ERRATA SHEET FOR
ANSI/ASHRAE/IES STANDARD 90.1-2010 (SI 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 90.1-2010, SI edition. The first printing is identified on the outside back cover of the standard as "Product Code: 86269 4/11", the second printing is identified as "Product Code: 86269 8/11 *Errata noted in the list dated 07/20/2011 have been corrected.*", the third printing is identified as "3/12", and the fourth printing is identified as "10/13". Shaded items have been added since the previously published errata sheet dated March 17, 2025 was distributed. Items identified with an asterisk "*" apply only to the first printing and have already been incorporated into the second printing (included in 7/20/2011 errata). The item highlighted in yellow applies only to the third (3/12) and fourth (10/13) printings and are correct in the other printings of the standard.

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 http://www.ashrae.org/resources--publications/periodicals/listserves.

Page(s)	Erratum
Table of Contents	**Contents.** Change "Informative Appendix G" to "Normative Appendix G".
9*	**3.2 Definitions.** In the definition of ***essential facility***, second column on page 9 immediately following "8. Buildings and other structures having critical national defense functions.", delete the sentence "Buildings and other structures having critical national defense functions." This sentence is a duplicate of item 8 under the definition of ***essential facility***.
24	**5.4.3.1.3 Acceptable Material and Assemblies.** In the first sentence of Section 5.4.3.1.3a change "0.2 L/s·m^2" to "0.02 L/s·m^2".
24	**5.4.3.1.3 Acceptable Material and Assemblies.** In Section 5.4.3.1.3a and 5.4.3.1.3b delete the redundant text as shown below. *(Note: Deletions are shown in ~~strikethrough~~.)* **5.4.3.1.3 Acceptable Materials and Assemblies.** […] a. Materials that have an air permeance not exceeding 0.02 L/s·m^2 under a pressure differential of ~~0.02 L/s·m^2 at~~ 75 Pa when tested in accordance with ASTM E2178. The following materials meet these requirements: […] b. Assemblies of materials and components (sealants, tapes, etc.) that have an average air leakage not to exceed 0.2 L/s·m^2 under a pressure differential of ~~0.2 L/s·m^2 at~~ 75 Pa when

tested in accordance with ASTM E2357, ASTM E1677, ASTM E1680, or ASTM E283. The following
assemblies meet these requirements:
[…]

24 **5.4.3.1.3 Acceptable Materials and Assemblies.** In the first sentence of Section 5.4.3.1.3b change "0.02 L/s·m^2" to "0.2 L/s·m^2".

35 **5.5.4.2.3 Minimum Skylight Fenestration Area.** In Section 5.5.4.2.3 Exception f change "Section 9.4.1.3" to "Section 9.4.1.4" in two (2) places.

35 **5.5.4.4 Fenestration Solar Heat Gain Coefficient (SHGC).** In the title of Section 5.5.4.4 delete the "a" in front of "aGain".

36 **5.5.4.4.2 SHGC of Skylights.** Change exception d to Section 5.5.4.4.2 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

d. For *dynamic glazing*, the minimum SHGC shall be used to demonstrate compliance with this section. *Dynamic glazing* shall be considered separately from other skylights ~~*vertical fenestration*~~, and area-weighted averaging with other skylights ~~*vertical fenestration*~~ that is not *dynamic glazing* shall not be permitted.

41 **6.4.1.2.1 Water-cooled centrifugal chilling packages.** Change the calculation for Adjusted NPLV in the example in Section 6.4.1.2.1 as follows:
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Adjusted NPLV = 6.525 x 0.9282 x 1.0009 = 6.062 ~~5.53~~ COP

45 **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~~.)

$$L_{max} = C_L(P^{0.65}/1000)$$

where

L_{max} = maximum permitted leakage, L/s·per m^2 of duct surface area

C_L = ~~6~~ 0.00563, duct leakage class, L/s·per m^2 of duct surface area ~~at 250~~per Pa$^{0.65}$

P = test pressure, which shall be equal to the design duct pressure class rating, Pa

47 **TABLE 6.5.1.1.3B High-Limit Shutoff Control Settings for Air Economizers.** Revise Table 6.5.1.1.3B as shown in the attached.

