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STATE OF CONNECTICUT
REGULATION
OF

NAME OF AGENCY

OFFICE OF POLICY AND MANAGEMENT

Concerning

SUBJECT MATTER OF REGULATION

Regulations and Procedures for Establishing Energy Efficiency Standards for Certain Appliances and Products

[DEPARTMENT OF PUBLIC UTILITY CONTROL] OFFICE OF POLICY AND MANAGEMENT

Sections 16a-48-1 to 16a-48-6 inclusive, of the Regulations of Connecticut State Agencies are amended to read as follows:

Energy Efficiency Standards

Section 16a-48-1. Definitions

As used in section 16a-48-1 to section 16a-48-6, inclusive, of the Regulations of Connecticut State Agencies:

(1) "ANNUAL FUEL UTILIZATION EFFICIENCY" MEANS A MEASURE OF THE FUEL CONVERTED TO HEAT SUPPLIED TO A SPACE IN PROPORTION TO THE TOTAL AMOUNT OF FUEL ENTERING THE FURNACE OR BOILER;

~~[(1)]~~ (2) "AV" means "Adjusted Volume," [1.63 x freezer volume (ft³)] + refrigerator volume (ft³);

(3) "BOILER" MEANS "BOILER" AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

~~[(4)]~~ "Department" means the Department of Public Utility Control] (4) "BOTTLE-TYPE WATER DISPENSER" MEANS "BOTTLE TYPE WATER DISPENSER" AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(5) "CENTRAL AIR CONDITIONER" MEANS "CENTRAL AIR CONDITIONER" AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(6) "CENTRAL FURNACE" MEANS "CENTRAL FURNACE" AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

~~[(2)]~~ (7) "Commercial clothes washer" means "commercial clothes washer" as defined in section 16a-48 of the Connecticut General Statutes;

(8) "COMMERCIAL HOT FOOD HOLDING CABINET" MEANS "COMMERCIAL HOT FOOD HOLDING CABINET" AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

~~[(3)]~~ (9) "Commercial refrigerators and freezers" means "commercial refrigerators and freezers" as defined in section 16a-48 of the Connecticut General Statutes;

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(10) “ELECTRICITY RATIO” MEANS “ELECTRICITY RATIO” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(5)] (11) “Energy Efficiency ratio” means “energy efficiency ratio” as defined in section 16a-48 of the Connecticut General Statutes;

(12) “FURNACE AIR HANDLER” MEANS “FURNACE AIR HANDLER” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(13) “HIGH INTENSITY DISCHARGE LAMP” MEANS “HIGH INTENSITY DISCHARGE LAMP” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(6)] (14) “Illuminated exit sign” means “illuminated exit sign” as defined in section 16a-48 of the Connecticut General Statutes;

[(7)] (15) “Large packaged air-conditioning equipment” means “large packaged air-conditioning equipment” as defined in section 16a-48 of the Connecticut General Statutes;

[(8)] (16) “Low-voltage dry-type transformer” means “low-voltage dry-type transformer” as defined in section 16a-48 of the Connecticut General Statutes;

(17) “METAL HALIDE LAMP” MEANS “METAL HALIDE LAMP” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(18) “METAL HALIDE LAMP FIXTURE” MEANS “METAL HALIDE LAMP FIXTURE” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(9)] (19) “Modified energy [factory] FACTOR” (MEF) means the quotient of the ft³ capacity of the clothes container divided by the total clothes washer energy consumption per cycle, with such energy consumption expressed as the sum of the machine electrical energy consumption, the hot water energy consumption, and the energy required for removal or the remaining moisture in the wash load, as determined using the applicable test method as directed by the Secretary;

[(10)] (20) “New product” means; “new product” as defined in section 16a-48 of the Connecticut General Statutes

[(11)] (21) “Pass-through cabinet” means “pass-through cabinet” as defined in section 16a-48 of the Connecticut General Statutes;

(22) “POOL HEATER” MEANS “POOL HEATER” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(23) “PORTABLE ELECTRIC SPA” MEANS “PORTABLE ELECTRIC SPA” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(24) “PROBE START METAL HALIDE BALLAST” MEANS “PROBE START METAL HALIDE BALLAST” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(12)] (25) “Reach-in cabinet” means “reach-in cabinet” as defined in section 16a-48 of the Connecticut General Statutes;

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(26) “RESIDENTIAL FURNACE OR BOILER” MEANS “RESIDENTIAL FURNACE OR BOILER” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(27) “RESIDENTIAL POOL PUMP” MEANS “RESIDENTIAL POOL PUMP” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(13)] (28) “Roll-in cabinet” or “roll-through cabinet” means “roll-in cabinet” or “roll-through cabinet” as defined in section 16a-48 of the Connecticut General Statutes;

[(14)] (29) “Secretary” means the Secretary of the Office of Policy and Management;

(30) “SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLY” MEANS “SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLY” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(31) “STATE REGULATED INCANDESCENT REFLECTOR LAMP” MEANS “STATE REGULATED INCANDESCENT REFLECTOR LAMP” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

[(15)] (32) “Torchiere lighting fixture” means “torchiere lighting fixture” as defined in section 16a-48 of the Connecticut General Statutes;

[(16)] (33) “Traffic signal module” means “traffic signal module” as defined in section 16a-48 of the Connecticut General Statutes;

[(17)] (34) “Transformer” means “transformer” as defined in section 16a-48 of the Connecticut General Statutes;

[(18)] (35) “Unit heater” means “unit heater” as defined in section 16a-48 of the Connecticut General Statutes;

[(19)] (36) “V” means total volume (ft³);

(37) “WALK-IN FREEZER” MEANS “WALK-IN FREEZER” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES;

(38) “WALK-IN REFRIGERATOR” MEANS “WALK-IN REFRIGERATOR” AS DEFINED IN SECTION 16a-48 OF THE CONNECTICUT GENERAL STATUTES; AND

[(20)] (39) “Water factor” means the quotient of the total weighted per-cycle water consumption divided by the capacity of the clothes washer, determined using the applicable test method as directed by the Secretary.

