

§ 430.32

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Conservation Act, as amended (42 U.S.C. 6291 *et seq.*).

[63 FR 13317, Mar. 18, 1998, as amended at 78 FR 62993, Oct. 23, 2013]

**§ 430.32 Energy and water conservation standards and their compliance dates.**

The energy and water (in the case of faucets, showerheads, water closets, and urinals) conservation standards for the covered product classes are:

(a) *Refrigerators/refrigerator-freezers/freezers.* These standards do not apply to refrigerators and refrigerator-freez-

ers with total refrigerated volume exceeding 39 cubic feet (1104 liters) or freezers with total refrigerated volume exceeding 30 cubic feet (850 liters). The energy standards as determined by the equations of the following table(s) shall be rounded off to the nearest kWh per year. If the equation calculation is halfway between the nearest two kWh per year values, the standard shall be rounded up to the higher of these values.

The following standards remain in effect from July 1, 2001 until September 15, 2014:

Product class	Energy standard equations for maximum energy use (kWh/yr)
1. Refrigerators and refrigerator-freezers with manual defrost .....	8.82AV + 248.4 0.31av + 248.4
2. Refrigerator-freezers—partial automatic defrost .....	8.82AV + 248.4 0.31av + 248.4
3. Refrigerator-freezers—automatic defrost with top-mounted freezer without through-the-door ice service and all-refrigerator—automatic defrost.	9.80AV + 276.0 0.35av + 276.0
4. Refrigerator-freezers—automatic defrost with side-mounted freezer without through-the-door ice service ..	4.91AV + 507.5 0.17av + 507.5
5. Refrigerator-freezers—automatic defrost with bottom-mounted freezer without through-the-door ice service.	4.60AV + 459.0 0.16av + 459.0
6. Refrigerator-freezers—automatic defrost with top-mounted freezer with through-the-door ice service .....	10.20AV + 356.0 0.36av + 356.0
7. Refrigerator-freezers—automatic defrost with side-mounted freezer with through-the-door ice service .....	10.10AV + 406.0 0.36av + 406.0
8. Upright freezers with manual defrost .....	7.55AV + 258.3 0.27av + 258.3
9. Upright freezers with automatic defrost .....	12.43AV + 326.1 0.44av + 326.1
10. Chest freezers and all other freezers except compact freezers .....	9.88AV + 143.7 0.35av + 143.7
11. Compact refrigerators and refrigerator-freezers with manual defrost .....	10.70AV + 299.0 0.38av + 299.0
12. Compact refrigerator-freezer—partial automatic defrost .....	7.00AV + 398.0 0.25av + 398.0
13. Compact refrigerator-freezers—automatic defrost with top-mounted freezer and compact all-refrigerator—automatic defrost.	12.70AV + 355.0 0.45av + 355.0
14. Compact refrigerator-freezers—automatic defrost with side-mounted freezer .....	7.60AV + 501.0 0.27av + 501.0
15. Compact refrigerator-freezers—automatic defrost with bottom-mounted freezer .....	13.10AV + 367.0 0.46av + 367.0
16. Compact upright freezers with manual defrost .....	9.78AV + 250.8 0.35av + 250.8
17. Compact upright freezers with automatic defrost .....	11.40AV + 391.0 0.40av + 391.0
18. Compact chest freezers .....	10.45AV + 152.0 0.37av + 152.0

AV: Adjusted Volume in ft<sup>3</sup>; av: Adjusted Volume in liters (L).

The following standards apply to products manufactured starting on September 15, 2014:

Product class	Equations for maximum energy use (kWh/yr)	
	Based on AV (ft <sup>3</sup> )	Based on av (L)
1. Refrigerator-freezers and refrigerators other than all-refrigerators with manual defrost.	7.99AV + 225.0 ...	0.282av + 225.0
1A. All-refrigerators—manual defrost .....	6.79AV + 193.6 ...	0.240av + 193.6
2. Refrigerator-freezers—partial automatic defrost .....	7.99AV + 225.0 ...	0.282av + 225.0

Product class	Equations for maximum energy use (kWh/yr)	
	Based on AV (ft³)	Based on av (L)
3. Refrigerator-freezers—automatic defrost with top-mounted freezer without an automatic icemaker.	8.07AV + 233.7 ...	0.285av + 233.7
3-BI. Built-in refrigerator-freezer—automatic defrost with top-mounted freezer without an automatic icemaker.	9.15AV + 264.9 ...	0.323av + 264.9
3I. Refrigerator-freezers—automatic defrost with top-mounted freezer with an automatic icemaker without through-the-door ice service.	8.07AV + 317.7 ...	0.285av + 317.7
3I-BI. Built-in refrigerator-freezers—automatic defrost with top-mounted freezer with an automatic icemaker without through-the-door ice service.	9.15AV + 348.9 ...	0.323av + 348.9
3A. All-refrigerators—automatic defrost .....	7.07AV + 201.6 ...	0.250av + 201.6
3A-BI. Built-in All-refrigerators—automatic defrost .....	8.02AV + 228.5 ...	0.283av + 228.5
4. Refrigerator-freezers—automatic defrost with side-mounted freezer without an automatic icemaker.	8.51AV + 297.8 ...	0.301av + 297.8
4-BI. Built-In Refrigerator-freezers—automatic defrost with side-mounted freezer without an automatic icemaker.	10.22AV + 357.4	0.361av + 357.4
4I. Refrigerator-freezers—automatic defrost with side-mounted freezer with an automatic icemaker without through-the-door ice service.	8.51AV + 381.8 ...	0.301av + 381.8
4I-BI. Built-In Refrigerator-freezers—automatic defrost with side-mounted freezer with an automatic icemaker without through-the-door ice service.	10.22AV + 441.4	0.361av + 441.4
5. Refrigerator-freezers—automatic defrost with bottom-mounted freezer without an automatic icemaker.	8.85AV + 317.0 ...	0.312av + 317.0
5-BI. Built-In Refrigerator-freezers—automatic defrost with bottom-mounted freezer without an automatic icemaker.	9.40AV + 336.9 ...	0.332av + 336.9
5I. Refrigerator-freezers—automatic defrost with bottom-mounted freezer with an automatic icemaker without through-the-door ice service.	8.85AV + 401.0 ...	0.312av + 401.0
5I-BI. Built-In Refrigerator-freezers—automatic defrost with bottom-mounted freezer with an automatic icemaker without through-the-door ice service.	9.40AV + 420.9 ...	0.332av + 420.9
5A. Refrigerator-freezer—automatic defrost with bottom-mounted freezer with through-the-door ice service.	9.25AV + 475.4 ...	0.327av + 475.4
5A-BI. Built-in refrigerator-freezer—automatic defrost with bottom-mounted freezer with through-the-door ice service.	9.83AV + 499.9 ...	0.347av + 499.9
6. Refrigerator-freezers—automatic defrost with top-mounted freezer with through-the-door ice service.	8.40AV + 385.4 ...	0.297av + 385.4
7. Refrigerator-freezers—automatic defrost with side-mounted freezer with through-the-door ice service.	8.54AV + 432.8 ...	0.302av + 432.8
7-BI. Built-In Refrigerator-freezers—automatic defrost with side-mounted freezer with through-the-door ice service.	10.25AV + 502.6	0.362av + 502.6
8. Upright freezers with manual defrost .....	5.57AV + 193.7 ...	0.197av + 193.7
9. Upright freezers with automatic defrost without an automatic icemaker .....	8.62AV + 228.3 ...	0.305av + 228.3
9I. Upright freezers with automatic defrost with an automatic icemaker .....	8.62AV + 312.3 ...	0.305av + 312.3
9-BI. Built-In Upright freezers with automatic defrost without an automatic icemaker ....	9.86AV + 260.9 ...	0.348av + 260.9
9I-BI. Built-in upright freezers with automatic defrost with an automatic icemaker .....	9.86AV + 344.9 ...	0.348av + 344.9
10. Chest freezers and all other freezers except compact freezers .....	7.29AV + 107.8 ...	0.257av + 107.8
10A. Chest freezers with automatic defrost .....	10.24AV + 148.1	0.362av + 148.1
11. Compact refrigerator-freezers and refrigerators other than all-refrigerators with manual defrost.	9.03AV + 252.3 ...	0.319av + 252.3
11A. Compact all-refrigerators—manual defrost .....	7.84AV + 219.1 ...	0.277av + 219.1
12. Compact refrigerator-freezers—partial automatic defrost .....	5.91AV + 335.8 ...	0.209av + 335.8
13. Compact refrigerator-freezers—automatic defrost with top-mounted freezer .....	11.80AV + 339.2	0.417av + 339.2
13I. Compact refrigerator-freezers—automatic defrost with top-mounted freezer with an automatic icemaker.	11.80AV + 423.2	0.417av + 423.2
13A. Compact all-refrigerators—automatic defrost .....	9.17AV + 259.3 ...	0.324av + 259.3
14. Compact refrigerator-freezers—automatic defrost with side-mounted freezer .....	6.82AV + 456.9 ...	0.241av + 456.9
14I. Compact refrigerator-freezers—automatic defrost with side-mounted freezer with an automatic icemaker.	6.82AV + 540.9 ...	0.241av + 540.9
15. Compact refrigerator-freezers—automatic defrost with bottom-mounted freezer .....	11.80AV + 339.2	0.417av + 339.2
15I. Compact refrigerator-freezers—automatic defrost with bottom-mounted freezer with an automatic icemaker.	11.80AV + 423.2	0.417av + 423.2
16. Compact upright freezers with manual defrost .....	8.65AV + 225.7 ...	0.306av + 225.7
17. Compact upright freezers with automatic defrost .....	10.17AV + 351.9	0.359av + 351.9
18. Compact chest freezers .....	9.25AV + 136.8 ...	0.327av + 136.8

AV = Total adjusted volume, expressed in ft³, as determined in appendices A and B of subpart B of this part.  
 av = Total adjusted volume, expressed in Liters.

