



# Commercial Energy Code Check Sheet

Short Form based on Chapter 8, IECC FORM DATE: 7/23/2002

2000 Edition + 2001 Supplements + NCTCOG Amendments)

**Notes to applicant: To use this guide packet return the first two pages with your plan submittal.** You may use this packet or you may submit a print out form from the COM Check program developed by the US Department of Energy available on the web site [www.energycodes.gov](http://www.energycodes.gov) If using COM Check you may select to comply either through Chapter 8 of the IECC 2000 Edition or you may use ASHRAE 90.1, 1999 Edition. You may also use the computer program by ASHRAE but be sure you are using the edition adopted by Chapter 7 of the IECC. If you are using the ASHRAE program you are strongly encouraged to have the analysis performed by a licensed Mechanical Engineer.

**Each building or area shall comply separately in all four areas (A, B, C & D)**

**Building Address:** \_\_\_\_\_ **Suite No.** \_\_\_\_\_

**Submitted By:** \_\_\_\_\_ **Company:** \_\_\_\_\_ **Date:** \_\_\_\_\_

I am: (check one) \_\_\_ Architect, \_\_\_ Mechanical Engineer, \_\_\_ General Contractor, \_\_\_ Other (describe)

### A. Building Envelope:

1. \_\_\_\_\_ If this project includes interior work only and the building envelope elements (exterior walls, roof/ceilings, windows and doors) are not being altered then check here and skip to the Mechanical section
2. \_\_\_\_\_ Determine the **window and glazed door area** as a percentage of the exterior wall area and attach calculations for review.
3. \_\_\_\_\_ See Tables 802.2 (1-4) for **building envelope requirements** based on glazing percentage found above
4. \_\_\_\_\_ Vestibules. Section 802.3.5 requires vestibule at exterior entrances to spaces over 3000 ft<sup>2</sup> (298 m<sup>2</sup>)

### B. Mechanical Requirements

1. \_\_\_\_\_ See Tables 803.2.2 for **minimum efficiency requirements** for air conditioning equipment. List the units sizes, types and efficiency ratings.
2. \_\_\_\_\_ **Temperature and humidity controls** shall comply:
  - 2a. \_\_\_\_\_ **§E803.2.3.1 Temperature controls.** Each heating and cooling system shall have at least one solid-state programmable thermostat. The thermostat shall have the capability to set back or shut down the system based on day of the week and time of day, and provide a readily accessible manual override that will return to the setback or shutdown schedule without reprogramming. Heat pumps having supplementary electric resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump can meet the heating load.
  - 2b. \_\_\_\_\_ **§E803.2.3.2 Humidity controls.** When humidistats are installed, they shall prevent the use of fossil fuel or electric power to achieve a humidity below 60 percent when the system controlled is cooling, and above 30 percent when the system controlled is heating.
3. \_\_\_\_\_ **§E803.2.6 Cooling with outdoor air.** Each system over 135,000 Btu/h (40KW) cooling capacity shall have an economizer that will automatically shut off the cooling system and allow all of the supply air to be provided directly from outdoors. Economizers shall be capable of operating at 100 percent outside air, even if additional mechanical cooling is required to meet the cooling load of the building. Where a single room or space is supplied by multiple air systems, the aggregate capacity of those systems shall be used in applying this requirement.

#### EXCEPTIONS:

1. Where the cooling equipment is covered by the minimum efficiency requirements of Table E803.2.2(1) or Table E803.2.2(2) and meets the efficiency requirements of **Table E803.2.6.**
2. Systems with air or evaporatively cooled condensers and which serve spaces with open case refrigeration or that require filtration equipment in order to meet the minimum ventilation requirements of Chapter M4 of the International Mechanical Code.

**TABLE E803.2.6  
MINIMUM EQUIPMENT EFFICIENCY ECONOMIZER EXCEPTION**

TOTAL COOLING CAPACITY OF EQUIPMENT	MINIMUM EFFICIENCY (climate zone 5b)
135,000 Btu/h to 759,999 Btu/h	9.9 EER
760,000 Btu/h or more	9.6 EER

4. \_\_\_\_\_ **§E803.2.8 Duct and plenum insulation and sealing.** All supply and return air ducts and plenums shall be insulated with a minimum of R-5 insulation when located in unconditioned spaces and with a minimum of R-8 insulation when located outside the building envelope. When located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation.

