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input power measured at that loading condition. Efficiency shall be calculated at each Loading Condition (1, 2, 3, and 4, in Table 1) and be recorded separately.

(F) Power consumption calculation. Power consumption of the unit under test at Loading Conditions 1, 2, 3, and 4 is the difference between the active output power at that Loading Condition and the active AC input power at that Loading Condition. The power consumption of Loading Condition 5 (no-load) is equal to the AC active input power at that Loading Condition.

(ii) Off Mode Measurement—If the multiple-voltage external power supply unit under test incorporates any on-off switches, the unit under test shall be placed in off mode and its power consumption in off mode measured and recorded. The measurement of the off mode energy consumption shall conform to the requirements specified in paragraph (4)(b)(i) of this appendix. Note that the only loading condition that will be measured for off mode is “Loading Condition 5” in paragraph (A), “Loading conditions and testing sequence”, except that all manual on-off switches shall be placed in the off position for the measurement.

[71 FR 71366, Dec. 8, 2006, as amended at 74 FR 12066, Mar. 23, 2009; 74 FR 13334, Mar. 27, 2009; 76 FR 31782, June 1, 2011]

Subpart C—Energy and Water Conservation Standards

§ 430.31 Purpose and scope.

This subpart contains energy conservation standards and water conservation standards (in the case of faucets, showerheads, water closets, and urinals) for classes of covered products that are required to be administered by the Department of Energy pursuant to the Energy Conservation Program for Consumer Products Other Than Automobiles under the Energy Policy and Conservation Act, as amended (42 U.S.C. 6291 *et seq.*). Basic models of covered products manufactured before the date on which an amended energy conservation standard or water conservation standard (in the case of faucets, showerheads, water closets, and urinals) becomes effective (or revisions of such models that are manufactured after such date and have the same energy efficiency, energy use characteristics, or water use characteristics (in the case of faucets, showerheads, water closets, and urinals), that comply with the energy conservation standard or water conservation standard (in the

case of faucets, showerheads, water closets, and urinals) applicable to such covered products on the day before such date shall be deemed to comply with the amended energy conservation standard or water conservation standard (in the case of faucets, showerheads, water closets, and urinals).

[63 FR 13317, Mar. 18, 1998]

§ 430.32 Energy and water conservation standards and their effective 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-freezers 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 14, 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

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Product class	Energy standard equations for maximum energy use (kWh/yr)	Product class	Energy standard equations for maximum energy use (kWh/yr)
10. Chest freezers and all other freezers except compact freezers.	9.88AV + 143.7	16. Compact upright freezers with manual defrost.	9.78AV + 250.8
11. Compact refrigerators and refrigerator-freezers with manual defrost.	0.35av + 143.7	17. Compact upright freezers with automatic defrost.	0.35av + 250.8
12. Compact refrigerator-freezer—partial automatic defrost.	10.70AV + 299.0	18. Compact chest freezers	11.40AV + 391.0
13. Compact refrigerator-freezers—automatic defrost with top-mounted freezer and compact all-refrigerator—automatic defrost.	0.38av + 299.0		0.40av + 391.0
14. Compact refrigerator-freezers—automatic defrost with side-mounted freezer.	7.00AV + 398.0		10.45AV + 152.0
15. Compact refrigerator-freezers—automatic defrost with bottom-mounted freezer.	0.25av + 398.0		0.37av + 152.0
	12.70AV + 355.0		
	0.45av + 355.0		
	7.60AV + 501.0		
	0.27av + 501.0		
	13.10AV + 367.0		
	0.46av + 367.0		

AV: Adjusted Volume in ft³; av: Adjusted Volume in liters (L).

The following standards apply to products manufactured starting on September 14, 2014:

Product class	Equations for maximum energy use (kWh/yr)	
	Based on AV (ft ³)	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
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

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Product class	Equations for maximum energy use (kWh/yr)	
	Based on AV (ft³)	Based on av (L)
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 24,999 Btu/h	8.5	9.4
5b. Without reverse cycle, with louvered sides, and 25,000 Btu/h or more	9.0	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	9.5	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 sampling plan stated in § 430.24(m).