52 **TABLE 6.5.4.5 Piping System Design Maximum Flow Rate in L/s.** Change "1" L/s to "11" L/s for Nominal Pipe Size 90 mm in column 2 (≤2000 Hours/Yr, Other).

61 **TABLE 6.8.1D Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners, and Room Air-Conditioner Heat Pumps – Minimum Efficiency Requirements.** In the first and third rows of Table 6.8.1D, in the column titled Minimum Efficiency, replace "EER" with "COP$_c$" as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
PTAC (cooling mode) standard size	All capacities	35.0°Cdb outdoor air	3.66 – (0.213 × Cap/1000)^c COP$_c$ (before 10/08/2012) 4.04 – (0.300 × Cap/1000)^c COP$_c$ ~~EER~~ (as of 10/08/2012)	AHRI 310/380

61 TABLE 6.8.1D Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners, and Room Air-Conditioner Heat Pumps –

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
PTAC (cooling mode) standard size	All capacities	35.0°Cdb outdoor air	3.66 – (0.213 × Cap/1000)[c] COP_c (before 10/08/2012) 4.04 – (0.300 × Cap/1000)[c] COP_c (as of 10/08/2012)	AHRI 310/380
PTAC (cooling mode) nonstandard size[b]	All capacities	35.0°C db outdoor air	3.19 – (0.213 × Cap/1000)[c] COPc	
PTHP (cooling mode) standard size	All capacities	35.0°C db outdoor air	3.60 – (0.213 × Cap/1000)[c] COP_c (before 10/08/2012) 4.10 – (0.300 × Cap/1000)[c] COP_c (as of 10/08/2012)	
PTHP (cooling mode) nonstandard size[b]	All capacities	35.0°C db outdoor air	3.16 – (0.213 × Cap/1000)[c] COPc	
PTHP (heating mode) standard size	All capacities	--	3.2 – (0.026 × Cap/1000)[c] COP_H (before 10/08/2012) 3.7 – (0.052 × Cap/1000)[c] COP_H (as of 10/08/2012)	
PTHP (heating mode) nonstandard size[b]	All capacities	--	2.9 – (0.026 × Cap/1000)[c] COP_H	

62 TABLE 6.8.1D Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners, and Room Air-Conditioner Heat Pumps – Minimum Efficiency Requirements (*continued*). In the fourth column titled "Test Procedure" change the superscript from "d" to "a" as shown below. Delete duplicate footnote "d" (same as footnote "a").

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

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[~~d~~a]

[a] Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
[b] Nonstandard size units must be factory *labeled* as follows: "MANUFACTURED FOR NONSTANDARD SIZE APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW STANDARD PROJECTS." Nonstandard size efficiencies apply only to units being installed in existing sleeves having an external *wall* opening of less than 16 in. high or less than 42 in. wide and having a cross-sectional area less than 670 $in.^2$.
[c] *Cap* means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h, use 7000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.
~~[d] Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.~~

69 **Table 6.8.3B Minimum Piping Insulation Thickness Cooling Systems (Chilled Water, Brine, and Refrigerant).** Change the insulation thickness requirement from "15 mm" to "13 mm" in three places.

70 **Section 7.4.3 Service Hot-Water Piping Insulation.** In Section 7.4.3 change "Table 6.8.3" to "Table 6.8.3A".