#### EXCEPTIONS:

1. When located within equipment.

2. When the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).

All joints, longitudinal and transverse seams, and connections in ductwork, shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems, or tapes. Tapes and mastics used to seal ductwork shall be listed and labeled in accordance with UL 181A or UL 181B. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Duct tape is not permitted as a sealant on any metal ducts.

5. \_\_\_\_\_ **§E803.2.9 Piping insulation.** Chilled water, brine or refrigerant lines ≤ 1.5" dia. Require 1.0" insulation and lines > 1.5" dia. Require 1.5" insulation. Based on insulation having a conductivity not exceeding 0.27 Btu per inch/h • ft<sup>2</sup> • °F.

### C. Service Water Heating:

1. **Temperature Controls:** \_\_\_\_\_ **§E804.3 Temperature controls.** Service water-heating equipment shall be provided with controls to allow a setpoint of 90°F (32°C) for equipment serving other than dwelling occupancies. The outlet temperature of lavatories in public facility rest rooms shall be limited to 110°F (43°C).

2. **Heat Traps:** \_\_\_\_\_ **§E804.4 Heat traps.** Water-heating equipment not supplied with integral heat traps and serving noncirculating systems shall be provided with heat traps on the supply and discharge piping associated with the equipment.

3. **Pipe Insulation:** \_\_\_\_\_ **§E804.5 Pipe insulation.** Piping on return circulation hot water systems shall be insulated with 1 inch (25 mm) of insulation having a conductivity not exceeding 0.28 Btu per inch/h • ft<sup>2</sup> • °F (1.59 W per 25 mm/m<sup>2</sup> • K). The first 8 feet (2438 mm) of piping in noncirculating systems served by equipment without integral heat traps shall be insulated with 0.5 inch (12.7 mm) of material having a conductivity not exceeding 0.28 Btu per inch/h • ft<sup>2</sup> • °F (1.59 W per 25 mm/m<sup>2</sup> • K).

### D. Lighting Systems:

1. \_\_\_\_\_ **§E805.2.1 Interior lighting controls.** Each area enclosed by walls or floor-to-ceiling partitions shall have at least one manual control for the lighting serving that area. The required controls shall be located within the area served by the controls or be a remote switch that identifies the lights served and indicates their status.

#### EXCEPTIONS:

1. Areas designated as security or emergency areas that must be continuously lighted.
2. Lighting in stairways or corridors that are elements of the means of egress.

2. \_\_\_\_\_ **§E805.2.2 Additional Controls.** Each area that is required to have a manual control shall have additional controls that meet the requirements of §E805.2.2.1, §E805.2.2.2 or §E805.2.2.3. (choose one)

2a. \_\_\_\_\_ **§E805.2.2.1 Bi-level switching.** Each area less than 250 ft<sup>2</sup> (23m<sup>2</sup>) that is required to have a manual control shall also allow the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by at least 50 percent.

#### EXCEPTIONS:

1. Areas that have only 1 luminaire.
2. Areas that are controlled by an occupant-sensing device.
3. Corridors, storerooms, rest rooms, or public lobbies.
4. Guest rooms.

2b. \_\_\_\_\_ **§E805.2.2.2 Automatic lighting shutoff.** Spaces greater than 250 ft<sup>2</sup> (23m<sup>2</sup>) in buildings larger than 5,000 ft<sup>2</sup> (465m<sup>2</sup>) shall be equipped with an automatic control device to shut off the lighting in those spaces. The automatic device shall function on either:

1. A scheduled basis, using time of day, with an independent program schedule that controls the interior lighting in those areas that do not exceed 25,000 ft<sup>2</sup> (2323m<sup>2</sup>) and are not more than one floor, or
2. An unscheduled basis by occupant intervention.

2c. \_\_\_\_\_ **§E805.2.2.3 Guest rooms.** Guest rooms in hotels, motels, boarding houses or similar buildings shall have at least one master switch at the main entry door that controls all permanently wired lighting fixtures and switched receptacles, except those in the bathroom(s). Suites shall have a control meeting these requirements at the entry to each room or at the primary entry to the suite.

3. \_\_\_\_\_ **§E805.2.3 Exterior lighting controls.** Automatic switching or photocell controls shall be provided for all exterior lighting not intended for 24-hour operation. Automatic time switches shall have a combination seven-day and seasonal daylight program schedule adjustment, and a minimum 4-hour power backup.

