

California Energy Commission

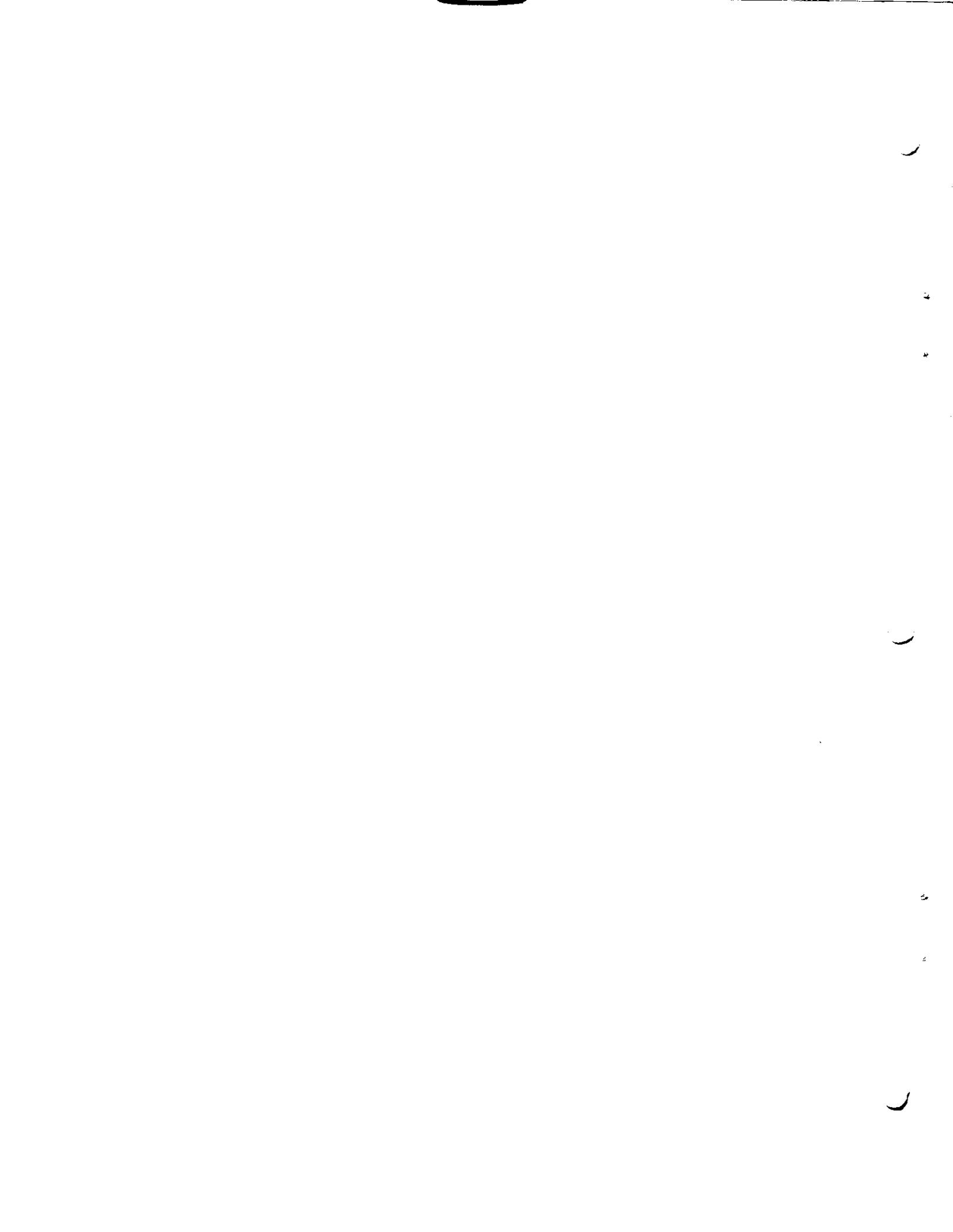
Conservation Division
Regulations for
Appliance Efficiency Standards,
(including requirements for
Intermittent Ignition Devices)

Relating to
Refrigerators and Freezers
Room Air Conditioners
Central Air Conditioners
Gas Space Heaters
Water Heaters
Plumbing Fittings
Gas Clothes Dryers
And
Gas Cooking Appliances

As Amended, July 19, 1978

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CALIFORNIA ADMINISTRATIVE CODE

TITLE 20, CHAPTER 2

SUBCHAPTER 4: ENERGY CONSERVATION

ARTICLE 4: APPLIANCE EFFICIENCY STANDARDS

1601. Scope. Unless otherwise indicated, the provisions of this article shall apply to the following types of new appliances sold in California:

(a) Refrigerators, refrigerator-freezers, and freezers which can be operated by alternating current electricity, excluding those designed expressly for use in recreational vehicles and other mobile equipment and those with total refrigerated volume exceeding 100 cubic feet.

