ERRATA SHEET FOR
ANSI/ASHRAE/IES STANDARD 90.1-2022 (SI Edition)
Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

March 17, 2025

The corrections listed in this errata sheet apply to ANSI/ASHRAE/IES Standard 90.1-2022, SI Edition. The first printing is identified on the outside back cover of the standard as "Product code: 86329 12/22". Shaded items have been added since the previously published errata sheet dated January 23, 2025 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.

Page(s)	Erratum

2 **Foreword.** Make the following change to Building Envelope.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Building Envelope

- *A requirement was added to perform whole-building air-leakage testing and measurement on buildings less than ~~2300~~ 930 m^2.*

45 **5.4.3.4 Vestibules and Revolving Doors.**
(Note: Deletions are shown in ~~strikethrough~~.)

5.4.3.4 Vestibules and Revolving Doors. Vestibules and revolving *doors* shall be installed in accordance with this section.

[…]

5.4.3.4.3 Vestibule Envelope. The exterior surfaces of both conditioned vestibules and unconditioned vestibules shall comply with the *continuous air barrier* requirements.

Exceptions to 5.4.3.4~~.~~3:
[…]

71 **6.1.4 Alterations to Heating, Ventilating, Air Conditioning, and Refrigeration in Existing Buildings.**
(Note: Deletions are shown in ~~strikethrough~~.)

6.1.4 Alterations to Heating, Ventilation, Air Conditioning, and Refrigeration in Existing Buildings

6.1.4.1 New HVACR *equipment* as a direct replacement of existing HVACR *equipment* shall comply with the following sections as applicable for the *equipment* being replaced:

[…]

6.1.4.5 New and replacement *piping* shall comply with Section 6.4.4.1.

Exceptions to 6.1.4~~.~~5: Compliance shall not be required
[…]

78 **6.4.3.4.3 Damper Leakage.** Revise Section 6.4.3.4.3 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

6.4.3.4.3 Damper Leakage. Where *outdoor air* supply and exhaust/relief dampers are required by Section 6.4.3.4~~6.4.3.4.1~~, they shall have a maximum leakage rate as indicated in Table 6.4.3.4.3.

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

100 **Table 6.5.6.1.2-2 Exhaust Air Energy Recovery Requirements for Ventilation Systems Operating Greater than or Equal to 8000 Hours per Year.** Change "≥35" to "≥66" in Table 6.5.6.1.2-2 as shown below.
(Note: Additions are shown in underline and deletions are shown in strikethrough.)

Table 6.5.6.1.2-2 Exhaust Air Energy Recovery Requirements for Ventilation Systems Operating Greater than or Equal to 8000 Hours per Year

	% Outdoor Air at Full Design Airflow Rate							
	≥10% and <20%	≥20% and <30%	≥30% and <40%	≥40% and <50%	≥50% and <60%	≥60% and <70%	≥70% and <80%	≥80%
Climate Zone	Design Supply Fan Airflow Rate, L/s							
3C	NR	NR	NR	NR	NR	NR	NR	NR
0B, 1B, 2B, 3B, 4C, 5C	NR	≥9203	≥4248	≥2360	≥1888	≥1416	≥708	≥60
0A, 1A, 2A, 3A, 4B, 5B	≥1180	≥944	≥472	≥236	≥66~~35~~	≥60	≥50	≥40
4A, 5A, 6A, 6B, 7, 8	≥100	≥65	≥50	≥40	≥35	≥30	≥25	≥20

NR—Not required

131/132 **Table 6.8.1-16 Heat Pump and Heat Recovery Water-Chilling Packages—Minimum Efficiency Requirements.** Add the following footnotes to the title and heading in Table 6.8.1-16 as shown below.
(Note: Additions are shown in underline.)

Table 6.8.1-16 Heat Pump and Heat Recovery Water-Chilling Packages—Minimum Efficiency Requirements[k]

Heat Recovery Heating Full-Load
Efficiency (COP*HR*)[c,j,o], W/W

172 **10.1.1 Scope.** Revise Section 10.1.1 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

10. OTHER EQUIPMENT

10.1 General

10.1.1 Scope. This section applies to other *equipment* as described ~~in Section 10.4~~below.

174 **10.4.6.1 Part-Load Controls and Efficiency.** Revise Section 10.4.6.1 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

10.4.6.1 Part-Load Controls and Efficiency. Compressed air *systems* where the total motor power is 18 *kW* or more shall be equipped with appropriately sized *trim compressor(s)* and primary storage. The compressed air *system* shall comply with either of the following:
a. The compressed air *system* shall include one or more variable-speed-drive (VSD) compressors. For *systems* with more than one compressor, the total combined capacity of the VSD compressor(s) acting as *trim compressors* must be at least 1.25 times the largest net capacity increment between combinations of compressors. The compressed air *system* shall include primary storage of at least ~~8~~24 litres per L/s of the largest *trim compressor*.
b. The total effective trim capacity of a compressor *system* is the size of the continuous operational range where the specific power of the compressor(s) (*kW*/50 L/s) is within 15% of the specific power at their most efficient operating point. The total effective trim capacity of the *system* is the sum of the effective trim capacity of the *trim compressors*.
Systems shall include primary storage of at least ~~8~~32 litres per L/s of the largest *trim compressor* and meet (1) or (2) as follows:
1. S*ystems* with more than one compressor, not including backup compressors, shall include a compressor or set of compressors with total effective trim capacity at least the size of the largest net capacity increment between combinations of compressors, or the size of the smallest compressor, whichever is larger.
2. For s*ystems* with one compressor, not including backup compressors, the total effective trim capacity shall include the range from 70% to 100% of rated capacity.