72 **TABLE 7.8 Performance Requirements for Water Heating Equipment.**
The 2010 SI edition of Standard 90.1 incorrectly included the I-P version of Table 7.8. See Table 7.8 for changes (attached). Table changed to reflect SI units.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

77 **9.4.1.2 Space Control.** Revise Section 9.4.1.2b as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

b. An *occupant sensor* or a timer switch shall be installed that automatically turns lighting off within 30 minutes of all occupants leaving a *space* in:

1. classrooms and lecture halls,
2. conference, meeting, and training rooms,
3. employee lunch and break rooms,
4. storage and supply rooms between 4.6~~15.24~~ m^2 and 92.9~~304.8~~ m^2,
5. rooms used for document copying and printing,
6. office *spaces* up to 23.2~~76.2~~ m^2,
7. restrooms, and
8. dressing, locker, and fitting rooms.

79 **Table 9.4.3B Individual Lighting Power Allowance for Building Exteriors.** For Nontradable Surfaces, Building facades, change "66 W/linear meter for each illuminated wall or surface length" to "8.2 W/linear meter for each illuminated wall or surface length".

80 **Table 9.4.3B Individual Lighting Power Allowance for Building Exteriors.** Revise Table 9.4.3B as shown. See Table 9.4.3B for changes (attached).
(Note: Deletions are shown in ~~strikethrough~~.)

83 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method.** In the first column on Table 9.6.1 change the space type as follows:
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Common Space Types[a]	LPD, W/m^2	RCR Threshold
Atrium		
First 13 m height	1.059 ~~0.10~~ per m (height)	NA
Height above 13 m	0.706 ~~0.07~~ per m (height)	NA

83 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method.** In the second column of Table 9.6.1 on page 83 change the column heading from "**LPD W/ft^2**" to "**LPD W/m^2**".

83 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method.** In the second column of Table 9.6.1 on page 83, under Building – Specific Space Types: Hospital – Corridor/Transition, change "Width < 8 ft" to "Width < 2.4 m".

84 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method.** In the first and second columns of Table 9.6.1 on page 84 change column headings from "**LPD W/ft^2**" to "**LPD W/m^2**".

84 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method *(continued)*.** In the second column of Table 9.6.1, under Retail Sales Area, change the reference from "Section 9.6.3(c)" to "Section 9.6.2(b)."

84 **TABLE 9.6.1 Lighting Power Densities Using the Space-by-Space Method.** In the second column of Table 9.6.1 on page 84 under the space type "Sports Arena" add the following:
(Note: Additions are shown in underline.)

Building - Specific Space Types	LPD W/m^2	RCR Threshold
Sports Arena		
Audience Seating	4.6	4
Court Sports Arena – Class 4	7.8	4
Court Sports Arena – Class 3	12.9	4
Court Sports Arena – Class 2	20.7	4
Court Sports Arena – Class 1	32.4	4
Ring Sports Arena	28.8	4

92 **TABLE 11.3.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget.**
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Table 11.3.1 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* and ~~*baseline building designs*~~ *budget building designs*.

…

Table 11.3.1 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

… c. 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*.

96 **11.3.2 HVAC Systems.**

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

11.3.2 HVAC Systems

…

i.…Unmet load hours for the proposed design or ~~*baseline building designs*~~ *budget building design* shall not exceed 300. 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 2400 L/s, 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 6.5.7.1.3 for the numbers and types of hoods and appliances provided in the proposed design.

112 **Table A3.1C Assembly U-Factors, C-Factors, *Ru, Rc*, and *HC* for Concrete Block Walls (*Continued)*.** In Table A3.1C for 200 mm block, Density 1,680 kg/m³, Partly Grouted, Cells Empty, change *HC* from "0.8" to "208".

146 **C5. MODELING ASSUMPTIONS.** Revise the text of Section C5 as shown below:
(Note: Additions are shown in underline.)

The following are modeling assumptions for the purposes of this appendix only and are not requirements for building operation.

199* **Informative Appendix E Informative References.** In the first paragraph of Informative Appendix E change the reference to "90.1-2007" to "90.1-2010".

209 **Normative Appendix G Performance Rating Method.** Correct the note immediately preceding Normative Appendix G as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

~~(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)~~

(This is a normative appendix and is part of this standard).