4. \_\_\_\_\_ **§E805.3 Tandem wiring.** One- or three-lamp fluorescent fixtures that are pendant- or surface-mounted in continuous rows or recess mounted in an accessible ceiling and within 10 feet (3048 mm) of each other shall be tandem wired.

#### EXCEPTIONS:

1. Where electronic high-frequency ballasts are used.
2. Luminaires not on the same switch control or in the same area.

5. \_\_\_\_\_ **Interior Lighting Power.** The maximum allowable watts per square foot shall be per Table 805.4.2. Provide a tabular listing of the various lighting fixtures, maximum wattage per fixture and how many of each type are specified in the plans with a summary showing allowable vs. actual watts.

Attachments: Tables 802.2 (1-4),  
Tables 803.2.2  
Table 805.4.2

**F. Y. I.** The following is from the IECC adopting ordinance.

**Section 302.1 Exterior Design Condition:**

CONDITION	VALUE
Winter <sup>a</sup> , design dry-bulb (°F) (99.6%)	17
Summer <sup>a</sup> , design dry-bulb (°F) (0.4%)	100
Summer <sup>a</sup> , design wet-bulb (°F) (0.4%)	78
Degree days heating <sup>b</sup>	2407
Degree days cooling <sup>b</sup>	2603
Climate zone <sup>c</sup>	5B

**\*\*Delete note "a" and replace with the following:**

a. These values are from ASHRAE Handbook of Fundamentals for Dallas/Ft. Worth International Airport 99.6% Winter DB, 0.4% Summer DB, and 0.4% Summer WB; and from Local Climatological Data for Dallas-Ft. Worth published by the National Climatic Data Center, National Oceanic and Atmospheric Administration. These values are for the purpose of providing a uniform basis of requirements for North Central Texas. This will not preclude licensed professionals from submitting design analyses based on site measurements or published data more specific to the building site. Adjustments shall be permitted to reflect local climates which differ from the tabulated values, or local weather experience determined by the code official.

**TABLE 802.2(1)  
BUILDING ENVELOPE REQUIREMENTS**

WINDOW AND GLAZED DOOR AREA 10 PERCENT OR LESS OF ABOVE-GRADE WALL AREA			
ELEMENT	CONDITION/VALUE (Zones 5B,6B)		
<b>Skylights (<i>U</i>-factor)</b>	1		
<b>Slab or below-grade wall (<i>R</i>-value)</b>	R-0		
<b>Windows and glass doors</b> PF < 0.25 0.25 ≤ PF < 0.50 PF ≥ 0.50	<b>SHGC</b>	<b><i>U</i>-factor</b>	
	Any	Any	
	Any	Any	
	Any	Any	
<b>Roof assemblies (<i>R</i>-value)</b>  All-wood joist/truss Metal joist/truss Concrete slab or deck Metal purlin with thermal block Metal purlin without thermal block	<b>Insulation between framing</b>	<b>Continuous insulation</b>	
	R-19	R-16	
	R-25	R-17	
	NA	R-16	
	R-25	R-17	
	X	R-17	
<b>Floors over outdoor air or unconditioned space (<i>R</i>-value)</b>  All-wood joist/truss Metal joist/truss Concrete slab or deck	<b>Insulation between framing</b>	<b>Continuous insulation</b>	
	R-11	R-6	
	R-11	R-6	
	NA	R-6	
<b>Above-grade walls (<i>R</i>-value)</b>  Framed R-value cavity R-value continuous CMU, ≥ 8 in., with integral insulation R-value cavity R-value continuous Other masonry walls R-value cavity R-value continuous	<b>No framing</b>	<b>Metal framing</b>	<b>Wood framing</b>
	NA	R-11	R-11
	NA	R-0	R-0
	NA	R-0	R-0
	R-0	R-0	R-0
	NA	R-0	R-0
	R-0	R-0	R-0
	NA	R-0	R-0
	R-0	R-0	R-0
	R-0	R-0	R-0