(1) Split system central air conditioners and central air conditioning heat pumps manufactured after January 1, 1992, and before January 23, 2006,

and single package central air conditioners and central air conditioning heat pumps manufactured after January 1, 1993, and before January 23, 2006, shall have Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor no less than:

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Product class	Seasonal energy efficiency ratio	Heating seasonal performance factor
(i) Split systems	10.0	6.8
(ii) Single package systems	9.7	6.6

(2) Central air conditioners and central air conditioning heat pumps manufactured on or after January 23, 2006, and before January 1, 2015, shall have Seasonal Energy Efficiency Ratio and Heating Seasonal Performance Factor no 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	13	7.7
(iii) Single-package air conditioners	13	
(iv) Single-package heat pumps	13	7.7
(v)(A) Through-the-wall air conditioners and heat pumps-split system ¹	10.9	7.1
(v)(B) Through-the-wall air conditioners and heat pumps-single package ¹	10.6	7.0
(vi) Small-duct, high-velocity systems	13	7.7
(vii)(A) Space-constrained products—air conditioners	12	
(vii)(B) Space-constrained products—heat pumps	12	7.4

¹ The “through-the-wall air conditioners and heat pump—split system” and “through-the-wall air conditioner and heat pump—single package” product classes only applied to products manufactured prior to January 23, 2010. Products manufactured as of that date must be assigned to one of the remaining product classes listed in this table. The product class assignment depends on the product’s characteristics. Product class definitions can be found in 10 CFR 430.2 and 10 CFR part 430, subpart B, appendix M. DOE believes that most, if not all, of the historically-characterized “through-the-wall” products will be assigned to one of the space-constrained product classes.

(3) 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 ¹	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	13	7.7
(vi)(A) Space-constrained products—air conditioners	12	
(vi)(B) Space-constrained products—heat pumps	12	7.4

¹ The “through-the-wall air conditioners and heat pump—split system” and “through-the-wall air conditioner and heat pump—single package” product classes only applied to products manufactured prior to January 23, 2010. Products manufactured as of that date must be assigned to one of the remaining product classes listed in this table. The product class assignment depends on the product’s characteristics. Product class definitions can be found in 10 CFR 430.2 and 10 CFR part 430, subpart B, appendix M. DOE believes that most, if not all, of the historically-characterized “through-the-wall” products will be assigned to one of the space-constrained product classes.

(4) In addition to meeting the applicable requirements in paragraph (c)(3) of this section, products in product class (i) of that paragraph (*i.e.*, split-system air conditioners) that are manufactured on or after January 1, 2015, and installed 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, shall have a Seasonal Energy Efficiency Ratio not less than 14.

(5) In addition to meeting the applicable requirements in paragraphs (c)(3) of this section, products in product classes (i) and (iii) of paragraph (c)(3) (*i.e.*, split-system air conditioners and single-package air conditioners) that are manufactured on or after January 1, 2015, and installed in the States of Arizona, California, Nevada, or New Mexico shall have a Seasonal Energy Efficiency Ratio not less than 14 and have an Energy Efficiency Ratio (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)
(i) Split-system rated cooling capacity less than 45,000 Btu/hr	12.2
(ii) Split-system rated cooling capacity equal to or greater than 45,000 Btu/hr	11.7
(iii) Single-package systems	11.0

(6) 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 energy factor of water heaters shall not be less than the following for products manufactured on or after the indicated dates.

Product class	Energy factor as of January 20, 2004	Energy factor as of April 16, 2015
Gas-fired Water Heater	$0.67 - (0.0019 \times \text{Rated Storage Volume in gallons})$.	For tanks with a Rated Storage Volume at or below 55 gallons: $EF = 0.675 - (0.0015 \times \text{Rated Storage Volume in gallons})$. For tanks with a Rated Storage Volume above 55 gallons: $EF = 0.8012 - (0.00078 \times \text{Rated Storage Volume in gallons})$. $EF = 0.68 - (0.0019 \times \text{Rated Storage Volume in gallons})$.
Oil-fired Water Heater	$0.59 - (0.0019 \times \text{Rated Storage Volume in gallons})$.	For tanks with a Rated Storage Volume at or below 55 gallons: $EF = 0.960 - (0.0003 \times \text{Rated Storage Volume in gallons})$. For tanks with a Rated Storage Volume above 55 gallons: $EF = 2.057 - (0.00113 \times \text{Rated Storage Volume in gallons})$. $EF = 0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.
Electric Water Heater	$0.97 - (0.00132 \times \text{Rated Storage Volume in gallons})$.	For tanks with a Rated Storage Volume at or below 55 gallons: $EF = 0.960 - (0.0003 \times \text{Rated Storage Volume in gallons})$. For tanks with a Rated Storage Volume above 55 gallons: $EF = 2.057 - (0.00113 \times \text{Rated Storage Volume in gallons})$. $EF = 0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.
Tabletop Water Heater	$0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.	$EF = 0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.
Instantaneous Gas-fired Water Heater.	$0.62 - (0.0019 \times \text{Rated Storage Volume in gallons})$.	$EF = 0.82 - (0.0019 \times \text{Rated Storage Volume in gallons})$.
Instantaneous Electric Water Heater.	$0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.	$EF = 0.93 - (0.00132 \times \text{Rated Storage Volume in gallons})$.