Section 16a-48-2. Scope

These provisions apply to the following types of new products that are sold, offered for sale or installed in Connecticut: commercial clothes washers; commercial refrigerators and freezers; illuminated exit signs; large packaged air-conditioning equipment; low-voltage dry-type transformers; torchiere lighting fixtures; traffic signal modules; [and] unit heaters, RESIDENTIAL FURNACES AND BOILERS; RESIDENTIAL POOL PUMPS; METAL HALIDE LAMP FIXTURES; SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES; STATE REGULATED INCANDESCENT REFLECTOR LAMPS; BOTTLE-TYPE WATER DISPENSERS; COMMERCIAL HOT FOOD HOLDING CABINETS; PORTABLE ELECTRIC SPAS; WALK-IN REFRIGERATORS AND WALK-IN FREEZERS; AND POOL HEATERS. Each provision applies only to units sold, offered for sale or installed on or after the effective date of the provision.

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These provisions do not include those products sold wholesale in Connecticut for final retail sale or installation outside the state, those installed in mobile manufactured homes at the time of construction, and those designed expressly for installation and use in recreational vehicles.

Section 16a-48-3. Applicability

The appliance efficiency standards set forth in section 16a-48-3 of the Regulations of Connecticut State Agencies, where in conflict with the State Building Code section 29-252 of the Connecticut General Statutes, shall take precedence over the standards contained in the State Building Code.

Section 16a-48-4. Appliance Energy Efficiency Standards

(a) Commercial clothes washers sold, offered for sale, or installed for the first time on or after July 1, 2007 shall meet or exceed the following energy efficiency standards:

Washer Type	Minimum Modified Energy Factor	Maximum Water Factor
Front loading <3.5 cubic foot clothes container compartment capacity	1.26	9.5
Top loading <1.6 cubic foot clothes container compartment capacity	0.65	9.5
Top loading =1.6 cubic foot and <4.0 cubic foot clothes container compartment capacity	1.26	9.5

(b) Commercial refrigerators and freezers sold, offered for sale, or installed on or after July 1, 2008 shall meet or exceed the following requirements:

Refrigerator/Freezer Type	Doors	Maximum Daily Energy Consumption kWh*
Reach-in cabinets, pass-through cabinets, and roll-in or roll-through cabinets that are refrigerators	Solid	$0.125V + 2.76$
	Transparent	$0.172V + 4.77$
Reach-in cabinets, pass-through cabinets, and roll-in or roll-through cabinets that are freezers	Solid	$0.398V + 2.28$
	Transparent	$0.940V + 5.10$
Reach-in cabinets that are refrigerator/freezers	Solid	$0.273AV + 1.65$

*Where V= Volume in Cubic Feet, and AV = Adjusted volume [$1.63 \times$ freezer volume in cubic feet] + refrigerator volume.

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(c) Illuminated exit signs sold, offered for sale, or installed on or after July 1, 2006 shall meet or exceed the following energy efficiency standards:

Standard	Requirement
Input Power	< 5 watts per face
Luminance contrast	> 0.8
Minimum luminance	> 8.6 candelas/square meter measured at normal (0°) and 45° viewing angles
Average luminance	> 15 candelas/square meter measured at normal (0°) and 45° viewing angles
Maximum to minimum luminance ratio	< 20:1 measured at normal (0°) and 45° viewing angles

(d) Large packaged air-conditioning equipment having not more than 760,000 BTUs per hour of capacity sold, offered for sale, or installed on or after July 1, 2009 shall meet a minimum energy efficiency ratio of 10.0 for units using both electric heat and air conditioning or units solely using electric air conditioning, and 9.8 for units using both natural gas heat and electric air conditioning.

(e) Large packaged air-conditioning equipment having not less than 761,000 BTUs per hour of capacity sold, offered for sale, or installed on or after July 1, 2009 shall meet a minimum energy efficiency ratio of 9.7 for units using both electric heat and air conditioning or units solely using electric air conditioning, and 9.5 for units using both natural gas heat and electric air conditioning.