(b) Room air conditioners.

Product class	Energy efficiency ratio, effective from Oct. 1, 2000 to May 31, 2014	Combined energy efficiency ratio, effective as of June 1, 2014
1. Without reverse cycle, with louvered sides, and less than 6,000 Btu/h .....	9.7	11.0
2. Without reverse cycle, with louvered sides, and 6,000 to 7,999 Btu/h .....	9.7	11.0
3. Without reverse cycle, with louvered sides, and 8,000 to 13,999 Btu/h .....	9.8	10.9
4. Without reverse cycle, with louvered sides, and 14,000 to 19,999 Btu/h .....	9.7	10.7
5a. Without reverse cycle, with louvered sides, and 20,000 to 27,999 Btu/h .....	8.5	9.4
5b. Without reverse cycle, with louvered sides, and 28,000 Btu/h or more .....	8.5	9.0
6. Without reverse cycle, without louvered sides, and less than 6,000 Btu/h .....	9.0	10.0
7. Without reverse cycle, without louvered sides, and 6,000 to 7,999 Btu/h .....	9.0	10.0
8a. Without reverse cycle, without louvered sides, and 8,000 to 10,999 Btu/h .....	8.5	9.6
8b. Without reverse cycle, without louvered sides, and 11,000 to 13,999 Btu/h .....	8.5	9.5
9. Without reverse cycle, without louvered sides, and 14,000 to 19,999 Btu/h .....	8.5	9.3
10. Without reverse cycle, without louvered sides, and 20,000 Btu/h or more .....	8.5	9.4
11. With reverse cycle, with louvered sides, and less than 20,000 Btu/h .....	9.0	9.8
12. With reverse cycle, without louvered sides, and less than 14,000 Btu/h .....	8.5	9.3
13. With reverse cycle, with louvered sides, and 20,000 Btu/h or more .....	8.5	9.3
14. With reverse cycle, without louvered sides, and 14,000 Btu/h or more .....	8.0	8.7
15. Casement-Only .....	8.7	9.5
16. Casement-Slider .....	9.5	10.4

(c) *Central air conditioners and heat pumps.* The energy conservation standards defined in terms of the heating seasonal performance factor are based on Region IV, the minimum standardized design heating requirement, and the provisions of 10 CFR 429.16.

(1) Each basic model of single-package central air conditioners and cen-

tral air conditioning heat pumps and each individual combination of split-system central air conditioners and central air conditioning heat pumps manufactured on or after January 1, 2015, shall have a Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor not less than:

Product class	Seasonal energy efficiency ratio (SEER)	Heating seasonal performance factor (HSPF)
(i) Split-system air conditioners .....	13	
(ii) Split-system heat pumps .....	14	8.2
(iii) Single-package air conditioners .....	14	
(iv) Single-package heat pumps .....	14	8.0
(v) Small-duct, high-velocity systems .....	12	7.2
(vi)(A) Space-constrained products—air conditioners .....	12	
(B) Space-constrained products—heat pumps .....	12	7.4

(2) In addition to meeting the applicable requirements in paragraph (c)(1) of this section, split-system air conditioners that are installed on or after January 1, 2015, in the States of Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, or Virginia, or in the District of Columbia, must have a Seasonal Energy Efficiency Ratio (SEER) of 14 or higher. Any outdoor unit model that has a certified combination with a rating below 14 SEER cannot be installed in these States. The least efficient

combination of each basic model must comply with this standard.

(3)(i) In addition to meeting the applicable requirements in paragraph (c)(1) of this section, split-system air conditioners and single-package air conditioners that are installed on or after January 1, 2015, in the States of Arizona, California, Nevada, or New Mexico must have a Seasonal Energy Efficiency Ratio (SEER) of 14 or higher and have an Energy Efficiency Ratio (EER) (at a standard rating of 95 °F dry bulb outdoor temperature) not less than the following:

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Product class	Energy efficiency ratio (EER)
(A) Split-system rated cooling capacity less than 45,000 Btu/hr .....	12.2
(B) Split-system rated cooling capacity equal to or greater than 45,000 Btu/hr .....	11.7
(C) Single-package systems .....	11.0

(ii) Any outdoor unit model that has a certified combination with a rating below 14 SEER or the applicable EER cannot be installed in this region. The least efficient combination of each basic model must comply with this standard.

(4) Each basic model of single-package central air conditioners and central air conditioning heat pumps and each individual combination of split-system central air conditioners and

central air conditioning heat pumps manufactured on or after January 1, 2015, shall have an average off mode electrical power consumption not more than the following:

Product class	Average off mode power consumption $P_{W,OFF}$ (watts)
(i) Split-system air conditioners .....	30
(ii) Split-system heat pumps .....	33
(iii) Single-package air conditioners .....	30
(iv) Single-package heat pumps .....	33
(v) Small-duct, high-velocity systems .....	30
(vi) Space-constrained air conditioners .....	30
(vii) Space-constrained heat pumps .....	33

(d) *Water heaters.* The uniform energy factor of water heaters shall not be less than the following:

Product class	Rated storage volume and input rating (if applicable)	Draw pattern	Uniform energy factor
Gas-fired Storage Water Heater .....	≥20 gal and ≤55 gal .....	Very Small .....	0.3456 – (0.0020 × $V_r$ )
		Low .....	0.5982 – (0.0019 × $V_r$ )
		Medium .....	0.6483 – (0.0017 × $V_r$ )
	>55 gal and ≤100 gal .....	High .....	0.6920 – (0.0013 × $V_r$ )
		Very Small .....	0.6470 – (0.0006 × $V_r$ )
		Low .....	0.7689 – (0.0005 × $V_r$ )
Oil-fired Storage Water Heater .....	≤50 gal .....	Medium .....	0.7897 – (0.0004 × $V_r$ )
		High .....	0.8072 – (0.0003 × $V_r$ )
		Very Small .....	0.2509 – (0.0012 × $V_r$ )
		Low .....	0.5330 – (0.0016 × $V_r$ )
Electric Storage Water Heaters .....	≥20 gal and ≤55 gal .....	Medium .....	0.6078 – (0.0016 × $V_r$ )
		High .....	0.6815 – (0.0014 × $V_r$ )
		Very Small .....	0.8808 – (0.0008 × $V_r$ )
		Low .....	0.9254 – (0.0003 × $V_r$ )
Tabletop Water Heater .....	≥20 gal and ≤120 gal .....	Medium .....	0.9307 – (0.0002 × $V_r$ )
		High .....	0.9349 – (0.0001 × $V_r$ )
		Very Small .....	1.9236 – (0.0011 × $V_r$ )
		Low .....	2.0440 – (0.0011 × $V_r$ )
Instantaneous Gas-fired Water Heater	<2 gal and >50,000 Btu/h .....	Medium .....	2.1171 – (0.0011 × $V_r$ )
		High .....	2.2418 – (0.0011 × $V_r$ )
		Very Small .....	0.6323 – (0.0058 × $V_r$ )
		Low .....	0.9188 – (0.0031 × $V_r$ )
Instantaneous Electric Water Heater ...	<2 gal .....	Medium .....	0.9577 – (0.0023 × $V_r$ )
		High .....	0.9884 – (0.0016 × $V_r$ )
		Very Small .....	0.80
		Low .....	0.81
Grid-Enabled Water Heater .....	>75 gal .....	Medium .....	0.81
		High .....	0.81
		Very Small .....	0.91
		Low .....	0.91
		Medium .....	0.91
		High .....	0.92
		Very Small .....	1.0136 – (0.0028 × $V_r$ )
		Low .....	0.9984 – (0.0014 × $V_r$ )
		Medium .....	0.9853 – (0.0010 × $V_r$ )
		High .....	0.9720 – (0.0007 × $V_r$ )

\*  $V_r$  is the Rated Storage Volume (in gallons), as determined pursuant to 10 CFR 429.17.