Note: The Rated Storage Volume equals the water storage capacity of a water heater, in gallons, as specified by the manufacturer.

(e) *Furnaces and boilers.* (1) *Furnaces.* (i) The Annual Fuel Utilization Efficiency (AFUE) of residential furnaces shall not be less than the following for non-weatherized furnaces manufactured before May 1, 2013, and weatherized furnaces manufactured before January 1, 2015:

Product class	AFUE (percent) ¹
(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

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

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(ii) The AFUE of residential non-weatherized furnaces manufactured on or after May 1, 2013, and weatherized gas and oil-fired furnaces manufactured on or after January 1, 2015 shall be not less than the following:

Product class	AFUE (percent) ¹
(A) Non-weatherized gas furnaces (not including mobile home furnaces)	80
(B) Mobile Home gas furnaces	80
(C) Non-weatherized oil-fired furnaces (not including mobile home furnaces)	83
(D) Mobile Home oil-fired furnaces	75
(E) Weatherized gas furnaces	81
(F) Weatherized oil-fired furnaces	78
(G) Electric furnaces	78

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

(iii) In addition to meeting the applicable requirements in paragraph (e)(1)(ii) of this section, products in product classes (A) and (B) of that paragraph (*i.e.*, residential non-weatherized gas furnaces (including mobile home furnaces)) that are manufactured on or after May 1, 2013, and installed in the States of Alaska, Colorado, Connecticut, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey,

New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming, shall have an AFUE not less than 90 percent.

(iv) 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 gas furnaces (including mobile home furnaces)	10	10
(B) Non-weatherized oil-fired furnaces (including mobile home furnaces)	11	11
(C) 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 ¹ (percent)
(A) Boilers (excluding gas steam)	80
(B) Gas steam boilers	75

¹ 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, shall not be less than the following and must comply with the design requirements as follows:

Product class	AFUE ¹ (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).

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

(iii) *Automatic means for adjusting water temperature.* (A) The automatic

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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.

(iv) 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

(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.

(g) *Clothes washers.* (1) Clothes washers manufactured before January 1, 2004, shall have an energy factor no less than:

Product Class	Energy factor (cu.ft./kWh/cycle)
i. Top-Loading, Compact (less than 1.6 ft. ³ capacity).	0.9.
ii. Top-Loading, Standard (1.6 ft. ³ or greater capacity).	1.18.
iii. Top-Loading, Semi-Automatic	¹ Not Applicable.
iv. Front-Loading	¹ Not Applicable.
v. Suds-saving	¹ Not Applicable.

¹ Must have an unheated rinse water option.

(2) Clothes washers manufactured on or after January 1, 2004, and before January 1, 2007, shall have a modified energy factor no less than:

Product Class	Modified energy factor (cu.ft./kWh/cycle)
i. Top-Loading, Compact (less than 1.6 ft. ³ capacity).	0.65.
ii. Top-Loading, Standard (1.6 ft. ³ or greater capacity).	1.04.
iii. Top-Loading, Semi-Automatic	¹ Not Applicable.
iv. Front-Loading	1.04.
v. Suds-saving	¹ Not Applicable.

¹ Must have an unheated rinse water option.

(3) Clothes washers manufactured on or after January 1, 2007, shall have a modified energy factor no less than:

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

¹ Must have an unheated rinse water option.

(4) All top-loading or front-loading standard-size residential clothes washers manufactured on or after January 1, 2011, shall meet the following standard—

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

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(ii) A water factor of not more than 9.5.