217 **Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget.** Revise item 6.g.1 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

6. Lighting
…
g. *Automatic* lighting controls included in the *proposed design* but not required by Section 9.4.1 shall be modeled using the following methods for each luminaire under control:
1. *Manual*-ON or partial-auto-ON *occupancy sensors* shall be modeled by reducing the lighting schedule each hour by the *occupancy sensor* reduction factors in Table G3.7-1 and G3.7-2for the applicable *space* type multiplied by 1.25~~0.25~~.

310 **Table G-1 Modeling Requirements for Calculating Proposed Building Performance and Baseline Building Performance (Continued).** Revise Exception to (a) and (b) under 10. HVAC Systems as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Exception to (a) and (b): Where part-load performance of chillers in the *proposed design* is not available, and design temperature across the condenser is 5.56°C, the performance curves in Normative Appendix J ~~Appendix L~~, as referenced in Table J-1, shall be modeled for the specified chiller. When using performance curves from Normative Appendix J ~~Appendix L~~, chiller minimum part-load ratio (ratio of load to available capacity at a given simulation time step) and minimum compressor unloading ratio (part-load ratio below which the chiller capacity cannot be reduced by unloading and chiller is false loaded) shall be equal to 0.25. *Simulation programs* that do not use performance curves are permitted to use an alternative simulation method that results in the same performance as the curves described in Normative Appendix J ~~Appendix L~~.

320 **G3.3.2.3 Opaque Assemblies.** Revise Section G3.3.2.3 as shown below.

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

G3.3.2.3 Opaque Assemblies. *Opaque* assemblies shall be modeled with *U-factors* meeting the requirements in Section ~~5.1.3~~5.1.4.

320 **G3.3.2.4 Fenestration.** Revise Section G3.3.2.4 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

G3.3.2.4 Fenestration. *Fenestration U-factor*, *SHGC*, and *VT* shall be modeled as meeting the requirements in Section ~~5.1.3~~5.1.4.

The *fenestration area* for an *existing building* shall equal the existing *fenestration area* prior to the proposed work and shall be distributed on each face of the *building* in the same proportions as the *existing building.*

320 **G3.3.2.1 General Approach.** Revise Section G3.3.2.1 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

G3.3.2.1 General Approach. *System* and *equipment* included in the scope of retrofit shall be modeled at ~~*efficiency*~~ efficiency levels meeting the mandatory and prescriptive requirements in Sections 5 through 10 and as described in this section. All other baseline *systems* and *equipment* shall be modeled the same as in the *proposed design.*

320 **G3.3.2.8 HVAC Systems.** Revise Section G3.3.2.8 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

G3.3.2.8 HVAC Systems

a. Baseline *HVAC system* types shall be the same as the *proposed design*.
Exception to G3.3.2.8(a): If the *proposed design* includes variable refrigerant flow heat pumps or *single-zone systems* with *electric resistance* heat, then air source heat pumps shall be used in the *baseline design*.
b. *Baseline systems* shall meet the requirements in Section ~~6.1.3~~6.1.4. Chillers shall meet the *efficiency* requirements in Table 6.8.1-3 using Path A or Path B, the same as the *proposed design*. If the *proposed design*
meets both Path A and Path B requirements, Path A shall be used.

[…]

343 **Table G3.9.2 Performance Rating Method Baseline Elevator Motor.** Revise Table G3.9.2 as shown below.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Number of Stories (Including Basement)	Motor Type	Counterweight	Mechanical Efficiency	Motor Efficiency[a]
≤4	Hydraulic	None	58%	Table G3.9.3
>4	Traction	*Proposed design* counterweight, if not specified use weight of the car plus 40% of the rated load	64%	Table G3.9.1 ~~G3.9.3~~

375 375 **L2.1.5 Calculating TSPR.** Revise Equation L-1 as shown below.

L2.1.5 Calculating TSPR. $TSPR_p$ shall be calculated according to Equation L-1:

$$TSPR_p = \frac{\text{Loads}_p}{\text{HVACinput}_p} \quad \text{(L-1)}$$

386 **L5. TSPR METRIC FOR SITE HVAC ENERGY INPUT.** Revise Informative Note 2 in Section L5 as shown below.

Informative Notes:
…
• For ~~source~~ *site energy*, replace Table 6.6.2.2 MPF values with those in Informative Table L4-4.
• For ~~*site*~~ source *energy*, replace Table 6.6.2.2 MPF values with those in Informative Table L4-5.

387 **Table L4.3.2-1 TSPR Reference Building Design HVAC Complex Systems**. Update Table L4.3.2-1 as shown in the attached. Change highlighted in yellow.