Capacity	Type	Minimum Energy Efficiency Ratio
=760,000 BTUs per hour	Units using both electric heat and air conditioning or units solely using electric air conditioning	10.0
	Units using both natural gas heat and electric air conditioning	9.8
=761,000 BTUs per hour	Units using both electric heat and air conditioning or units solely using electric air conditioning	9.7
	Units using both natural gas heat and electric air conditioning	9.5

(f) Low voltage dry-type distribution transformers sold, offered for sale, or installed on or after July 1, 2006 shall meet or exceed the following energy efficiency values:

Single Phase		Three Phase	
Rated Power Output kVa	Minimum Efficiency %	Rated Power Output kVa	Minimum Efficiency %
= 15 < 25	97.7	= 15 < 30	97.0
= 25 < 37.5	98.0	= 30 < 45	97.5
= 37.5 < 50	98.2	= 45 < 75	97.7
= 50 < 75	98.3	= 75 < 112.5	98.0
= 75 < 100	98.5	= 112.5 < 150	98.2
= 100 < 167	98.6	= 150 < 225	98.3
= 167 < 250	98.7	= 225 < 300	98.5
= 250 < 333	98.8	= 300 < 500	98.6
333	98.9	= 500 < 750	98.7
		= 750 < 1000	98.8
		1000	98.9

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(g) Torchiere lighting fixtures sold, offered for sale, or installed on or after July 1, 2006 shall not consume more than 190 watts and shall not be capable of operating with lamps that total more than 190 watts.

(h) Traffic signal modules sold, offered for sale, or installed on or after July 1, 2006 shall meet the product specification of the “Energy Star Program Requirements for Traffic Signals” developed by the United States Environmental Protection Agency that took effect in February 2001, except where the department, in consultation with the Commissioner of Transportation, determines that such specification would compromise safe signal operation, and shall meet or exceed the following energy efficiency standards:

Type	Red		Amber		Green	
	At 25°C (77°F)	At 74°C (165.2°F)	At 25°C (77°F)	At 74°C (165.2°F)	At 25°C (77°F)	At 74°C (165.2°F)
300 mm circular	11 watts	17 watts	22 watts	25 watts	15 watts	15 watts
200 mm circular	8 watts	13 watts	13 watts	16 watts	12 watts	12 watts
300 mm arrow	9 watts	12 watts	10 watts	12 watts	11 watts	11 watts
Lane control (X)	9 watts	12 watts	No requirement		No requirement	
Lane control (Arrow)	No requirement		No requirement		11 watts	11 watts

The power consumption of traffic signal lamps shall be not greater than 25 watts.

(i) Unit heaters sold, offered for sale, or installed on or after July 1, 2006 shall not have continuously burning pilot lights and shall have either power venting or an automatic flue damper.

(j) RESIDENTIAL FURNACES AND BOILERS PURCHASED BY THE STATE AFTER JANUARY 1, 2009 SHALL MEET THE FOLLOWING CRITERIA:

TYPE OF EQUIPMENT	ANNUAL FUEL UTILIZATION EFFICIENCY	ELECTRICITY RATIO
GAS AND PROPANE FURNACES	≥ 90%	--
OIL FURNACES	≥ 83%	--
GAS AND PROPANE BOILERS	≥ 84%	--
OIL-FIRED HOT WATER BOILERS	≥ 84%	--
GAS AND PROPANE STEAM BOILERS	≥ 82%	--
OIL-FIRED STEAM BOILERS	≥ 82%	--
FURNACES WITH FURNACE AIR HANDLERS EXCEPT FOR OIL FURNACES OF < 94,000 BTU/HOUR CAPACITY	--	≤ 2.0
OIL FURNACES < 94,000 BTU/HOUR CAPACITY WITH FURNACE AIR HANDLERS	--	≤ 2.3

(k) METAL HALIDE LAMP FIXTURES SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2010 THAT ARE DESIGNED TO BE OPERATED WITH LAMPS RATED ≥ 150 WATTS BUT ≤ 500 WATTS SHALL NOT CONTAIN A PROBE-START METAL HALIDE LAMP BALLAST;

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(l) SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES SOLD INDIVIDUALLY OR SOLD AS A COMPONENT OR IN CONJUNCTION WITH ANOTHER PRODUCT AND MANUFACTURED AFTER JANUARY 1, 2008 SHALL MEET OR EXCEED THE FOLLOWING ENERGY EFFICIENCY STANDARDS: THE EFFICIENCY IN THE ACTIVE MODE OF POWER SUPPLIES WHEN TESTED AT 115 VOLTS AT 60 HZ, SHALL NOT BE LESS THAN THE APPLICABLE VALUES SHOWN (EXPRESSED AS THE DECIMAL EQUIVALENT OF A PERCENTAGE); AND THE ENERGY CONSUMPTION IN THE NO-LOAD MODE OF POWER SUPPLIES WHEN TESTED AT 115 VOLTS AT 60 HZ SHALL NOT BE GREATER THAN THE VALUES SHOWN IN THE FOLLOWING TABLE:

NAMEPLATE OUTPUT	MINIMUM EFFICIENCY – ACTIVE MODE
0 TO < 1 WATT	0.49* NAMEPLATE OUTPUT
≥ 1 AND ≤ 49 WATTS	0.09 * Ln(NAMEPLATE OUTPUT) + 0.49
> 49 WATTS	0.84
	MAXIMUM ENERGY CONSUMPTION – NO-LOAD MODE
0 TO < 10 WATTS	0.5 WATTS
≥ 10 AND ≤ 250 WATTS	0.75 WATTS

WHERE Ln (NAMEPLATE OUTPUT) = NATURAL LOGARITHM OF THE NAMEPLATE OUTPUT EXPRESSED IN WATTS

EXCEPTIONS:

(1) SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES MADE AVAILABLE BY A MANUFACTURER DIRECTLY TO A CONSUMER OR TO A SERVICE OR REPAIR FACILITY AFTER AND SEPARATE FROM THE ORIGINAL SALE OF THE PRODUCT REQUIRING THE POWER SUPPLY AS A SERVICE PART OR SPARE PART, SHALL MEET THE STANDARDS EFFECTIVE JANUARY 1, 2012 FOR EXTERNAL POWER SUPPLIES USED WITH LAPTOP COMPUTERS, MOBILE PHONES, PRINTERS, PRINT SERVERS, SCANNERS, PERSONAL DIGITAL ASSISTANTS AND DIGITAL CAMERAS; EFFECTIVE JULY 1, 2012 FOR EXTERNAL POWER SUPPLIES USED WITH WIRELINE TELEPHONES AND ALL OTHER APPLICATIONS.

