, 2023 was distributed.

**NOTICE:** ASHRAE now has a list server for Standing Standards Project Committee 90.1 (SSPC 90.1). Interested parties can now subscribe and unsubscribe to the list server and be automatically notified via e-mail when activities and information related to the Standard and the User’s Manual is available. To sign up for the list server please visit **Project Committee List Servers for Standard** on the Technology / Standards section of the ASHRAE website at <https://www.ashrae.org/technical-resources/standards-and-guidelines/project-committee-list-servers>.

<u>Page(s)</u>	<u>Erratum</u>
10	<p><b>Footnote 1 (bottom of page).</b> Change the URL for the schedules and internal loads as shown below.</p> <p>1. Schedules and internal loads by <i>building</i> area type are at <a href="http://sspc901.ashraeps.org/documents.php">http://sspc901.ashraeps.org/documents.php</a>.</p>
13	<p><b>3.2 Definitions.</b> Under the definition for <i>daylight area, secondary sidelighted area</i>, last sentence, insert a space between “ftor” so it reads “5 ft or higher”.</p>
38	<p><b>3.3 Abbreviations and Acronyms.</b> Change IES from “Illumination Engineering Society of North America” to “Illuminating Engineering Society”.</p>
70	<p><b>5.9.1 Inspections.</b> Insert the following informative note immediately after Section 5.9.1. (<i>Note: Additions are shown in <u>underline</u>.</i>)</p> <p><b><u>Informative Note:</u></b> See Appendix E for commissioning references.</p>
80	<p><b>6.4.3.4.3 Damper Leakage.</b> Revise Section 6.4.3.4.3 as shown below. (<i>Note: Additions are shown in <u>underline</u> and deletions are shown in <del>strikethrough</del>.</i>)</p> <p><b>6.4.3.4.3 Damper Leakage</b> Where <i>outdoor air</i> supply and exhaust/relief dampers are required by Section <del>6.4.3.4.3.4.1</del>, they shall have a maximum leakage rate as indicated in Table 6.4.3.4.3 when tested in accordance with AMCA 500D.</p>
83	<p><b>6.4.3.11.1 Monitoring.</b> Revise the last sentence in Section 6.4.3.11.1 as shown below. (<i>Note: Additions are shown in <u>underline</u> and deletions are shown in <del>strikethrough</del>.</i>)</p> <p>The <i>efficiency</i> shall be calculated in <del>tons</del> <u>(COP) kW/ton</u> (see Appendix E).</p>

- 85 **6.4.4.2.2 Duct Leakage Tests.** Correct the equation in Section 6.4.4.2.2 as shown below.  
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

$$L_{max} = C_L P^{0.65}$$

where

- $L_{max}$  = maximum permitted leakage, cfm/ per 100 ft<sup>2</sup> of duct surface area  
 $C_L$  = 4, duct leakage class, cfm/ per 100 ft<sup>2</sup> of duct surface area ~~at 1~~ per in. of water<sup>0.65</sup>  
 $P$  = test pressure, which shall be equal to the design duct pressure class rating, in. of water

- 97 **6.5.3.6 Fractional Horsepower Fan Motors.** Revise item 3 of the Exceptions to 6.5.3.6 as shown below.  
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

**Exceptions to 6.5.3.6**

...

3. Motors covered by Table 10.8-3 or Table 10.8-4 ~~Table 10.8-4 or Table 10.8-5.~~

- 99 **6.5.4.4 Chilled- and Hot-Water Temperature Reset Controls.** In the Exceptions to 6.5.4.4, Exception 3, change the reference to “Section 6.5.4.1” to “Section 6.5.4.2”.

- 120 **Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps – Minimum Efficiency Requirements (Continued).** Revise the equipment type subcategory for “VRF groundwater source (cooling mode)” as shown in the attached Table 6.8.1-10.  
(Note: Deletions are shown in ~~strikethrough~~.)