394 **Table M-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2019.** Update the Description of Changes for Addendum t as shown in the attached. Change highlighted in yellow.

395 **Table M-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2019.** Revise Table M-1 as shown in the attached, for Addenda ac and ar.
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

400-414 **Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County.** Replace Table Annex1-1 with the attached.

Table 6.5.1.1.3 High-Limit Shutoff Control Settings for Air Economizers [a]

Control Type	Allowed Only in Climate Zone at Listed Set Point	Required High-Limit Set Points (Economizer Off when):	
		Equation	Description
Fixed dry-bulb temperature	0B, 1B, 2B, 3B, 3C, 4B, 4C, 5B, 5C, 6B, 7, 8	T_{OA} > 24°C	*Outdoor air* temperature exceeds 24°C
	5A, 6A	T_{OA} > 21°C	*Outdoor air* temperature exceeds 21°C
	0A, 1A, 2A, 3A, 4A,	T_{OA} > 18°C	*Outdoor air* temperature exceeds 18°C
Differential dry-bulb temperature	0B, 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 with fixed dry-bulb temperature	All	h_{OA} > 65.1 ~~47~~ kJ/kg [b] or T_{OA} > 24°C	*Outdoor air* enthalpy exceeds 65.1 ~~47~~ kJ/kg [b] of dry air [b] or *outdoor air* temperature exceeds 24°C
Differential enthalpy with fixed dry-bulb temperature	All	$h_{OA} > h_{RA}$ or T_{OA} > 24°C	*Outdoor air* enthalpy exceeds return air enthalpy or *outdoor air* temperature exceeds 24°C

a. Devices with selectable rather than adjustable *set points* shall be capable of being set to within 1.1°C and 3.4kJ/kg of the *set point* listed.

b. At altitudes substantially different than sea level, the fixed enthalpy limit shall be set to the enthalpy value at 24°C and 50% rh. As an example, at approximately 1830 m elevation, the fixed enthalpy limit is approximately 71.4 ~~53.5~~ kJ/kg.

Table L4.3.2-1 TSPR Reference Building Design HVAC Complex Systems

Building Type Parameter	Large Office (warm) [a]	Large Office (cold) [b]	School (warm) [a]	School (cold) [b]
System type	*VAV/reheat* water-cooled chiller/ electric *reheat* with parallel fan powered boxes	*VAV/reheat* water-cooled chiller/ gas *boiler*	*VAV/reheat* water-cooled chiller/ electric *reheat* with parallel fan powered boxes	*VAV/reheat* water-cooled chiller/ gas *boiler*
Fan control	VSD, no static pressure *reset*	VSD, no static pressure *reset*	VSD, no static pressure *reset*	VSD, no static pressure *reset*
Main fan power (W·s/L) proposed ≥MERV13	2.485	2.485	2.485	2.485
Main fan power (W·s/L) proposed <MERV13	2.274	2.274	2.274	2.274
Zonal fan power, W·s/L	0.75	NA	0.75	NA
Minimum zone airflow fraction	1.5 × V_{oz}	1.5 × V_{oz}	1.2 × V_{oz}	1.2 × V_{oz}
Heat/cool sizing factor	1.25/1.15	1.25/1.15	1.25/1.15	1.25/1.15
Outdoor air economizer	No	Yes except 4A	No	Yes except 4A
Occupied *outdoor air* (= proposed)	Sum(V_{oz})/0.75	Sum(V_{oz})/0.75	Sum(V_{oz})/0.65	Sum(V_{oz})/0.65
Energy recovery ventilator *enthalpy recovery ratio* bypass; SAT *set point*	NA	NA	50%; no bypass	50%; 60°F except 4A
Demand control ventilation	No	No	No	No
Cooling source	2 water-cooled centrif chillers	2 water-cooled centrif chillers	2 water-cooled screw chillers	2 water-cooled screw chillers
Cooling *efficiency*	Table G3.5.3	Table G3.5.3	Table G3.5.3	Table G3.5.3
Heating source (*reheat*)	*Electric resistance*	Gas *boiler*	*Electric resistance*	Gas *boiler*
Furnace or *boiler efficiency*	1.0	75% E_t	1.0	80% E_t
Condenser heat rejection	Axial-fan open-circuit cooling tower			
Cooling-tower *efficiency*, L/s·*kW* (See Section G3.2.3.11)	3.23	3.23	3.23	3.23
Open-circuit cooling-tower turndown (>1060 *kW*)	50%	50%	50%	50%
Pump (constant flow/variable flow)/range	Constant flow; 5.6°C range	Constant flow; 5.6°C range	Constant flow; 5.6°C range	Constant flow; 5.6°C range

Open-circuit cooling-tower approach	~~G3.1.3.11~~G3.2.3.11	~~G3.1.3.11~~G3.2.3.11	~~G3.1.3.11~~G3.2.3.11	~~G3.1.3.11~~G3.2.3.11
Cooling condenser *pump* power, W·s/L	300	300	300	300