216 **TABLE G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance.** In item No. 11 Service Hot-Water Systems, under the Baseline Building Performance column, condition i, Exception 3, in the first sentence change "usuage" to "usage".

218 **TABLE G3.1.1.B Baseline System Descriptions.** For System No. 6 and No. 7 change the System Type as follows:
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

TABLE G3.1.1B Baseline System Descriptions

System No.	System Type	Fan Control	Cooling Type	Heating Type
6. Packaged VAV with PFP Boxes	Packaged rooftop VAV with parallel fan power boxes and reheat	VAV	Direct expansion	Electric resistance
7. VAV with Reheat	~~Packaged rooftop~~ VAV with reheat	VAV	Chilled water	Hot-water fossil fuel boiler

219-220 **G3.1.2.10 System Fan Power.** Change the equations in Section G3.1.2.10 as follows:

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

G3.1.2.10 System Fan Power. *System* fan electrical power for supply, return, exhaust, and relief (excluding power to fan-powered VAV boxes) shall be calculated using the following formulas:

For Systems 1 and 2,

P_{fan} = *CFMs* × 0.64 ~~0.3~~

For systems 3 through 8,

P_{fan} = input kW_i ~~× 746~~ / Fan Motor Efficiency

Efficiency For systems 9 and 10 (supply fan),

P_{fan} = *CFMs* × 0.64 ~~0.3~~

For Systems 9 and 10 (*non-mechanical cooling* fan if required by Section G3.1.2.8.2)

P_{fan} = CFM_{nmc} × 0.114 ~~0.054~~

where

P_{fan} = electric power to fan motor (watts)

and

input kW_i = input kilowatts of baseline fan motor from Table G3.1.2.9

Fan Motor Efficiency = the efficiency from Table 10.8B for the next motor size greater than the input kW using a totally enclosed fan cooled motor at 1800 rpm.

CFMs = the baseline *system* maximum design supply fan airflow rate in L/s

CFM_{nmc} = the baseline non-*mechanical cooling* fan airflow in L/s

220 **G3.1.2.11 Exhaust Air Energy Recovery.** Revise Section G3.1.2.11 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

G3.1.2.11 Exhaust Air Energy Recovery. Exhaust air energy recovery shall be modeled for the ~~*budget building design*~~ *baseline building design* in accordance with Section 6.5.6.1.

220* **TABLE G3.1.3.7 Type and Number of Chillers.** Revise Table G3.1.3.7 as follows:
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

TABLE G3.1.3.7 Type and Number of Chillers

Building Peak Cooling Load	Number and Type of Chiller(s)
≤ 1055 kW ~~£11,148 m²~~	1 water-cooled screw chiller

> 1055 kW ~~11,148 m²~~ , < 2110 kW ~~22,296 m²~~	2 water-cooled screw chillers sized equally
≥ 2110 kW ~~³22,296 m²~~	2 water-cooled centrifugal chillers minimum with chillers added so that no chiller is larger than 2813 kW, a□l sized equally