(2) SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES WITH PRODUCTS SUBJECT TO CERTIFICATION BY THE UNITED STATES FOOD AND DRUG ADMINISTRATION.

(m) STATE REGULATED INCANDESCENT REFLECTOR LAMPS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL BE LABELED INDICATING THE DATE OF MANUFACTURE, AND SHALL BE MANUFACTURED TO MEET THE FOLLOWING MINIMUM AVERAGE LAMP EFFICACY REQUIREMENTS:

NOMINAL LAMP WATTAGE	MINIMUM AVERAGE LAMP EFFICACY, LUMENS PER WATT
40-50	10.5
51-66	11.0
67-85	12.5
86-115	14.0
116-155	14.5
156-205	15.0

EXCEPTIONS:

- (1) ≤ 45 WATT R-20 (REFLECTOR, 2.5" DIAMETER)
- (2) ≤ 50 WATT ER-30 (ELLIPSOIDAL REFLECTOR, 3.75" DIAMETER)
- (3) ≤ 50 WATT ER-40 (ELLIPSOIDAL REFLECTOR, 5.0 " DIAMETER)
- (4) 65 WATT ER-40 (ELLIPSOIDAL REFLECTOR, 5.0" DIAMETER)
- (5) ≤ 50 WATT BR-30 (BULGE REFLECTOR, 3.75" DIAMETER)
- (6) ≤ 50 WATT BR-40 (BULGE REFLECTOR, 5.0" DIAMETER)
- (7) 65 WATT BR-30 (BULGE REFLECTOR, 3.75" DIAMETER)

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(8) 65 WATT BR-40 (BULGE REFLECTOR, 5.0" DIAMETER)

(n) BOTTLE-TYPE WATER DISPENSERS THAT ARE DESIGNED FOR THE DISPENSING OF BOTH HOT AND COLD WATER THAT ARE SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL HAVE A STAND-BY ENERGY CONSUMPTION OF ≤ 1.2 KWH PER DAY.

(o) COMMERCIAL HOT FOOD HOLDING CABINETS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL HAVE AN IDLE ENERGY RATE NO GREATER THAN 40 WATTS PER SQUARE FOOT OF MEASURED INTERIOR VOLUME.

(p) THE STANDBY POWER OF PORTABLE ELECTRIC SPAS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL NOT BE GREATER THAN $5(V^{2/3})$ WATTS WHERE V = THE TOTAL VOLUME, IN GALLONS.

(q) WALK IN REFRIGERATORS AND WALK-IN FREEZERS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL BE EQUIPPED WITH THE FOLLOWING REQUIRED COMPONENTS:

MOTOR TYPE	REQUIRED COMPONENTS
ALL	AUTOMATIC DOOR CLOSERS THAT FIRMLY CLOSE ALL REACH-IN DOORS
ALL	AUTOMATIC DOOR CLOSERS ON ALL DOORS NO WIDER THAN FOUR FOOT OR HIGHER THAN SEVEN FOOT, THAT FIRMLY CLOSE WALK-IN DOORS THAT HAVE BEEN CLOSED TO WITHIN ONE INCH OF FULL CLOSURE.
ALL	ENVELOPE INSULATION > R-28 FOR REFRIGERATORS
ALL	ENVELOPE INSULATION > R-36 FOR FREEZERS
CONDENSER FAN MOTORS < 1 hp	ELECTRONICALLY COMMUTATED MOTORS; PERMANENT SPLIT CAPACITOR-TYPE MOTORS; OR POLYPHASE MOTORS > 1/2 hp
SINGLE-PHASE EVAPORATOR FAN MOTORS < 1 HP AND < 460 VOLTS	ELECTRONICALLY COMMUTATED MOTORS

(r) RESIDENTIAL POOL PUMPS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2010 SHALL MEET THE FOLLOWING CRITERIA:

(1) POOL PUMP MOTORS SHALL NOT BE SPLIT-PHASE OR CAPACITOR START—INDUCTION TYPE.

(2) POOL PUMP MOTORS ≥ 1 HP SHALL HAVE THE CAPABILITY OF OPERATING AT TWO OR MORE SPEEDS WITH THE LOW SPEED HAVING A ROTATION RATE ON MORE THAN 1/2 OF THE MOTORS MAXIMUM ROTATION RATE;

(3) POOL PUMP MOTOR CONTROLS SHALL HAVE THE CAPABILITY OF OPERATING THE POOL PUMP AT LEAST TWO SPEEDS. THE DEFAULT CIRCULATION SPEED SHALL BE THE LOWEST SPEED, WITH A HIGH SPEED OVERRIDE CAPABILITY BEING FOR A TEMPORARY PERIOD NOT TO EXCEED ON NORMAL CYCLE.