Table M-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2019

Addendum	Sections	Description of Changes[a]	ASHRAE Standard Committee Approval	Co-sponsor Approval (IES)	ASHRAE BOD/Tech Council Approval	ANSI Approval
ba	9.4.1, Table 9.5.2.1, Appendix E, Table G3.7-1, Table G3.7-2	Updates the space-by-space LPD values based on efficacy improvements consistent with manufacturer data sheets. Makes various changes to lighting control requirements, including the addition of several new space types and a new requirement for multilevel control with continuous dimming in place of bilevel lighting control.	7/20/2022	9/8/2022	8/15/2022	9/9/2022
cc	10.5.1.1	Increases the prescriptive on-site renewable energy requirement added by Addendum by from 0.25 W/ft^2 to 0.5 W/ft^2.	7/20/2022	9/8/2022	8/15/2022	9/9/2022

Table M-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2019

Addendum	Sections	Description of Changes[a]	ASHRAE Standard Committee Approval	Cosponsor Approval (IES)	ASHRAE BOD/Tech Council Approval	ANSI Approval
t	3.2, 4.2.5, 5.1.3, 5.4.3, 5.7.2, 5.7.3.1, 5.8, 5.9.1.2, 6.4.4.2.1, 6.4.5, 6.5.1, Table 12.5.1 (5), 12.5.3, 13, C1.5, C3.5.5.3, C3.6, C3.1.1.4, Table G3.1 (5), Table H-3	Adds requirement to perform whole-building air leakage testing and measurement on buildings less than ~~2300~~930 m^2, specifies performance requirements for compliance, references the applicable ASTM standard, and modifies relevant Section 3 terminology.	6/25/2022	6/17/2022	6/29/2022	7/29/2022

Table M-1 Addenda to ANSI/ASHRAE/IES Standard 90.1-2019

Addendum	Sections	Description of Changes[a]	ASHRAE Standard Committee Approval	Co-sponsor Approval (IES)	ASHRAE BOD/Tech Council Approval	ANSI Approval
ac	3.2, 9.4.1.2, Table ~~9.2.3.1~~9.2.2.1, Table 9.6.1, Appendix E	Updates interior lighting power and minimum control requirements: adds a power exception for the germicidal function in luminaires and sources, removes exceptions for casinos and parking garage daylight transition zone lighting, and provides a definition for the latter item.	6/25/2022	6/17/2022	6/29/2022	7/29/2022
ar	3.2, Table ~~9.2.3.1~~9.2.2.1, 9.4.4, Appendix E	Adds requirements for indoor horticultural lighting based on a new metric, photosynthetic photon efficacy (PPE), developed in ANSI/ASABE S640.	7/20/2022	9/8/2022	8/15/2022	9/9/2022

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County

State/County	Zone
Alabama (AL)	
Zone 3A except...	
Baldwin	2A
Coffee	2A
Covington	2A
Dale	2A
Escambia	2A
Geneva	2A
Henry	2A
Houston	2A
Mobile	2A
Alaska (AK)	
Zone 7 except...	
Ketchikan Gateway	5C
Prince of Wales-Outer Ketchikan	5C
Sitka	5C
Haines	6A
Juneau	6A
Kodiak Island	6A
Skagway-Hoonah-Angoon	6A
Wrangell-Petersburg	6A
Denali	8
Fairbanks North Star	8
Nome	8
North Slope	8
Northwest Arctic	8
Southeast Fairbanks	8
Wade Hampton	8
Yukon-Koyukuk	8
Arizona (AZ)	
Zone 3B except...	
La Paz	2B
Maricopa	2B
Pima	2B
Pinal	2B
Yuma	2B
Gila	4B
Yavapai	4B
Apache	5B
Coconino	5B
Navajo	5B
Arkansas (AR)	
Zone 3A except...	
Baxter	4A
Benton	4A
Boone	4A
Carroll	4A
Fulton	4A
Izard	4A
Madison	4A
Marion	4A
Newton	4A
Searcy	4A
Stone	4A
Washington	4A
California (CA)	
Zone 3B except...	
Imperial	2B
Alameda	3C
Marin	3C
Mendocino	3C
Monterey	3C
Napa	3C
San Benito	3C
San Francisco	3C
San Luis Obispo	3C
San Mateo	3C
Santa Barbara	3C
Santa Clara	3C
Santa Cruz	3C
Sonoma	3C
Ventura	3C
Amador	4B
Calaveras	4B
El Dorado	4B
Inyo	4B
Lake	4B
Mariposa	4B
Trinity	4B
Tuolumne	4B
Del Norte	4C
Humboldt	4C