(b) Room air conditioners, excluding those installed in mobile homes at the time of construction and those designed expressly for use in recreational vehicles and other mobile equipment.

(c) Central air conditioning heat pumps (regardless of capacity) and other central air conditioners with a cooling capacity of less than 65,000 Btu per hour excluding those installed in mobile homes at the time of construction and those designed expressly for use in recreational vehicles or other mobile equipment. Requirements for central air conditioning heat pumps with cooling capacity of 65,000 Btu per hour or more apply to heating performance but not cooling performance.

(d) Gas space heaters excluding the following types:

- gravity type central furnaces
- all heaters installed in mobile homes at the time of construction
- all heaters designed expressly for use in recreational vehicles and other mobile equipment
- fan type central furnaces with input rates of 400,000 Btu per hour or more
- infrared heaters

(e) Water heaters, excluding nonstorage type electric water heaters, water heaters used exclusively for space heating, storage type water heaters installed in mobile homes at the time of construction, and water heaters designed expressly for use in recreational vehicles and other mobile equipment.

(f) Plumbing fittings, including showerheads, lavatory faucets and sink faucets.

(g) Residential type gas clothes dryers excluding those designed to burn only liquefied petroleum gases and those designed expressly for use in recreational vehicles.

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(h) Household cooking gas appliances except those designed to burn only liquefied petroleum gases, those which do not have an electrical line voltage supply connection and have three or less continuously burning pilot lights, and those designed expressly for use in mobile homes and recreational vehicles.

The provisions of this article shall not apply to new appliances manufactured in California, but sold outside the state, nor to new appliances manufactured outside California and sold wholesale in California for final retail sale outside the state. For purposes of these regulations, the sale of a building which contains a new, permanently installed appliance is not considered the sale of a new appliance.

1602. Definitions. For the purpose of this article the following definitions shall apply:

(a) General

(1) "Accepted laboratory" means any testing laboratory approved by the Commission for testing of a particular type of appliance.

(2) "Date of sale" means the day when the appliance is physically delivered to the buyer.

(3) "Failure modes and effects analysis" means an analysis of a particular design which describes the most probable ways systems and components can fail, the consequences of such failures, and design steps taken to minimize or reduce the possibility of their occurrence.

(4) "Intermittent type ignition device" means any ignition system on a gas appliance which is not a continuously burning gas pilot light.

(5) "Manufacturer" means any person engaged in the production or assembly of an appliance. Manufacturer also includes any person whose brand or trademark appears on such appliance, if the brand or trademark of the person actually producing or assembling the appliance does not appear on the appliance.

(6) "Marking plate" means a plate, located so as to be easily read when the appliance is in a normally installed position.

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(b) Refrigerators and Freezers

(1) "Automatic defrost system" means a defrost system in which the defrosting action for all refrigerated surfaces is initiated and terminated automatically.

(2) "Freezer" means a cabinet designed as a unit for the storage of food at temperatures of about 0° F, having the ability to freeze food, and having a source of refrigeration requiring an energy input.

(3) "Manual defrost system" means a defrost system in which the defrosting action for all refrigerated surfaces is initiated manually.

(4) "Partial automatic defrost system" means a defrost system in which the defrosting action for the refrigerated surfaces in the refrigerator compartment is initiated and terminated automatically and the defrosting action for the refrigerated surfaces in the freezer is initiated manually.

(5) "Refrigerator" means a cabinet designed for the refrigerated storage of food at temperatures above 32° F, and having a source of refrigeration requiring an energy input. It may include a compartment for the freezing and storage of food at temperatures below 32° F, but does not provide a separate low temperature compartment designed for the freezing of and the long-term storage of food at temperatures below 8° F. It has only one exterior door, but it may have interior doors on compartments.

(6) "Refrigerator-freezer" means a cabinet which consists of two or more compartments with at least one of the compartments designed for the refrigerated storage of foods at temperatures above 32° F, and with at least one of the compartments designed for the freezing of and the storage of frozen foods at temperatures of 8° F or below. The source of refrigeration requires energy input.

(7) "Upright freezer" means a freezer whose access door is at the front of the appliance.

(c) Air Conditioners

(1) "Air conditioner" means one or more factory made assemblies which include an evaporator or cooling coil and an electrically driven compressor and condenser combination, and may include a heating function.

(2) "Central air conditioner" means an air conditioner which is not a room air conditioner.

(3) "Central air conditioning heat pump" means a central air conditioner which is capable of heating by refrigeration, and which may or may not include a capability for cooling.