(s) POOL HEATERS SOLD, OFFERED FOR SALE, OR INSTALLED ON OR AFTER JANUARY 1, 2009 SHALL MEET OR EXCEED THE FOLLOWIN CRITERIA:

(1) THERMAL EFFICIENCIES OF GAS-FIRED AND OIL-FIRED POOL HEATERS SHALL BE NOT LESS THAN 78%;

(2) NATURAL GAS POOL HEATERS SHALL NOT BE EQUIPPED WITH A CONSTANTLY BURNING PILOT LIGHT;

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(3) ALL POOL HEATERS SHALL HAVE A READILY ACCESSIBLE ON-OFF SWITCH THAT IS MOUNTED ON THE OUTSIDE OF THE HEATER THAT ALLOWS SHUTTING OFF THE HEATER WITHOUT ADJUSTING THE THERMOSTAT SETTING;

(4) HEAT PUMP POOL HEATERS SHALL HAVE A COEFFICIENT OF PERFORMANCE (COP) OF NOT LESS THAN 3.5 AT STANDARD TEMPERATURE RATING AND AT LOW TEMPERATURE RATING.

Section 16a-48-5. Test Methods

a) General Testing Requirements. The manufacturer shall cause the testing of units of each basic model of appliance or covered product using the applicable test method listed. If the manufacturer of the basic model does not participate in an approved industry certification program for the basic model, or does not apply such a program to test all units, the testing shall be at a laboratory that, as determined by the Secretary:

(1) has conducted tests using the applicable test method within the previous 12 months;

(2) agrees to interpret and apply the applicable test method set forth precisely as written;

(3) has, and keeps properly calibrated and maintained, all equipment, material, and facilities necessary to apply the applicable test method precisely as written;

(4) agrees to and does maintain copies of all test reports, and provides any such report to the Secretary upon request, for all basic models that are still in commercial production; and

(5) agrees to permit the Secretary to witness any test of such an appliance upon request, up to once per calendar year for each basic model.

b) Commercial Clothes Washers: The test method for commercial clothes washers is that described in 10 CFR Section 430.23(j), Appendix J1 to Subpart B of Part 430 (2005).

c) Commercial Refrigerators/Freezers: The test method for commercial refrigerators and freezers is as follows:

Volume shall be measured using ANSI/AHAM HRF1-1979. Energy consumption shall be measured using ANSI/ASHRAE 1171992, except that the back (loading) doors of pass-through and roll-through refrigerators and freezers shall remain closed throughout the test, and except that the controls of all appliances shall be adjusted to obtain the following product temperatures in degrees Fahrenheit:

- Refrigerator Compartment 38 ± 2
- Freezer Compartment 0 ± 2
- Wine chiller 45 ± 2
- Ice Cream Cabinet -5 ± 2

When a refrigerator, refrigerator-freezer, or freezer can be operated using either alternating current electricity or one or more other sources of primary power, the test shall be performed using alternating current electricity only.

d) Illuminated Exit Signs:

The test method for illuminated exit signs (Energy Star Qualified Exit Signs Specification Version 2.0) is as follows:

(1) Conditions for testing:

(A) testing shall be conducted in clear (non-smoke) conditions;

(B) all measurements shall be made in a stable ambient air temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$;

(C) all voltages shall be provided within ± 0.5 percent by a constant voltage power supply;

(D) signs which are rated for continuous operation at more than one AC input voltage

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shall be tested at each of the rated AC input voltages.

(E) prior to input power or photometric measurements, the sign shall be operated at the rated input voltage for a period of 100 hours;

(F) in addition, a sign with an internal battery shall be operated from the battery for one-and-one-half hours and then recharged for the period specified by the manufacturer; and

(G) all of the light sources of the sign, except those only energized in the battery operation mode, shall produce light throughout the first 100 hours of operation.

(2) Input power measurement:

Measure the total input power of the sign in its entirety with an appropriate true RMS watt meter at the rated input voltage which represents normal operation. For a sign that includes a battery, the battery circuit shall be connected and the battery fully charged before any measurements are made. Calculate input power per face by dividing total input power of the sign by the number of faces.

(3) Photometric measurements:

Each of the luminance characteristics of the sign shall be measured at three voltages (or three voltages for each of the rated AC input voltages for signs rated for continuous operation at more than one AC input voltage).

(A) the rated input voltage which represents normal operation;

(B) a voltage corresponding to the minimum voltage provided either by the internal battery or a remote emergency power source after one minute of operation, as applicable; and

(C) a voltage corresponding to the minimum voltage provided by the internal battery after the marked rated operating time or at 87.5 percent of the rated emergency input voltage for signs intended to be connected to a remote emergency power source. The level of illumination of the exit sign shall be permitted to decline to 60 percent of the initial illumination by the end of the emergency lighting time duration. All measurements shall be taken with less than 0.01 foot-candles of external illumination on the face of the sign. The luminances shall be measured from two viewing angles:

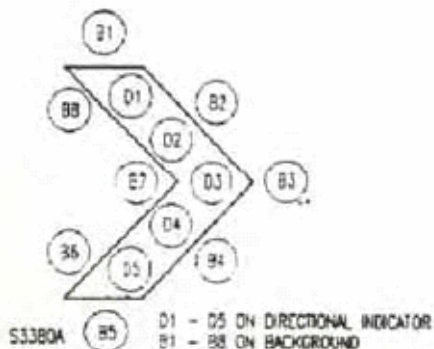
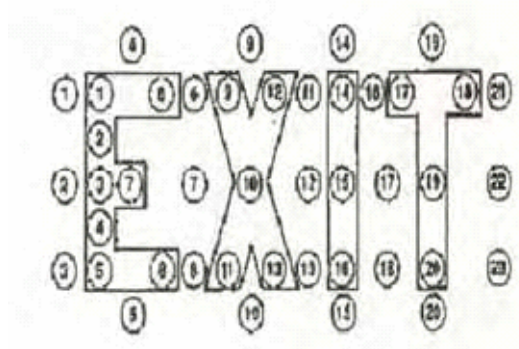
1) from normal (0°) to the face of the sign, and 2) from 45° to the face of the sign.