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Lassen	5B
Modoc	5B
Nevada	5B
Plumas	5B
Sierra	5B
Siskiyou	5B
Alpine	6B
Mono	6B
Colorado (CO)	
Zone 5B except...	
Baca	4B
Bent	4B
Las Animas	4B
Otero	4B
Prowers	4B
Alamosa	6B
Archuleta	6B
Chaffee	6B
Conejos	6B
Costilla	6B
Dolores	6B
Eagle	6B
Moffat	6B
Ouray	6B
Rio Blanco	6B
Saguache	6B
San Miguel	6B
Clear Creek	7
Grand	7
Gunnison	7
Hinsdale	7
Jackson	7
Lake	7
Mineral	7
Park	7
Pitkin	7
Rio Grande	7
Routt	7
San Juan	7
Summit	7
Connecticut (CT)	
Zone 5A	
Delaware (DE)	
Zone 4A	
District of Columbia (DC)	
Zone 4A	
Florida (FL)	
Zone 2A except...	
Broward	1A
Miami-Dade	1A
Monroe	1A
Palm Beach	1A
Georgia (GA)	
Zone 3A except...	
Appling	2A
Atkinson	2A
Bacon	2A
Baker	2A
Berrien	2A
Brantley	2A
Brooks	2A
Bryan	2A
Calhoun	2A
Camden	2A
Charlton	2A
Chatham	2A
Clinch	2A
Coffee	2A
Colquitt	2A
Cook	2A
Decatur	2A
Dougherty	2A
Early	2A
Echols	2A
Effingham	2A
Evans	2A
Glynn	2A
Grady	2A
Irwin	2A
Jeff Davis	2A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Lanier	2A
Liberty	2A
Long	2A
Lowndes	2A
McIntosh	2A
Miller	2A
Mitchell	2A
Pierce	2A
Seminole	2A
Tattnall	2A
Thomas	2A
Tift	2A
Toombs	2A
Ware	2A
Wayne	2A
Worth	2A
Hawaii (HI)	
Zone 1A	
Idaho (ID)	
Zone 6B except...	
Ada	5B
Benewah	5B
Canyon	5B
Cassia	5B
Clearwater	5B
Elmore	5B
Gem	5B
Gooding	5B
Idaho	5B
Jerome	5B
Kootenai	5B
Latah	5B
Lewis	5B
Lincoln	5B
Minidoka	5B
Nez Perce	5B
Owyhee	5B
Payette	5B
Power	5B
Shoshone	5B
Twin Falls	5B
Washington	5B
Illinois (IL)	
Zone 5A except...	
Alexander	4A
Bond	4A
Calhoun	4A
Christian	4A
Clark	4A
Clay	4A
Clinton	4A
Coles	4A
Crawford	4A
Cumberland	4A
Edwards	4A
Effingham	4A
Fayette	4A
Franklin	4A
Gallatin	4A
Greene	4A
Hamilton	4A
Hardin	4A
Jackson	4A
Jasper	4A
Jefferson	4A
Jersey	4A
Johnson	4A
Lawrence	4A
Macoupin	4A
Madison	4A
Marion	4A
Massac	4A
Monroe	4A
Montgomery	4A
Perry	4A
Pope	4A
Pulaski	4A
Randolph	4A
Richland	4A
Saline	4A
Shelby	4A
St. Clair	4A
Union	4A
Wabash	4A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Washington	4A
Wayne	4A
White	4A
Williamson	4A
Indiana (IN)	
Zone 5A except...	
Bartholomew	4A
Brown	4A
Clark	4A
Clay	4A
Crawford	4A
Daviess	4A
Dearborn	4A
Decatur	4A
Dubois	4A
Fayette	4A
Floyd	4A
Franklin	4A
Gibson	4A
Greene	4A
Harrison	4A
Hendricks	4A
Jackson	4A
Jefferson	4A
Jennings	4A
Johnson	4A
Knox	4A
Lawrence	4A
Marion	4A
Martin	4A
Monroe	4A
Morgan	4A
Ohio	4A
Orange	4A
Owen	4A
Perry	4A
Pike	4A
Posey	4A
Putnam	4A
Ripley	4A
Rush	4A
Scott	4A
Shelby	4A
Spencer	4A
Sullivan	4A
Switzerland	4A
Union	4A
Vanderburgh	4A
Vigo	4A
Warrick	4A
Washington	4A
Iowa (IA)	
Zone 5A except...	
Cerro Gordo	6A
Clay	6A
Dickinson	6A
Emmet	6A
Hancock	6A
Kossuth	6A
Lyon	6A
Mitchell	6A
O'Brien	6A
Osceola	6A
Palo Alto	6A
Sioux	6A
Winnebago	6A
Worth	6A
Kansas (KS)	
Zone 4A except...	
Cheyenne	5A
Decatur	5A
Gove	5A
Greeley	5A
Jewell	5A
Logan	5A
Norton	5A
Phillips	5A
Rawlins	5A
Republic	5A
Scott	5A
Sheridan	5A
Sherman	5A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Smith	5A
Thomas	5A
Wallace	5A
Wichita	5A
Kentucky (KY)	
Zone 4A	
Louisiana (LA)	
Zone 2A except...	
Bienville Parish	3A
Bossier Parish	3A
Caddo Parish	3A
Caldwell Parish	3A
Catahoula Parish	3A
Claiborne Parish	3A
Concordia Parish	3A
De Soto Parish	3A
East Carroll Parish	3A
Franklin Parish	3A
Grant Parish	3A
Jackson Parish	3A
La Salle Parish	3A
Lincoln Parish	3A
Madison Parish	3A
Morehouse Parish	3A
Natchitoches Parish	3A
Ouachita Parish	3A
Red River Parish	3A
Richland Parish	3A
Sabine Parish	3A
Tensas Parish	3A
Union Parish	3A
Vernon Parish	3A
Webster Parish	3A
West Carroll Parish	3A
Winn Parish	3A
Maine (ME)	
Zone 6A except...	
Aroostook	7
Maryland (MD)	
Zone 4A except...	
Allegany	5A
Garrett	5A
Massachusetts (MA)	
Zone 5A	
Michigan (MI)	
Zone 5A except...	
Alcona	6A
Alger	6A
Alpena	6A
Antrim	6A
Arenac	6A
Baraga	6A
Benzie	6A
Charlevoix	6A
Cheboygan	6A
Chippewa	6A
Clare	6A
Crawford	6A
Delta	6A
Dickinson	6A
Emmet	6A
Gladwin	6A
Gogebic	6A
Grand Traverse	6A
Houghton	6A
Iosco	6A
Iron	6A
Isabella	6A
Kalkaska	6A
Lake	6A
Leelanau	6A
Luce	6A
Mackinac	6A
Manistee	6A
Mason	6A
Mecosta	6A
Menominee	6A
Missaukee	6A
Montmorency	6A
Newaygo	6A
Oceana	6A
Ogemaw	6A
Ontonagon	6A
Osceola	6A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Oscoda	6A
Otsego	6A
Presque Isle	6A
Roscommon	6A
Schoolcraft	6A
Wexford	6A
Keweenaw	7
Marquette	7
Minnesota (MN)	
Zone 6A except...	
Fillmore	5A
Houston	5A
Winona	5A
Aitkin	7
Beltrami	7
Carlton	7
Cass	7
Clearwater	7
Cook	7
Crow Wing	7
Hubbard	7
Itasca	7
Kittson	7
Koochiching	7
Lake	7
Lake of the Woods	7
Mahnomen	7
Marshall	7
Norman	7
Pennington	7
Pine	7
Polk	7
Red Lake	7
Roseau	7
St. Louis	7
Wadena	7
Mississippi (MS)	
Zone 3A except...	
George	2A
Hancock	2A
Harrison	2A
Jackson	2A
Pearl River	2A
Stone	2A
Missouri (MO)	
Zone 4A except...	
Dunklin	3A
Pemiscot	3A
Adair	5A
Andrew	5A
Atchison	5A
Clark	5A
Daviess	5A
DeKalb	5A
Gentry	5A
Grundy	5A
Harrison	5A
Holt	5A
Knox	5A
Lewis	5A
Linn	5A
Livingston	5A
Macon	5A
Marion	5A
Mercer	5A
Nodaway	5A
Pike	5A
Putnam	5A
Ralls	5A
Schuyler	5A
Scotland	5A
Shelby	5A
Sullivan	5A
Worth	5A
Montana (MT)	
Zone 6B	
Nebraska (NE)	
Zone 5A	
Nevada (NV)	
Zone 5B except...	
Clark	3B
Carson City	4B