(e) *Furnaces and boilers.* (1) *Furnaces.* shall not be less than the following for (i) The Annual Fuel Utilization Efficiency (AFUE) of residential furnaces manufactured before November 19, 2015, non-

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weatherized oil furnaces manufactured before May 1, 2013, and weatherized furnaces manufactured before January 1, 2015:

Product class	AFUE (percent) <sup>1</sup>
(A) Furnaces (excluding classes noted below) .....	78
(B) Mobile Home furnaces .....	75
(C) Small furnaces (other than those designed solely for installation in mobile homes) having an input rate of less than 45,000 Btu/hr.	
(1) Weatherized (outdoor) .....	78
(2) Non-weatherized (indoor) .....	78

<sup>1</sup> Annual Fuel Utilization Efficiency, as determined in § 430.23(n)(2) of this part.

(ii) The AFUE of residential furnaces starting on the compliance date indicated in the table below shall not be less than the following:

Product class	AFUE (percent) <sup>1</sup>	Compliance date
(A) Non-weatherized gas furnaces (not including mobile home furnaces) .....	80	November 19, 2015.
(B) Mobile Home gas furnaces .....	80	November 19, 2015.
(C) Non-weatherized oil-fired furnaces (not including mobile home furnaces) ....	83	May 1, 2013.
(D) Mobile Home oil-fired furnaces .....	75	September 1, 1990.
(E) Weatherized gas furnaces .....	81	January 1, 2015.
(F) Weatherized oil-fired furnaces .....	78	January 1, 1992.
(G) Electric furnaces .....	78	January 1, 1992.

<sup>1</sup> Annual Fuel Utilization Efficiency, as determined in § 430.23(n)(2) of this part.

(iii) Furnaces manufactured on or after May 1, 2013, shall have an electrical standby mode power consumption ( $P_{W,SB}$ ) and electrical off mode power consumption ( $P_{W,OFF}$ ) not more than the following:

Product class	Maximum standby mode electrical power consumption, $P_{W,SB}$ (watts)	Maximum off mode electrical power consumption, $P_{W,OFF}$ (watts)
(A) Non-weatherized oil-fired furnaces (including mobile home furnaces) ...	11	11
(B) Electric furnaces .....	10	10

(2) *Boilers.* (i) The AFUE of residential boilers manufactured before September 1, 2012, shall not be less than the following:

Product class	AFUE <sup>1</sup> (percent)
(A) Boilers (excluding gas steam) .....	80
(B) Gas steam boilers .....	75

<sup>1</sup> Annual Fuel Utilization Efficiency, as determined in § 430.22(n)(2) of this part.

(ii) Except as provided in paragraph (e)(2)(iv) of this section, the AFUE of residential boilers, manufactured on or after September 1, 2012, and before January 15, 2021, shall not be less than the following and must comply with the design requirements as follows:

Product class	AFUE <sup>1</sup> (percent)	Design requirements
(A) Gas-fired hot water boiler.	82	Constant burning pilot not permitted. Automatic means for adjusting water temperature required (except for boilers equipped with tankless domestic water heating coils).
(B) Gas-fired steam boiler.	80	Constant burning pilot not permitted.
(C) Oil-fired hot water boiler.	84	Automatic means for adjusting temperature required (except for boilers equipped with tankless domestic water heating coils).
(D) Oil-fired steam boiler.	82	None.
(E) Electric hot water boiler.	None	Automatic means for adjusting temperature required (except for boilers equipped with tankless domestic water heating coils).

<sup>1</sup> Annual Fuel Utilization Efficiency, as determined in § 430.22(n)(2) of this part.

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(iii)(A) Except as provided in paragraph (e)(2)(v) of this section, the AFUE of residential boilers, manufactured on and after January 15, 2021,

shall not be less than the following and must comply with the design requirements as follows:

Product class	AFUE <sup>1</sup> (percent)	Design requirements
(1) Gas-fired hot water boiler .....	84	Constant-burning pilot not permitted. Automatic means for adjusting water temperature required (except for boilers equipped with tankless domestic water heating coils).
(2) Gas-fired steam boiler .....	82	Constant-burning pilot not permitted.
(3) Oil-fired hot water boiler .....	86	Automatic means for adjusting temperature required (except for boilers equipped with tankless domestic water heating coils).
(4) Oil-fired steam boiler .....	85	None.
(5) Electric hot water boiler .....	None	Automatic means for adjusting temperature required (except for boilers equipped with tankless domestic water heating coils).
(6) Electric steam boiler .....	None	None.

<sup>1</sup> Annual Fuel Utilization Efficiency, as determined in § 430.23(n)(2) of this part.

(B) Except as provided in paragraph (e)(2)(v) of this section, the standby mode power consumption ( $P_{W,SB}$ ) and off mode power consumption ( $P_{W,OFF}$ ) of residential boilers, manufactured on and after January 15, 2021, shall not be more than the following:

Product class	$P_{W,SB}$ (watts)	$P_{W,OFF}$ (watts)
(1) Gas-fired hot water boiler .....	9	9
(2) Gas-fired steam boiler .....	8	8
(3) Oil-fired hot water boiler .....	11	11
(4) Oil-fired steam boiler .....	11	11
(5) Electric hot water boiler .....	8	8
(6) Electric steam boiler .....	8	8

(iv) *Automatic means for adjusting water temperature.* (A) The automatic means for adjusting water temperature as required under paragraph (e)(2)(ii) of this section must automatically adjust the temperature of the water supplied by the boiler to ensure that an incremental change in inferred heat load produces a corresponding incremental change in the temperature of water supplied.

(B) For boilers that fire at a single input rate, the automatic means for adjusting water temperature requirement may be satisfied by providing an automatic means that allows the burner or heating element to fire only when the means has determined that the inferred heat load cannot be met by the residual heat of the water in the system.

(C) When there is no inferred heat load with respect to a hot water boiler, the automatic means described in this paragraph shall limit the temperature of the water in the boiler to not more than 140 degrees Fahrenheit.

(D) A boiler for which an automatic means for adjusting water temperature is required shall be operable only when the automatic means is installed.

(v) A boiler that is manufactured to operate without any need for electricity or any electric connection, electric gauges, electric pumps, electric wires, or electric devices is not required to meet the AFUE or design requirements applicable to the boiler requirements of paragraph (e)(2)(ii) of this section, but must meet the requirements of paragraph (e)(2)(i) of this section, as applicable.

(f) *Dishwashers.* (1) The energy factor of dishwashers manufactured on or after May 14, 1994, must not be less than:

Product class	Energy factor (cycles/kWh)
(i) Compact Dishwasher (capacity less than eight place settings plus six serving pieces as specified in ANSI/AHAM DW-1 [Incorporated by reference, see § 430.22] using the test load specified in section 2.7 of appendix C in subpart B) .....	0.62
(ii) Standard Dishwasher (capacity equal to or greater than eight place settings plus six serving pieces as specified in ANSI/AHAM DW-1 [Incorporated by Reference, see § 430.22] using the test load specified in section 2.7 of appendix C in subpart B) .....	0.46

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(2) All dishwashers manufactured on or after January 1, 2010, shall meet the following standard—

(i) Standard size dishwashers shall not exceed 355 kwh/year and 6.5 gallons per cycle.

(ii) Compact size dishwashers shall not exceed 260 kwh/year and 4.5 gallons per cycle.

(3) All dishwashers manufactured on or after May 30, 2013, shall meet the following standard—

(i) Standard size dishwashers shall not exceed 307 kwh/year and 5.0 gallons per cycle.

(ii) Compact size dishwashers shall not exceed 222 kwh/year and 3.5 gallons per cycle.

(g) *Clothes washers.* (1) Clothes washers manufactured on or after January 1, 2007 shall have a Modified Energy Factor no less than:

Product class	Integrated modified energy factor (cu.ft./kWh/cycle)	Integrated water factor (gal/cycle/cu.ft.)
i. Top-loading, Compact (less than 1.6 ft <sup>3</sup> capacity) .....	0.86	14.4
ii. Top-loading, Standard (1.6 ft <sup>3</sup> or greater capacity) .....	1.29	8.4
iii. Front-loading, Compact (less than 1.6 ft <sup>3</sup> capacity) .....	1.13	8.3
iv. Front-loading, Standard (1.6 ft <sup>3</sup> or greater capacity) .....	1.84	4.7

(4) Clothes washers manufactured on or after January 1, 2018 shall have an Integrated Modified Energy Factor no

Product class	Modified energy factor (cu.ft./kWh/cycle)
i. Top-loading, Compact (less than 1.6 ft <sup>3</sup> capacity).	0.65.
ii. Top-loading, Standard (1.6 ft <sup>3</sup> or greater capacity).	1.26.
iii. Top-Loading, Semi-Automatic .....	Not Applicable. <sup>1</sup>
iv. Front-loading .....	1.26.
v. Suds-saving .....	Not Applicable. <sup>1</sup>

<sup>1</sup> Must have an unheated rinse water option.

