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ADDENDA

ANSI/ASHRAE/IES Addendum ca2 to
ANSI/ASHRAE/IES Standard 90.1-2022

Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and the American National Standards Institute on November 28, 2025, and by the Illuminating Engineering Society on November 13, 2025.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

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FOREWORD

Addendum ca2 modifies the additional efficiency requirements located in Section 11. This addendum covers three areas. It cleans up and modifies some existing credit language, it introduces new credits, and it modifies the number of required credits:

a. *Cleanup of existing energy credit language for lighting and cooking equipment:*
   1. *Lighting Efficiency Measures—added limits to achievable lighting credits to account for interactions between the different credits*
   2. *L02—revised measure to be lighting power based rather than floor area based*
   3. *L03—revised to align with Section 9 changes*
   4. *L05—revised to better align with Section 9 changes and life safety considerations*
   5. *L06—revised measure to be lighting-power based rather than floor-area based*
   6. *Q02—revised so that each type of eligible kitchen equipment can earn credits, making it easier to achieve this measure*
   7. *G01—revised measure to be lighting-power based rather than floor-area based*
   8. *G05—modified HVAC Cooling Energy Storage to align with Heating Energy Storage credit G10*
b. *Added new energy credits:*
   1. *E02: Reduced Air Leakage*
   2. *H08: Axial-Fan Open-Circuit Cooling-Tower Efficiency Improvement (with update to H03: HVAC Cooling Performance Improvement)*
   3. *W10: Ozone Laundry Sanitation*
   4. *W11: Low-Temperature Commercial Dishwashers*
   5. *G08: Electric Vehicle Charging Load Management*
   6. *G09: Electric Vehicle Power Export*
   7. *G10: HVAC Heating Energy Storage*
c. *Energy credits and load management credit requirement changes:*
   1. *This addendum modifies the required number of credits from a range of 28 to 50 to a range of 31 to 92, depending on building type and climate zone. This represents an average increase across all climate zones and building types of 79%. Note, this does not represent an energy savings of 79%.*
   2. *This addendum puts a limit of 70% (as a function of required credits) on the number of credits related to load management that can be utilized for compliance.*

PNNL provided the SSPC90.1 analysis showing two different energy credit packages or pathways. The first package is a cost-effective package that utilizes all available credits, including credits for increased equipment efficiency. This package did not use any of the new credits. The second package is a minimum efficiency package that looked at the credits that could be achieved without applying credits for increased equipment efficiency. The minimum efficiency package confirms a compliance pathway that allows the use of Federal minimum equipment efficiencies. This package did use some of the newly proposed credits.

Informative Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ca2 to Standard 90.1-2022

Modify Section 3 as shown (I-P and SI).

3. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

[. . .]

3.2 Definitions

[. . .]

AC-coupled: electrical connections between electrical sources, electrical storage, and electrical loads using alternating current.

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[. . .]

DC-coupled: electrical connections between electrical sources, electrical storage, and electrical loads using direct current.

[. . .]

demand response control: a control capable of receiving and automatically responding to a *demand response signal*.

demand response signal: a signal that provides actionable information to modify electricity consumption for a limited time period.

[. . .]

electric vehicle power export equipment (EVPE): the equipment, including the outlet on the vehicle, that is used to provide electrical power at voltages greater than 30V AC or 60V DC to loads external to the vehicle as the source of supply.

[. . .]

3.3 Abbreviations and Acronyms

[. . .]

DC	direct current

[. . .]

EVPE	*electric vehicle power export equipment*
EVSE	electric vehicle supply equipment

[. . .]

Modify Section 11.5.1 as shown (I-P and SI). Note, Items 11.5.1(a) through (e) are unchanged.

11.5.1 Energy Credits Required Projects shall achieve the total number of credits required in Table 11.5.1-1 based on the *building* use type and climate zone. *Buildings* ~~Projects with multiple *building* use types, *unconditioned* or *semiheated buildings*, parking garages, projects using *on-site renewable energy*, *alterations*, and *buildings* with separate shell-and-core and initial build-out *construction* permits~~ shall comply as follows:

[. . .]

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Delete existing Table 11.5.1-1 (not shown) and replace with the following (I-P and SI).

Table 11.5.1-1 Energy Credit Requirements by Building Use Type

Building Use Type[a]	Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Multifamily[b]	78	72	71	71	67	66	57	62	57	63	63	57	62	66	55	68	65	63	68
Health care[c]	60	54	60	59	59	56	58	55	61	57	53	57	52	53	60	56	55	58	56
Hotel/motel	79	75	71	70	63	59	56	56	54	51	53	50	50	51	47	55	48	53	53
Office[d]	78	76	77	83	74	74	75	73	69	74	74	69	77	77	68	80	77	82	79
Restaurant[e]	77	74	70	71	67	61	67	62	51	70	62	58	71	65	65	77	71	86	92
Retail	88	87	84	86	79	73	68	68	53	64	58	50	61	58	47	59	58	53	52
Education[f]	73	75	85	83	84	83	80	86	78	79	88	77	77	89	71	83	83	86	83
Warehouse[g]	71	69	79	74	78	80	68	82	85	79	88	80	67	74	77	62	74	66	56
Other[h]	39	38	38	38	35	35	33	35	33	35	34	31	34	35	31	36	34	35	35

a. All *building* use types include supporting functions such as corridors, break rooms, lobbies, restrooms, mechanical rooms, storage rooms, conference rooms, individual *equipment* and *computer rooms* with loads ≤10 *kW*, minor snack and beverage service without a commercial kitchen, and up to 10% of *gross floor area* of other *building* use types such as an office area less than 2000 ft^2 (190 m^2) in a nonoffice *building* use type.

b. "Multifamily" includes apartments, condominiums, dormitories, retirement living facilities, nontransient lodging, and *residential* portions of institutional care facilities, excluding prisons.

c. "Health Care" includes *buildings* within the scope of ASHRAE Standard 170 *ventilation* requirements that are dedicated to patient care, including related support areas of health care facilities, hospitals, nursing facilities, outpatient facilities, and surgery centers.

d. Office includes offices or clinics where medical, dental, psychotherapy, physical therapy or other services are provided that are not within the scope of ASHRAE Standard 170 *ventilation* requirements.

e. Restaurants with commercial kitchens and dining areas that are separate *buildings* or constructed under separate permits shall meet restaurant building use type requirements. Where restaurants are part of a larger building and are not seeking credit for either measure W01, W02, W03, or Q02, their area is permitted to be included with the larger *building* use type.

f. Education includes schools, lecture halls, gymnasiums, and libraries.

g. Warehouse that are *conditioned spaces,* including storage and distribution *building*s, refrigerated warehouses, and storage rental facilities.

h. All other *buildings*, including any *building* use not covered in the eight listed *building* use types above and data centers using Standard 90.4, shall use the energy credits required and available for the "Other" category.

Modify Section 11.5.2 as shown (I-P and SI).

11.5.2 Energy Credits Achieved. Projects shall comply with the following:

a. Energy credits achieved for the project shall be the sum of measure energy credits for individual measures included in the project.

b. Where a project contains multiple *building* use types, credits achieved for each *building* use type shall be weighted by the *gross floor area* of each *building* use type group to determine the weighted-average project energy credits achieved.

c. The combined renewable (R01) and load management (G01 through ~~G07~~G10) energy credits achieved through Section 11.5.2.6 and 11.5.2.8 shall be no less than 10% ~~limited to meeting 60%~~ of required energy credits by Section 11.5.1.

d. The combined envelope (E01 and E02), HVAC (H01 through H08), service water heating (W01 through W11), energy monitoring (P01), lighting (L01 through L06) and *equipment* (Q01 through Q03) energy credits achieved through credit measures in Sections 11.5.2.1 through 11.5.2.5 and 11.5.2.7 shall be no less than 30% of the energy credits required by Section 11.5.1.

e. Credits are available for the measures listed in Section 11.5.2.1 through 11.5.2.8~~.~~, and the ~~Base~~ base energy ~~credits~~ credit values are ~~shown in~~specified by Tables 11.5.3-1 through 11.5.3-9 by *building* use types ~~in each~~ and climate zone~~.~~

f. Measure *energy* credits achieved shall be determined in one of three ways, depending on the measure:

   ~~a~~1. The measure energy credit shall be the base *energy* credit for the measure, where no adjustment factor or formula is shown in the measure description (e.g., EC_{H02_base}).

   ~~b~~2. The measure energy credit shall be the base *energy* credit for the measure, adjusted by a factor or formula as stated in the measure description in this section. Where adjustments are applied, each measure *energy* credit shall be rounded to the nearest whole number (e.g., EC_{H02_adj}).

   ~~c~~3. The measure energy credit shall be by direct formula as stated in the measure description in this section, where each measure credit shall be rounded to the nearest whole number (e.g., EC_{H02_calc}).