(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 ³ or greater capacity)	3.01
ii. Electric, Compact (120V) (less than 4.4 ft ³ capacity)	3.13
iii. Electric, Compact (240V) (less than 4.4 ft ³ 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:

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

(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)
1. Gas wall fan type up to 42,000 Btu/h	75
2. Gas wall fan type over 42,000 Btu/h	76
3. Gas wall gravity type up to 27,000 Btu/h	65
4. Gas wall gravity type over 27,000 Btu/h up to 46,000 Btu/h	66
5. Gas wall gravity type over 46,000 Btu/h	67
6. Gas floor up to 37,000 Btu/h	57
7. Gas floor over 37,000 Btu/h	58
8. Gas room up to 20,000 Btu/h	61
9. Gas room over 20,000 Btu/h up to 27,000 Btu/h	66
10. Gas room over 27,000 Btu/h up to 46,000 Btu/h	67
11. Gas room over 46,000 Btu/h	68
12. Gas hearth up to 20,000 Btu/h	61
13. Gas hearth over 20,000 Btu/h and up to 27,000 Btu/h	66
14. Gas hearth over 27,000 Btu/h and up to 46,000 Btu/h	67
15. Gas hearth over 46,000 Btu/h	68

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

(2) Gas cooking products without an electrical supply cord shall not be equipped with a constant burning pilot light. This standard is effective on April 9, 2012.

(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)(1) *Fluorescent lamp ballasts (other than specialty application mercury vapor lamp ballasts).* Except as provided in paragraphs (m)(2), (m)(3), (m)(4), (m)(5), (m)(6) and (m)(7) of this section, each fluorescent lamp ballast—

(i) (A) Manufactured on or after January 1, 1990;

(B) Sold by the manufacturer on or after April 1, 1990; or

(C) Incorporated into a luminaire by a luminaire manufacturer on or after April 1, 1991; and

(ii) Designed—

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

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

(C) For use in connection with an F40T12, F96T12, or F96T12HO lamps shall have a power factor of 0.90 or greater and shall have a ballast efficacy factor not less than the following:

Application for operation of	Ballast input voltage	Total nominal lamp watts	Ballast efficacy factor
One F40 T12 lamp	120	40	1.805
	277	40	1.805
Two F40 T12 lamps	120	80	1.060
	277	80	1.050
Two F96T12 lamps	120	150	0.570
	277	150	0.570
Two F96T12HO lamps ..	120	220	0.390
	277	220	0.390

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

(i) A ballast that is designed for dimming or for use in ambient temperatures of 0 °F or less, or

(ii) A ballast that has a power factor of less than 0.90 and is designed for use only in residential building applications.

(3) Except as provided in paragraph (m)(4) of this section, each fluorescent lamp ballast—

(i) (A) Manufactured on or after April 1, 2005;

(B) Sold by the manufacturer on or after July 1, 2005; or

(C) Incorporated into a luminaire by a luminaire manufacturer on or after April 1, 2006; and

(ii) Designed—

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

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

(C) For use in connection with an F40T12, F96T12, or F96T12HO lamps; shall have a power factor of 0.90 or greater and shall have a ballast efficacy factor not less than the following:

Application of operation of	Ballast input voltage	Total nominal lamp watts	Ballast efficacy factor
One F40 T12 lamp	120	40	2.29
	277	40	2.29
Two F40 T12 lamps	120	80	1.17
	277	80	1.17
Two F96T12 lamps	120	150	0.63
	277	150	0.63
Two F96T12HO lamps ..	120	220	0.39
	277	220	0.39

(4) (i) The standards described in paragraph (m)(3) do not apply to:

(A) A ballast that is designed for dimming to 50 percent or less of its maximum output;

(B) A ballast that is designed for use with two F96T12HO lamps at ambient temperatures of –20 °F or less and for use in an outdoor sign;

(C) A ballast that has a power factor of less than 0.90 and is designed and labeled for use only in residential building applications; or

(D) A replacement ballast as defined in paragraph (m)(4)(ii) of this section.