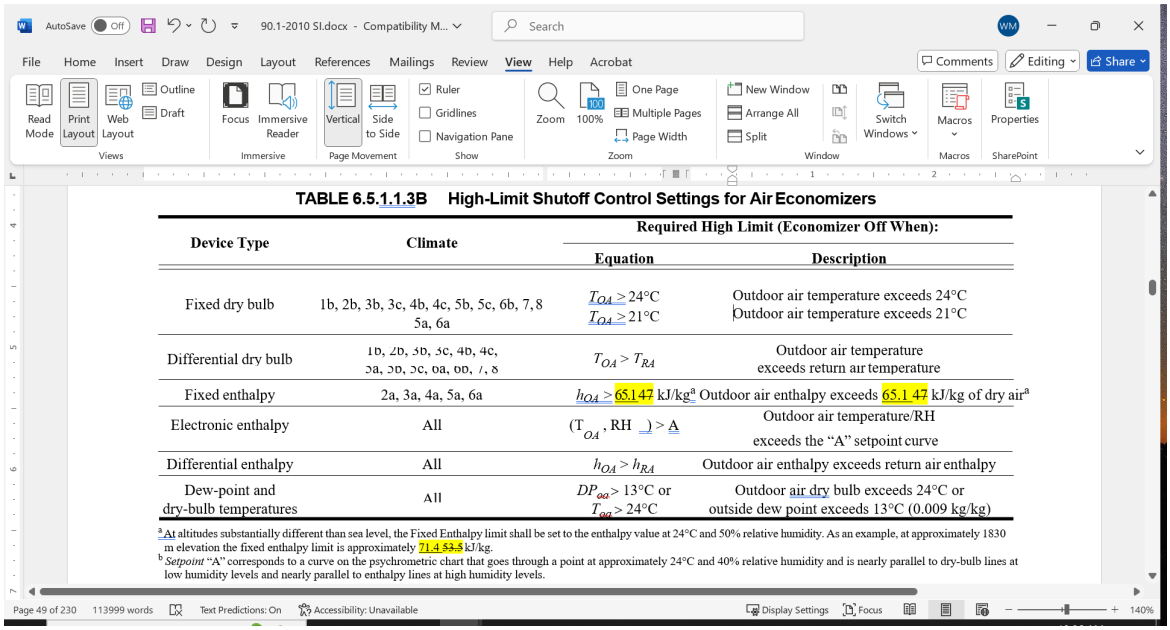

TABLE 6.5.1.1.3B High-Limit Shutoff Control Settings for Air Economizers

Device Type	Climate	Required High Limit (Economizer Off When): Equation	Description
Fixed dry bulb	1b, 2b, 3b, 3c, 4b, 4c, 5b, 5c, 6b, 7, 8 5a, 6a	T_{OA} ≥ 24°C T_{OA} ≥ 21°C	Outdoor air temperature exceeds 24°C Outdoor air temperature exceeds 21°C
Differential dry bulb	1b, 2b, 3b, 3c, 4b, 4c, 5a, 5b, 5c, 6a, 6b, 7, 8	$T_{OA} > T_{RA}$	Outdoor air temperature exceeds return air temperature
Fixed enthalpy	2a, 3a, 4a, 5a, 6a	h_{OA} ≥ 65.147 kJ/kg[a]	Outdoor air enthalpy exceeds 65.1 47 kJ/kg of dry air[a]
Electronic enthalpy	All	(T_{OA}, RH _) > A	Outdoor air temperature/RH exceeds the "A" setpoint curve
Differential enthalpy	All	$h_{OA} > h_{RA}$	Outdoor air enthalpy exceeds return air enthalpy
Dew-point and dry-bulb temperatures	All	DP_{oa} > 13°C or T_{oa} > 24°C	Outdoor air dry bulb exceeds 24°C or outside dew point exceeds 13°C (0.009 kg/kg)

[a] At altitudes substantially different than sea level, the Fixed Enthalpy limit shall be set to the enthalpy value at 24°C and 50% relative humidity. As an example, at approximately 1830 m elevation the fixed enthalpy limit is approximately 71.4 53.5 kJ/kg.

[b] *Setpoint* "A" corresponds to a curve on the psychrometric chart that goes through a point at approximately 24°C and 40% relative humidity and is nearly parallel to dry-bulb lines at low humidity levels and nearly parallel to enthalpy lines at high humidity levels.