(4) "Coefficient of Performance (COP)" of a heat pump means the ratio of the rate of useful heat output delivered by the complete heat pump unit (exclusive of supplementary heating) to the corresponding rate of energy input, in consistent units and under operating conditions specified in Section 1603(b) and (c) of these regulations. British thermal units shall be converted to kilowatt-hours at the rate of 3412 British thermal units per kilowatt-hour.

(5) "Cooling capacity" means a measure of the ability of a unit to remove heat from an enclosed space under test conditions specified in Section 1603(b) and (c) of these regulations.

(6) "Energy efficiency ratio (EER)" means the ratio of the cooling capacity of the air conditioner in British thermal units per hour, to the total electrical input in watts under test conditions specified in Section 1603(b) and (c) of these regulations.

(7) "Packaged terminal air conditioner" means a room air conditioner consisting of a factory-selected combination of heating and cooling components, assemblies or sections, intended to serve an individual room or zone and constructed in a manner which complies with the definition contained in the Standard for Packaged Terminal Air Conditioners approved by the American National Standards Institute on November 17, 1977, known as ANSI/ARI 310-1976.

(8) "Room air conditioner" means a factory encased air conditioner designed as a unit for mounting in a window or through a wall, or as a console. It is designed for delivery of conditioned air to an enclosed space without ducts.

(9) "Room air conditioning heat pump" means a room air conditioner, which is capable of heating by refrigeration, and which may or may not include a capability for cooling.

(10) "Single package central air conditioner" means a central air conditioner which is not a split system central air conditioner.

(11) "Split system central air conditioner" means a central air conditioner consisting of two or more major components; a compressor-containing unit, normally installed outside the building, and a non-compressor-containing unit, normally installed within the building.

(d) Gas Space Heaters

- (1) "Boiler" means a space heater which is a self-contained appliance for supplying steam or hot water primarily intended for space heating application.
- (2) "Central furnace" means a self-contained space heater designed to supply heated air through ducts of more than 10 inches length.
- (3) "Duct heater or furnace" means a space heater designed to be installed within a duct.
- (4) "Energy consumption during standby" means the energy consumed by the gas space heater when the main burner is not operating. It does not include energy consumption related to associated cooling equipment. It shall be reported in watts, based on a conversion factor of 3.412 British thermal units per watt-hour.
- (5) "Fan type heater or furnace" means a space heater that provides for the circulation of heated air at pressures other than atmospheric.
- (6) "Floor heater or furnace" means a self-contained, floor mounted space heater without ducts.
- (7) "Gravity type heater or furnace" means a space heater which provides for circulation of heated air through the differential densities of the heated air and the nonheated air.
- (8) "Infrared heater" means a space heater which directs a substantial amount of its energy output in the form of infrared energy into the area to be heated.
- (9) "Room heater" means a free-standing non-recessed space heater.
- (10) "Seasonal efficiency" or "steady state efficiency" or "thermal efficiency" of a space heater means a measure of the percentage of heat from the combustion of gas which is transferred to the space being heated under conditions specified in Section 1603 of these regulations.
- (11) "Space heater" means an appliance that supplies heat to a space for the purpose of providing warmth to those objects within the space.
- (12) "Unit heater" means a self contained fan type heater designed to be installed within the heated space.
- (13) "Wall heater or furnace" means a wall mounted, self-contained space heater without ducts that exceed 10 inches.

(e) Water Heaters

(1) "Height of a gas storage-type water heater" means the vertical distance from the top of the flue to the bottom of the firebox.

(2) "Large storage-type water heater" means a storage-type water heater whose input rating exceeds 75,000 Btu per hour (gas) or 12 kilowatts (electric).

(3) "Mobile home storage-type water heater" means a storage-type water heater designed expressly for use in mobile homes.

(4) "Small storage-type water heater" means a storage-type water heater whose input rating does not exceed 75,000 Btu per hour (gas), or 12 kilowatts (electric).

(5) "Standby loss of a storage type heater" when expressed as a percent means the ratio of heat lost per hour to the heat content of the stored water above room temperature. "Standby loss of a storage type heater" when expressed in watts per square foot means the heat lost per hour, per square foot of tank surface area.

(6) "Storage-type water heater" means a water heater that heats and stores water within the appliance at a thermostatically controlled temperature for delivery on demand, and which has an input rating less than 4000 Btu/hour per gallon of stored capacity.

(7) "Swimming pool heater" means a water heater designed for heating nonpotable water at atmospheric pressure, such as water in swimming pools, therapeutic pools, and similar applications.

(8) "Thermal efficiency" or "recovery efficiency" of a water heater means a measure of the percentage of heat from the combustion of gas which is transferred to the water as measured under test conditions specified in Section 1603 of these regulations.

(9) "Water heater" means an appliance for supplying hot water for purposes other than space heating.

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(f) Plumbing Fittings

(1) "Lavatory faucet" means a plumbing fitting designed for discharge into a lavatory.