(ii) For purposes of this paragraph (m), a replacement ballast is defined as a ballast that:

(A) Is manufactured on or before June 30, 2010;

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(B) Is designed for use to replace an existing ballast in a previously installed luminaire;

(C) Is marked "FOR REPLACEMENT USE ONLY";

(D) Is shipped by the manufacturer in packages containing not more than 10 ballasts;

(E) Has output leads that when fully extended are a total length that is less than the length of the lamp with which it is intended to be operated; and

(F) Meets or exceeds the ballast efficacy factor in the following table:

Application for operation of	Ballast input voltage	Total nominal lamp watts	Ballast efficacy factor
One F40 T12 lamp	120	40	1.805
	277	40	1.805
Two F40 T12 lamps	120	80	1.060
	277	80	1.050
Two F96T12 lamps	120	150	0.570
	277	150	0.570
Two F96T12HO lamps ..	120	220	0.390
	277	220	0.390

Application for operation of	Ballast input voltage	Total nominal lamp watts	Ballast efficacy factor
One F34T12 lamp	120/277	34	2.61
Two F34T12 lamps	120/277	68	1.35
Two F96T12/ES lamps	120/277	120	0.77
Two F96T12HO/ES lamps	120/277	190	0.42

(5) Except as provided in paragraph (m)(7) of this section, each fluorescent lamp ballast (other than replacement ballasts defined in § 430.2)—

(i)(A) Manufactured on or after July 1, 2009;

(B) Sold by the manufacturer on or after October 1, 2009; or

(C) Incorporated into a luminaire by a luminaire manufacturer on or after July 1, 2010; and

(ii) Designed—

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

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

(C) For use in connection with F34T12 lamps, F96T12/ES lamps, or F96T12HO/ES lamps; shall have a power factor of 0.90 or greater and shall have a ballast efficacy factor of not less than the following:

(6) The standards in paragraph (m)(5) shall apply to all ballasts covered by paragraph (m)(5)(ii), including replacement ballasts and ballasts described in paragraph (m)(7) of this section, that are manufactured on or after July 1, 2010, or sold by the manufacturer on or after October 1, 2010.

(7) The standards in paragraph (m)(5) do not apply to—

(i) A ballast that is designed for dimming to 50 percent or less of the maximum output of the ballast;

(ii) A ballast that is designed for use with 2 F96T12HO lamps at ambient

temperatures of 20 degrees F or less and for use in an outdoor sign; or

(iii) A ballast that has a power factor of less than 0.90 and is designed and labeled for use only in residential applications.

(n) *General service fluorescent lamps and incandescent reflector lamps.* (1) Except as provided in paragraphs (n)(2) and (n)(3) 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	>35W	69	75.0	Nov. 1, 1995.
	≤35W	45	75.0	Nov. 1, 1995.
2-foot U-shaped	>35W	69	68.0	Nov. 1, 1995.
	≤35W	45	64.0	Nov. 1, 1995.
8-foot slimline	>65W	69	80.0	May 1, 1994.
	>65W	45	80.0	May 1, 1994.
8-foot high output	>100W	69	80.0	May 1, 1994.

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Lamp type	Nominal lamp wattage	Minimum CRI	Minimum average lamp efficacy (lm/W)	Effective date
	≤100W	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) 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
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) Except as provided in paragraph (n)(5) 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)
40–50	10.5
51–66	11.0
67–85	12.5

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

(5) 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	≥125V	6.8*P ^{0.27}
		≤2.5	<125V	5.9*P ^{0.27}
40–205	Modified Spectrum	>2.5	≥125V	5.7*P ^{0.27}
			<125V	5.0*P ^{0.27}
		≤2.5	≥125V	5.8*P ^{0.27}
			<125V	5.0*P ^{0.27}
			≥125V	4.9*P ^{0.27}
			<125V	4.2*P ^{0.27}

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.

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(6) (i)(A) Subject to the exclusions in paragraph (n)(6)(ii) of this section, the standards specified in this section shall apply to ER incandescent reflector lamps, BR incandescent reflector lamps, BPAR incandescent reflector lamps, and similar bulb shapes on and after January 1, 2008.

(B) Subject to the exclusions in paragraph (n)(6)(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) ^{1,2}
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) ^{3,4}

NOTE:
¹Sprayheads 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.

²Sprayheads 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)).

³Sprayheads 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.

⁴Sprayheads 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). Any such showerhead shall also meet the requirements of ASME/ANSI Standard A112.18.1M-1996, 7.4.4(a).

(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 (gpf (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.

(2)(i) Ceiling fan light kits with medium screw base sockets manufactured on or after January 1, 2007, shall be

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packaged with screw-based lamps to fill all screw base sockets.