**TABLE 802.2(2)  
BUILDING ENVELOPE REQUIREMENTS**

<b>WINDOW AND GLAZED DOOR AREA OVER 10 PERCENT BUT NOT GREATER THAN 25 PERCENT OF ABOVE-GRADE WALL AREA</b>				
<b>ELEMENT</b>	<b>CONDITION/VALUE</b>			
<b>Skylights (<i>U</i>-factor)</b>	1			
<b>Slab or below-grade wall (<i>R</i>-value)</b>	R-0			
<b>Windows and glass doors</b> PF < 0.25 0.25 ≤ PF < 0.50 PF ≥ 0.50	<b>SHGC</b>		<b><i>U</i>-factor</b>	
	0.6		Any	
	0.7		Any	
	Any		Any	
<b>Roof assemblies (<i>R</i>-value)</b>  All-wood joist/truss Metal joist/truss Concrete slab or deck Metal purlin with thermal block Metal purlin without thermal block	<b>Insulation between framing</b>		<b>Continuous insulation</b>	
	R-25		R-19	
	R-25		R-20	
	NA		R-19	
	R-30		R-20	
	X		R-20	
<b>Floors over outdoor air or unconditioned space (<i>R</i>-value)</b> All-wood joist/truss Metal joist/truss Concrete slab or deck	<b>Insulation between framing</b>		<b>Continuous insulation</b>	
	R-11		R-6	
	R-11		R-6	
	NA		R-6	
<b>Above-grade walls (<i>R</i>-value)</b>	<b>No framing</b>	<b>Metal framing</b>	<b>Wood framing</b>	
	Framed			
	R-value cavity	NA	R-11	R-11
	R-value continuous	NA	R-0	R-0
	CMU, ≥ 8 in., with integral insulation			
	R-value cavity	NA	R-11	R-11
	R-value continuous	R-5	R-0	R-0
	Other masonry walls			
	R-value cavity	NA	R-11	R-11
	R-value continuous	R-5	R-0	R-0

**TABLE 802.2(3)  
BUILDING ENVELOPE REQUIREMENTS**

<b>WINDOW AND GLAZED DOOR AREA OVER 25 PERCENT BUT NOT GREATER THAN 40 PERCENT OF ABOVE-GRADE WALL AREA</b>			
<b>ELEMENT</b>	<b>CONDITION/VALUE</b>		
<b>Skylights (<i>U</i>-factor)</b>	1		
<b>Slab or below-grade wall (<i>R</i>-value)</b>	R-0		
<b>Windows and glass doors</b> PF < 0.25 0.25 ≤ PF < 0.50 PF ≥ 0.50	<b>SHGC</b>		<b><i>U</i>-factor</b>
	0.4		0.7
	0.5		0.7
	0.6		0.7
<b>Roof assemblies (<i>R</i>-value)</b>  All-wood joist/truss Metal joist/truss Concrete slab or deck Metal purlin with thermal block Metal purlin without thermal block	<b>Insulation between framing</b>		<b>Continuous insulation</b>
	R-25		R-19
	R-25		R-20
	NA		R-19
	R-30		R-20
	X		R-20
<b>Floors over outdoor air or unconditioned space (<i>R</i>-value)</b> All-wood joist/truss Metal joist/truss Concrete slab or deck	<b>Insulation between framing</b>		<b>Continuous insulation</b>
	R-11		R-6
	R-11		R-6
	NA		R-6

Table continued on next page.

<b>Above-grade walls (R-value)</b>	<b>No framing</b>	<b>Metal framing</b>	<b>Wood framing</b>
Framed			
R-value cavity	NA	R-11	R-11
R-value continuous	NA	R-0	R-0
CMU, $\geq$ 8 in., with integral insulation			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