(2) "Plumbing fitting" means a device designed to control and/or guide the flow of water into or convey water from a fixture.

(3) "Showerhead" means a device through which water is discharged for a shower bath.

(4) "Sink faucet" means a plumbing fitting designed for discharge into a sink. "Sink faucet" does not include utility faucets designed for use with service sinks.

(g) Clothes Dryers

(1) "Gas clothes dryer" means a device used to dry wet laundry by means of heat derived from the combustion of fuel gases.

(h) Cooking appliances

(1) "Household cooking gas appliance" means a gas appliance for domestic food preparation, providing at least top or surface cooking, oven cooking, or broiling.

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1603. Test Methods. (a) Refrigerators and Freezers. The manufacturer shall cause the testing of samples of each model of refrigerator, refrigerator-freezer and freezer, to be sold in California.

(1) Fresh food refrigerated volume, freezer refrigerated volume, total refrigerated volume and shelf area shall be measured using the American National Standard Methods of Testing for Household Refrigerators, Combination Refrigerator-Freezers and Household Freezers, approved by the American National Standards Institute on May 6, 1969, known as ANSI B 38.1-1970.

(2) The energy consumption shall be measured using the standard test procedure approved by the Association of Home Appliance Manufacturers, in July 1975, known as HRF-2-ECFT.

(3) When manually operated anti-sweat switches are provided, the values of energy consumption shall be determined with these switches set at their highest energy consuming position.

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.

(b) Room Air Conditioners. The manufacturer shall cause the testing of samples of each model of room air conditioner and room air conditioning heat pump to be sold in California.

(1) Until April 2, 1978, the method of sampling of room air conditioners shall be that used by the Association of Home Appliances in its certification program. Commencing April 3, 1978, the method of sampling shall be that required by the Department of Energy and found in 42 Federal Register 27896-27899 (June 1, 1977).

(2) The cooling capacity, heating capacity, electrical input and energy efficiency ratio (EER) of packaged terminal air conditioners shall be determined using the test procedure approved by the American National Standards Institute on November 17, 1977, known as ANSI/ARI 310-1976 or the test procedure approved by the Air Conditioning and Refrigeration Institute in 1978, known as ARI 380/78. The cooling capacity, heating capacity, electrical input and energy efficiency ratio (EER) of all other

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room air conditioners and room air conditioning heat pumps shall be determined using the standard for room air conditioners, approved by the American National Standards Institute, on December 21, 1972, known as ANSI/AHAM RAC-1, with ASHRAE 58-74 used in lieu of ASHRAE 58-65.

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(3) The thermal efficiency of room air conditioners with heating capability shall be determined by dividing the heating capacity by the electrical input in equivalent units.

(c) Central Air Conditioners. The manufacturer shall cause the testing of samples of each model of central air conditioner and central air conditioning heat pump to be sold in California.

(1) Until September 30, 1978, the method of sampling shall be that used by the Air-Conditioning and Refrigeration Institute in its certification program. Commencing October 1, 1978, the method of sampling shall be that required by the Department of Energy and found in 42 Federal Register 60150-60157 (November 25, 1977).

(2) The cooling capacity, heating capacity, electrical input, energy efficiency ratio and coefficient of performance of central air conditioners and central air conditioning heat pumps shall be determined using one of the test procedures approved by the Air-Conditioning and Refrigeration Institute or American Society of Heating, Refrigerating and Air-Conditioning Engineers on the dates shown in Table C-1 and known by the numbers shown.

TABLE C-1

Appliance Type	Number	Date of Approval
Central air conditioning heat pumps with capacity less than 135,000 Btu/hr.	ARI 240-77 ARI 320-76	1977 1976
Other heat pumps.	ASHRAE 90-75	August 11, 1975
Other central air conditioners	ARI 210-75	1975

The seasonal energy efficiency ratio shall be determined using the test procedure required by the Department of Energy and found in 42 Federal Register 60150-60157 (November 25, 1977).

(3) The standby electrical input of central air conditioning heat pumps shall be determined by measuring the watt-hours used in a one-hour period, at 75°F plus or minus 10°F ambient conditions, starting from a cold start. The adjusted coefficient of performance shall be calculated as follows:

$$\text{Adjusted Coefficient of Performance} = \frac{\text{Rated heating capacity (watts)}}{\text{Rated electrical input (watts)} + \left[c \times \text{standby electrical input (watts)} \right]}$$

Where c = 2.5 for 47°F test and c = 0 for 17°F test.

(4) When a central air conditioner consists of more than one assembly, the assemblies shall be designed to be used together, and the requirements of rating shall be based upon use of matched assemblies.

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(d) Gas Space Heaters. The manufacturer shall cause the testing of samples of each model of gas space heater to be sold in California.