(4) Luminance measurement positions:

The positions where the luminances for the legend and background of the exit sign are to be measured are found in Figures 40.4 through 40.9A (as appropriate for the type of sign being tested) of UL 924-1995 (revised 1999).

(5) Measurement of exit sign luminance

Measurement of directional indicator



The luminance for each numbered position in the legend and directional indicator shall be measured over a circular area as large as possible while maintaining at least a 1.6 mm distance between the perimeter of the circular area and the adjacent border. The positions for measuring the luminances of the background shall lie within 25.4 mm of the legend and directional indicator but no closer than 1.6 mm to the border.

(6) Luminance calculations:

The following shall be calculated:

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(A) Average luminance of (i) the legend or background of the legend, whichever is higher, and where applicable, (ii) the directional indicator or its background, whichever is higher: for each, the luminance of all the positions measured.

(B) Luminance contrast: $\text{Contrast} = \frac{L_g - L_e}{L_g}$

Where: L_g is the greater luminance and L_e is the lesser luminance, either the variable L_g or L_e may represent the legend or directional indicator, and the remaining variable shall represent the respective background.

(C) Minimum luminance of (i) the legend or background of the legend, whichever is higher, and where applicable, (ii) the directional indicator or its background, whichever is higher: for each, the lowest luminance of all points measured.

(D) Maximum to minimum luminance ratio of (i) the legend, or background of the legend, whichever is higher, and where applicable, (ii) the directional indicator or its background, whichever is higher: for each the ratio of the highest luminance of any position measured to the lowest luminance of any position measured.

e) Large Packaged Air Conditioning Equipment: The test method for large packaged air conditioning equipment is ARI Standard 340/360-2000 "Commercial and Industrial Unitary Air-Conditioning and Heat-Pump Equipment."

f) Distribution Transformers: The test method for distribution transformers is NEMA TP-2-2005.

g) Torchieres: There is no test method for torchieres.

h) Traffic Signal Modules: Traffic signal modules must meet the minimum performance requirements of the relevant Institute of Transportation Engineers specification, and be tested under the conditions presented in Section 6.4.2 of the "Interim LED Purchase Specification, Vehicle Traffic Control Signal Heads, Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules (VTCSH Part 2).

i) Unit Heaters: There is [not] NO test method for unit heaters.

j) RESIDENTIAL FURNACES AND BOILERS: THE TEST METHOD FOR RESIDENTIAL BOILERS AND FURNACES IS 10 CFR SECTION 430.23(n) (2005).

k) METAL HALIDE LAMP FIXTURES: THE TEST METHOD FOR METAL HALIDE LAMP FIXTURES IS ANSI C82.6-2005.

l) SINGLE-VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES: THE TEST METHOD FOR SINGLE-VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES IS US EPA "TEST METHOD FOR CALCULATING THE ENERGY EFFICIENCY OF SINGLE-VOLTAGE EXTERNAL AC-DC AND AC-AC POWER SUPPLIES" DATED AUGUST 11, 2004.

m) STATE REGULATED INCANDESCENT REFLECTOR LAMPS: TEST METHOD FOR STATE REGULATED INCANDESCENT REFLECTOR LAMPS IS 10 CFR SECTION 430.23(r) (2005).

n) BOTTLE-TYPE WATER DISPENSERS: THE TEST METHOD FOR BOTTLE-TYPE WATER DISPENSERS IS EPA ENERGY STAR PROGRAM REQUIREMENTS FOR BOTTLED WATER COOLERS (2004), WITH THE EXCEPTION THAT UNITS EQUIPPED WITH AN INTEGRAL AUTOMATIC TIMER SHALL NOT BE TESTED USING SECTION 4D, "TIMER USAGE", OF THE REFERENCED TEST METHOD.

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o) COMMERCIAL HOT FOOD HOLDING CABINETS: THE TEST METHOD FOR COMMERCIAL HOT FOOD HOLDING CABINETS IS ANSI/ASTM F2140-01 (TEST FOR IDLE ENERGY RATE-DRY TEST), AND US EPA'S ENERGY STAR GUIDELINES, "MEASURING INTERIOR VOLUME" (TEST FOR INTERIOR VOLUME).

p) PORTABLE ELECTRIC SPAS: THE TEST METHOD FOR PORTABLE ELECTRIC SPAS IS AS FOLLOWS:

- (1) MINIMUM CONTINUOUS TESTING TIME SHALL BE 72 HOURS;
- (2) THE WATER TEMPERATURE SHALL REMAIN AT OR ABOVE THE TEST TEMPERATURE OF 102°F AND THE AMBIENT AIR TEMPERATURE SHALL REMAIN AT OR BELOW THE TEST TEMPERATURE OF 60°F FOR THE DURATION OF THE TEST;
- (3) THE STANDARD COVER THAT COMES WITH THE UNIT SHALL BE USED DURING THE TEST;
- (4) THE TEST SHALL START WHEN THE WATER TEMPERATURE HAS BEEN AT 102°F FOR AT LEAST FOUR HOURS;
- (5) THE UNIT SHALL REMAIN COVERED AND IN THE DEFAULT OPERATION MODE DURING THE TEST. ENERGY-CONSERVING CIRCULATION FUNCTIONS, IF PRESENT, MUST NOT BE ENABLED IF NOT APPROPRIATE FOR CONTINUOUS, LONG-TERM USE;
- (6) TOTAL ENERGY USE SHALL BE RECORDED FOR THE PERIOD OF THE TEST, BEGINNING AT THE END OF THE FIRST HEATING CYCLE AFTER THE FOUR HOUR STABILIZATION PERIOD, AND FINISHING AT THE END OF THE FIRST HEATING CYCLE AFTER 72 HOURS HAS ELAPSED;
- (7) DATA REPORTED SHALL INCLUDE: SPA IDENTIFICATION (MAKE, MODEL, S/N, SPECIFICATIONS); VOLUME OF THE UNIT IN GALLONS; COVER R-VALUE; SUPPLY VOLTAGE; AVERAGE RELATIVE HUMIDITY DURING THE TEST; MINIMUM, MAXIMUM, AND AVERAGE WATER TEMPERATURES DURING THE TEST; MINIMUM, MAXIMUM, AND AVERAGE AMBIENT AIR TEMPERATURES DURING THE TEST; DATE OF TEST, LENGTH OF TEST (T IN HOURS); TOTAL ENERGY USED DURING THE TEST (P, IN WATT-HOURS); AND STANDBY POWER (P/T, IN WATTS).

q) RESIDENTIAL POOL PUMPS: THE TEST METHOD FOR RESIDENTIAL POOL PUMPS IS AS FOLLOWS:

- (1) IEEE 114-2001 SHALL BE USED FOR THE MEASUREMENT OF MOTOR EFFICIENCY;
- (2) ANSI/HI 1.6-2000 SHALL BE USED FOR THE MEASUREMENT OF PUMP AND MOTOR COMBINATIONS EFFICIENCY;
- (3) TWO CURVES SHALL BE CALCULATED:
CURVE A: $H = 0.0167 \times F^2$
CURVE B: $H = 0.050 \times F^2$

WHERE F IS THE FLOW RATE IN GALLONS PER MINUTE AND H IS THE TOTAL SYSTEM HEAD IN FEET OF WATER.

- (4) FOR EACH CURVE (A & B), THE PUMP HEAD SHALL BE ADJUSTED UNTIL THE FLOW AND HEAD LIE ON THE CURVE. THE FOLLOWING SHALL BE REPORTED FOR EACH CURVE AND PUMP SPEED (TWO SPEED PUMPS SHALL BE TESTED AT BOTH HIGH AND LOW SPEEDS): HEAD, IN FEET OF WATER; FLOW IN GALLONS PER MINUTE; POWER IN WATTS AND VOLT AMPS; AND ENERGY FACTOR IN GALLONS PER WATT HOUR, WHERE ENERGY FACTOR (EF) IS CALCULATED AS: $EF = \text{FLOW (GPM)} * 60 / \text{POWER (WATTS)}$.

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r) POOL HEATERS: THE TEST METHOD FOR POOL HEATERS IS AS FOLLOWS:

POOL HEATER TEST METHODS

APPLIANCE		TEST METHOD	
GAS-FIRED AND OIL-FIRED POOL HEATERS		ANSI Z21.56-1998	
ELECTRIC RESISTANCE POOL HEATERS		ANSI/ASHRAE 146-1998	
HEAT PUMP POOL HEATERS		ANSI/ASHRAE 146-1998 AS MODIFIED BY ADDENDUM TEST PROCEDURES PUBLISHED BY POOL HEAT PUMP MANUFACTURERS ASSOCIATION DATED APRIL 1999, REV. 4: FEBRUARY 28, 2000.	
READING	STANDARD TEMPERATURE RATING	LOW TEMPERATURE RATING	SPA CONDITIONS RATING
AIR TEMPERATURE DRY-BULB WET-BULB	27° C (80.6° F) 21.7° C (71° F)	10° C (50° F) 6.9° C (44.4° F)	27° C (80.6° F) 21.7° C (71° F)
RELATIVE HUMIDITY	63%	63%	63%
POOL WATER TEMPERATURE	23.7° C (80° F)	23.7° C (80° F)	40° C (104° F)

s) WALK-IN REFRIGERATORS AND WALK-IN FREEZERS: THERE IS NO TEST METHOD FOR WALK-IN REFRIGERATORS OR WALK-IN FREEZERS.