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Informative Note: The number of energy credits achieved for each individual measure is determined in one of three ways:

1. The base energy credit for the measure shown in Tables 11.5.3-1 through 11.5.3-9 for the *building* use type and climate zone where no adjustment factor or formula is shown in the measure description. This applies to the following measures:
   - E02: 11.5.2.1.2, "Reduced Air Leakage"
   - H04: 11.5.2.2.4, "Residential Space HVAC Control"
   - H07: 11.5.2.2.7, "Improved HVAC Sequence of Operations"
   - W01: 11.5.2.3.1(a), "Heat Recovery for Service Hot-Water Preheating"
   - W05: 11.5.2.3.3(a), "Point-of-Use Water Heater"
   - W06: 11.5.2.3.3(b), "Thermostatic Balancing Valves"
   - W07: 11.5.2.3.4, "Dwelling-Unit Service Hot-Water Submeters"
   - W08: 11.5.2.3.5, ~~"Right-Sizing the Hot-Water Distribution System"~~ "Reduce Residential Service Hot-Water Fixture Flow"
   - W11: 11.5.2.3.8, "Low-Temperature Commercial Dishwashers"
   - P01: 11.5.2.4, "Energy Monitoring"
   - L03: 11.5.2.5.3, "Occupancy Sensor Control Areas"
   - ~~Q02: 11.5.2.7.2, "Efficient Kitchen Equipment"~~
   - Q03: 11.5.2.7.3, "Fault Detection and Diagnostics System"
   - G02: 11.5.2.8.2, "HVAC Load Management"
   - G03: 11.5.2.8.3, "Automated Shading Load Management"
   - G07: 11.5.2.8.7, "Building Thermal Mass"
2. The base credit for the measure shown in Tables 11.5.3-1 through 11.5.3-9 for the *building* use type and climate zone adjusted by proration factor or formula as stated in the measure description in this section. This applies to the following measures:
   - H02: 11.5.2.2.2, "HVAC Heating Performance Improvement"
   - H03: 11.5.2.2.3, "HVAC Cooling Performance Improvement"
   - H05: 11.5.2.2.5, "Ground-Source Heat-Pump System"
   - H06: 11.5.2.2.6, "Dedicated Outdoor Air System with Zone Fan Control"
   - H08: 11.5.2.2.8, "Axial-Fan Open-Circuit Cooling-Tower Efficiency Improvement"
   - W02: 11.5.2.3.1(b), "Heat-Pump Water Heater"
   - W03: 11.5.2.3.1(c), "Efficient Gas Water Heater"
   - W04: 11.5.2.3.2, "Service Hot-Water Piping Insulation Increase"
   - W09: 11.5.2.3.6, "Shower Drain Heat Recovery"
   - W10: 11.5.2.3.7, "Ozone Laundry Sanitation"
   - L02: 11.5.2.5.2, "Continuous Dimming and High-End Trim"
   - L04: 11.5.2.5.4, "Increased Daylighting Control Area"
   - L05:11.5.2.5.5, "Lighting Control for Multifamily Buildings"
   - L06: 11.5.2.5.6, "Reduce Interior Lighting Power"
   - R01: 11.5.2.6, "On-Site Renewable Energy"
   - Q01: 11.5.2.7.1, "Efficient Elevator Equipment"
   - Q02: 11.5.2.7.2, "Efficient Kitchen Equipment"
   - G01: 11.5.2.8.1, "Lighting Load Management"
   - G04: 11.5.2.8.4, "Electric Energy Storage"
   - G05: 11.5.2.8.5, "HVAC Cooling Energy Storage"
   - G06: 11.5.2.8.6, "Service Hot-Water Thermal Storage"
   - G08: 11.5.2.8.8, "Electric Vehicle Charging Load Management"
   - G09: 11.5.2.8.9, "Electric Vehicle Power Export"
   - G10: 11.5.2.8.10, "HVAC Heating Energy Storage"

Modify Section 11.5.2.1.1 and add new Sections 11.5.2.1 and 11.5.2.1.2 and Tables 11.5.2.1.2-1 and 11.5.2.1.2-2 as shown (I-P and SI).

11.5.2.1 Improved Building Envelope Performance. To achieve these credits, *building envelope* measures shall be installed in accordance with Section 11.5.2.1.1 or 11.5.2.1.2. The *building envelope* shall also comply with Sections 5.4 and 5.5.

11.5.2.1.1 E01: Improved Envelope Performance. ~~To achieve this credit, building envelope measures shall be installed to improve the energy performance of the project. Measure e~~ Energy credits for

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Table 11.5.2.1.2-1 E02: Reduced Air Leakage Credits for Multifamily Buildings (I-P)

Building Use Type	Maximum Measured Air Leakage, (cfm/sf @ 75 Pa)	Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Multifamily (credit/floor)[a]	0.30	0.4	0.5	0.2	0.2	0.1	0.1	0.3	0.0	0.0	0.1	0.0	0.0	0.9	0.2	0.0	1.2	0.6	0.9	0.4
	0.25	0.7	0.8	0.2	0.3	0.2	0.1	0.4	0.0	0.0	0.9	0.0	0.1	1.3	0.2	0.0	1.8	0.8	1.3	0.6
	0.20	0.9	1.0	0.3	0.4	0.2	0.2	0.5	0.0	0.0	1.2	0.0	0.1	1.8	0.3	0.0	2.3	1.1	1.7	0.7
	0.15	1.1	1.3	0.4	0.5	0.3	0.2	0.6	0.1	0.0	1.4	0.0	0.1	2.2	0.3	0.0	2.9	1.3	2.1	0.9
	0.10	1.3	1.5	0.4	0.6	0.3	0.2	0.7	0.1	0.0	1.6	0.0	0.1	2.6	0.3	0.0	3.4	1.5	2.5	1.1

a. E02 = Number of floors × tabular credits rounded to the nearest whole number.

Table 11.5.2.1.2-1 E02: Reduced Air Leakage Credits for Multifamily Buildings (SI)

Building Use Type	Maximum Measured Air Leakage, (L/s·m^2)	Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Multifamily (credit/floor)[a]	1.5	0.4	0.5	0.2	0.2	0.1	0.1	0.3	0.0	0.0	0.1	0.0	0.0	0.9	0.2	0.0	1.2	0.6	0.9	0.4
	1.3	0.7	0.8	0.2	0.3	0.2	0.1	0.4	0.0	0.0	0.9	0.0	0.1	1.3	0.2	0.0	1.8	0.8	1.3	0.6
	1.0	0.9	1.0	0.3	0.4	0.2	0.2	0.5	0.0	0.0	1.2	0.0	0.1	1.8	0.3	0.0	2.3	1.1	1.7	0.7
	0.76	1.1	1.3	0.4	0.5	0.3	0.2	0.6	0.1	0.0	1.4	0.0	0.1	2.2	0.3	0.0	2.9	1.3	2.1	0.9
	0.51	1.3	1.5	0.4	0.6	0.3	0.2	0.7	0.1	0.0	1.6	0.0	0.1	2.6	0.3	0.0	3.4	1.5	2.5	1.1

a. E02 = Number of floors × tabular credits rounded to the nearest whole number.

~~improvement of the~~ improved *building envelope energy* performance shall be determined ~~based on the following~~ as follows:

$$EC_{E01\_calc} = 1000 \times \frac{EPF_{E01\_base} - EPF_{prop}}{EPF_{E01\_base}}$$

where

EC_{E01_calc} = energy credits achieved for improved envelope performance

EPF_{E01_base} = *base envelope performance factor* calculated in accordance with Normative Appendix C

EPF_{prop} = *proposed envelope performance factor* calculated in accordance with Normative Appendix C

11.5.2.1.2 E02: Reduced Air Leakage. Where tested in accordance with the applicable method specified in Section 5.4.3.1.4, energy credits for measured *air leakage* less than the maximum *air leakage* permitted by Section 5.4.3.1.4 shall be determined as follows:

a. Energy credits for multifamily *buildings* shall be the product of the applicable value in Table 11.5.2.1.2-1 and the number of above-grade floors, rounded to the nearest whole number.
b. For all other *building* use types, energy credits shall be the applicable value specified in Table 11.5.2.1.2-2.

Modify Section 11.5.2.2 as shown (I-P and SI). Note, this section was previously modified by Addendum j.

11.5.2.2 Improved HVAC Performance. *Equipment* shall ~~meet applicable requirements of~~ comply with Sections 6.4 and 6.5. Credits shall be as ~~shown in~~specified by Section 11.5.3 or as specified in each subsection for *building* use types where base energy credits are included in ~~Section 11.5.3~~ section tables. Systems are permitted to achieve HVAC energy credits by ~~meeting the requirements of~~ complying with one of the following:

a. Section 11.5.2.2.1, H01
b. Section 11.5.2.2.2, H02
c. Section 11.5.2.2.3, H03

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d. Section 11.5.2.2.4, H04
e. Section 11.5.2.2.5, H05
f. Section 11.5.2.2.6, H06
g. Section 11.5.2.2.7, H07
h. Section 11.5.2.2.8, H08
~~h~~i. Any combination of H02, H03, H04, H05, H06, H07, H08
~~i~~j. Any combination H01, H04, and H07

Modify Section 11.5.2.2.3 as shown (I-P and SI).