(1) The method of sampling for gas fan type central furnaces when being tested for the steady state efficiency (for the 1979 and 1980 standards) shall be that used by the American Gas Association Laboratories in its certification program. The steady state efficiency of gas fan type central furnaces shall be determined using the test procedure required by the Department of Energy and found in 42 Federal Register 20147-20181 (May 10, 1978).

(2) The method of sampling of gas fan type central furnaces, when being tested for the seasonal efficiency (for the 1982 and 1984 standards), shall be that required by the Department of Energy and found in 42 Federal Register 20147-20181 (May 10, 1978).

The seasonal efficiency of gas fan-type central furnaces shall be calculated using the following formula:

$$\text{Seasonal efficiency} = \frac{\left[\begin{array}{l} \text{annual fuel} \\ \text{energy} \\ \text{consumption} \\ \text{(Btu)} \end{array} \right] \times \left[\begin{array}{l} \text{annual fuel} \\ \text{utilization} \\ \text{efficiency} \end{array} \right] + \left[\begin{array}{l} \text{annual auxiliary} \\ \text{electrical energy} \\ \text{consumption which} \\ \text{provides heat} \\ \text{to heated space} \\ \text{(kWh)} \end{array} \right] \times \frac{3412 \text{ Btu}}{\text{kWh}}}{\left[\begin{array}{l} \text{annual fuel} \\ \text{energy} \\ \text{consumption} \end{array} \right] + \left[\begin{array}{l} \text{total annual} \\ \text{auxiliary elec-} \\ \text{trical energy} \end{array} \right]} \times \frac{10236 \text{ Btu}}{\text{kWh}}$$

The annual fuel energy consumption, annual auxiliary electrical energy consumption which provides heat to the heated space, total annual auxiliary electrical energy consumption and annual fuel utilization efficiency of gas fan type central furnaces shall be determined using the test procedure required by the Department of Energy and found in 42 Federal Register 20147 - 20181 (May 10, 1978).

(3) The method of sampling all other gas space heaters shall be that used by the American Gas Association Laboratories in its certification program.

Thermal efficiency and energy consumption during standby shall be measured using one of the test procedures approved by the American National Standards Institute on the dates shown in Table D-1 and known by the numbers shown.

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TABLE D-1

Number	Date of Approval
Z 21.11.1 - 1974	January 7, 1974
Z 21.13 - 1974	August 12, 1974
Z 21.16 - 1971	December 17, 1971
Z 21.34 - 1971	December 17, 1971
Z 21.44 - 1977	January 20, 1977
Z 21.48 - 1976	February 10, 1976
Z 21.49 - 1975	March 25, 1975

(4) Commencing July 8, 1979, all intermittent type ignition devices used on gas fan-type central furnaces or gas fan-type wall furnaces shall comply with the requirements of Subsection 1603(i).

(5) Commencing July 8, 1978, all gas fan-type central furnaces with input rate less than 175,000 Btu per hour, except those designed to burn only liquefied petroleum gases, and those designed expressly for use in mobile homes or recreational vehicles shall be tested by an accepted laboratory and shall be certified by the Commission if they comply with the test procedure approved by the American National Standards Institute on April 19, 1973, known as ANSI Z21.47-1973, and addenda approved on May 13, 1974, known as ANSI Z21.47a-1974, and addenda approved on September 22, 1975, known as ANSI Z21.47b-1975. They shall also comply with the requirements of Subsection 1603(k).

(6) Commencing December 22, 1979, all gas fan-type wall furnaces except those designed to burn only liquefied petroleum gases and those designed expressly for use in recreational vehicles shall be tested by an accepted laboratory and shall be certified by the Commission if they comply with either the test procedure approved by the American National Standards Institute on March 25, 1975, known as ANSI Z21.49-1975, and the addenda approved on January 20, 1977, known as ANSI Z21.49a-1977, or the test procedure approved by the American National Standards Institute on January 20, 1977, known as ANSI Z21.44-1977.

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(e) Water Heaters. The manufacturer shall cause the testing of samples of each model of water heater (except swimming pool heaters) to be sold in California.

(1) The method of sampling of small storage type water heaters except mobile home storage type water heaters, shall be that required by the Department of Energy and found in 42 Federal Register 54110-54119 (October 4, 1977). The recovery efficiency, standby loss and storage capacity shall be measured using the test procedure required by the Department of Energy on and found in 42 Federal Register 54110-54119. (October 4, 1977).

(2) The method of sampling for all other water heaters shall be that used by the American Gas Association Laboratories in its certification program. The recovery efficiency, standby loss and storage capacity (where applicable) shall be measured using one of the test procedures approved by the American National Standards Institute on the dates shown in Table E-1 and known by the numbers shown.