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Douglas	4B
Esmeralda	4B
Lincoln	4B
Lyon	4B
Mineral	4B
Nye	4B
New Hampshire (NH)	
Zone 6A except...	
Hillsborough	5A
Merrimack	5A
Rockingham	5A
Strafford	5A
New Jersey (NJ)	
Zone 4A except...	
Bergen	5A
Hunterdon	5A
Morris	5A
Passaic	5A
Somerset	5A
Sussex	5A
Warren	5A
New Mexico (NM)	
Zone 5B except...	
Chaves	3B
Dona Ana	3B
Eddy	3B
Hidalgo	3B
Lea	3B
Luna	3B
Otero	3B
Sierra	3B
Bernalillo	4B
Catron	4B
Curry	4B
DeBaca	4B
Grant	4B
Guadalupe	4B
Lincoln	4B
Quay	4B
Roosevelt	4B
Socorro	4B
Union	4B
Valencia	4B
New York (NY)	
Zone 5A except...	
Bronx	4A
Kings	4A
Nassau	4A
New York	4A
Queens	4A
Richmond	4A
Suffolk	4A
Chenango	6A
Clinton	6A
Delaware	6A
Essex	6A
Franklin	6A
Fulton	6A
Hamilton	6A
Herkimer	6A
Jefferson	6A
Lewis	6A
Madison	6A
Montgomery	6A
Oneida	6A
Otsego	6A
St. Lawrence	6A
Sullivan	6A
Ulster	6A
Warren	6A
North Carolina (NC)	
Zone 3A except...	
Alleghany	5A
Ashe	5A
Avery	5A
Buncombe	4A
Burke	4A
Caldwell	4A
Graham	4A
Haywood	4A
Henderson	4A
Jackson	4A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Macon	4A
Madison	4A
McDowell	4A
Mitchell	4A
Stokes	4A
Surry	4A
Swain	4A
Transylvania	4A
Watauga	5A
Wilkes	5A
Yadkin	4A
Yancy	5A
North Dakota (ND)	
Zone 6A except...	
Benson	7
Bottineau	7
Burke	7
Cavalier	7
Divide	7
Grand Forks	7
McHenry	7
Nelson	7
Pembina	7
Pierce	7
Ramsey	7
Renville	7
Rolette	7
Towner	7
Walsh	7
Ward	7
Ohio (OH)	
Zone 5A except...	
Adams	4A
Athens	4A
Brown	4A
Butler	4A
Clermont	4A
Clinton	4A
Fayette	4A
Franklin	4A
Gallia	4A
Greene	4A
Hamilton	4A
Highland	4A
Hocking	4A
Jackson	4A
Lawrence	4A
Madison	4A
Meigs	4A
Pickaway	4A
Pike	4A
Ross	4A
Scioto	4A
Vinton	4A
Warren	4A
Washington	4A
Oklahoma (OK)	
Zone 3A except...	
Alfalfa	4A
Craig	4A
Delaware	4A
Ellis	4A
Garfield	4A
Grant	4A
Harper	4A
Kay	4A
Major	4A
Nowata	4A
Osage	4A
Ottawa	4A
Washington	4A
Woods	4A
Woodward	4A
Beaver	4B
Cimarron	4B
Texas	4B
Oregon (OR)	
Zone 4C except...	
Baker	5B
Crook	5B
Deschutes	5B
Gilliam	5B