11.5.2.2.3 H03: HVAC Cooling Performance Improvement. To achieve this credit, *space* cooling *equipment* *efficiency* shall ~~exceed the minimum cooling *efficiency* requirements by~~ be 5% or more efficient than the minimum *efficiency* ~~listed in~~ specified in the applicable ~~the~~ tables in Section 6.8.1 ~~or Informative Appendix F~~. For water-cooled chiller plants, heat rejection *efficiency* shall also ~~exceed~~ be greater than the minimum *efficiency* ~~listed in~~ specified in Table 6.8.1-7 by ~~at least~~ not less than the percentage improvement in ~~the~~ chiller *efficiency*. Credit H08 shall be used to calculate the energy credit for the improved heat rejection *efficiency* of axial-fan open-circuit cooling towers that is not in proportion to the percent of cooling *efficiency* improvement. The measure energy credit (EC_{CE}) for cooling *efficiency* improvement shall be determined as follows:

$$EC_{H03\_adj} = EC_{H03\_base} \times \frac{EI_{cool}}{0.05}$$

EC_{H03_adj} = energy credits achieved for cooling *efficiency* improvement
EC_{H03_base} = H03 base energy credits from Section 11.5.3
EI_{cool} = lesser of the percentage improvement (as a fraction) above minimum cooling *efficiency* requirements or ~~20% (0.20)~~50% (0.50) for DX systems or 30% (0.30) for air- and water-cooled chillers. Where cooling *equipment* with different minimum ~~efficiencies~~*efficiencies* are included in the *building*, a cooling capacity weighted-average improvement shall be used. Where multiple cooling performance requirements are provided, the *equipment* shall ~~exceed~~ be more efficient than the annualized *energy* or part-load requirement. Meeting both part-load and full-load *efficiencies* is not required.

Add new Section 11.5.2.2.8 as shown (I-P and SI).

11.5.2.2.8 H08: Axial-Fan Open-Circuit Cooling-Tower Efficiency Improvement. To achieve this credit, the heat rejection *efficiency* of axial-fan open-circuit cooling towers shall be 15% or more efficient than the minimum *efficiency* specified, at the applicable rating condition, by Table 6.8.1-7. The credit shall be calculated as follows:

$$EC_{H08\_adj} = EC_{H08\_base} \times \frac{EI_{CT} - EI_{cool}}{0.15}$$

where

EC_{H08_adj} = energy credits achieved for heat rejection efficiency improvement
EC_{H08_base} = H08 base energy credit from Section 11.5.3
EI_{CT} = lesser of the percentage cooling tower efficiency improvement (as a fraction) above minimum *efficiency* requirements from Table 6.8.1-7 or 60% (0.60)
EI_{cool} = percentage improvement (as a fraction) in cooling efficiency taken for H03.

Modify Section 11.5.2.3 as shown (I-P and SI).

11.5.2.3 Reduced Energy Use in Service Water Heating. Energy credits described in Section 11.5.2.3.1 through ~~11.5.2.3.6~~ 11.5.2.3.8 are available in any combination described in those sections for *building* use types where base energy credits are specified by Section 11.5.3 ~~tables~~.

Add new Sections 11.5.2.3.7 and 11.5.2.3.8 as shown (I-P and SI).

11.5.2.3.7 W10: Ozone Laundry Sanitation. To achieve this credit, one or more washing machines in a central laundry facility within the *building* shall be designed and installed to use ozone laundry systems for sanitation. Washing machines intended for individual use by *building* occupants are not eligible to achieve this credit. Washing machines with ozone laundry systems shall comply with the following:

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Table 11.5.2.1.2-2 E02: Reduced Air Leakage Credits for Buildings Other than Multifamily (I-P)

Building Use Type	Maximum Measured Air Leakage (cfm/ft^2 @ 75 Pa)	Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Health care	0.30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.25	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
	0.20	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	0
	0.15	1	1	0	0	1	0	0	0	0	1	0	0	1	1	0	1	1	1	1
	0.10	1	1	0	0	1	0	0	0	0	1	1	0	1	1	0	1	1	1	1
Hotel/motel	0.30	1	1	1	1	0	0	1	0	0	1	0	0	2	1	0	3	1	3	2
	0.25	2	2	1	1	1	0	1	0	0	2	0	0	3	1	0	5	2	4	3
	0.20	2	2	1	2	1	1	1	0	0	2	0	0	4	1	0	6	3	6	4
	0.15	3	3	1	2	1	1	1	0	0	3	1	0	5	1	0	8	3	7	5
	0.10	3	3	2	2	1	1	1	0	0	4	1	1	6	2	0	9	4	8	6
Office	0.30	1	1	1	0	0	0	1	0	0	2	0	1	3	1	0	4	2	3	2
	0.25	2	1	1	1	1	0	2	0	0	2	0	1	4	1	0	6	3	4	2
	0.20	2	1	1	1	1	0	2	1	0	3	0	1	5	2	1	7	4	6	3
	0.15	2	2	1	1	1	1	2	1	0	4	0	2	6	2	1	9	5	7	4
	0.10	3	2	2	1	2	1	3	1	0	5	1	2	7	2	1	11	6	9	4
Restaurant	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
	0.20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0
	0.15	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	2	1	0
	0.10	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	1	1
Retail	0.30	1	1	1	0	0	0	1	0	0	2	1	1	1	1	1	3	2	2	1
	0.25	1	1	1	1	1	1	2	1	0	3	1	2	2	2	1	5	3	3	2
	0.20	1	2	1	1	1	1	2	1	0	4	1	2	3	2	1	6	4	5	2
	0.15	2	2	1	1	1	1	2	1	0	5	2	3	5	3	2	7	5	6	3
	0.10	2	3	1	1	1	1	3	2	0	6	2	4	6	3	2	9	6	7	4
Education	0.30	1	1	1	0	1	0	1	0	0	1	0	0	2	0	0	2	1	2	1
	0.25	1	1	1	1	1	0	2	0	0	2	0	1	3	1	0	3	2	3	2
	0.20	1	2	1	1	1	0	3	0	0	3	0	1	4	1	0	5	2	4	2
	0.15	2	2	1	1	2	1	3	1	0	4	0	1	6	1	0	6	3	5	3
	0.10	2	2	2	1	2	1	3	1	0	4	0	1	7	1	0	7	4	6	3
Warehouse	0.30	3	4	1	2	1	1	6	2	0	12	4	6	17	10	4	20	14	17	9
	0.25	4	6	1	3	2	2	10	3	0	18	7	9	25	14	6	30	21	25	14
	0.20	6	9	2	3	2	3	13	4	0	24	10	12	33	19	7	40	28	33	18
	0.15	7	11	2	4	3	3	15	5	0	30	11	15	42	23	9	50	35	42	23
	0.10	9	14	3	5	4	4	18	6	0	36	14	18	50	28	11	60	42	50	28
Other	0.30	1	1	1	0	0	0	1	0	0	2	0	1	2	1	0	3	2	3	2
	0.25	2	1	1	1	1	0	2	0	0	2	0	1	3	1	0	5	3	4	2
	0.20	2	2	1	1	1	1	2	1	0	3	0	1	4	2	1	6	3	5	3
	0.15	2	2	1	1	1	1	2	1	0	4	1	2	6	2	1	8	4	6	4
	0.10	3	3	2	1	2	1	3	1	0	5	1	2	7	2	1	9	5	8	4

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Table 11.5.2.1.2-3 E02: Reduced Air Leakage Credits for Buildings Other than Multifamily (SI)

Building Use Type	Maximum Measured Air Leakage ($L/s \cdot m^2$)	Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Health care	1.5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0
	1.0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	1	0
	0.76	1	1	0	0	1	0	0	0	0	1	0	0	1	1	0	1	1	1	1
	0.51	1	1	0	0	1	0	0	0	0	1	1	0	1	1	0	1	1	1	1
Hotel/motel	1.5	1	1	1	1	0	0	1	0	0	1	0	0	2	1	0	3	1	3	2
	1.3	2	2	1	1	1	0	1	0	0	2	0	0	3	1	0	5	2	4	3
	1.0	2	2	1	2	1	1	1	0	0	2	0	0	4	1	0	6	3	6	4
	0.76	3	3	1	2	1	1	1	0	0	3	1	0	5	1	0	8	3	7	5
	0.51	3	3	2	2	1	1	1	0	0	4	1	1	6	2	0	9	4	8	6
Office	1.5	1	1	1	0	0	0	1	0	0	2	0	1	3	1	0	4	2	3	2
	1.3	2	1	1	1	1	0	2	0	0	2	0	1	4	1	0	6	3	4	2
	1.0	2	1	1	1	1	0	2	1	0	3	0	1	5	2	1	7	4	6	3
	0.76	2	2	1	1	1	1	2	1	0	4	0	2	6	2	1	9	5	7	4
	0.51	3	2	2	1	2	1	3	1	0	5	1	2	7	2	1	11	6	9	4
Restaurant	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0
	1.0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0
	0.76	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	2	1	0
	0.51	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	1	1
Retail	1.5	1	1	1	0	0	0	1	0	0	2	1	1	1	1	1	3	2	2	1
	1.3	1	1	1	1	1	1	2	1	0	3	1	2	2	2	1	5	3	3	2
	1.0	1	2	1	1	1	1	2	1	0	4	1	2	3	2	1	6	4	5	2
	0.76	2	2	1	1	1	1	2	1	0	5	2	3	5	3	2	7	5	6	3
	0.51	2	3	1	1	1	1	3	2	0	6	2	4	6	3	2	9	6	7	4
Education	1.5	1	1	1	0	1	0	1	0	0	1	0	0	2	0	0	2	1	2	1
	1.3	1	1	1	1	1	0	2	0	0	2	0	1	3	1	0	3	2	3	2
	1.0	1	2	1	1	1	0	3	0	0	3	0	1	4	1	0	5	2	4	2
	0.76	2	2	1	1	2	1	3	1	0	4	0	1	6	1	0	6	3	5	3
	0.51	2	2	2	1	2	1	3	1	0	4	0	1	7	1	0	7	4	6	3
Warehouse	1.5	3	4	1	2	1	1	6	2	0	12	4	6	17	10	4	20	14	17	9
	1.3	4	6	1	3	2	2	10	3	0	18	7	9	25	14	6	30	21	25	14
	1.0	6	9	2	3	2	3	13	4	0	24	10	12	33	19	7	40	28	33	18
	0.76	7	11	2	4	3	3	15	5	0	30	11	15	42	23	9	50	35	42	23
	0.51	9	14	3	5	4	4	18	6	0	36	14	18	50	28	11	60	42	50	28
Other	1.5	1	1	1	0	0	0	1	0	0	2	0	1	2	1	0	3	2	3	2
	1.3	2	1	1	1	1	0	2	0	0	2	0	1	3	1	0	5	3	4	2
	1.0	2	2	1	1	1	1	2	1	0	3	0	1	4	2	1	6	3	5	3
	0.76	2	2	1	1	1	1	2	1	0	4	1	2	6	2	1	8	4	6	4
	0.51	3	3	2	1	2	1	3	1	0	5	1	2	7	2	1	9	5	8	4