(ii) The screw-based lamps required under paragraph (2)(i) of this section shall—

(A) Meet the ENERGY STAR Program requirements for Compact Fluorescent Lamps, version 3; or

(B) Use light sources other than compact fluorescent lamps that have lumens per watt performance at least equivalent to comparable configured compact fluorescent lamps meeting the energy conservation standards described in paragraph (2)(ii)(A) of this section.

(3) Ceiling fan light kits with pin-based sockets for fluorescent lamps manufactured on or after January 1, 2007 shall—

(i) Meet the ENERGY STAR Program Requirements for Residential Light Fixtures version 4.0 issued by the Environmental Protection Agency; and

(ii) Shall be packaged to include the lamps described in paragraph (s)(3)(i) of

this section with the ceiling fan light kits to fill all sockets.

(4) Ceiling fan light kits with socket types other than those covered in paragraphs (2) and (3) of this section, including candelabra screw base sockets, manufactured on or after January 1, 2009—

(i) Shall not be capable of operating with lamps that total more than 190 watts; and

(ii) Shall be packaged to include the lamps described in clause (i) with the ceiling fan light kits.

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

Factor	Requirements
Lamp Power (Watts) & Configuration ¹	Minimum Efficacy: lumens/watt(Based upon initial lumen data). ²
<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.
1,000-hour Lumen Maintenance	The average of at least 5 lamps must be a minimum 90.0% of initial (100-hour) lumen output @ 1,000 hours of rated life.
Lumen Maintenance	80.0% of initial (100-hour) rating at 40 percent of rated life (per ANSI C78.5 Clause 4.10).
Rapid Cycle Stress Test	Per ANSI C78.5 and IESNA LM-65 (clauses 2.3.5, and 6). <i>Exception:</i> Cycle times must be 5 minutes on, 5 minutes off. Lamp will be cycled once for every two hours of rated life. At least 5 lamps <i>must meet or exceed</i> the minimum number of cycles.
Average Rated Lamp Life	≥6,000 hours as declared by the manufacturer on packaging. At 80% of rated life, statistical methods may be used to confirm lifetime claims based on sampling performance.

¹ Take performance and electrical requirements at the end of the 100-hour aging period according to ANSI Standard C78.5. The lamp efficacy shall be the average of the lesser of the lumens per watt measured in the base up and/or other specified positions. Use wattages placed on packaging to select proper specification efficacy in this table, not measured wattage. Labeled wattages are for reference only.

² Efficacies are based on measured values for lumens and wattages from pertinent test data. Wattages and lumens placed on packages may not be used in calculation and are not governed by this specification. For multi-level or dimmable systems, measurements shall be at the highest setting. Acceptable measurement error is ±3%.

(v) *Dehumidifiers*. (1) Dehumidifiers manufactured on or after October 1, 2007, shall have an energy factor that meets or exceeds the following values:

Product capacity (pints/day)	Minimum energy factor (liters/kWh)
25.00 or less	1.00
25.01–35.00	1.20
35.01–54.00	1.30
54.01–74.99	1.50

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Product capacity (pints/day)	Minimum energy factor (liters/kWh)
75.00 or more	2.25

(2) 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
75.00 or more	2.5

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

(ii) A class A external power supply shall not be subject to the standards in paragraph w(1)(i) if the class A external power supply is—

(A) Manufactured during the period beginning on July 1, 2008, and ending on June 30, 2015, and

(B) Made available by the manufacturer as a service part or a spare part for an end-use product—

(1) That constitutes the primary load; and

(2) Was manufactured before July 1, 2008.

(3) The standards described in paragraph (w)(1)(i) shall not constitute an energy conservation standard for the separate end-use product to which the external power supply is connected.

(4) Any class A external power supply manufactured on or after July 1, 2008 shall be clearly and permanently marked in accordance with the External Power Supply International Efficiency Marking Protocol, as referenced in the ‘Energy Star Program Requirements for Single Voltage External Ac-Dc and Ac-Ac Power Supplies,’ (incorporated by reference; see § 430.3), published by the Environmental Protection Agency.

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

(A) Is an AC-to-AC external power supply;

(B) Has a nameplate output of 20 watts or more;

(C) Is certified to the Secretary as being designed to be connected to a security or life safety alarm or surveillance system component; and

(D) On establishment within the External Power Supply International Efficiency Marking Protocol, as referenced in the ‘Energy Star Program 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.