[j)] t) References

[A)] (1) Section 6.4.2, VTCSH Part 2
Institute of Transportation Engineers
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438
Phone: (202) 289-0222
FAX: (202)-289-7722
www.ite.org

[b)] (2) CFR, Title 10, Section 430.23 (2005)
Copies available from:
Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
www.access.gpo.gov/nara/cfr

[c)] (3) Energy Star Qualified Exit Signs Specification Version 2.0; EPA ENERGY STAR PROGRAM REQUIREMENTS FOR BOTTLED WATER COOLERS (2004); EPA TEST METHOD FOR CALCULATING THE ENERGY EFFICIENCY OF SINGLE-VOLTAGE AC-DC AND AC-AC POWER SUPPLIES, AUGUST 11, 2004.
Copies available from:
US EPA
ENERGY STAR Programs Hotline & Distribution (MS-6202J)
1200 Pennsylvania Ave NW
Washington, DC 20460
www.energystar.gov

[d)] (4) ANSI/ASHRAE 117-1992; ANSI/ASHRAE 146-1998

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Copies available from:
American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle N.E.
Atlanta, GA 30329
Phone: (800) 527-4723 (U.S./Canada) or (404) 636-8400
FAX: (404) 321-5478
www.ashrae.org

[e)] (5) ANSI/AHAM HRF1-1979
Copies available from:
Association of Home Appliance Manufacturers
1111 19th Street, NW, Suite 402
Washington, DC 20036
Phone: (202) 872-5955
FAX: (202) 872-9354
www.aham.org

[f)] (6) NEMA TP-2-2005
Copies available from:
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1752
Rosslyn, VA 22209
Phone: (703) 841-3200
FAX: (703) 841-5900
www.nema.org

[g)] (7) ARI Standard 340/360-2000
Air Conditioning and Refrigeration Institute
4100 N. Fairfax Drive, Suite 200
Arlington, VA 22203
Phone (703)-524-8800
FAX (703)-528-3816
www.ari.org

(8) ANSI C82.6-2005; ANSI Z21.56-1998
COPIES AVAILABLE FROM:
AMERICAN NATIONAL STANDARDS INSTITUTE
1819 L STREET, NW, 6TH FLOOR
WASHINGTON, DC 20036
WWW.ANSI.ORG
PHONE: (202) 293-8020
FAX: (202) 293-9287

(9) ANSI/ASTM F2140-01
COPIES AVAILABLE FROM:
AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 BARR HARBOR DRIVE
WEST CONSHOHOCKEN, PA 19428-2959
WWW.ASTM.ORG
PHONE: (610) 832-9585
FAX: (610) 832-9555

(10) ANSI/HI 1.6-2000
COPIES AVAILABLE FROM:
HYDRAULIC INSTITUTE
9 SYLVAN WAY
PARSIPPANY, NJ 07054

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WWW.HYDRAULICINSTITUTE.COM

PHONE: (973) 267-9700

(11) IEEE 114-2001

COPIES AVAILABLE FROM:

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

PUBLICATIONS OFFICE

10662 LOS VAQUEROS CIRCLE

PO BOX 3014

LOS ALAMITOS, CA 90720-1264

WWW.IEEE.ORG

PHONE: (714) 821-8380

FAX: (714) 821-4010

(12) ADDENDUM TEST PROCEDURE-APRIL 1999, REV. 4: FEB 28, 2000

COPIES AVAILABLE FROM:

POOL HEAT PUMP MANUFACTURERS ASSOCIATION

JEFF TAWNEY, PRESIDENT

C/O AQUACAL

2737 24TH STREET, NORTH

ST. PETERSBURG, FL 33713

PHONE: (727) 823-5642 EXT. 130

Section 16a-48-6. Certification of Product Compliance

a) Using the test methods outlined in Section 16a-48-5, manufacturers must provide data in such form as to allow the secretary to make a determination as to whether the product meets the standards set forth in Section 16a-48-4.

b) Procedures for the submittal of data are as follows:

1) If a manufacturer's product is certified in the State of California (CA), the manufacturer must send a letter on company letterhead to the Connecticut Office of Policy and Management (OPM) that indicates that the product is so certified and that the information the manufacturer had previously submitted to the California Energy Commission (CEC) is true and correct. A manufacturer of propane unit heaters must additionally provide pilot light information to the Secretary for Connecticut certification. SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES ARE EXEMPT FROM THESE REQUIREMENTS. MANUFACTURERS OF SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES MUST LABEL THEIR PRODUCT AS REQUIRED BY THE CALIFORNIA CODE OF REGULATIONS, TITLE 20: DIVISION 2, CHAPTER 4, ARTICLE 4, SECTION 1607: APPLIANCE EFFICIENCY REGULATIONS.

2) If the product is not certified in CA, the manufacturer must submit certification data to the CEC (<http://www.energy.ca.gov/appliances/index.html>) and submit a letter to the Secretary indicating that the information has been submitted to CA and that it is true and correct.

c) For each product listed in Section 16a-48-4, the Secretary will periodically review and validate the certification material submitted to the CEC.

d) The Secretary will create a publicly available list of certified products, and will notify the manufacturer within 45 days of submittal of compliance of the status of the manufacturer's product with regard to certification, or, if the Secretary does not certify the product, reasons for non-certification. EXCEPTION: SINGLE VOLTAGE EXTERNAL AC TO DC POWER SUPPLIES.

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Statement of Purpose:

To establish energy efficiency standards for several new product categories. Those products are (1) residential furnaces and boilers purchased by the state; and the following products sold, offered for sale, or installed in the state of Connecticut: (2) metal halide lamp fixtures, (3) single voltage external AC to DC power supplies, (4) state regulated incandescent reflector lamps, (5) bottle-type water dispensers, (6) commercial hot food holding cabinets, (7) portable electric spas, (8) walk-in refrigerators and freezers, (9) pool pumps, and (10) pool heaters.