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a. Be sized to provide ozone concentrations of not less than 2.0 ppm per washing machine and designed to transfer ozone into the water using venturi injection or bubble diffusion.

b. Be specified on the *construction documents* submitted for permitting and installed prior to the issuance of the certificate of occupancy.

Base energy credit values shall be adjusted based on the washing machine capacity being served by ozone laundry systems using the following factor:

$$EC_{W10\_adj} = EC_{W10\_base} \times \frac{OzoneCapacity}{TotalCapacity}$$

where

EC_{W10_adj} = energy credits achieved for commercial ozone laundry systems

EC_{W10_base} = W10 base energy credit specified by Section 11.5.3

OzoneCapacity = the rated washing capacity, in pounds (kilograms), of all washing machine *equipment* in central laundry facilities to be provided with ozone laundry systems.

TotalCapacity = the rated washing capacity, in pounds (kilograms), of all washing machine *equipment* in central laundry facilities eligible to achieve this credit.

11.5.2.3.8 W11: Advanced Commercial Conveyor and Flight-Type Dishwashers. To achieve this credit, conveyor and flight-type dishwashing *equipment* in commercial kitchens shall comply with the applicable efficiency requirements specified in Table 11.5.2.7.2-3, use pumped fresh water rinse, use an automatic soil removal device, have an integral system diagnostics and controls interface, be specified on the *construction documents* submitted for permitting, and be installed prior to the issuance of the certificate of occupancy and comply with one of the following:

a. Be a low-temperature dishwasher that applies chemical sanitizing solution for final sanitation.

b. Be a high-temperature dishwasher that uses not less than 180°F(82°C) water for final sanitation, has an energy recovery device to preheat incoming cold water for wash and rinse cycles, and has a cold-water-only supply connection.

Modify Section 11.5.2.5 as shown (I-P and SI).

11.5.2.5 Lighting Efficiency Measures. ~~To achieve these credits, interior lighting in the project shall meet measure requirements in accordance with Sections 11.5.2.5.2, 11.5.2.5.3, 11.5.2.5.4, 11.5.2.5.5, or 11.5.2.5.6. Credits shall be as in Section 11.5.3. Use of multiple credits from this section shall be allowed. Functional testing of lighting controls shall comply with Section 9.9.~~Lighting efficiency base energy credit values shall be as specified in Section 11.5.3. Functional testing of lighting controls for lighting measures shall comply with Section 9.9.

a. L01 may not be used with any other lighting measures L02 through L06.

b. L02 and L06 may not be used together.

c. The sum of achieved energy credits from measures L02 through L06 and G01 shall not be more than 75% of the total available lighting credits from these measures for the applicable *building* use type and climate zone. Where a building includes multiple *building* use types, the available lighting credits shall be the weighted average based on the *gross floor area* of each *building* use type.

~~***Informative Note:*** Where lighting *efficiency* measures include reductions in lighting power, the lighting design should achieve ANSI/IES recommended practice for illuminance levels as referenced at www.ies.org/standards/lighting library/the interactive illuminance selector or in relevant IES recommended practice (RP) standards.~~

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Modify Sections 11.5.2.5.2 and 11.5.2.5.3 as shown (I-P and SI).

11.5.2.5.2 L02: ~~Continuous Dimming and~~ High-End Trim or Lumen Maintenance Control. To achieve this credit, ~~*general lighting* in~~ 75% or more of ~~*gross lighted floor area*~~ the installed *interior lighting power* shall have *luminaires* configured for ~~*continuous dimming*~~ *high-end trim* or *lumen maintenance* and shall comply with the following.

a. *Construction documents* for permitting shall specify the maximum initial ~~and tuned~~ *set points* for each *luminaire* control group.

b. *Set point* configuration setting shall be accessible only to authorized personnel.

~~a~~c. ~~*High-end trim,* shall be implemented, and *construction documents* shall state that maximum light output or power of controlled lighting~~ Initial lighting power shall be ~~initially~~ reduced by ~~at least~~ 15% or more from full output. ~~The average maximum light output or power of the controlled lighting shall be documented without *high-end trim* and with *high-end trim* in accordance with Section 9.9.1 to verify reduction of light output or power by at least 15% when tuned.~~

~~b~~d. ~~Where *lumen maintenance control* without lighting sensors, is used, controls shall be configured to limit the initial maximum lumen output or maximum lighting power to 85% or less of full light output or full power draw.~~ For hotel and multifamily *building* use types, the *gross lighted floor area* shall not include *dwelling units* or guest rooms

~~c~~e. ~~*High-end trim* and *lumen maintenance* controls shall be accessible only to authorized personnel.~~ *Manual* control *devices* shall not increase the lighting power above the maximum *set point.*

~~d~~f. ~~Where this credit is taken, the additional *interior lighting power allowance* in Section 9.5.2.3 related to dimming control is not permitted to be used.~~ ~~For hotel and multifamily *building* use types, the *gross lighted floor area* is for common areas shall not including *dwelling units* or guest rooms. Where *general lighting* in less~~ Less than 75% but ~~at least~~not less than 50% of the *installed interior lighting power* ~~*gross lighted floor area*~~ shall receive~~s *high-end trim*~~, the base credits from the tables in Section 11.5.3, ~~shall be~~ prorated as follows:

~~$$\frac{\text{\% Tuned area of } \textit{gross lighted floor area}}{75\%} \times \text{Base energy credits for L02}$$~~

$$EC_{L02\_adj} = \frac{LUM_{tuned}}{75\%} \times EC_{L02\_base}$$

where

EC_{L02_adj} = energy credits achieved for lighting *high-end trim* or *lumen maintenance* control

LUM_{tuned} = percentage of installed interior lighting power using *luminaires* configured for *high-end trim* or *lumen maintenance,* where $50\% \le LUM_{tuned} \le 75\%$

EC_{L02_base} = L02 base energy credit value specified by Section 11.5.3

~~**11.5.2.5.3 L03: Occupancy Sensor Control Areas.** To achieve this credit, either *buildings* shall use Section 9.3, "Simplified Building Method Compliance Path," or in all *spaces* where *automatic* partial OFF (See Section 9.4.1.1[g]) or *automatic* full OFF (See Section 9.4.1.1[h]) is not required, it shall be installed as follows:~~

~~a. *Automatic* shutoff or light reduction shall occur within 15 minutes of all occupants leaving each control zone.~~

~~b. For *spaces* with multiple control zones or *automatic* partial OFF control, *automatic* full shutoff shall occur within 15 minutes of all occupants leaving the *space*.~~

~~c. For *spaces* with one control zone, *automatic* full OFF control shall be used.~~

~~d. All areas of the project with *automatic* partial OFF or *automatic full* OFF control shall have one *control device* for every 600 ft^2 of *gross lighted area*.~~

~~Where this credit is taken, additional *interior lighting power allowance* in Section 9.5.2.3 related to *occupancy sensor control* shall not be used.~~

~~**Exception to 11.5.2.5.3:** Exception to *automatic* full OFF control requirement: stairwells.~~

11.5.2.5.3 L03: Occupancy Sensor Control Areas. To achieve this credit, *buildings* shall comply with one of the following:

a. Section 9.3, "Simplified Building Method Compliance Path,"

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b. Where a space type in Table 9.5.2.1-1 or Table 9.5.2.1-2 specifies ADD2 for *occupancy sensors* shutoff control, *occupancy sensors* serving the space shall be installed and configured as follows:
   1. *Occupancy sensors* shall shut off all lighting in each control zone within no more than 15 minutes of all occupants leaving such control zone.
   2. The *occupancy sensor* shutoff control zones shall not average more than 600 ft^2 (56 m^2) and no single zone more than 900 ft^2 (84 m^2).

Exception to 11.5.2.5.3: *Automatic* full OFF is not required for stairwells.

Modify Section 11.5.2.5.5 as shown (I-P and SI).