TABLE E-1

Appliance Type	Number	Date of Approval
Electric types		
large	C 72.1 - 1972	March 16, 1972
mobile home	C 72.1 - 1972	March 16, 1972
Gas types		
	Z 21.10.1 - 1975	October 17, 1975
	Z 21.10.3 - 1975	October 17, 1975
	Z 21.13 - 1974	August 12, 1974

Junction box equipment shall be bypassed during performance of the standby loss test.

(3) Commencing 24 months after the date of the certification of the first model of swimming pool heater, all intermittent type ignition devices used on swimming pool heaters shall comply with the requirements of Sub-section 1603(i).

(4) Commencing 24 months after the date of certification of the first model of swimming pool heater, all gas-fired swimming pool heaters shall be tested by an accepted laboratory and shall be certified by the Commission, if they comply with the test procedure approved by the American National Standards Institute on November 25, 1974, known as ANSI Z21.56a-1975; or if they comply with the test procedure approved by the American National Standards Institute on August 12, 1974, known as ANSI Z21.13-1974, and addenda approved on February 13, 1976, known as ANSI Z21.13a-1976.

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(f) Plumbing Fittings. The manufacturer shall cause the testing of samples of each model of showerhead, lavatory faucet and sink faucet to be sold in California.

A sample of sufficient size of each model shall be tested so that there is a probability of not less than 0.95 that the mean maximum flow rate of the sample is within plus or minus five percent of the true mean maximum flow rate of all units. The water flow rates certified by the manufacturer under the provisions of Section 1605 of these regulations shall be the mean maximum flow rate of the sample.

The maximum flow rate shall be measured using the test procedure approved by the American National Standards Institute on October 2, 1975 and known as ANSI A112.18.1-1975 with Section 5.14 modified to read as follows:

"5.14 Discharge

The inlet(s) of the fitting, with standard accessories, shall be connected to smooth pipe or tubing of the same nominal diameter as the fitting outlet, which is at least 20 inside diameters long.

Upstream pressure tap(s) shall be located 1/2 to 2-1/2 inside diameters upstream from the fitting inlet. Pressure tap size and configuration shall conform with ASME Performance Test Code Supplement, Instruments and Apparatus, PTC 19.2-1964 Part 2 - Pressure Measurement, paragraph 2.05. Pressure Transducers on gauges shall be calibrated as per PTC 19.2-1964, Chapter 4.

The fitting shall be thoroughly flushed before measuring the flow rate.

Water at a temperature of 140°F plus or minus 5°F shall be discharged from the fitting for ten minutes. The test for water discharge rate shall then be performed with water whose temperature is 100°F plus or minus 5°F. The fitting shall then be examined to ensure that the parts have not been damaged by the hot water. The test pressure at the inlet shall cover a range between 20 and 80 psig when flowing. All fittings shall be tested at maximum flow setting. The rates of flow used for certification under the provisions of Section 1605 shall be the maximum rate of flow at any supply pressure between 20 and 45 psig and the maximum rate of flow at any supply pressure between 45 and 80 psig.

If a fluid meter is used to measure flow rate, the installation shall be in accordance with ASME Supplement 19.5 on Instruments and Apparatus, Application, Part II of Fluid Meters, 1972."

(g) Clothes Dryers

(1) Commencing February 10, 1979, all intermittent type ignition devices used on gas clothes dryers shall comply with the requirements of Subsection 1603(i).

(2) Commencing February 10, 1979, all gas clothes dryers shall be tested by an accepted laboratory and shall be certified by the Commission, if they comply with the test procedure approved by the American National Standards Institute on August 4, 1975, known as ANSI Z21.5.1-1975.

(h) Cooking Appliances

(1) Commencing July 8, 1978, all intermittent type ignition devices used on gas cooking appliances shall comply with the requirements of Subsection 1603(i).

(2) Commencing July 8, 1978, all household cooking gas appliances shall be tested by an accepted laboratory and shall be certified by the Commission, if they comply with the test procedure approved by the American National Standards Institute on February 12, 1974, known as ANSI Z21.1-1974, and the addenda approved on November 25, 1974, known as ANSI Z21.1a-1974, and the addenda approved on February 13, 1976, known as ANSI Z21.1b-1976.

(i) Intermittent Ignition Devices

(1) All intermittent type ignition devices manufactured on or after July 8, 1979 or submitted to an accepted laboratory for testing on or after January 1, 1978 shall be tested by an accepted laboratory and shall comply with the test procedure approved by the American National Standards Institute on August 4, 1975, known as ANSI Z21.20-1975, with addenda approved on January 5, 1977, known as ANSI Z21.20a-1977, and with the electrical test requirements described in Subsection 1603(j), and with the failure modes and effects analysis described in Subsection 1603(k). For the purpose of this subsection, the date of submittal to an accepted laboratory shall be the date of the letter in which the manufacturer requests a test reservation date from the laboratory.