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Grant	5B
Harney	5B
Hood River	5B
Jefferson	5B
Klamath	5B
Lake	5B
Malheur	5B
Morrow	5B
Sherman	5B
Umatilla	5B
Union	5B
Wallowa	5B
Wasco	5B
Wheeler	5B
Pennsylvania (PA)	
Zone 5A except...	
Adams	4A
Berks	4A
Bucks	4A
Chester	4A
Cumberland	4A
Dauphin	4A
Delaware	4A
Franklin	4A
Lancaster	4A
Lebanon	4A
Montgomery	4A
Perry	4A
Philadelphia	4A
York	4A
Rhode Island (RH)	
Zone 5A	
South Carolina (SC)	
Zone 3A except...	
Beaufort	2A
Jasper	2A
South Dakota (SD)	
Zone 6A except...	
Bennett	5A
Bon Homme	5A
Brule	5A
Charles Mix	5A
Clay	5A
Douglas	5A
Gregory	5A
Haakon	5A
Hutchinson	5A
Jackson	5A
Jones	5A
Lyman	5A
Mellette	5A
Stanley	5A
Todd	5A
Tripp	5A
Union	5A
Yankton	5A
Tennessee (TN)	
Zone 4A except...	
Bedford	3A
Chester	3A
Coffee	3A
Crockett	3A
Davidson	3A
Decatur	3A
Dyer	3A
Fayette	3A
Franklin	3A
Gibson	3A
Giles	3A
Grundy	3A
Hamilton	3A
Hardeman	3A
Hardin	3A
Haywood	3A
Henderson	3A
Hickman	3A
Lauderdale	3A
Lawrence	3A
Lewis	3A
Lincoln	3A
Madison	3A
Marion	3A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone	State/County	Zone
Marshall	3A	Fayette	2A
Maury	3A	Fort Bend	2A
McNairy	3A	Freestone	2A
Moore	3A	Galveston	2A
Perry	3A	Goliad	2A
Rutherford	3A	Gonzales	2A
Shelby	3A	Grimes	2A
Tipton	3A	Guadalupe	2A
Wayne	3A	Hardin	2A
Williamson	3A	Harris	2A
Texas (TX)		Hays	2A
Zone 3A except...		Hill	2A
Cameron	1A	Houston	2A
Hidalgo	1A	Jackson	2A
Willacy	1A	Jasper	2A
Anderson	2A	Jefferson	2A
Angelina	2A	Jim Hogg	2A
Aransas	2A	Jim Wells	2A
Atascosa	2A	Johnson	2A
Austin	2A	Karnes	2A
Bastrop	2A	Kenedy	2A
Bee	2A	Kleberg	2A
Bell	2A	Lavaca	2A
Bexar	2A	Lee	2A
Bosque	2A	Leon	2A
Brazoria	2A	Liberty	2A
Brazos	2A	Limestone	2A
Brooks	2A	Live Oak	2A
Burleson	2A	Madison	2A
Caldwell	2A	Matagorda	2A
Calhoun	2A	McLennan	2A
Chambers	2A	McMullen	2A
Cherokee	2A	Milam	2A
Colorado	2A	Montgomery	2A
Comal	2A	Navarro	2A
Coryell	2A	Newton	2A
Dallas	2A	Nueces	2A
DeWitt	2A	Orange	2A
Duval	2A	Polk	2A
Ellis	2A	Refugio	2A
Falls	2A	Robertson	2A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone	State/County	Zone
San Jacinto	2A	Crosby	3B
San Patricio	2A	Culberson	3B
Starr	2A	Dawson	3B
Tarrant	2A	Dickens	3B
Travis	2A	Ector	3B
Trinity	2A	El Paso	3B
Tyler	2A	Fisher	3B
Victoria	2A	Foard	3B
Walker	2A	Gaines	3B
Waller	2A	Garza	3B
Washington	2A	Glasscock	3B
Wharton	2A	Hall	3B
Williamson	2A	Hardeman	3B
Wilson	2A	Haskell	3B
Bandera	2B	Hemphill	3B
Dimmit	2B	Howard	3B
Edwards	2B	Hudspeth	3B
Frio	2B	Irion	3B
Kinney	2B	Jeff Davis	3B
La Salle	2B	Jones	3B
Maverick	2B	Kent	3B
Medina	2B	Kerr	3B
Real	2B	Kimble	3B
Uvalde	2B	King	3B
Val Verde	2B	Knox	3B
Webb	2B	Loving	3B
Zapata	2B	Lubbock	3B
Zavala	2B	Lynn	3B
Andrews	3B	Martin	3B
Baylor	3B	Mason	3B
Borden	3B	McCulloch	3B
Brewster	3B	Menard	3B
Callahan	3B	Midland	3B
Childress	3B	Mitchell	3B
Coke	3B	Motley	3B
Coleman	3B	Nolan	3B
Collingsworth	3B	Pecos	3B
Concho	3B	Presidio	3B
Cottle	3B	Reagan	3B
Crane	3B	Reeves	3B
Crockett	3B	Runnels	3B