11.5.2.5.5 L05: Lighting Control for Multifamily Buildings

a. ~~Common-area restrooms, laundry rooms, storage rooms, utility rooms, and garages shall have *automatic* full OFF control in accordance with Section 9.4.1.1(h).~~ Stairwells, lobbies, and corridors shall have *occupancy sensors* with reduction in accordance with Section 9.4.1.1(g). Controls shall reduce *general lighting* in the *space* by 66% or more of lighting power within 15 minutes of all occupants leaving the spaces.

b. ~~Stairwells, lobbies, and corridors shall have *automatic* partial OFF in accordance with Section 9.4.1.1(g) controls that shall reduce *general lighting* power in the *space* by at least 66% of full lighting power within 15 minutes of all occupants leaving the *space*.~~ All non *dwelling unit spaces* not listed in 11.5.2.5.5(a) shall have *occupancy sensor* shutoff in accordance with section 9.4.1.1(h).

c. c. Each *dwelling unit* shall have a main control by the ~~main~~ primary entrance that turns off not less than 75% of permanently installed interior *luminaires* ~~all the lights~~ and all switched receptacles in the *dwelling unit*. Not less than two switched receptacles shall be provided in living and sleeping rooms or areas and clearly identified. All switched receptacles shall be located within 12 in. of an unswitched receptacle. The main control shall be permitted to have two controls, one for permanently wired lighting and one for switched receptacles. The main controls shall ~~should~~ be clearly identified as "lights ~~master~~main off" and "switched outlets ~~master~~main off".

Exception to 11.5.2.5.5: ~~Alternatively, where all permanently wired lighting is~~ Lighting controlled by *occupancy sensors* in accordance with 9.4.1.1(h)~~, only the switched outlets are required to be master switched~~. ~~Alternatively, stairwells are permitted to be excluded from item (b) and measure credits shall be one less than L05 base credits from Section 11.5.3.~~

11.5.2.5.6 L06: Reduce Interior Lighting Power. To achieve this credit, the building shall use Section 9.3, "Simplified Building Method Compliance Path," or the *installed interior lighting power*, ~~less~~excluding any additional lighting ~~allowed from~~ permitted by Section 9.5.2.2, shall be 95% or less than the *interior lighting power allowance,* ~~less~~excluding any additional lighting ~~allowed~~ ~~in~~ permitted by Section 9.5.2.2. In multifamily, dormitory, hotel, and motel *buildings*, the credit ~~is~~ shall be calculated for ~~common~~ all areas excluding *dwelling units*, dormitory living quarters, fire station sleeping quarters, and guest rooms ~~other than *dwelling units* and guest rooms~~. Energy credits shall not be credited more ~~greater~~ than ~~two~~ 2 times the L06 base energy credit ~~from~~ specified by Section 11.5.3 and shall be determined as follows:

$$\sout{EC_{L06\_adj} = EC_{sim} + EC_{L06\_base} \times 20 \times \frac{LPA_{net} - LP_{net}}{LPA_{net}}}$$

$$EC_{L06\_adj} = EC_{L06\_base} \times LP_{DCCF} \times 20 \times \frac{LPA_{net} - LP_{net}}{LPA_{net}}$$

EC_{L06_adj} = energy credits achieved for lighting power reduction

~~EC_{sim} = EC_{L06_base} where *buildings* use Section 9.3, otherwise EC_{sim} = 0~~

EC_{L06_base} = L06 base energy credit from Section 11.5.3

LP_{DCCF} = *installed interior lighting power* DC-coupling factor (1.05 if *DC-coupled*, 1.0 if *AC-coupled)*. Where *installed lighting power systems* with different LP_{DCCF} values are included in the *building*, an *installed interior lighting power* weighted-average LP_{DCCF} shall be used.

LPA_{net} = net *interior lighting power allowance* wattage calculated in accordance with the method used to ~~meet the requirements of~~ comply with Section 9.2.2.1, ~~W,~~ excluding any additional interior lighting allowances ~~in~~ permitted by Section 9.5.2.2

LP_{net} = net *installed interior lighting power* wattage calculated in accordance with Sections 9.1.3

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and 9.1.4, W, excluding any additional interior lighting allowances ~~in~~ permitted by Section 9.5.2.2

Modify Section 11.5.2.7.2 as shown (I-P and SI).

11.5.2.7.2 Q02: Efficient Kitchen Equipment. This credit applies to ~~To achieve this credit, in projects or facilities that include a~~ commercial kitchens, within a *building*, ~~with~~ where~~at least~~ one or more gas or electric fryers is to be installed.~~, all fryers, dishwashers, steam cookers, and/or ovens shall comply with all of the following:~~. Credit options exist for fryers, dishwashers, steam cookers, and/or ovens. All units of the same *equipment* type, installed in the *building*, shall comply. To achieve this credit, commercial kitchen *equipment* shall:

a. Achieve performance levels in accordance with the *equipment* specifications listed in Tables 11.5.2.7.2-1 through 11.5.2.7.2-4 ~~when~~ where rated in accordance with the applicable test procedure.
b. Be installed prior to the issuance of the certificate of occupancy.
c. Have associated performance levels ~~listed on~~ specified in the *construction documents* submitted for permitting.

Energy credits for efficient kitchen *equipment* shall be determined as follows:

$$EC_{Q02\_adj} = EC_{Q02\_fryer} + EC_{Q02\_steam} + EC_{Q02\_dish} + EC_{Q02\_oven}$$

where

EC_{Q02_adj} = energy credits achieved for efficient kitchen equipment
EC_{Q02_fryer} = Q02 base energy credit from Section 11.5.3
EC_{Q02_steam} = (EC_{Q02_fryer} – 1) where steam cookers from Table 11.5.2.7.2-2 are installed
EC_{Q02_dish} = (EC_{Q02_fryer} – 1) where commercial dishwashers from Table 11.5.2.7.2-3 are installed
EC_{Q02_oven} = (EC_{Q02_fryer} – 2) where commercial ovens from Table 11.5.2.7.2-4 are installed

Energy credits for efficient kitchen *equipment* shall be as stated in Section 11.5.3.

Informative Note: Where a commercial kitchen is included in a *building* where base energy credit~~s~~ values for efficient kitchen *equipment* are ~~excluded~~ not specified by Section 11.5.3, such as a cafeteria in an office *building*, ~~treat~~ the kitchen and dining area shall be treated as a restaurant *building* use type following the weighted-average method specified by~~in~~ Section 11.5.1(a).

Modify Sections 11.5.2.8, 11.5.2.8.1, and 11.5.2.8.2 as shown (I-P and SI).

11.5.2.8 Load Management Systems. Energy credits for load management measures in Sections 11.5.2.8.1 through 11.5.2.8.~~7~~.10 are available ~~in any combination~~ to projects in *buildings* that have ~~at least~~ one or more of the following:

11.5.2.8.1 G01: Lighting Load Management. To achieve this credit, *luminaires* shall have dimming capability, and load management controls shall gradually, over ~~a period of~~ not more than 15 minutes, reduce *general lighting* power with *continuous dimming* ~~in 75% of the project area~~ by ~~at least~~ not less than 20% ~~during peak- price periods coincident with high *building* load~~. It shall be permitted to substitute decorative and display- lighting equivalent power reductions for *general lighting* reductions. Where ~~less than~~ 50% or more, but not greater than 75%~~, but at least 50%~~ of the project *general lighting* power is controlled, the base energy credit~~s~~ values from the tables in Section 11.5.3 shall be prorated as follows:

~~$$\frac{\text{Portion of project with lighting load management, \%}}{75\%} \times \text{G01 table credits}$$~~

$$EC_{G01\_adj} = \frac{IGLP_{lmc}}{75\%} \times EC_{G01\_base}$$

where

EC_{G01_adj} = energy credits achieved for lighting load management
$IGLP_{lmc}$ = percentage of installed *general lighting* power with load management controls, where $50\% \le IGLP_{lmc} \le 75\%$
EC_{G01_base} = G01 base energy credit value specified by Section 11.5.3

Exception to 11.5.2.8.1: Load management controls shall be permitted to turn-off 25% or more of lighting power in ~~Warehouse~~ warehouse~~,~~ ~~*semiheated* semiheated~~, and ~~or~~ retail storage areas ~~with load manage-~~

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Table 11.5.2.7.2-3 ~~Minimum~~ Efficiency Requirements for Energy Credits: Commercial Dishwashers[a] (I-P)

Machine Type	High-Temp Efficiency Requirements		Low-Temp Efficiency Requirements		Test Procedure
	Idle Energy Rate[a,b]	Water Consumption[b,c]	Idle Energy Rate[a,b]	Water Consumption[b,c]	
Under counter	~~≤0.50 kW~~ ≤0.30 *kW*	≤0.86 GPR	~~≤0.50 kW~~ ≤0.25 *kW*	≤1.19 GPR	ASTM Standard ~~F1696-18~~ F1696-20 ASTM Standard F1920-15
Stationary single-tank door	~~≤0.70 kW~~ ≤0.55 *kW*	≤0.89 GPR	~~≤0.60 kW~~ ≤0.30 *kW*	≤1.18 GPR	
Pot, pan, and utensil	~~≤1.20 kW~~ ≤0.90 *kW*	≤0.58 GPR	~~≤1.00 KW~~ NR	~~≤0.58 GPSF~~ NR	
Single-tank conveyor	~~≤1.50 kW~~ ≤1.20 *kW*	≤0.70 GPR	~~≤1.50 kW~~ ≤0.85 *kW*	≤0.79 GPR	
Multiple-tank conveyor	~~≤2.25 kW~~ ≤1.85 *kW*	≤0.54 GPR	~~≤2.00 kW~~ ≤1.00 *kW*	≤0.54 GPR	
Single-tank flight type	Reported	GPH ≤ 2.975x + 55.00	Reported	~~GPH ≤ 2.975x + 55.00~~NR	
Multiple-tank flight type	Reported	GPH ≤ 4.96x + 17.00	Reported	~~GPH ≤ 4.96x + 17.00~~ NR	

NR* = no requirement

a. Energy and water requirements from ENERGY STAR Program Requirements for Commercial Dishwashers—Eligibility Criteria (Rev. September—2021)

b. Idle results should be measured with the door closed and represent the total idle *energy* consumed by the machine including all tank heater(s) and controls. Internal or external booster heater *energy* consumption shall not be part of this measurement unless it cannot be separately monitored.

c. GPR = gallons per rack; GPSF = gallons per square foot of rack; GPH = gal/hour; ~~x = ft^2 of conveyor belt (i.e., width × length)/min (max conveyor speed)~~ x = maximum conveyor speed (ft/min as verified through NSF 3 certification) × conveyor belt width (ft).