- 127 **Table 6.8.3-1 Minimum Piping Insulation Thickness Heating and Hot Water Systems<sup>a,b,c,d,e</sup> (Steam, Steam Condensate, Hot-Water Heating and Domestic Water Systems).** Revise Note e of Table 6.8.3-1 as shown below.  
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

e. The table is based on steel pipe. Nonmetallic pipes schedule 80 thickness or less shall use the table values. For other nonmetallic pipes having *thermal resistance* greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per foot ~~metre~~ than a steel pipe of the same size with the insulation thickness shown in the table.

- 143 **Exception to 9.4.1.1(g).** Revise the Exception to 9.4.1.1(g) as shown below.  
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

**Exception to 9.4.1.1(g)**

This requirement does not have to be complied with in *spaces* that meet all four ~~three~~ of the following requirements:

1. The *space* has an installed *LPD* of no more than 0.80 W/ft<sup>2</sup>.
2. The *space* is lighted by *HID lamp*.
3. The *general lighting* power in the *space* is automatically reduced by at least 30% within 20 minutes of all occupants leaving the *space*.
4. Lighting load does not exceed 0.02 W/ft<sup>2</sup> multiplied by the *gross lighted area* of the *building*.

**144**      **94.1.1 Interior Lighting Controls.** Add the following exception to the Exceptions to 9.4.1.1(h) as shown below.

4. Lighting load not exceeding 0.02 W/ft<sup>2</sup> multiplied by the *gross lighted area* of the building.

**171**      **11.5.2 HVAC Systems.** Revise Section 11.5.2 as shown below.

(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

**11.5.2 HVAC Systems**

...

i...Unmet load hours for the proposed design or ~~baseline building design~~ budget building design shall not exceed 300 hours. The unmet load hours for the proposed design shall not exceed the unmet load hours for the budget building design. Alternatively, unmet load hours exceeding approved by the building official, provided that sufficient justification is given indicating that the accuracy of the simulation is not significantly compromised by these unmet loads.

...

k. **Kitchen Exhaust.** For kitchens with a total exhaust hood airflow rate greater than 5000 cfm, use a demand ventilation system on 75% of the exhaust air. The system shall reduce exhaust and replacement air system airflow rates by 50% for one half of the kitchen occupied hours in the ~~baseline design~~ budget building design. If the proposed design uses demand ventilation, the same airflow rate schedule shall be used. The maximum exhaust flow rate allowed for the hood or hood section shall meet the requirements of Section 6.5.7.2.2 for the numbers and types of hoods and appliances provided in the proposed design.

**174**      **Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget.** Revise Table 11.5.1 as shown below.

(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

**Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget**

**Proposed Design (Column A) Design Energy Cost (DEC)**

**1. Design Model**

...

b. All *conditioned spaces* in the proposed design shall be simulated as being both heated and cooled, even if no cooling or heating system is being installed. Temperature and humidity *control set points* and schedules, as well as *temperature control throttling range*, shall be the same for *proposed design* and ~~baseline building design~~ budget building design.

...

**Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget**

**Budget Building Design (Column B) Energy Cost Budget (ECB)**

**11. Service Water Heating**

...

Exceptions

... 3. For 24-hour facilities that meet the prescriptive criteria for use of condenser heat recovery systems described in Section 6.5.6.2, a system meeting the requirements of that section shall be included in the ~~baseline building design~~ budget building design, regardless of the exceptions to Section 6.5.6.2. If a condenser heat recovery system meeting the requirements described in Section 6.5.6.2 cannot be modeled, the requirement for including such a system in the actual building shall be met as a prescriptive requirement in accordance with Section 6.5.6.2 and no heat recovery system shall be included in the proposed design or budget building design.