**TABLE 802.2(4)  
BUILDING ENVELOPE REQUIREMENTS**

<b>WINDOW AND GLAZED DOOR AREA OVER 40 PERCENT BUT NOT GREATER THAN 50 PERCENT OF ABOVE-GRADE WALL AREA</b>			
<b>ELEMENT</b>	<b>CONDITION/VALUE</b>		
<b>Skylights (U-factor)</b>	1		
<b>Slab or below-grade wall (R-value)</b>	R-0		
<b>Windows and glass doors</b>	<b>SHGC</b>	<b>U-factor</b>	
PF < 0.25	0.4	0.7	
$0.25 \leq$ PF < 0.50	0.5	0.7	
PF $\geq$ 0.50	0.6	0.7	
<b>Roof assemblies (R-value)</b>	<b>Insulation between framing</b>	<b>Continuous insulation</b>	
All-wood joist/truss	R-25	R-19	
Metal joist/truss	R-25	R-20	
Concrete slab or deck	NA	R-19	
Metal purlin with thermal block	R-30	R-20	
Metal purlin without thermal block	R-38	R-20	
<b>Floors over outdoor air or unconditioned space (R-value)</b>	<b>Insulation between framing</b>	<b>Continuous insulation</b>	
All-wood joist/truss	R-11	R-6	
Metal joist/truss	R-11	R-6	
Concrete slab or deck	NA	R-6	
<b>Above-grade walls (R-value)</b>	<b>No framing</b>	<b>Metal framing</b>	<b>Wood framing</b>
Framed			
R-value cavity	NA	R-13	R-11
R-value continuous	NA	R-3	R-0
CMU, $\geq$ 8 in., with integral insulation			
R-value cavity	NA, NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

**TABLE 803.2.2(4)**  
**WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS,**  
**WARM AIR DUCT FURNACES AND UNIT HEATERS, MINIMUM EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE	SIZE CATEGORY (INPUT)	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY <sup>d</sup>	EFFICIENCY AS OF 10/29/2001 <sup>d,e</sup>	TEST PROCEDURE <sup>a</sup>
Warm air furnace, gas-fired	< 225,000 Btu/h		78% AFUE or 80% E <sub>t</sub> <sup>e</sup>	78% AFUE or 80% E <sub>t</sub> <sup>e</sup>	DOE 10 CFR Part 430 or ANSI Z21.47
	≥ 225,000 Btu/h	Maximum capacity <sup>b</sup>	80% E <sub>t</sub> <sup>e</sup>	80% E <sub>t</sub> <sup>e</sup>	ANSI Z21.47
Warm air furnace, oil-fired	< 225,000 Btu/h		78% AFUE or 80% E <sub>t</sub> <sup>e</sup>	78% AFUE or 80% E <sub>t</sub> <sup>e</sup>	DOE 10 CFR Part 430 or UL 727
	≥ 225,000 Btu/h	Maximum capacity <sup>b</sup>	81% E <sub>t</sub> <sup>e</sup>	81% E <sub>t</sub> <sup>e</sup>	UL 727
Warm air duct furnaces, gas-fired	All capacities	Maximum capacity <sup>b</sup>	78% E <sub>t</sub> <sup>e</sup>	80% E <sub>t</sub> <sup>e</sup>	ANSI Z83.9
		Minimum capacity <sup>b</sup>	75% E <sub>t</sub> <sup>e</sup>	—	
Warm air unit heaters, gas-fired	All capacities	Maximum capacity <sup>b</sup>	78% E <sub>t</sub> <sup>e</sup>	80% E <sub>t</sub> <sup>e</sup>	ANSI Z83.8
		Minimum capacity <sup>b</sup>	74% E <sub>t</sub> <sup>e</sup>	—	
Warm air unit heaters, oil-fired	All capacities	Maximum capacity <sup>b</sup>	81% E <sub>t</sub> <sup>e</sup>	80% E <sub>t</sub> <sup>e</sup>	UL 731
		Minimum capacity <sup>b</sup>	81% E <sub>t</sub> <sup>e</sup>	—	

For SI: 1 Btu/h = 0.2931W

- <sup>a</sup> Chapter 9 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- <sup>b</sup> Minimum and maximum ratings as provided for and allowed by the unit's controls.
- <sup>c</sup> Combination units not covered by the National Appliance Energy Conservation Act of 1987 (NAECA) (3-phase power or cooling capacity greater than or equal to 65,000 Btu/h [19 kW]) shall comply with either rating.
- <sup>d</sup> E<sub>t</sub> = Thermal efficiency. See test procedure for detailed discussion.
- <sup>e</sup> E<sub>c</sub> = Combustion efficiency (100% less flue losses). See test procedure for detailed discussion.
- <sup>f</sup> E<sub>c</sub> = Combustion efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.
- <sup>g</sup> E<sub>t</sub> = Thermal efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