(2) All top-loading or front-loading standard-size residential clothes washers manufactured on or after January 1, 2011, and before March 7, 2015, shall meet the following standard—

(i) A Modified Energy Factor of at least 1.26; and

(ii) A Water Factor of not more than 9.5.

(3) Clothes washers manufactured on or after March 7, 2015, and before January 1, 2018, shall have an Integrated Modified Energy Factor no less than, and an Integrated Water Factor no greater than:

Product class	Integrated modified energy factor (cu.ft./kWh/cycle)	Integrated water factor (gal/cycle/cu.ft.)
i. Top-loading, Compact (less than 1.6 ft <sup>3</sup> capacity) .....	1.15	12.0
ii. Top-loading, Standard (1.6 ft <sup>3</sup> or greater capacity) .....	1.57	6.5
iii. Front-loading, Compact (less than 1.6 ft <sup>3</sup> capacity) .....	1.13	8.3
iv. Front-loading, Standard (1.6 ft <sup>3</sup> or greater capacity) .....	1.84	4.7

(h) *Clothes dryers.* (1) Gas clothes dryers manufactured after January 1, 1988 shall not be equipped with a constant burning pilot.

(2) Clothes dryers manufactured on or after May 14, 1994 and before January 1, 2015, shall have an energy factor no less than:

Product class	Energy factor (lbs/kWh)
i. Electric, Standard (4.4 ft <sup>3</sup> or greater capacity)	3.01

Product class	Energy factor (lbs/kWh)
ii. Electric, Compact (120V) (less than 4.4 ft <sup>3</sup> capacity) .....	3.13
iii. Electric, Compact (240V) (less than 4.4 ft <sup>3</sup> capacity) .....	2.90
iv. Gas .....	2.67

(3) Clothes dryers manufactured on or after January 1, 2015, shall have a combined energy factor no less than:

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Product class	Combined energy factor (lbs/kWh)	Product class	Combined energy factor (lbs/kWh)
i. Vented Electric, Standard (4.4 ft <sup>3</sup> or greater capacity) .....	3.73	vi. Ventless Electric, Combination Washer-Dryer .....	2.08
ii. Vented Electric, Compact (120V) (less than 4.4 ft <sup>3</sup> capacity) .....	3.61		
iii. Vented Electric, Compact (240V) (less than 4.4 ft <sup>3</sup> capacity) .....	3.27		
iv. Vented Gas .....	3.30		
v. Ventless Electric, Compact (240V) (less than 4.4 ft <sup>3</sup> capacity) .....	2.55		

(i) *Direct heating equipment.* (1) Vented home heating equipment manufactured on or after January 1, 1990 and before April 16, 2013, shall have an annual fuel utilization efficiency no less than:

Product class	Annual fuel utilization efficiency, Jan. 1, 1990 (percent)
1. Gas wall fan type up to 42,000 Btu/h .....	73
2. Gas wall fan type over 42,000 Btu/h .....	74
3. Gas wall gravity type up to 10,000 Btu/h .....	59
4. Gas wall gravity type over 10,000 Btu/h up to 12,000 Btu/h .....	60
5. Gas wall gravity type over 12,000 Btu/h up to 15,000 Btu/h .....	61
6. Gas wall gravity type over 15,000 Btu/h up to 19,000 Btu/h .....	62
7. Gas wall gravity type over 19,000 Btu/h and up to 27,000 Btu/h .....	63
8. Gas wall gravity type over 27,000 Btu/h and up to 46,000 Btu/h .....	64
9. Gas wall gravity type over 46,000 Btu/h .....	65
10. Gas floor up to 37,000 Btu/h .....	56
11. Gas floor over 37,000 Btu/h .....	57
12. Gas room up to 18,000 Btu/h .....	57
13. Gas room over 18,000 Btu/h up to 20,000 Btu/h .....	58
14. Gas room over 20,000 Btu/h up to 27,000 Btu/h .....	63
15. Gas room over 27,000 Btu/h up to 46,000 Btu/h .....	64
16. Gas room over 46,000 Btu/h .....	65

(2) Vented home heating equipment manufactured on or after April 16, 2013, shall have an annual fuel utilization efficiency no less than:

Product class	Annual fuel utilization efficiency, April 16, 2013 (percent)
Gas wall fan type up to 42,000 Btu/h .....	75
Gas wall fan type over 42,000 Btu/h .....	76
Gas wall gravity type up to 27,000 Btu/h .....	65
Gas wall gravity type over 27,000 Btu/h up to 46,000 Btu/h .....	66
Gas wall gravity type over 46,000 Btu/h .....	67
Gas floor up to 37,000 Btu/h .....	57
Gas floor over 37,000 Btu/h .....	58
Gas room up to 20,000 Btu/h .....	61
Gas room over 20,000 Btu/h up to 27,000 Btu/h .....	66
Gas room over 27,000 Btu/h up to 46,000 Btu/h .....	67
Gas room over 46,000 Btu/h .....	68

(j) *Cooking Products* (1) Gas cooking products with an electrical supply cord manufactured on or after January 1, 1990, shall not be equipped with a constant burning pilot light.

(2) Gas cooking products without an electrical supply cord manufactured on or after April 9, 2012, shall not be equipped with a constant burning pilot light.

(3) Microwave-only ovens and countertop convection microwave ovens manufactured on or after June 17, 2016 shall have an average standby power not more than 1.0 watt. Built-in and over-the-range convection microwave ovens manufactured on or after June 17, 2016 shall have an average standby power not more than 2.2 watts.



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(k) *Pool heaters.* (1) Gas-fired pool heaters manufactured on or after January 1, 1990 and before April 16, 2013, shall have a thermal efficiency not less than 78%.

(2) Gas-fired pool heaters manufactured on or after April 16, 2013, shall have a thermal efficiency not less than 82%.

(1) *Television sets.* [Reserved]

(m) *Fluorescent lamp ballasts*—(1) *Standards for fluorescent lamp ballasts (other than dimming ballasts).* Except as provided in paragraphs (m)(2) and (3) of this section, each fluorescent lamp ballast manufactured on or after November 14, 2014,

(i) Designed and marketed—  
(A) To operate at nominal input voltages at or between 120 and 277 volts;

(B) To operate with an input current frequency of 60 Hertz; and

(C) For use in connection with fluorescent lamps (as defined in § 430.2)

(ii) Must have—

(A) A power factor of:

(1) 0.9 or greater for ballasts that are not residential ballasts; or

(2) 0.5 or greater for residential ballasts; and

(B) A ballast luminous efficiency not less than the following:

$$BLE = A / (1 + B \times \text{average total lamp arc power} - C)$$

Where A, B, and C are as follows:

Description	A	B	C
Instant start and rapid start ballasts (not classified as residential ballasts) that are designed and marketed to operate: 4-foot medium bipin lamps; ..... 2-foot U-shaped lamps; or 8-foot slimline lamps.	0.993	0.27	0.25
Programmed start ballasts (not classified as residential ballasts) that are designed and marketed to operate: 4-foot medium bipin lamps; ..... 2-foot U-shaped lamps; 4-foot miniature bipin standard output lamps; or 4-foot miniature bipin high output lamps.	0.993	0.51	0.37
Instant start and rapid start ballasts (not classified as sign ballasts) that are designed and marketed to operate 8-foot high output lamps .....	0.993	0.38	0.25
Programmed start ballasts (not classified as sign ballasts) that are designed and marketed to operate 8-foot high output lamps .....	0.973	0.70	0.37
Sign ballasts that are designed and marketed to operate 8-foot high output lamps .....	0.993	0.47	0.25
Instant start and rapid start residential ballasts that are designed and marketed to operate: 4-foot medium bipin lamps; ..... 2-foot U-shaped lamps; or 8-foot slimline lamps.	0.993	0.41	0.25
Programmed start residential ballasts that are designed and marketed to operate: 4-foot medium bipin lamps or ..... 2-foot U-shaped lamps.	0.973	0.71	0.37

(2) *Standards for certain dimming ballasts.* Except as provided in paragraph (m)(3) of this section, each dimming ballast manufactured on or after November 14, 2014; designed and marketed to operate one F34T12, two F34T12, two F96T12/ES, or two F96T12HO/ES lamps; and

(i) Designed and marketed—

(A) To operate at nominal input voltages at or between 120 and 277 volts;

(B) To operate with an input current frequency of 60 Hertz; and

(C) For use in connection with fluorescent lamps (as defined in § 430.2)

(ii) Must have—

(A) A power factor of:

(1) 0.9 or greater for ballasts that are not residential ballasts; or

(2) 0.5 or greater for residential ballasts; and

(B) A ballast luminous efficiency not less than the following:

Designed and marketed for operation of a maximum of	Nominal input voltage	Total nominal lamp watts	Ballast luminous efficiency	
			Low frequency ballasts	High frequency ballasts
One F34T12 lamp .....	120/277	34	0.777	0.778
Two F34T12 lamps .....	120/277	68	0.804	0.805

Designed and marketed for operation of a maximum of	Nominal input voltage	Total nominal lamp watts	Ballast luminous efficiency	
			Low frequency ballasts	High frequency ballasts
Two F96T12/ES lamps .....	120/277	120	0.876	0.884
Two F96T12HO/ES lamps .....	120/277	190	0.711	0.713

(3) *Exemptions.* The power factor and ballast luminous efficiency standards described in paragraph (m)(1)(ii) and (m)(2)(ii) of this section do not apply to:

(i) A dimming ballast designed and marketed to operate exclusively lamp types other than one F34T12, two F34T12, two F96T12/ES, or two F96T12HO/ES lamps;

(ii) A low frequency ballast that is designed and marketed to operate T8 diameter lamps; is designed and marketed for use in electromagnetic-interference-sensitive-environments only; and is shipped by the manufacturer in packages containing 10 or fewer ballasts; or

(iii) A programmed start ballast that operates 4-foot medium bipin T8 lamps and delivers on average less than 140 milliamperes to each lamp.