(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

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GENERAL SERVICE INCANDESCENT LAMPS—Continued

Rated lumen ranges	Maximum rate wattage	Minimum rate life-time	Effective date
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.

[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.

EFFECTIVE DATE NOTE: At 76 FR 70628, Nov. 14, 2011, § 430.32 was amended by revising paragraph (m)(1) introductory text; and adding paragraphs (m)(8), (m)(9), and (m)(10), effective Jan. 13, 2012. For the convenience of the user, the added and revised text is set forth as follows:

§ 430.32 Energy and water conservation standards and their effective dates.

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(m)(1) *Fluorescent lamp ballasts (other than specialty application mercury vapor lamp bal-*

lasts). Except as provided in paragraphs (m)(2), (m)(3), (m)(4), (m)(5), (m)(6), (m)(7), (m)(8), (m)(9), and (m)(10) of this section, each fluorescent lamp ballast—

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(8) Except as provided in paragraph (m)(9) of this section, each fluorescent lamp ballast—

(i) Manufactured on or after November 14, 2014;

(ii) Designed—

(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)

(iii) Shall have—

(A) A power factor of 0.9 or greater except for those ballasts defined in paragraph (m)(8)(iii)(B) of this section;

(B) A power factor of 0.5 or greater for residential ballasts, which are defined in (m)(8)(vi) of this section;

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

$$BLE = A/(1+B \times \text{average total lamp arc power} \wedge - C) \text{ Where A, B, and C are as follows:}$$

Description	A	B	C
Instant start and rapid start ballasts (not classified as residential) that are designed to operate	0.993	0.27	0.25
4-foot medium bipin lamps.			
2-foot U-shaped lamps.			
8-foot slimline lamps.			
Programmed start ballasts (not classified as residential) that are designed to operate	0.993	0.51	0.37
4-foot medium bipin lamps.			
2-foot U-shaped lamps.			
4-foot miniature bipin standard output lamps.			
4-foot miniature bipin high output lamps.			

BLE = A/(1+B*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 sign ballasts) that are designed to operate 8-foot high output lamps.	0.993	0.38	0.25
Programmed start ballasts (not classified as sign ballasts) that are designed to operate 8-foot high output lamps.	0.973	0.70	0.37
Sign ballasts that operate 8-foot high output lamps.	0.993	0.47	0.25
Instant start and rapid start residential ballasts that operate 4-foot medium bipin lamps. 2-foot U-shaped lamps. 8-foot slimline lamps.	0.993	0.41	0.25
Programmed start residential ballasts that are designed to operate 4-foot medium bipin lamps. 2-foot U-shaped lamps.	0.973	0.71	0.37

(iv) Instant start, rapid start, and programmed start are defined in appendix Q1 of subpart B of this part. Average total lamp arc power is as defined and measured in accordance with appendix Q1 of subpart B of this part.

(v) Sign ballasts have an Underwriters Laboratories Inc. Type 2 rating and are designed, labeled, and marketed for use in outdoor signs.

(vi) Residential ballasts meet FCC consumer limits as set forth in 47 CFR part 18 and are designed and labeled for use in residential applications.

(9) The standards described in paragraph (m)(8) of this section do not apply to:

(i) A ballast that is designed for dimming to 50 percent or less of the maximum output of the ballast except for those specified in m(10); and

(ii) A low frequency ballast (as defined in appendix Q1 to subpart of this part) that:

(A) Is designed to operate T8 diameter lamps;

(B) Is designed, labeled, and marketed for use in EMI-sensitive environments only;

(C) Is shipped by the manufacturer in packages containing 10 or fewer ballasts; and

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

(10) Each fluorescent lamp ballast—

(i) Manufactured on or after November 14, 2014;

(ii) Designed—

(A) To operate at nominal input voltages of 120 or 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);

(D) For dimming to 50 percent or less of the maximum output of the ballast

(iii) Shall have—

(A) A power factor of 0.9 or greater except for those ballasts defined in paragraph (m)(8)(iii)(B) of this section;

(B) A power factor of 0.5 or greater for residential ballasts, which meet FCC Part B consumer limits and are designed and labeled for use only in residential applications;

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

Designed for the operation of	Ballast 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
Two F96T12/ES lamps	120/277	120	0.876	0.884
Two F96T12HO/ES lamps	120/277	190	0.711	0.713

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§ 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 effi-

ciency, 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.