(2) All other intermittent type ignition devices subject to the requirements of Subsection 1605(h) shall be tested by an accepted laboratory and shall comply with the test procedure approved by the American National Standards Institute on August 4, 1975, known as ANSI Z21.20-1975.

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(j) Electrical Test Requirements for Gas Appliances with Intermittent Type Ignition Devices

Electrically operated intermittent type ignition devices shall be subjected to the following tests without evidence of unsafe failure. A separate device shall be used for each test.

(1) Line Transient Test. The device shall be subjected to a transient voltage of 750-800 volts applied to the primary power supply of the device by means of a transient generator.

The pulse shape shall be 2.5 microseconds maximum rise time between 30 to 90 percent peak voltage and 15-30 microseconds decay time to half peak value. The transient voltage shall be applied 1000 times with a positive polarity and 1000 times with a negative polarity.

(2) Lightning Transient Test. The device shall be subjected to a transient of 10 pulses of 10 KV discharged from a 0.1 microfarad capacitor through a 100 ohm resistor.

(3) Static Discharge Test. The device shall be subjected to 25 KV discharge with the device energized and de-energized. The static discharge shall be applied to any surface or terminal which could be touched during normal servicing.

If line transient suppression networks are used, the tests shall be repeated with the line transient suppression networks bypassed.

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(k) Failure Modes and Effects Analysis

In addition to the requirements set forth above, the Commission shall not certify any intermittent type ignition device or forced air central furnace submitted to an accepted laboratory for testing on or after January 1, 1978 unless an accepted laboratory has evaluated a failure modes and effects analysis. All intermittent ignition devices and forced air central furnaces shall comply with this section as of July 8, 1979. For the purpose of this subsection, the date of submittal to an accepted laboratory shall be the date of the letter in which the manufacturer requests a test reservation date from the laboratory.

The failure modes and effects analysis shall include for each functional part, an analysis of potential failure modes and the effects of the failures. The report of the analysis shall include the following items:

- (1) The catalog/model number and name of the automatic gas ignition system or component thereof;
- (2) The name of the manufacturer;
- (3) A list of reference documents such as prints, diagrams, and instructions;
- (4) Identification of individual functional part(s), such as resistors, capacitors, semi-conductor devices, or transformers, by circuit designation on manufacturer's literature;
- (5) All modes in which a component could potentially fail to perform its intended function, regardless of their probability or effect;
- (6) Any possible occurrence or influence that could lead to the failure;
- (7) The effect of the failure;
- (8) A cause and effects analysis which shows how the probability or effect of failure could be reduced.

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1604. Efficiency Standards.

(a) Refrigerators and Freezers. The energy consumption of all new refrigerators, refrigerator-freezers and freezers, manufactured on or after the date specified in Table A shall be certified not to exceed the values derived from the appropriate formulae where V is the total refrigerated volume (cubic feet) and EC is the energy consumption (kWh per month):

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TABLE A

<u>Effective Date</u>	<u>Appliance</u>	<u>Formula</u>
November 3, 1977	Refrigerators	$EC = 40 + 2.5V$
	Refrigerator-freezers and freezers	
	(a) with automatic defrost system	$EC = 40 + 7V$
	(b) all others	$EC = 40 + 5V$
November 3, 1979	Refrigerators	$EC = 40 + 2.5V$
	Refrigerators-freezers	
	(a) with automatic defrost system	$EC = 40 + 5V$
	(b) all others	$EC = 40 + 4V$
	Freezers	
	(a) upright freezers with with automatic defrost systems	$EC = 40 + 6V$
(b) all others	$EC = 40 + 4V$	

(b) Room Air Conditioners. The energy efficiency ratio and thermal efficiency (where applicable) of all new room air conditioners manufactured on or after the date specified in Table B shall be certified to be not less than the values shown. In the case of room air conditioners labeled for use at both 230 volts and 208 volts, the energy efficiency ratio shall be certified not to be less than the values shown when tested both at 230 volts and 208 volts.

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TABLE B

<u>Effective Date</u>	<u>Appliance</u>	<u>EER based on AHAM sampling procedure</u>	<u>EER based on DOE sampling procedure</u>	<u>Thermal Efficiency</u>
November 3, 1977	Room air conditioners <ul style="list-style-type: none"> . those with cooling capacity equal to or greater than 20,000 Btu/hour . other heat pumps . all other room air conditioners 	7.0 7.1 7.5	- - -	
April 3, 1978	Room air conditioners <ul style="list-style-type: none"> . those with cooling capacity equal to or greater than 20,000 Btu/hour . other heat pumps . all other room air conditioners 	- - -	7.0 7.1 7.5	
December 22, 1978	Room air conditioners <ul style="list-style-type: none"> . those with heating capability 			90%
November 3, 1979	Room air conditioners <ul style="list-style-type: none"> . those designed for use with a supply of at least 200 volts . other heat pumps . all other room air conditioners 	- - -	8.2 8.3 8.7	

(c) Central Air Conditioners The energy efficiency ratio of all new central air conditioners manufactured on or after the date specified in Table C-2 shall be certified to be not less than the values shown. In the case of central air conditioners labeled for use at both 230 volts and 208 volts, the energy efficiency ratio shall be certified not to be less than the values shown when tested both at 230 volts and 208 volts.