(4) For the purposes of this paragraph (m), the definitions found in appendix Q of subpart B of this part apply.

(n) *General service fluorescent lamps and incandescent reflector lamps.* (1) Except as provided in paragraphs (n)(2), (n)(3), and (n)(4) of this section, each of the following general service fluorescent lamps manufactured after the effective dates specified in the table shall meet or exceed the following lamp efficacy and CRI standards:

Lamp type	Nominal lamp wattage	Minimum CRI	Minimum average lamp efficacy lm/W	Effective date
4-foot medium bipin .....	>35 W	69	75.0	Nov. 1, 1995.
	≤35 W	45	75.0	Nov. 1, 1995.
2-foot U-shaped .....	>35 W	69	68.0	Nov. 1, 1995.
	≤ 35 W	45	64.0	Nov. 1, 1995.
8-foot slimline .....	>65 W	69	80.0	May 1, 1994.
	≤65 W	45	80.0	May 1, 1994.
8-foot high output .....	>100 W	69	80.0	May 1, 1994.
	≤100 W	45	80.0	May 1, 1994.

(2) The standards described in paragraph (n)(1) of this section do not apply to:

(i) Any 4-foot medium bipin lamp or 2-foot U-shaped lamp with a rated wattage less than 28 watts;

(ii) Any 8-foot high output lamp not defined in ANSI C78.81 (incorporated by reference; see § 430.3) or related supplements, or not 0.800 nominal amperes; or

(iii) Any 8-foot slimline lamp not defined in ANSI C78.3 (incorporated by reference; see § 430.3).

(3) Except as provided in paragraph (n)(4) of this section, each of the following general service fluorescent lamps manufactured after July 14, 2012, shall meet or exceed the following lamp efficacy standards shown in the table:

Lamp type	Correlated color temperature	Minimum average lamp efficacy lm/W
4-foot medium bipin .....	≤4,500K .....	89
	>4,500K and ≤7,000K .....	88
2-foot U-shaped .....	≤4,500K .....	84
	>4,500K and ≤7,000K .....	81
8-foot slimline .....	≤4,500K .....	97
	>4,500K and ≤7,000K .....	93
8-foot high output .....	≤4,500K .....	92
	>4,500K and ≤7,000K .....	88

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Lamp type	Correlated color temperature	Minimum average lamp efficacy lm/W
4-foot miniature bipin standard output .....	≤4,500K .....	86
	>4,500K and ≤7,000K .....	81
4-foot miniature bipin high output .....	≤4,500K .....	76
	>4,500K and ≤7,000K .....	72

(4) Each of the following general service fluorescent lamps manufactured on or after January 26, 2018, shall

meet or exceed the following lamp efficacy standards shown in the table:

Lamp type	Correlated color temperature	Minimum average lamp efficacy lm/W
4-foot medium bipin .....	≤4,500K .....	92.4
	>4,500K and ≤7,000K .....	88.7
2-foot U-shaped .....	≤4,500K .....	85.0
	>4,500K and ≤7,000K .....	83.3
8-foot slimline .....	≤4,500K .....	97.0
	>4,500K and ≤7,000K .....	93.0
8-foot high output .....	≤4,500K .....	92.0
	>4,500K and ≤7,000K .....	88.0
4-foot miniature bipin standard output .....	≤4,500K .....	95.0
	>4,500K and ≤7,000K .....	89.3
4-foot miniature bipin high output .....	≤4,500K .....	82.7
	>4,500K and ≤7,000K .....	76.9

(5) Except as provided in paragraph (n)(6) of this section, each of the following incandescent reflector lamps manufactured after November 1, 1995, shall meet or exceed the lamp efficacy standards shown in the table:

Nominal lamp wattage	Minimum average lamp efficacy lm/W
86–115 .....	14.0
116–155 .....	14.5
156–205 .....	15.0

Nominal lamp wattage	Minimum average lamp efficacy lm/W
40–50 .....	10.5
51–66 .....	11.0
67–85 .....	12.5

(6) Each of the following incandescent reflector lamps manufactured after July 14, 2012, shall meet or exceed the lamp efficacy standards shown in the table:

Rated lamp wattage	Lamp spectrum	Lamp diameter inches	Rated voltage	Minimum average lamp efficacy lm/W
40–205 .....	Standard Spectrum .....	>2.5	≥125 V	6.8*P <sup>0.27</sup>
			<125 V	5.9*P <sup>0.27</sup>
40–205 .....	Modified Spectrum .....	>2.5	≥125 V	5.7*P <sup>0.27</sup>
			<125 V	5.0*P <sup>0.27</sup>
		≤2.5	≥125 V	5.8*P <sup>0.27</sup>
			<125 V	5.0*P <sup>0.27</sup>
40–205 .....	Modified Spectrum .....	≤2.5	≥125 V	4.9*P <sup>0.27</sup>
			<125 V	4.2*P <sup>0.27</sup>

**Note 1:** P is equal to the rated lamp wattage, in watts.  
**Note 2:** Standard Spectrum means any incandescent reflector lamp that does not meet the definition of modified spectrum in 430.2.

(7)(i)(A) Subject to the exclusions in paragraph (n)(7)(ii) of this section, the standards specified in this section shall

apply to ER incandescent reflector lamps, BR incandescent reflector lamps, BPAR incandescent reflector

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lamps, and similar bulb shapes on and after January 1, 2008.

(B) Subject to the exclusions in paragraph (n)(7)(ii) of this section, the standards specified in this section shall apply to incandescent reflector lamps with a diameter of more than 2.25 inches, but not more than 2.75 inches, on and after June 15, 2008.

(ii) The standards specified in this section shall not apply to the following types of incandescent reflector lamps:

(A) Lamps rated at 50 watts or less that are ER30, BR30, BR40, or ER40 lamps;

(B) Lamps rated at 65 watts that are BR30, BR40, or ER40 lamps; or

(C) R20 incandescent reflector lamps rated 45 watts or less.

(o) *Faucets.* The maximum water use allowed for any of the following faucets manufactured after January 1, 1994, when measured at a flowing water pressure of 60 pounds per square inch (414 kilopascals), shall be as follows:

Faucet type	Maximum flow rate (gpm (L/min)) or (gal/cycle (L/cycle))
Lavatory faucets .....	2.2 gpm (8.3 L/min) <sup>1 2</sup>
Lavatory replacement aerators.	2.2 gpm (8.3 L/min)
Kitchen faucets .....	2.2 gpm (8.3 L/min)
Kitchen replacement aerators.	2.2 gpm (8.3 L/min)
Metering faucets .....	0.25 gal/cycle (0.95 L/cycle) <sup>3 4</sup>

**NOTE:**

<sup>1</sup> Sprayheads with independently-controlled orifices and manual controls.

The maximum flow rate of each orifice that manually turns on or off shall not exceed the maximum flow rate for a lavatory faucet.

<sup>2</sup> Sprayheads with collectively controlled orifices and manual controls.

The maximum flow rate of a sprayhead that manually turns on or off shall be the product of (a) the maximum flow rate for a lavatory faucet and (b) the number of component lavatories (rim space of the lavatory in inches (millimeters) divided by 20 inches (508 millimeters)).

<sup>3</sup> Sprayheads with independently controlled orifices and metered controls.

The maximum flow rate of each orifice that delivers a preset volume of water before gradually shutting itself off shall not exceed the maximum flow rate for a metering faucet.

<sup>4</sup> Sprayheads with collectively-controlled orifices and metered controls.

The maximum flow rate of a sprayhead that delivers a preset volume of water before gradually shutting itself off shall be the product of (a) the maximum flow rate for a metering faucet and (b) the number of component lavatories (rim space of the lavatory in inches (millimeters) divided by 20 inches (508 millimeters)).