**TABLE 803.2.2(3)**  
**PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS**

EQUIPMENT TYPE	SIZE CATEGORY (INPUT)	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY <sup>a</sup>	EFFICIENCY AS OF 10/29/2001 <sup>a</sup>	TEST PROCEDURE <sup>a</sup>
PTAC (cooling mode) new construction	All capacities	95°F db outdoor air	10.0 - (0.16 x Cap/1000) EER	12.5 - (0.213 x Cap/1000) EER	ARI 310/380
PTAC (cooling mode) replacements <sup>b</sup>	All capacities	95°F db outdoor air	10.0 - (0.16 x Cap/1000) EER	10.9 - (0.213 x Cap/1000) EER	
PTHP (Cooling mode) new construction	All capacities	95°F db outdoor air	10.0 - (0.16 x Cap/1000) EER	12.3 - (0.213 x Cap/1000) EER	
PTHP (cooling mode) replacements <sup>b</sup>	All capacities	95°F db outdoor air	10.0 - (0.16 x Cap/1000) EER	10.8 - (0.213 x Cap/1000) EER	
PTHP (heating mode) new construction	All capacities		2.9 - (0.026 x Cap/1000) COP	3.2 - (0.026 x Cap/1000) COP	
PTHP (heating mode) replacements <sup>b</sup>	All capacities		2.9 - (0.026 x Cap/1000) COP	2.9 - (0.026 x Cap/1000) COP	

For SI: °C = [(°F) - 32] / 1.8, 1 Btu/h = 0.2931W

- <sup>a</sup> Chapter 9 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- <sup>b</sup> Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7,000 Btu/h, use 7,000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.
- <sup>c</sup> Replacement units must be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing sleeves less than 16-in. (406 mm) high and less than 42-in. (1067 mm) wide.

**TABLE 803.2.2 (2)  
UNITARY AND APPLIED HEAT PUMPS, ELECTRICALLY OPERATED,  
MINIMUM EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE	SIZE CATEGORY	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY <sup>a</sup>	EFFICIENCY AS OF 10/29/2001 <sup>b</sup>	TEST PROCEDURE <sup>c</sup>
Air cooled, (cooling mode)	< 65,000 Btu/h <sup>d</sup>	Split system	10.0 SEER	10.0 SEER	ARI 210/240
		Single package	9.7 SEER	9.7 SEER	
	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	8.9 EER <sup>e</sup>	10.1 EER <sup>e</sup>	ARI 340/360
		Split system and single package	8.5 EER <sup>e</sup>	9.3 EER <sup>e</sup>	
Water-source (cooling mode)	< 17,000 Btu/h	85°F entering water	9.3 EER		ARI 320
		86°F entering water		11.2 EER	ISO-13256-1
	≥ 17,000 Btu/h and < 65,000 Btu/h	85°F entering water	9.3 EER		ARI 320
		86°F entering water		12.0 EER	ISO-13256-1
	≥ 65,000 Btu/h and < 135,000 Btu/h	85°F entering water	10.5 EER		ARI 320
		86°F entering water		12.0 EER	ISO-13256-1
Groundwater-source (cooling mode)	< 135,000 Btu/h	70°F entering water	11.0 EER		ARI 325
		50°F entering water	11.5 EER		
		59°F entering water		16.2 EER	ISO-13256-1
Ground source (cooling mode)	< 135,000 Btu/h	77°F entering brine	10.0 EER		ARI 330
		70°F entering brine	10.4 EER		
		77°F entering water		13.4 EER	ISO-13256-1
Air cooled (heating mode)	< 65,000 Btu/h <sup>d</sup> (Cooling capacity)	Split system	6.8 HSPF	6.8 HSPF	ARI 210/240
		Single package	6.6 HSPF	6.6 HSPF	
	≥ 65,000 Btu/h and < 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.0 COP	3.2 COP	ARI 340/360
		47°F db/43°F wb outdoor air	2.9 COP	3.1 COP	
Water-source (heating mode)	< 135,000 Btu/h (Cooling capacity)	70°F entering water	3.8 COP		ARI 320
		68°F entering water		4.2 COP	ISO-13256-1
Groundwater-source (heating mode)	< 135,000 Btu/h (Cooling capacity)	70°F entering water	3.4 COP		ARI 325
		50°F entering water	3.0 COP		ISO-13256-1
Ground source (heating mode)	< 135,000 Btu/h (Cooling capacity)	32°F entering brine	2.5 COP		ARI 330
		32°F entering water		3.1 COP	ISO-13256-1

For SI: °C = [(°F) - 32] / 1.8, 1 Btu/h = 0.2931W

- <sup>a</sup> Chapter 9 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- <sup>b</sup> IPLVs and Part load rating conditions are only applicable to equipment with capacity modulation.
- <sup>c</sup> Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
- <sup>d</sup> Single-phase air-cooled heat pumps < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA). SEER and HSPF values are those set by NAECA.