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone	State/County	Zone
Schleicher	3B	Sherman	4B
Scurry	3B	Swisher	4B
Shackelford	3B	Yoakum	4B
Sterling	3B	**Utah (UT)**	
Stonewall	3B	*Zone 5B except...*	
Sutton	3B	Washington	3B
Taylor	3B	Daggett	6B
Terrell	3B	Duchesne	6B
Terry	3B	Morgan	6B
Throckmorton	3B	Rich	6B
Tom Green	3B	Summit	6B
Upton	3B	Uintah	6B
Ward	3B	Wasatch	6B
Wheeler	3B	**Vermont (VT)**	
Wilbarger	3B	Zone 6A	
Winkler	3B	**Virginia (VA)**	
Armstrong	4B	*Zone 4A except...*	
Bailey	4B	Alleghany	5A
Briscoe	4B	Bath	5A
Carson	4B	Brunswick	3A
Castro	4B	Chesapeake city	3A
Cochran	4B	Clifton Forge city	5A
Dallam	4B	Covington city	5A
Deaf Smith	4B	Emporia city	3A
Donley	4B	Franklin city	3A
Floyd	4B	Greensville	3A
Gray	4B	Halifax	3A
Hale	4B	Hampton city	3A
Hansford	4B	Highland	5A
Hartley	4B	Isle of Wight	3A
Hockley	4B	Mecklenburg	3A
Hutchinson	4B	Newport News city	3A
Lamb	4B	Norfolk city	3A
Lipscomb	4B	Pittsylvania	3A
Moore	4B	Portsmouth city	3A
Ochiltree	4B	South Boston	3A
Oldham	4B	Southampton	3A
Parmer	4B	Suffolk city	3A
Potter	4B	Surry	3A
Randall	4B	Sussex	3A
Roberts	4B	Virginia Beach city	3A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Washington (WA)	
Zone 5B except...	
Clark	4C
Cowlitz	4C
Grays Harbor	4C
Jefferson	4C
King	4C
Lewis	4C
Mason	4C
Pacific	4C
Pierce	4C
Skagit	4C
Snohomish	4C
Thurston	4C
Wahkiakum	4C
Whatcom	4C
Clallam	5C
Island	5C
Kitsap	5C
San Juan	5C
Ferry	6B
Pend Oreille	6B
Stevens	6B
West Virginia (WV)	
Zone 5A except...	
Berkeley	4A
Boone	4A
Braxton	4A
Cabell	4A
Calhoun	4A
Clay	4A
Doddridge	4A
Fayette	4A
Gilmer	4A
Greenbrier	4A
Jackson	4A
Jefferson	4A
Kanawha	4A
Lewis	4A
Lincoln	4A
Logan	4A
Mason	4A
McDowell	4A
Mercer	4A
Mingo	4A
Monroe	4A
Morgan	4A
Nicholas	4A
Pleasants	4A
Putnam	4A
Raleigh	4A
Ritchie	4A
Roane	4A
Summers	4A
Tyler	4A
Upshur	4A
Wayne	4A
Webster	4A
Wirt	4A
Wood	4A
Wyoming	4A
Wisconsin (WI)	
Zone 6A except...	
Adams	5A
Calumet	5A
Columbia	5A
Crawford	5A
Dane	5A
Dodge	5A
Fond du Lac	5A
Grant	5A
Green	5A
Green Lake	5A
Iowa	5A
Jefferson	5A
Juneau	5A
Kenosha	5A
La Crosse	5A
Lafayette	5A
Milwaukee	5A
Monroe	5A
Outagamie	5A

Table Annex1-1 ASHRAE Standard 169-2013, Table B-1: U.S. Climate Zones by State and County *(Continued)*

State/County	Zone
Ozaukee	5A
Racine	5A
Richland	5A
Rock	5A
Sauk	5A
Vernon	5A
Walworth	5A
Washington	5A
Waukesha	5A
Waushara	5A
Winnebago	5A
Wyoming (WY)	
Zone 6B except...	
Goshen	5B
Laramie	5B
Platte	5B
Lincoln	7
Sublette	7
Teton	7
Commonwealth/Municipality	**Zone**
Puerto Rico (PR)	
Zone 1A except...	
Barraquitas	2B
Cayey	2B
Other	Zone
Pacific Islands (PI)	
Zone 1A except...	
Midway Sand Island	2A
Virgin Islands (VI)	
Zone 1A	