(p) *Showerheads.* The maximum water use allowed for any showerheads manufactured after January 1, 1994, shall be 2.5 gallons per minute (9.5 liters per minute) when measured at a flowing pressure of 80 pounds per square inch gage (552 kilopascals). When used as a

component of any such showerhead, the flow-restricting insert shall be mechanically retained at the point of manufacture such that a force of 8.0 pounds force (36 Newtons) or more is required to remove the flow-restricting insert, except that this requirement shall not apply to showerheads for which removal of the flow-restricting insert would cause water to leak significantly from areas other than the spray face.

(q) *Water closets.* (1) The maximum water use allowed in gallons per flush for any of the following water closets manufactured after January 1, 1994, shall be as follows:

Water closet type	Maximum flush rate (gpi (Lpf))
Gravity tank-type toilets .....	1.6 (6.0)
Flushometer tank toilets .....	1.6 (6.0)
Electromechanical hydraulic toilets .....	1.6 (6.0)
Blowout toilets .....	3.5 (13.2)

(2) The maximum water use allowed for flushometer valve toilets, other than blowout toilets, manufactured after January 1, 1997, shall be 1.6 gallons per flush (6.0 liters per flush).

(r) *Urinals.* The maximum water use allowed for any urinals manufactured after January 1, 1994, shall be 1.0 gallons per flush (3.8 liters per flush). The maximum water use allowed for a trough-type urinal shall be the product of:

(1) The maximum flow rate for a urinal and

(2) The length of the trough-type urinal in inches (millimeter) divided by 16 inches (406 millimeters).

(s) *Ceiling fans and ceiling fan light kits.* (1) All ceiling fans manufactured on or after January 1, 2007, shall have the following features:

(i) Fan speed controls separate from any lighting controls;

(ii) Adjustable speed controls (either more than 1 speed or variable speed);

(iii) The capability of reversible fan action, except for—

(A) Fans sold for industrial applications;

(B) Fans sold for outdoor applications; and

(C) Cases in which safety standards would be violated by the use of the reversible mode.

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(2) Ceiling fan light kits manufactured on or after January 1, 2007, and prior to January 7, 2019, with medium screw base sockets must be packaged with medium screw base lamps to fill all sockets. These medium screw base lamps must—

(i) Be compact fluorescent lamps that meet or exceed the following requirements or be as described in paragraph (s)(2)(ii) of this section:

Factor	Requirements
Rated Wattage (Watts) & Configuration <sup>1</sup> .	Minimum Initial Lamp Efficacy (lumens per watt) <sup>2</sup>
<i>Bare Lamp:</i>	
Lamp Power <15 ..	45.0
Lamp Power ≥15 ..	60.0
<i>Covered Lamp (no reflector):</i>	
Lamp Power <15 ..	40.0
15≤Lamp Power <19.	48.0
19≤Lamp Power <25.	50.0
Lamp Power ≥25 ..	55.0
<i>With Reflector:</i>	
Lamp Power <20 ..	33.0
Lamp Power ≥20 ..	40.0
Lumen Maintenance at 1,000 hours.	≥ 90.0%
Lumen Maintenance at 40 Percent of Lifetime.	≥ 80.0%
Rapid Cycle Stress Test.	Each lamp must be cycled once for every 2 hours of lifetime. At least 5 lamps must meet or exceed the minimum number of cycles.
Lifetime .....	≥ 6,000 hours for the sample of lamps.

<sup>1</sup> Use rated wattage to determine the appropriate minimum efficacy requirements in this table.

<sup>2</sup> Calculate efficacy using measured wattage, rather than rated wattage, and measured lumens to determine product compliance. Wattage and lumen values indicated on products or packaging may not be used in calculation.

(ii) Be light sources other than compact fluorescent lamps that have lumens per watt performance at least equivalent to comparably configured compact fluorescent lamps meeting the energy conservation standards in paragraph (s)(2)(i) of this section.

(3) Ceiling fan light kits manufactured on or after January 1, 2007, and prior January 7, 2019, with pin-based

sockets for fluorescent lamps must use an electronic ballast and be packaged with lamps to fill all sockets. These lamp ballast platforms must meet the following requirements:

Factor	Requirement
System Efficacy Per Lamp Ballast Platform in Lumens Per Watt (lm/w).	≥50 lm/w for all lamps below 30 total listed lamp watts.  ≥60 lm/w for all lamps that are ≤ 24 inches and ≥30 total listed lamp watts. ≥70 lm/w for all lamps that are > 24 inches and ≥30 total listed lamp watts.

(4) Ceiling fan light kits manufactured on or after January 1, 2009, and prior to January 7, 2019, with socket types other than those covered in paragraphs (s)(2) or (3) of this section, including candelabra screw base sockets, must be packaged with lamps to fill all sockets and must not be capable of operating with lamps that total more than 190 watts.

(5) Ceiling fan light kits manufactured on or after January 7, 2019 must be packaged with lamps to fill all sockets, and each basic model of lamp packaged with the basic model of CFLK and each basic model of integrated SSL in the CFLK basic model shall meet the requirements shown in the table:

Lumens <sup>1</sup>	Minimum required efficacy (lm/W)
<120 .....	50
≥120 .....	(74.0 – 29.42 × 0.9983 lumens)

<sup>1</sup> Use the lumen output for each basic model of lamp packaged with the basic model of CFLK or each basic model of integrated SSL in the CFLK basic model to determine the applicable standard.

(i) Ceiling fan light kits with medium screw base sockets manufactured on or after January 7, 2019 and packaged with compact fluorescent lamps must include lamps that also meet the following requirements:

Lumen Maintenance at 1,000 hours .....	≥90.0%.
Lumen Maintenance at 40 Percent of Lifetime .....	≥80.0%.
Rapid Cycle Stress Test .....	Each lamp must be cycled once for every 2 hours of lifetime of compact fluorescent lamp as defined in § 430.2. At least 5 lamps must meet or exceed the minimum number of cycles.
Lifetime .....	≥6,000 hours for the sample of lamps.

(ii) Ceiling fan light kits with pin based sockets for fluorescent lamps, manufactured on or after January 7,

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2019, must also use an electronic ballast.

(t) *Torchieres*. A torchiere manufactured on or after January 1, 2006 shall:

(1) Consume not more than 190 watts of power; and

(2) Not be capable of operating with lamps that total more than 190 watts.

(u) *Compact fluorescent lamps*. (1) Medium Base Compact Fluorescent Lamps. A bare or covered (no reflector) medium base compact fluorescent lamp manufactured on or after January 1, 2006, must meet the following requirements:

Factor	Requirements
Labeled Wattage (Watts) & Configuration *	Measured initial lamp efficacy (lumens per watt) must be at least:
<i>Bare Lamp:</i>	
Labeled Wattage < 15	45.0.
Labeled Wattage ≥ 15	60.0.
<i>Covered Lamp (no reflector):</i>	
Labeled Wattage < 15	40.0.
15 ≤ Labeled Wattage < 19	48.0.
19 ≤ Labeled Wattage < 25	50.0.
Labeled Wattage ≥ 25	55.0.
Lumen Maintenance at 1,000 Hours	≥90.0%.
Lumen Maintenance at 40 Percent of Lifetime **	≥80.0%.
Rapid Cycle Stress Test	Each lamp must be cycled once for every 2 hours of lifetime.** At least 5 lamps must meet or exceed the minimum number of cycles.
Lifetime **	≥6,000 hours.

\* Use labeled wattage to determine the appropriate efficacy requirements in this table; do not use measured wattage for this purpose.

\*\* Lifetime refers to lifetime of a compact fluorescent lamp as defined in 10 CFR 430.2.

(2) [Reserved].

(v) *Dehumidifiers*. (1) Dehumidifiers manufactured on or after October 1, 2012, shall have an energy factor that meets or exceeds the following values:

Product capacity (pints/day)	Minimum energy factor (liters/kWh)
Up to 35.00	1.35
35.01–45.00	1.50
45.01–54.00	1.60
54.01–75.00	1.70
75.01 or more	2.5

(2) Dehumidifiers manufactured on or after June 13, 2019, shall have an integrated energy factor that meets or exceeds the following values:

Portable dehumidifier product capacity (pints/day)	Minimum integrated energy factor (liters/kWh)
25.00 or less	1.30
25.01–50.00	1.60
50.01 or more	2.80
Whole-home dehumidifier product case volume (cubic feet)	
8.0 or less	1.77

Portable dehumidifier product capacity (pints/day)	Minimum integrated energy factor (liters/kWh)
More than 8.0	2.41

(w) *External power supplies*. (1)(i) Except as provided in paragraphs (w)(2) and (5) of this section, all Class A external power supplies manufactured on or after July 1, 2008, shall meet the following standards:

Active Mode	
Nameplate output	Required efficiency (decimal equivalent of a percentage)
Less than 1 watt	0.5 times the Nameplate output.
From 1 watt to not more than 51 watts.	The sum of 0.09 times the Natural Logarithm of the Nameplate Output and 0.5.
Greater than 51 watts	0.85.
Not more than 250 watts	0.5 watts.