**TABLE 803.2.2 (1)**  
**UNITARY AIR CONDITIONERS AND CONDENSING UNITS, ELECTRICALLY OPERATED,**  
**MINIMUM EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE	SIZE CATEGORY	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY <sup>a</sup>	EFFICIENCY AS OF 10/29/2001 <sup>b</sup>	TEST PROCEDURE <sup>c</sup>
Air conditioners, air cooled	< 65,000 Btu/h <sup>d</sup>	Split system	10.0 SEER	10.0 SEER	ARI 210/240
		Single package	9.7 SEER	9.7 SEER	
	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	8.9 EER <sup>e</sup>	10.3 EER <sup>e</sup>	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	Split system and single package	8.5 EER <sup>e</sup>	9.7 EER <sup>e</sup>	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Split system and single package	8.5 EER <sup>e</sup> 7.5 IPLV <sup>f</sup>	9.5 EER <sup>e</sup> 9.7 IPLV <sup>f</sup>	
> 760,000 Btu/h	Split system and single package	8.2 EER <sup>e</sup> 7.5 IPLV <sup>f</sup>	9.2 EER <sup>e</sup> 9.4 IPLV <sup>f</sup>		
Air Conditioners, water and evaporatively cooled	< 65,000 Btu/h	Split System and single package	9.3 EER	12.1 EER	ARI 210/240
	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	10.5 EER <sup>e</sup>	11.5 EER <sup>e</sup>	ARI 340/360
	≥ 135,000 Btu/h and 240,000 Btu/h	Split system and single package	9.6 EER <sup>e</sup>	11.0 EER <sup>e</sup>	
	> 240,000 Btu/h	Split system and single package	9.6 EER <sup>e</sup> 9.0 IPLV <sup>f</sup>	11.0 EER <sup>e</sup> 10.3 IPLV <sup>f</sup>	

For SI: 1 Btu/hr = 0.2931 W

- <sup>a</sup> Chapter 9 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- <sup>b</sup> IPLVs are only applicable to equipment with capacity modulation.
- <sup>c</sup> Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.
- <sup>d</sup> Single-phase air-cooled air-conditioners < 65,000 Btu/h are regulated by the National Appliance Energy Conservation Act of 1987 (NAECA). SEER values are those set by NAECA.

**TABLE 803.2.2.(5)**  
**BOILERS, GAS- AND OIL-FIRED, MINIMUM EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE <sup>e</sup>	SIZE CATEGORY (INPUT)	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY <sup>a,b</sup>	EFFICIENCY AS OF 10/29/2001 <sup>c</sup>	TEST PROCEDURE
Boilers, gas-fired	< 300,000 Btu/h	Hot water	80% AFUE	80% AFUE	DOE 10 CFR Part 430
		Steam	75% AFUE	75% AFUE	
	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h	Maximum capacity <sup>b</sup>	80% E <sub>c</sub>	75% E <sub>t</sub>	H.I. HBS 86
		> 2,500,000 Btu/h <sup>f</sup>	Hot water	80% E <sub>c</sub>	
		Steam	80% E <sub>c</sub>	80% E <sub>c</sub>	
Boilers, oil-fired	< 300,000 Btu/h		80% AFUE	80% AFUE	DOE 10 CFR Part 430
	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h	Maximum capacity <sup>b</sup>	83% E <sub>c</sub>	78% E <sub>t</sub>	H.I. HBS 86
		> 2,500,000 Btu/h <sup>f</sup>	Hot water	83% E <sub>c</sub>	
			Steam	83% E <sub>c</sub>	83% E <sub>c</sub>
Oil-fired (Residual)	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h	Maximum capacity <sup>b</sup>	83% E <sub>c</sub>	78% E <sub>t</sub>	H.I. HBS 86
		> 2,500,000 Btu/h <sup>f</sup>	Hot water	83% E <sub>c</sub>	
			Steam	83% E <sub>c</sub>	