- 183**      **12. Normative References.** In Section 12 make the following correction.  
(Note: Deletions are shown in ~~strikethrough~~.)
- AHRI 340/360-2015 (~~I-P~~) and AHRI 341/361-2015 (~~SI~~) Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment
- 249**      **Footnote 2 (bottom of page).** Change the URL for the schedules and internal loads as shown below.
2. Schedules and internal loads by *building* area type are found at <http://sspc901.ashraepcs.org/documents.php>.
- 257**      **Informative Appendix E Informative References.** In the table in Informative Appendix E make the following corrections. See attached.  
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)
- 282**      **G3.1.3.11 Heat Rejection (Systems 7, 8, 9, 12, and 13).** In Section G3.1.3.11 replace “water-side economizer” with “fluid economizer” in two places.
- 285**      **Table G3.1.1.-3 Baseline HVAC System Types.** In the first column of Table G3.1.1-3 change “residential” to “nonresidential” in three places. See attached.
- 311**      **Table H-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2013 (Continued).** For Addendum ad in Table H-1 change “unlabeled” to “unlabeled”.
- 376**      **Section Annex1-1: ASHRAE Standard 169-2013, Section A3: Climate Zone Definitions.** In Section A3, sentence immediately following item b.3 delete the extra “the” from the first word “Userthe” so the sentence reads “Use the third criteria below for determining the Dry/Humid threshold if not Marine (C)”.

**Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps— Minimum Efficiency Requirements (Continued)**

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF groundwater source (cooling mode)	<135,000 Btu/h	All	VRF multisplit system with heat recovery	16.2 EER	AHRI 1230
			59°F entering water		
			VRF multisplit system with heat recovery	16.0 EER	
	59°F entering water				
	≥135,000 Btu/h		VRF multisplit system with heat recovery	13.8 EER	
			59°F entering water		
VRF multisplit system with heat recovery		13.6 EER			
			59°F entering water		

**Informative Appendix E  
Informative References**

Subsection No.	Reference	Title/Source
<u>5.9.1</u>	<u>ASTM E2947-14</u>	<u>Standard Guide for Building Enclosure Commissioning</u>
<u>5.9.1</u>	<u>ASTM E2813-12</u>	<u>Standard Practice for Building Enclosure Commissioning</u>
<u>6.7.2.3-6.7.2.4</u>	NEBB Procedural Standards—2013	Procedural Standards for Building Systems Commissioning
<u>6.7.2.3.1</u>	AABC 2002	Associated Air Balance Council, National Standards for Total System Balance
<u>6.7.2.3.1</u>	ASHRAE Standard 111-2008	Measurement, Testing, Adjusting and Balancing of Building HVAC Systems
<u>6.7.2.4</u>	<u>ASHRAE Standard 202-2013</u>	<u>Commissioning Process for Buildings and Systems</u>
<u>6.7.2.4</u>	<u>ASHRAE Guideline 0-2013</u>	<u>The Commissioning Process</u>

**Table G3.1.1-3 Baseline HVAC System Types**

<b>Building Type, Number of Floors, and Gross Conditioned Floor Area</b>	<b>Climate Zones 3B, 3C, and 4 to 8</b>	<b>Climate Zones 0 to 3A</b>
Residential	System 1—PTAC	System 2—PTHP
Public assembly <120,000 ft <sup>2</sup>	System 3—PSZ-AC	System 4—PSZ-HP
Public assembly ≥120,000 ft <sup>2</sup>	System 12—SZ-CV-HW	System 13—SZ-CV-ER
Heated-only storage	System 9—Heating and ventilation	System 10—Heating and ventilation
Retail and 2 floors or fewer	System 3—PSZ-AC	System 4—PSZ-HP
Other <b>nonresidential</b> and 3 floors or fewer and <25,000 ft <sup>2</sup>	System 3—PSZ-AC	System 4—PSZ-HP
Other <b>nonresidential</b> and 4 or 5 floors and <25,000 ft <sup>2</sup> or 5 floors or fewer and 25,000 ft <sup>2</sup> to 150,000 ft <sup>2</sup>	System 5—Packaged VAV with reheat	System 6—Packaged VAV with PFP boxes
Other <b>nonresidential</b> and more than 5 floors or >150,000 ft <sup>2</sup>	System 7—VAV with reheat	System 8—VAV with PFP boxes