Table 11.5.2.7.2-3 ~~Minimum~~ Efficiency Requirements for Energy Credits: Commercial Dishwashers[a] (SI)

Machine Type	High-Temp Efficiency Requirements		Low-Temp Efficiency Requirements		Test Procedure
	Idle Energy Rate[a,b]	Water Consumption[b,c]	Idle Energy Rate[a,b]	Water Consumption[b,c]	
Under counter	~~≤0.50 kW~~ ≤0.30 *kW*	≤3.3 LPR	~~≤0.50 kW~~ ≤0.25 *kW*	≤4.50 LPR	ASTM Standard ~~F1696-18~~ F1696-20 ASTM Standard F1920-15
Stationary single-tank door	~~≤0.70 kW~~ ≤0.55 *kW*	≤3.4 LPR	~~≤0.60 kW~~ ≤0.30 *kW*	≤4.47 LPR	
Pot, pan, and utensil	~~≤1.20 kW~~ ≤0.90 *kW*	≤2.2 LPR	~~≤1.00 KW~~ NR	~~≤0.20 LPSM~~ NR	
Single-tank conveyor	~~≤1.50 kW~~ ≤1.20 *kW*	≤2.6 LPR	~~≤1.50 kW~~ ≤0.85 *kW*	≤3.0 LPR	
Multiple-tank conveyor	~~≤2.25 kW~~ ≤1.85 *kW*	≤2.0 LPR	~~≤2.00 kW~~ ≤1.00 *kW*	≤2.0 LPR	
Single-tank flight type	Reported	LPH ≤ 11.26x + 208.0	Reported	~~LPH ≤ 11.26x + 208.0~~ NR	
Multiple-tank flight type	Reported	LPH ≤ 18.8x + 64.3	Reported	~~LPH ≤ 18.8x + 64.3~~ NR	

NR* = no requirement

a. Energy and water requirements from ENERGY STAR Program Requirements for Commercial Dishwashers—Eligibility Criteria (Rev. September—2021)

b. Idle results should be measured with the door closed and represent the total idle *energy* consumed by the machine including all tank heater(s) and controls. Internal or external booster heater *energy* consumption shall not be part of this measurement unless it cannot be separately monitored.

c. LPR = litres per rack; LPSM = litres per square metre of rack; LPH = liters per hour; ~~x = square metres of conveyor belt (i.e., width × length)/min (max conveyor speed).~~ x = maximum conveyor speed (m/sec as verified through NSF 3 certification) × conveyor belt speed width (m).

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~~ment controls shall be permitted to switch off at least 25% of lighting power~~ in 75% of the ~~project area~~ *interior lighting power allowance* without dimming.

11.5.2.8.2 G02: HVAC Load Management. To achieve this credit, load management controls shall be configured to:

a. ~~gradually~~ increase the cooling *set point* by ~~at least~~ 3°F or more or reduce effective cooling capacity to 60% of installed capacity during the period of coincident high *building* load and summer peak prices;
b. ~~where electric heating is used, gradually~~ reduce the heating *set point* of electric heating by ~~at least~~ 3°F or more or reduce effective heating capacity to 60% of installed capacity during the period of coincident high *building* load and winter peak prices; and
c. provide excess *outdoor air* preceding the peak summer price period and reduce *outdoor air* by ~~at least~~ 30% or more during the period of coincident high *building* load and summer peak prices, in accordance with ~~ASHRAE Standard 62.1~~, Section 6.2.5.2 of ANSI/ASHRAE Standard 62.1.

Modify Sections 11.5.2.8.4, 11.5.2.8.5, and 11.5.2.8.6 as shown (I-P and SI).

11.5.2.8.4 G04: ~~Electric~~ Electrical Energy Storage. To achieve this credit, ~~electric~~ electrical *energy* storage devices, such as batteries or flywheel~~s devices,~~ shall be designed to be charged by load management controls ~~to store electricity~~ during off-peak periods and to use stored *energy* during on-peak periods to reduce *building* peak period *demand*. ~~Electric~~ Electrical *energy* storage devices shall have a ~~minimum~~ capacity ~~between~~ of ~~at least~~ not less than 0.5 Wh/ft^2 (5.4 Wh/m^2) based on project *gross floor area*. and ~~For capacity other than 1.0 Wh/ft^2, credits~~ ~~can~~ Base energy credit values specified by Section 11.5.3 shall be prorated as follows:

~~$$\frac{\text{Installed electric storage capacity, Wh/ft}^2}{1.0} \times \text{G04 table credits}$$~~

$$\text{EC}_{G04\_adj} = \frac{\text{EESC}_{inst}}{1.0} \times \text{EC}_{G04\_base}$$

where

EC_{G04_adj} = energy credits achieved for electrical *energy* storage
EESC_{inst} = *installed electrical energy storage capacity,* Wh/ft^2 (Wh/m^2)
EC_{G04_base} = G04 base energy credit value specified by Section 11.5.3

11.5.2.8.5 G05: HVAC Cooling Energy Storage. To achieve this credit, ice or chilled-water storage *equipment* shall be installed and load management controls configured to reduce electric cooling peak *demand,* shift load to match regional generation of renewable energy, or shift load to match favorable outdoor ambient conditions that reduce overall energy consumption. Storage ~~tank(s)~~container(s) shall be demonstrated through analysis to have less than 2% loss of stored capacity over a 24-hour period for the cooling design day.

Base energy credits in Section 11.5.3 are for storage capacity of 1.0 ton-hours (kWh) storage per ton (*kW*) of design-day peak cooling load with a 1.15 sizing factor. ~~Prorate *energy*~~ Energy credits for ~~other~~ installed storage *systems* sized between 0.5 and ~~4.0~~5.0 ton-hours (kWh) storage per ton (*kW*) of design-day peak cooling load shall be prorated. Larger storage shall be permitted; however, prorated credits shall be ~~are~~ limited by a storage ratio no greater than ~~o~~ ~~4.0~~5.0 ton-hours (kWh) storage per ton (*kW*) of design-day cooling load. The capacity of the thermal storage device shall be provided by the *manufacturer* of the device on the *construction documents* submitted for permitting. ~~Energy~~ Prorated energy credits shall be determined as follows:

$$\text{EC}_{G05\_adj} = \text{EC}_{G05\_base} \times \frac{(1.44 \times \text{SR} + 0.71)}{2.15}$$

where

EC_{G05_adj} = *energy* credits achieved for HVAC cooling *energy* storage
EC_{G05_base} = G05 base *energy* credit for *building* use type and climate zone based on ton-hours storage per ton (kWh storage per *kW*) of design-day cooling load
SR = storage ratio in ton-hours (kWh) storage per ton (*kW*) of design-day peak cooling load, where $0.5 \le \text{SR} \le$ ~~4.0~~5.0

Informative Note: Where the thermal storage system is capable of and configured to provide storage for heating and cooling load management, credits may be claimed for both sections 11.5.2.8.5 and 11.5.2.8.10.

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AHRI 900 can be utilized for the testing and rating of thermal storage *equipment* used for cooling, which may be charged and discharged with any variety of heat transfer fluids, including thermal storage using water, ice on coil, encapsulated ice, phase change material, ice harvester chiller, ice slurry, or unitary. Measure G05 base energy credit values in Section 11.5.3 are based on a storage capacity of 1.0 ton-hours (kWh) storage per ton (*kW*) of design-day peak cooling load with a 1.15 sizing factor.

11.5.2.8.6 G06: Service Hot-Water Thermal Storage. To achieve this credit, where service hot water is heated by electricity, *automatic* controls activated by ~~utility~~ *demand* ~~response signal~~ *demand response signal*, peak price period time control, or local *building demand* monitoring shall be configured to preheat stored service hot water before the peak- price period and suspend electric water heating during the period of peak prices coincident with peak *building* load. *Demand response controls* shall be in accordance with AHRI Standard 1430. Where heat-pump water heating is used, the required additional ~~Storage~~storage capacity shall ~~be provided by~~ comply with item (b). All other systems shall comply with ~~be provided by~~ either item (a) or item (b) ~~of the following~~.

a. ~~Preheating~~ Preheat water above 140°F delivery temperature to provide ~~with at least~~ 1.2 *kW*h or more of additional *energy* storage per *kW* of water heating capacity. Tempering valves shall be provided at the *water heater* delivery location. ~~This option is not available where heat-pump water heating is used.~~
b. ~~Providing~~ Provide additional heated water tank storage capacity above peak service hot-water demand with equivalent peak storage capacity to that calculated in accordance with item (a).