For SI: 1 Btu/h = 0.2931W

- <sup>a</sup> Chapter 9 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- <sup>b</sup> Minimum and maximum ratings as provided for and allowed by the unit's controls.
- <sup>c</sup> E<sub>c</sub> = Combustion efficiency (100% less flue losses). See reference document for detailed information.
- <sup>d</sup> E<sub>t</sub> = Thermal efficiency. See reference document for detailed information.
- <sup>e</sup> Alternate test procedures used at the manufacturer's option are ASME PTC-4.1 for units over 5,000,000 Btu/h input, or ANSI Z21.13 for units greater than or equal to 300,000 Btu/h and less than or equal to 2,500,000 Btu/h input.
- <sup>f</sup> These requirements apply to boilers with rated input of 8,000,000 Btu/h or less that are not packaged boilers, and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers.

**TABLE 905.4.2  
INTERIOR LIGHTING POWER**

BUILDING OR AREA TYPE	ENTIRE BUILDING (W/ft <sup>2</sup> )	TENANT AREA OR PORTION OF BUILDING (W/ft <sup>2</sup> )
Auditorium	NA	1.6
Bank/financial institution <sup>a</sup>	NA	2.0
Classroom/lecture hall <sup>b</sup>	NA	1.6
Convention, conference or meeting center <sup>a</sup>	NA	1.5
Corridor, restroom, support area	NA	0.8
Dining <sup>a</sup>	NA	1.4
Exercise center <sup>a</sup>	1.4	1.1
Exhibition hall	NA	3.3
Grocery store <sup>c</sup>	1.9	2.1
Gymnasium playing surface	NA	1.9
Hotel function <sup>a</sup>	NA	2.4
Industrial work, < 20 ft ceiling height	NA	2.1
Industrial work, 20 ft ceiling height	NA	3.0
Kitchen	NA	2.2
Library <sup>a</sup>	1.5	1.8
Lobby—hotel <sup>a</sup>	NA	1.9
Lobby—other <sup>a</sup>	NA	1.0
Mall, arcade, or atrium	NA	1.4
Medical and clinical care <sup>b, d</sup>	1.6	1.6
Museum <sup>b</sup>	1.6	1.6
Office <sup>b</sup>	1.3	1.5
Religious worship <sup>a</sup>	2.2	3.2
Restaurant <sup>a</sup>	1.7	1.7
Retail sales, wholesale showroom <sup>c</sup>	1.9	2.1
School	1.5	NA
Storage, industrial and commercial	0.6	1.0
Theaters—motion picture	1.1	1.0
Theaters—performance <sup>a</sup>	1.4	1.5
Other	0.6	1.0

For SI: 1 foot = 304.8 mm, 1 W/ft<sup>2</sup> = W/0.0929 m<sup>2</sup>.

NA = Not Applicable.

- a. Where lighting equipment is specified to be installed for decorative appearances in addition to lighting equipment specified for general lighting and is switched or dimmed on circuits different from the circuits for general lighting, the smaller of the actual wattage of the decorative lighting equipment or 1.0 W/ft<sup>2</sup> times the area of the space that the decorative lighting equipment is in shall be added to the interior lighting power determined in accordance with this line item.
- b. Where lighting equipment is specified to be installed to meet requirements of visual display terminals as the primary viewing task, the smaller of the actual wattage of the lighting equipment or 0.35 W/ft<sup>2</sup> times the area of the space that the lighting equipment is in shall be added to the interior lighting power determined in accordance with this line item.
- c. Where lighting equipment is specified to be installed to highlight specific merchandise in addition to lighting equipment specified for general lighting and is switched or dimmed on circuits different from the circuits for general lighting, the smaller of the actual wattage of the lighting equipment installed specifically for merchandise, or 1.6 W/ft<sup>2</sup> times the area of the specific display, or 3.9 W/ft<sup>2</sup> times the actual case or shelf area for displaying and selling fine merchandise such as jewelry, fine apparel and accessories, or china and silver, shall be added to the interior lighting power determined in accordance with this line item.
- d. Where lighting equipment is specified to be installed, the smaller of the actual wattage of the lighting equipment, or 1.0 W/ft<sup>2</sup> times the area of the emergency, recovery, medical supply and pharmacy space shall be added to the interior lighting power determined in accordance with this line item.