(ii) Except as provided in paragraphs (w)(5), (w)(6), and (w)(7) of this section, all direct operation external power supplies manufactured on or after February 10, 2016, shall meet the following standards:

<b>Single-Voltage External AC-DC Power Supply, Basic-Voltage</b>		
<b>Nameplate Output Power (P<sub>out</sub>)</b>	<b>Minimum Average Efficiency in Active Mode (expressed as a decimal)</b>	<b>Maximum Power in No-Load Mode [W]</b>
P <sub>out</sub> ≤ 1 W	≥ 0.5 × P <sub>out</sub> + 0.16	≤ 0.100
1 W < P <sub>out</sub> ≤ 49 W	≥ 0.071 × ln(P <sub>out</sub> ) – 0.0014 × P <sub>out</sub> + 0.67	≤ 0.100
49 W < P <sub>out</sub> ≤ 250 W	≥ 0.880	≤ 0.210
P <sub>out</sub> > 250 W	≥ 0.875	≤ 0.500
<b>Single-Voltage External AC-DC Power Supply, Low-Voltage</b>		
<b>Nameplate Output Power (P<sub>out</sub>)</b>	<b>Minimum Average Efficiency in Active Mode (expressed as a decimal)</b>	<b>Maximum Power in No-Load Mode [W]</b>
P <sub>out</sub> ≤ 1 W	≥ 0.517 × P <sub>out</sub> + 0.087	≤ 0.100
1 W < P <sub>out</sub> ≤ 49 W	≥ 0.0834 × ln(P <sub>out</sub> ) – 0.0014 × P <sub>out</sub> + 0.609	≤ 0.100
49 W < P <sub>out</sub> ≤ 250 W	≥ 0.870	≤ 0.210
P <sub>out</sub> > 250 W	≥ 0.875	≤ 0.500
<b>Single-Voltage External AC-AC Power Supply, Basic-Voltage</b>		
<b>Nameplate Output Power (P<sub>out</sub>)</b>	<b>Minimum Average Efficiency in Active Mode (expressed as a decimal)</b>	<b>Maximum Power in No-Load Mode [W]</b>
P <sub>out</sub> ≤ 1 W	≥ 0.5 × P <sub>out</sub> + 0.16	≤ 0.210
1 W < P <sub>out</sub> ≤ 49 W	≥ 0.071 × ln(P <sub>out</sub> ) – 0.0014 × P <sub>out</sub> + 0.67	≤ 0.210
49 W < P <sub>out</sub> ≤ 250 W	≥ 0.880	≤ 0.210
P <sub>out</sub> > 250 W	≥ 0.875	≤ 0.500
<b>Single-Voltage External AC-AC Power Supply, Low-Voltage</b>		
<b>Nameplate Output Power (P<sub>out</sub>)</b>	<b>Minimum Average Efficiency in Active Mode (expressed as a decimal)</b>	<b>Maximum Power in No-Load Mode [W]</b>
P <sub>out</sub> ≤ 1 W	≥ 0.517 × P <sub>out</sub> + 0.087	≤ 0.210
1 W < P <sub>out</sub> ≤ 49 W	≥ 0.0834 × ln(P <sub>out</sub> ) – 0.0014 × P <sub>out</sub> + 0.609	≤ 0.210

$49 \text{ W} < P_{\text{out}} \leq 250 \text{ W}$	$\geq 0.870$	$\leq 0.210$
$P_{\text{out}} > 250 \text{ W}$	$\geq 0.875$	$\leq 0.500$
<b>Multiple-Voltage External Power Supply</b>		
<b>Nameplate Output Power (<math>P_{\text{out}}</math>)</b>	<b>Minimum Average Efficiency in Active Mode</b> <i>(expressed as a decimal)</i>	<b>Maximum Power in No-Load Mode [W]</b>
$P_{\text{out}} \leq 1 \text{ W}$	$\geq 0.497 \times P_{\text{out}} + 0.067$	$\leq 0.300$
$1 \text{ W} < P_{\text{out}} \leq 49 \text{ W}$	$\geq 0.075 \times \ln(P_{\text{out}}) + 0.561$	$\leq 0.300$
$P_{\text{out}} > 49 \text{ W}$	$\geq 0.860$	$\leq 0.300$

(iii) Except as provided in paragraphs (w)(5), (w)(6), and (w)(7) of this section, all external power supplies manufactured on or after February 10, 2016, shall meet the following standards:

	Class A EPS	Non-Class A EPS
Direct Operation EPS .....	Level VI: 10 CFR 430.32(w)(1)(ii) .....	Level VI: 10 CFR 430.32(w)(1)(ii).
Indirect Operation EPS .....	Level IV: 10 CFR 430.32(w)(1)(i) .....	No Standards.

(2) A basic model of external power supply is not subject to the energy conservation standards of paragraph (w)(1)(ii) of this section if the external power supply—

- (i) Is manufactured during the period beginning on February 10, 2016, and ending on February 10, 2020;
- (ii) Is marked in accordance with the External Power Supply International Efficiency Marking Protocol, as in effect on February 10, 2016;
- (iii) Meets, where applicable, the standards under paragraph (w)(1)(i) of this section, and has been certified to the Secretary as meeting those standards; and
- (iv) Is made available by the manufacturer only as a service part or a spare part for an end-use product that—
  - (A) Constitutes the primary load; and
  - (B) Was manufactured before February 10, 2016.

(3) The standards described in paragraph (w)(1) of this section shall not constitute an energy conservation standard for the separate end-use prod-

uct to which the external power supply is connected.

(4) Any external power supply subject to the standards in paragraph (w)(1) of this section shall be clearly and permanently marked in accordance with the International Efficiency Marking Protocol for External Power Supplies (incorporated by reference; see §430.3), published by the U.S. Department of Energy.

(5) *Non-application of no-load mode requirements.* The no-load mode energy efficiency standards established in paragraph (w)(1) of this section shall not apply to an external power supply manufactured before July 1, 2017, that—

- (i) Is an AC-to-AC external power supply;
- (ii) Has a nameplate output of 20 watts or more;
- (iii) Is certified to the Secretary as being designed to be connected to a security or life safety alarm or surveillance system component; and
- (iv) On establishment within the External Power Supply International Efficiency Marking Protocol, as referenced in the “Energy Star Program



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Requirements for Single Voltage External Ac-Dc and Ac-Ac Power Supplies” (incorporated by reference, see § 430.3), published by the Environmental Protection Agency, of a distinguishing mark for products described in this clause, is permanently marked with the distinguishing mark.

(6) An external power supply shall not be subject to the standards in paragraph (w)(1) of this section if it is a device that requires Federal Food and Drug Administration (FDA) listing and approval as a medical device in accordance with section 513 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360(c)).

(7) A direct operation, AC–DC external power supply with nameplate output voltage less than 3 volts and nameplate output current greater than or equal to 1,000 milliamps that charges the battery of a product that is fully or primarily motor operated shall not be subject to the standards in paragraph (w)(1)(ii) of this section.

(x) *General service incandescent lamps, intermediate base incandescent lamps and candelabra base incandescent lamps.* (1) The energy conservation standards in this paragraph apply to general service incandescent lamps:

(i) Intended for a general service or general illumination application (whether incandescent or not);

(ii) Has a medium screw base or any other screw base not defined in ANSI C81.61 (incorporated by reference; see § 430.3); and

(iii) Is capable of being operated at a voltage at least partially within the range of 110 to 130 volts.

(A) General service incandescent lamps manufactured after the effective dates specified in the tables below, except as described in paragraph (x)(1)(B) of this section, shall have a color rendering index greater than or equal to 80 and shall have rated wattage no greater than and rated lifetime no less than the values shown in the table below:

GENERAL SERVICE INCANDESCENT LAMPS

Rated lumen ranges	Maximum rate wattage	Minimum rate life-time	Effective date
1490–2600 .....	72	1,000 hrs .....	1/1/2012
1050–1489 .....	53	1,000 hrs .....	1/1/2013
750–1049 .....	43	1,000 hrs .....	1/1/2014
310–749 .....	29	1,000 hrs .....	1/1/2014

(B) Modified spectrum general service incandescent lamps manufactured after the effective dates specified shall have a color rendering index greater

than or equal to 75 and shall have a rated wattage no greater than and rated lifetime no less than the values shown in the table below:

MODIFIED SPECTRUM GENERAL SERVICE INCANDESCENT LAMPS

Rated lumen ranges	Maximum rate wattage	Minimum rate life-time	Effective date
1118–1950 .....	72	1,000 hrs .....	1/1/2012
788–1117 .....	53	1,000 hrs .....	1/1/2013
563–787 .....	43	1,000 hrs .....	1/1/2014
232–562 .....	29	1,000 hrs .....	1/1/2014

(2) Each candelabra base incandescent lamp shall not exceed 60 rated watts.

(3) Each intermediate base incandescent lamp shall not exceed 40 rated watts.