Add new Sections 11.5.2.8.8 through 11.5.2.8.10 as shown (I-P and SI).

11.5.2.8.8 G08: Electric Vehicle Charging Load Management. To achieve this credit, *buildings* with parking facilities with 40 *kW* or more of load dedicated to electric vehicle charging shall have automatic controls activated by a utility demand response signal, peak price period time control, or local building monitoring, which shall be configured to reduce electric vehicle charging load by not less than 10% of the active load dedicated to electric vehicle charging. For projects capable of reducing electric vehicle charging load by more than 4 *kW*, credits shall be prorated as follows:

$$EC_{G08\_adj} = AF \times EC_{G08\_base}$$

$$AF = \left[\frac{EVCC_{prop}}{(GCFA \times EVCD_{base})}\right]$$

where

EC_{G08_adj} = energy credits achieved for electric vehicle charging load management
EC_{G08_base} = G08 base energy credit value specified by Section 11.5.3
AF = ratio of proposed charging capacity to base credit charging capacity. When calculating EC_{G08_adj}, AF shall be no less than 1.0 and shall have a maximum value of 3.
$EVCC_{prop}$ = proposed electric vehicle charging capacity, W
GCFA = *gross conditioned floor area*, ft^2 (m^2)
$EVCD_{base}$ = base (default) EV charging capacity density 0.1 W/ft^2 (0.01 W/m^2) of *gross conditioned floor area* for warehouses, 2 W/ft^2 (0.2 W/m^2) of *gross conditioned floor area*, for all other building types, W/ft^2 (W/m^2)

11.5.2.8.9 G09: Electric Vehicle Power Export. To achieve this credit, *buildings* shall have parking facilities with 40 *kW* or more of load dedicated to electric vehicle charging and the following:

a. Electric vehicle power transfer *equipment* configured to export power from electric vehicles
b. Automatic controls, activated by utility demand response signal, peak price period time control, or local building monitoring, shall enable electric vehicle power export by 10% or more of active load dedicated to electric vehicle charging

This measure is not permitted to be used in combination with measure G08. Credits shall be prorated as follows:

$$EC_{G09\_adj} = AF \times EC_{G09\_base}$$

$$AF = \left[\frac{EVCC_{prop}}{(GCFA \times EVCD_{base})}\right]$$

where

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EC_{G09_adj} = energy credits achieved for electric vehicle power export

EC_{G09_base} = G09 base energy credit value specified by Section 11.5.3

AF = ratio of proposed charging capacity to base credit charging capacity. When calculating EC_{G09_adj}, AF shall be no less than 1.0 and shall have a maximum value of 3.

$EVCC_{prop}$ = proposed electric vehicle charging capacity in watts, W

GCFA = *gross conditioned floor area*, ft^2 (m^2)

$EVCD_{base}$ = base (default) EV charging capacity density 0.1 W/ft^2 (0.01 W/m^2) of *gross conditioned floor area* for warehouses, 2 W/ft^2 (0.2 W/m^2) of *gross conditioned floor area*, for all other building types, W/ft^2 (W/m^2)

11.5.2.8.10 HVAC Heating Energy Storage. To achieve this credit, stored heating thermal energy shall be generated by electrical means. Thermal energy storage heating *equipment* shall be installed and load management controls configured to reduce electric heating peak demand, shift load to match regional generation of renewable energy, or shift load to match favorable outdoor ambient conditions that reduce overall energy consumption. Storage container(s) shall be demonstrated through analysis to have less than 2% loss of stored thermal capacity over a 24-hour period for the heating design day.

Energy credits for installed storage systems sized between 0.5 and 5.0 MBtu (kWh) storage per MBtu/h (*kW*) of design-day peak heating load shall be prorated. Larger storage shall be permitted; however, prorated credits shall be limited by a storage ratio no greater than 5.0 MBtu (*kW*h) storage per MBtu/h (*kW*) of design-day peak heating load. The capacity of the thermal storage device provided by the *manufacturer* shall be specified in the *construction documents* submitted for permitting. Prorated energy credits shall be determined as follows:

$$EC_{G10\_adj} = EC_{G10\_base} \times HeatTypeMult \times (0.198 + 0.545 \times SR - 0.072 \times SR^2)$$

where

EC_{G10_adj} = energy credits achieved for HVAC heating energy storage

EC_{G10_base} = G10 base energy credit for *building* use type and climate zone based on MBtu storage per MBtu/h (kWh storage per *kW*) of design-day heating load

HeatTypeMult = 1.0 for electric resistance heating

0.42 for heat pump heating in Climate Zones 0 to 4, 5A, and 5C

0.57 for heat pump heating in Climate Zones 5B, 6A, 6B, 7, and 8

SR = storage ratio in MBtu storage per MBtu/h (kWh storage per *kW*) of design-day heating load, where $0.5 \le SR \le 5.0$

Informative Note: Where the thermal storage system is capable of and configured to provide storage for heating and cooling load management, credits may be claimed for Sections 11.5.2.8.5 and 11.5.2.8.10. Measure G10 base energy credit values in Section 11.5.3 are based on storage capacity of 2.0 MBtu (kWh) storage per MBtu/h (*kW*) of design-day peak heating load with a 1.15 sizing factor.

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Modify Tables 11.5.3-1 through 11.5.3-9 as shown (I-P and SI). Rows not shown are unchanged.

Table 11.5.3-1 Energy Credits for Multifamily

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	3	3	3	3	2	2	2	2	1	2	2	1	2	2	1	2	2	2	2
H08	Cooling Tower Efficiency	11.5.2.2.8	5	4	4	3	3	1	2	1	0	1	0	0	1	0	0	1	0	0	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	9	9	11	11	13	14	17	16	20	19	19	22	20	20	23	20	21	21	21
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~22~~	~~5~~	~~27~~	~~12~~	~~19~~	~~18~~	~~19~~	~~33~~	~~10~~	~~11~~	~~20~~	~~9~~	~~7~~	~~14~~	~~8~~	~~6~~	~~15~~	~~1~~	~~3~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	21	23	22	23	23	18	18	16	14	17	14	12	14	13	11	14	11	14	9
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	7	8	9	8	10	9	10	11	14	13	10	13	11	10	13	11	10	11	12
G09	Electric Vehicle Power Export	11.5.2.8.9	7	8	9	8	10	9	10	11	14	13	10	13	11	10	13	11	10	11	12
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	0	1	1	8	4	3	12	4	9	13	10	6	27	19	24	27

× = Credits excluded from this *building* use type and climate zone.

Table 11.5.3-2 Energy Credits for Health Care Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	4	3	3	3	3	3	3	3	2	3	3	2	3	3	2	3	3	3	3
H08	Cooling Tower Efficiency	11.5.2.2.8	3	2	3	2	2	1	1	1	1	1	0	0	1	0	0	1	0	0	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W10	Ozone Laundry Sanitation	11.5.2.3.7	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
W11	Low-Temperature Dishwashers	11.5.2.3.8	1	1	1	1	1	1	1	1	2	1	1	2	1	1	2	1	1	1	1
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~9~~	~~2~~	~~12~~	~~5~~	~~9~~	~~7~~	~~10~~	~~14~~	~~10~~	~~6~~	~~8~~	~~7~~	~~5~~	~~7~~	~~5~~	~~4~~	~~8~~	~~1~~	~~1~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	17	17	16	16	17	13	15	13	14	16	11	12	13	10	10	14	10	13	6
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	9	10	10	10	10	11	10	11	11	10	11	12	10	11	11	10	10	9	9
G09	Electric Vehicle Power Export	11.5.2.8.9	9	10	10	10	10	11	10	11	11	10	11	12	10	11	11	10	10	9	9
G10	HVAC Heating Energy Storage	11.5.2.8.10	1	2	2	3	6	5	9	7	11	14	9	17	15	14	13	24	17	25	30

× = credits excluded from this *building* use type and climate zone.

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Table 11.5.3-3 Energy Credits for Hotel/Motel

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
H08	Cooling Tower Efficiency	11.5.2.2.8	6	4	5	3	5	1	3	1	1	2	0	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	3	3	4	4	4	5	6	5	6	6	6	7	7	7	8	7	7	8	8
W10	Ozone Laundry Sanitation	11.5.2.3.7	44	45	52	51	57	62	67	70	80	77	77	86	84	81	89	83	84	83	82
W11	Low-Temperature Dishwashers	11.5.2.3.8	11	12	13	13	14	15	15	16	18	16	17	18	17	17	18	16	17	16	15
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~18~~	~~5~~	~~25~~	~~11~~	~~19~~	~~17~~	~~22~~	~~33~~	~~20~~	~~14~~	~~19~~	~~12~~	~~12~~	~~16~~	~~8~~	~~9~~	~~19~~	~~2~~	~~3~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	14	16	14	16	15	13	15	12	12	17	12	14	16	12	13	18	13	16	11
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	5	5	6	6	6	6	7	7	6	6	7	7	6	7	8	6	7	6	6
G09	Electric Vehicle Power Export	11.5.2.8.9	5	5	6	6	6	6	7	7	6	6	7	7	6	7	8	6	7	6	6
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	0	1	1	3	3	1	6	6	6	9	10	8	14	15	20	29

× = credits excluded from this *building* use type and climate zone.