Table 7.8
Performance Requirements for Water Heating Equipment

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Performance Required [a]	Test Procedure [b, c]
Electric table top water heaters	≤ 12 kW	Resistance ≥ 75.7 L	0.93 - ~~0.00132~~ 0.00035V EF	DOE 10 CFR Part 430
Electric water heaters	≤ 12 kW	Resistance ≥75.7 L	0.97- ~~0.00132~~ 0.00035V EF	DOE 10 CFR Part 430
	>12 kW	Resistance≥75.7 L	~~20 + 35~~ 5.9 + 5.3 $\sqrt{V}$ SL, W	Section G.2 of ANSI Z21.10.3
	≤ 24 Amps and ≤ 250 Volts	Heat Pump	0.93- ~~0.00132~~ 0.00035V EF	DOE 10 CFR Part 430
Gas storage water heaters	≤ 22.98 kW	≥75.7 L	0.67- ~~0.00190~~0.0005V EF	DOE 10 CFR Part 430
	>22.98 kW	<309.75 W/L	80% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL, W	Sections G.1 and G.2 of ANSI Z21.10.3
Gas instantaneous water heaters	>14.66 kW and <58.62 kW	≥309.75 W/L and <7.57 L	0.62- ~~0.00190~~0.0005V EF	DOE 10 CFR Part 430
	≥58.62 kW[d]	≥309.75 W/L and <37.85	80% E_t	Sections G.1 and G.2 of ANSI Z21.10.3
	≥58.62 kW	≥309.75 W/L and ≥37.85	80% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL, W	
Oil storage water heaters	≤ 30.78 kW	≥75.7 L	0.59- ~~0.00190~~0.0005V EF	DOE 10 CFR Part 430
	>30.78 kW	<309.75 W/L	78% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL, W	Sections G.1 and G.2 of ANSI Z21.10.3
Oil instantaneous water heaters	≤ 61.55 kW	≥309.75 W/L and <7.57 L	0.59- ~~0.00190~~0.0005V EF	DOE 10 CFR Part 430
	>61.55 kW	≥309.75 W/L and <37.85	80% E_t	Sections G.1 and G.2 of ANSI Z21.10.3
	>61.55 kW	≥309.75 W/L		

		and ≥37.85	78% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL, W	
Hot-water supply boilers, gas and oil	≥61.55 kW and <3663.8 kW	≥309.75 W/L and <37.85	80% E_t	Sections G.1 and G.2 of ANSI Z21.10.3
Hot-water supply boilers, gas		≥309.75 W/L and ≥37.85	80% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL, W	
Hot-water supply boilers, oil		≥309.75 W/L and ≥37.85	78% E_t (Q/~~800 + 110~~799 + 16.6 $\sqrt{V}$) SL,W	
Pool heaters oil and gas	All		78% E_t	ASHRAE 146
Heat pump pool heaters	All		4.0 COP	ASHRAE 146
Unfired storage tanks	All		R-2.2	(none)

[a] *Energy factor* (EF) and thermal *efficiency* (*Et*) are minimum requirements, while standby loss (SL) is maximum W based on a 38.9°C temperature difference between stored water and ambient requirements. In the EF equation, *V* is the rated volume in ~~gallons~~ liters. In the SL equation, *V* is the rated volume in ~~gallons~~ liters and *Q* is the nameplate input rate in W.

[b] Section 12 contains a complete specification, including the year version, of the referenced test procedure.

[c] Section G1 is titled "Test Method for Measuring Thermal Efficiency" and Section G2 is titled "Test Method for Measuring Standby Loss."

[d] Instantaneous *water heaters* with input rates below 58.62 W must comply with these requirements if the *water heater* is designed to heat water to temperatures 82.2°C or higher.

TABLE 9.4.3B Individual Lighting Power Allowances for Building Exteriors (*continued*)

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4
Entrances and gatehouse inspection stations at guarded facilities	No allowance	8.1 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.75~~ 8.1 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.75~~ 8.1 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.75~~ 8.1 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")
Loading areas for law enforcement, fire, ambulance, and other emergency service vehicles	No allowance	5.4 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.5~~ 5.4 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.5~~ 5.4 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")	~~0.5~~ 5.4 W/m^2 of uncovered area (covered areas are included in the "Canopies and Overhangs" section of "Tradable Surfaces")