(y) *Residential furnace fans.* Residential furnace fans incorporated in the products listed in Table 1 of this paragraph and manufactured on and after July 3, 2019, shall have a fan energy rating (FER) value that meets or is less than the following values:

TABLE 1—ENERGY CONSERVATION STANDARDS FOR COVERED RESIDENTIAL FURNACE FANS\*

Product class	FER ** (Watts/cfm)
Non-Weatherized, Non-Condensing Gas Furnace Fan (NWG-NC) .....	$FER = 0.044 \times Q_{Max} + 182$
Non-Weatherized, Condensing Gas Furnace Fan (NWG-C) .....	$FER = 0.044 \times Q_{Max} + 195$
Weatherized Non-Condensing Gas Furnace Fan (WG-NC) .....	$FER = 0.044 \times Q_{Max} + 199$
Non-Weatherized, Non-Condensing Oil Furnace Fan (NWO-NC) .....	$FER = 0.071 \times Q_{Max} + 382$
Non-Weatherized Electric Furnace/Modular Blower Fan (NWEF/NWMB) .....	$FER = 0.044 \times Q_{Max} + 165$
Mobile Home Non-Weatherized, Non-Condensing Gas Furnace Fan (MH-NWG-NC).	$FER = 0.071 \times Q_{Max} + 222$
Mobile Home Non-Weatherized, Condensing Gas Furnace Fan (MH-NWG-C) .....	$FER = 0.071 \times Q_{Max} + 240$
Mobile Home Electric Furnace/Modular Blower Fan (MH-EF/MB) .....	$FER = 0.044 \times Q_{Max} + 101$
Mobile Home Non-Weatherized Oil Furnace Fan (MH-NWO) .....	Reserved
Mobile Home Weatherized Gas Furnace Fan (MH-WG)** .....	Reserved

\* Furnace fans incorporated into hydronic air handlers, SDHV modular blowers, SDHV electric furnaces, and CAC/HP indoor units are not subject to the standards listed in this table.  
 \*\*  $Q_{Max}$  is the airflow, in cfm, at the maximum airflow-control setting measured using the final DOE test procedure at 10 CFR part 430, subpart B, appendix AA.

(z) *Battery chargers.* (1) Battery chargers manufactured on or after June 13, 2018, must have a unit energy consumption (UEC) less than or equal to the prescribed “Maximum UEC” standard

when using the equations for the appropriate product class and corresponding rated battery energy as shown in the following table:

Product class	Product class description	Rated battery energy (Ebatt**)	Special characteristic or battery voltage	Maximum UEC (kWh/yr) (as a function of Ebatt**)
1 .....	Low-Energy .....	≤5 Wh .....	Inductive Connection * .....	3.04
2 .....	Low-Energy, Low-Voltage .....	<100 Wh ..	<4 V .....	$0.1440 * E_{batt} + 2.95$
3 .....	Low-Energy, Medium-Voltage ...	.....	4–10 V .....	For $E_{batt} < 10$ Wh, 1.42 kWh/yr $E_{batt} \geq 10$ Wh, $0.0255 * E_{batt} + 1.16$
4 .....	Low-Energy, High-Voltage .....	.....	>10 V .....	$0.11 * E_{batt} + 3.18$
5 .....	Medium-Energy, Low-Voltage ...	100–3000 Wh.	<20 V .....	$0.0257 * E_{batt} + .815$
6 .....	Medium-Energy, High-Voltage ..	.....	≥20 V .....	$0.0778 * E_{batt} + 2.4$
7 .....	High-Energy .....	>3000 Wh	.....	$0.0502 * E_{batt} + 4.53$

\* Inductive connection and designed for use in a wet environment (e.g. electric toothbrushes).  
 \*\*  $E_{batt}$  = Rated battery energy as determined in 10 CFR part 429.39(a).

(2) A battery charger shall not be subject to the standards in paragraph (z)(1) of this section if it is a device that requires Federal Food and Drug Administration (FDA) listing and approval as a life-sustaining or life-supporting device in accordance with section 513 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360(c)).

[54 FR 6077, Feb. 7, 1989]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 430.32, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.fdsys.gov](http://www.fdsys.gov).

EFFECTIVE DATE NOTES: 1. At 81 FR 75262, Oct. 28, 2016, § 430.32 was amended by adding paragraph (aa), effective Feb. 27, 2017. For the convenience of the user, the added text is set forth as follows:

**§ 430.32 Energy and water conservation standards and their compliance dates.**

\* \* \* \* \*

(aa) *Miscellaneous refrigeration products.* The energy standards as determined by the equations of the following table(s) shall be rounded off to the nearest kWh per year. If the equation calculation is halfway between the nearest two kWh per year values, the standard shall be rounded up to the higher of these values.

(1) Coolers manufactured starting on October 28, 2019 shall have Annual Energy Use (AEU) no more than:

Product class	AEU (kWh/yr)
1. Built-in compact .....	$7.88AV + 155.8$
2. Built-in	
3. Freestanding compact	

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Product class	AEU (kWh/yr)
4. Freestanding	

AV = Total adjusted volume, expressed in ft<sup>3</sup>, as calculated according to appendix A of subpart B of this part.

(2) Combination cooler refrigeration products manufactured starting on October 28, 2019 shall have Annual Energy Use (AEU) no more than:

Product class	AEU (kWh/yr)
C-3A. Cooler with all-refrigerator—automatic defrost.	4.57AV + 130.4
C-3A-BI. Built-in cooler with all-refrigerator—automatic defrost.	5.19AV + 147.8
C-9. Cooler with upright freezers with automatic defrost without an automatic icemaker.	5.58AV + 147.7
C-9-BI. Built-in cooler with upright freezer with automatic defrost without an automatic icemaker.	6.38AV + 168.8
C-9I. Cooler with upright freezer with automatic defrost with an automatic icemaker.	5.58AV + 231.7
C-9I-BI. Built-in cooler with upright freezer with automatic defrost with an automatic icemaker.	6.38AV + 252.8
C-13A. Compact cooler with all-refrigerator—automatic defrost.	5.93AV + 193.7
C-13A-BI. Built-in compact cooler with all-refrigerator—automatic defrost.	6.52AV + 213.1

AV = Total adjusted volume, expressed in ft<sup>3</sup>, as calculated according to appendix A of subpart B of this part.

2. At 81 FR 90120, Dec. 13, 2016, §430.32 was amended by removing paragraph (f)(1) introductory text; removing and reserving paragraph (f)(2); and redesignating paragraph (f)(3) as (f)(1), effective Jan. 12, 2017.

**§ 430.33 Preemption of State regulations.**

(a) Any State regulation providing for any energy conservation standard, or water conservation standard (in the case of faucets, showerheads, water closets, and urinals), or other requirement with respect to the energy efficiency, energy use, or water use (in the case of faucets, showerheads, water closets, or urinals) of a covered product that is not identical to a Federal standard in effect under this subpart is preempted by that standard, except as provided for in sections 325(i)(6)(A)(vi), 327(b) and (c) of the Act.

(b) No State regulation, or revision thereof, concerning the energy efficiency, energy use, or water use of the covered product shall be effective with respect to such covered product, unless the State regulation or revision in the case of any portion of any regulation that establishes requirements for gen-

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eral service incandescent lamps, intermediate base incandescent lamps, or candelabra base lamps, was enacted or adopted by the State of California or Nevada before December 4, 2007, except that—

(1) The regulation adopted by the California Energy Commission with an effective date of January 1, 2008, shall only be effective until the effective date of the Federal standard for the applicable lamp category under paragraphs (A), (B), and (C) of section 325(i)(1) of EPCA; and

(2) The States of California and Nevada may, at any time, modify or adopt a State standard for general service lamps to conform with Federal standards with effective dates no earlier than 12 months prior to the Federal effective dates prescribed under paragraphs (A), (B), and (C) of section 325(i)(1) of EPCA, at which time any prior regulations adopted by the State of California or Nevada shall no longer be effective.

[63 FR 13318, Mar. 18, 1998, as amended at 74 FR 12070, Mar. 23, 2009; 78 FR 62993, Oct. 23, 2013]

**§ 430.34 Energy and water conservation standards amendments**

The Department of Energy may not prescribe any amended standard which increases the maximum allowable energy use or, in the case of showerheads, faucets, water closets or urinals, the maximum allowable water use, or which decreases the minimum required energy efficiency of a covered product.

[67 FR 36406, May 23, 2002]

**§ 430.35 Petitions with respect to general service lamps.**

(a) Any person may petition the Secretary for an exemption for a type of general service lamp from the requirements of this subpart. The Secretary may grant an exemption only to the extent that the Secretary finds, after a hearing and opportunity for public comment, that it is not technically feasible to serve a specialized lighting application (such as a military, medical, public safety or certified historic lighting application) using a lamp that meets the requirements of this subpart. To grant an exemption for a product under this paragraph, the Secretary