Table 11.5.3-4 Energy Credits for Office Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	3	3	3	3	3	3	2	2	2	2	2	1	2	2	1	2	2	2	2
H08	Cooling Tower Efficiency	11.5.2.2.8	7	5	5	4	4	1	2	1	1	1	1	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~22~~	~~6~~	~~29~~	~~13~~	~~21~~	~~19~~	~~22~~	~~37~~	~~22~~	~~13~~	~~21~~	~~12~~	~~12~~	~~16~~	~~8~~	~~9~~	~~20~~	~~2~~	~~3~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	33	37	34	36	37	34	32	27	31	33	24	18	29	19	14	26	18	28	11
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	4	1	6	3	9	14	12	14	20	11	20	20	19	20	20	16	26	25	12
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	9	8	10	10	11	11	11	12	12	10	12	12	11	11	12	11	11	9	8
G09	Electric Vehicle Power Export	11.5.2.8.9	9	8	10	10	11	11	11	12	12	10	12	12	11	11	12	11	11	9	8
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	1	2	2	15	10	2	27	13	24	33	27	28	54	43	46	58

× = credits excluded from this *building* use type and climate zone.

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Table 11.5.3-5 Energy Credits for Restaurant Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	4	3	3	3	3	2	2	2	1	2	2	1	2	2	1	2	2	3	3
H08	Cooling Tower Efficiency	11.5.2.2.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	58	59	65	63	68	70	70	73	81	71	72	78	70	71	77	66	70	63	58
[. . .]																					
~~Q02~~	~~Efficient Kitchen Equipment~~	~~11.5.2.7.2~~	~~19~~	~~21~~	~~24~~	~~22~~	~~24~~	~~26~~	~~26~~	~~27~~	~~31~~	~~27~~	~~28~~	~~30~~	~~26~~	~~27~~	~~30~~	~~24~~	~~26~~	~~23~~	~~22~~
Q02	Efficient Kitchen Equipment	11.5.2.7.2	6	6	7	7	7	8	8	8	8	8	8	8	8	8	8	7	8	6	6
[. . .]																					
G05	HVAC Cooling Energy Storage	11.5.2.8.5	4	1	5	2	4	3	4	6	2	2	3	1	1	2	×	1	2	×	×
G05	HVAC Cooling Energy Storage	11.5.2.8.5	16	19	15	18	18	15	14	14	13	13	11	9	10	9	8	11	8	11	5
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	2	×	3	1	4	6	4	5	11	3	7	7	4	9	5	3	6	4	1
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	5	5	6	6	6	6	7	7	6	6	7	7	6	7	8	6	7	6	6
G09	Electric Vehicle Power Export	11.5.2.8.9	5	5	6	6	6	6	7	7	6	6	7	7	6	7	8	6	7	6	6
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	2	2	5	10	9	9	17	12	17	31	20	21	32	29	56	61

× = credits excluded from this *building* use type and climate zone.

Table 11.5.3-6 Energy Credits for Retail Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	5	5	4	4	4	3	3	3	2	3	3	2	3	3	2	3	3	3	4
H08	Cooling Tower Efficiency	11.5.2.2.8	7	5	6	4	6	2	3	2	1	2	1	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~24~~	~~6~~	~~35~~	~~15~~	~~26~~	~~23~~	~~28~~	~~40~~	~~18~~	~~15~~	~~23~~	~~9~~	~~10~~	~~16~~	~~3~~	~~8~~	~~16~~	~~2~~	~~2~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	27	31	27	31	30	26	26	25	25	24	21	18	19	17	17	20	16	20	11
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	4	1	6	2	8	14	11	14	32	9	20	20	16	20	18	13	23	21	10
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	9	8	10	10	11	11	11	12	12	10	12	12	11	11	12	11	11	9	8
G09	Electric Vehicle Power Export	11.5.2.8.9	9	8	10	10	11	11	11	12	12	10	12	12	11	11	12	11	11	9	8
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	2	1	2	12	8	3	22	13	24	26	26	26	39	35	48	55

× = credits excluded from this *building* use type and climate zone.

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Table 11.5.3-7 Energy Credits for Education Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	5	4	4	4	4	3	3	3	2	3	3	2	3	3	2	3	3	3	3
H08	Cooling Tower Efficiency	11.5.2.2.8	6	4	4	3	4	1	2	1	1	2	0	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	8	9	10	10	10	12	11	14	15	14	14	16	14	14	16	13	14	13	12
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~26~~	~~7~~	~~37~~	~~17~~	~~30~~	~~28~~	~~36~~	~~40~~	~~38~~	~~23~~	~~37~~	~~22~~	~~20~~	~~28~~	~~13~~	~~16~~	~~32~~	~~3~~	~~4~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	24	28	23	27	23	25	18	21	23	22	17	13	18	16	12	23	12	15	8
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	4	1	6	2	8	14	11	14	20	10	20	20	19	30	19	16	20	20	10
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	2	3	3	3	3	4	3	4	3	3	4	4	2	4	5	4	3	3	3
G09	Electric Vehicle Power Export	11.5.2.8.9	2	3	3	3	3	4	3	4	3	3	4	4	2	4	5	4	3	3	3
G10	HVAC Heating Energy Storage	11.5.2.8.10	1	0	4	1	8	1	18	5	5	12	9	19	18	21	19	25	18	31	44

× = credits excluded from this *building* use type and climate zone.

Table 11.5.3-8 Energy Credits for Warehouse Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	3	3	2	3	2	2	2	2	1	3	2	2	4	3	2	4	3	4	4
H08	Cooling Tower Efficiency	11.5.2.2.8	6	4	4	3	4	1	2	1	1	2	0	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~40~~	~~15~~	~~40~~	~~32~~	~~40~~	~~40~~	~~32~~	~~40~~	~~17~~	~~12~~	~~26~~	~~4~~	~~5~~	~~12~~	~~1~~	~~3~~	~~7~~	~~×~~	~~×~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	30	35	28	34	30	28	17	22	13	12	13	3	5	6	1	3	2	2	0
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	4	1	6	3	9	15	12	14	20	9	20	20	14	20	19	10	20	15	6
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	6	7	8	7	8	9	8	9	9	6	8	9	6	7	9	5	7	5	5
G09	Electric Vehicle Power Export	11.5.2.8.9	33	34	40	35	41	39	40	43	49	34	40	42	29	34	42	22	28	23	24
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	0	0	0	1	28	11	1	71	46	47	70	71	45	96	84	95	83

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Table 11.5.3-9 Energy Credits for Other Buildings

ID	Energy Credit Abbreviated Title	Section	Climate Zone																		
			0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
E01	Improved Envelope Performance	11.5.2.1	Determined in accordance with Section ~~11.5.2.1~~11.5.2.1.1																		
E02	Air Leakage		Determined in accordance with Section 11.5.2.1.2																		
[. . .]																					
H07	Guideline 36 Sequences	11.5.2.2.7	4	4	3	3	3	3	2	2	2	3	2	2	3	3	2	3	3	3	3
H08	Cooling Tower Efficiency	11.5.2.2.8	5	3	4	3	3	1	2	1	1	1	0	0	1	0	0	1	0	1	0
[. . .]																					
W09	Shower Drain Heat Recovery	11.5.2.3.6	4	4	5	5	6	7	8	8	9	9	9	10	10	10	11	10	10	10	10
W10	Ozone Laundry Sanitation	11.5.2.3.7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
W11	Low-Temperature Dishwashers	11.5.2.3.8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
[. . .]																					
~~G05~~	~~HVAC Cooling Energy Storage~~	~~11.5.2.8.5~~	~~21~~	~~6~~	~~26~~	~~13~~	~~21~~	~~19~~	~~22~~	~~30~~	~~17~~	~~12~~	~~20~~	~~10~~	~~9~~	~~14~~	~~7~~	~~7~~	~~15~~	~~2~~	~~3~~
G05	HVAC Cooling Energy Storage	11.5.2.8.5	23	26	22	25	24	22	19	19	18	19	15	12	16	13	11	16	11	15	8
[. . .]																					
G07	Building Mass/Night Flush	11.5.2.8.7	4	1	5	2	8	13	10	12	20	8	19	20	14	25	16	12	20	18	8
G08	Electric Vehicle Charging Load Management	11.5.2.8.8	6	6	7	7	7	8	7	8	8	6	8	8	6	7	9	7	7	6	6
G09	Electric Vehicle Power Export	11.5.2.8.9	6	6	7	7	7	8	7	8	8	6	8	8	6	7	9	7	7	6	6
G10	HVAC Heating Energy Storage	11.5.2.8.10	0	0	1	1	3	2	13	7	4	23	14	20	27	25	21	39	33	43	48

× = credits excluded from this *building* use type and climate zone.

Modify Section 13 as shown (I-P and SI).

Reference		Section
[. . .]		
AHRI 1430-2022	Demand Flexible Electric Storage Water Heaters	11.5.2.8.6
[. . .]		
~~ASTM F1696-18~~ASTM F1696-20	Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines	Table 11.5.2.7.2-3
~~ASTM F1920-15~~ASTM F1920-20	Standard Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines	Table 11.5.2.7.2-3
[. . .]		

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ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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