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TABLE C-2

<u>Effective Date</u>	<u>Appliance</u>	<u>EER based on ARI sampling procedure</u>	<u>EER based on DOE sampling procedure</u>	<u>Seasonal EER</u>
November 3, 1977	Central air conditioners			
	heat pumps	6.7	-	-
	all others	7.0	-	-
January 1, 1979	Central air conditioners			
	heat pumps	6.7	-	
	all others	-	7.0	
November 3, 1979	Central air conditioners			
	heat pumps	7.5	-	-
	all others	-	8.0	-

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The adjusted coefficient of performance of all new central air conditioning heat pumps manufactured on or after the dates specified in Table C-3 shall be certified not to be less than the values shown. In the case of central air conditioners designed labeled for use at both 230 volts and 208 volts, the adjusted coefficient of performance shall be certified not to be less than the values shown when tested both at 230 volts and 208 volts.

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TABLE C-3

<u>Effective Date</u>	<u>Appliance</u>	<u>Adjusted Coefficient of Performance</u>		
		<u>Air Source</u>		<u>Water Source</u>
		47° outdoor temp.	17° outdoor temp.	70° water temp.
December 22, 1978	Central air conditioning heat pumps	2.2	1.2	2.2
November 3, 1979	Central air conditioning heat pumps	2.5	1.5	2.5

(d) Gas Space Heaters

(1) The steady state efficiency and seasonal efficiency of all new fan type gas central furnaces manufactured on or after the dates specified in Table D-2 shall be certified not to be less than the values shown and the energy consumption during standby shall be certified not to exceed the values shown.

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TABLE D-2

<u>Effective Date</u>	<u>Appliance</u>	<u>Steady State Efficiency</u>	<u>Energy Consumption During Standby</u>	<u>Seasonal Efficiency</u>
June 22, 1979	Gas fan type central furnaces with input rate less than 175,000 Btu per hour except for those combined with a single package central air conditioner with rated cooling capacity exceeding 65,000 Btu per hour.	75%	<u>Basic Standard</u> 25 watts	No requirement
		No requirement	<u>Alternative standard at manufacturer's option</u> No requirement	71%
Dec. 22, 1980	Gas fan type central furnaces with input rate of 175,000 Btu per hour or more and those combined with a single package central air conditioner with rated cooling capacity exceeding 65,000 Btu per hour.	75%	<u>Basic Standard</u> 25 watts	No requirement
		No requirement	<u>Alternative standard at manufacturer's option</u> No requirement	71%
Dec. 22, 1982	Gas fan type central furnaces with input rate less than 175,000 Btu per hour, except those combined with a single package central air conditioner with rated cooling capacity exceeding 65,000 Btu per hour.	No requirement	No requirement	71%
Dec. 22, 1984	Gas fan type central furnaces with input rate of 175,000 Btu per hour or more, and those combined with a single package central air conditioner with rated cooling capacity exceeding 65,000 Btu per hour.	No requirement	No requirement	71%

(2) The thermal efficiency of all other new gas space heaters manufactured on or after the date specified in Table D-3 shall be certified not to be less than the values shown, and the energy consumption during standby (with the exception noted below) shall be certified not to exceed the values shown.

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TABLE D-3

<u>Effective Date</u>	<u>Appliance</u>	<u>Energy Consumption During Standby</u>	<u>Thermal Efficiency</u>
December 22, 1978	Gas space heaters		
	Wall,		
	fan type	10 watts*	77%
	gravity type	147 watts	70%
	Floor,		
	fan type	10 watts*	70%
	gravity type	147 watts	65%
December 22, 1980	Room with capacity over 20,000 Btu/hour	147 watts	70%
	others	147 watts	65%
	Boilers	147 watts	75%
	Unit	10 watts*	77%
Duct	10 watts*	77%	
December 22, 1981	Wall, fan type	10 watts*	80%
December 22, 1983	Unit	10 watts*	80%
	Duct	10 watts*	80%

* For space heaters designed expressly for use with liquefied petroleum gases including propane, the maximum energy consumption during standby shall not exceed 147 watts.

(e) Water Heaters

(1) The recovery efficiency or thermal efficiency (as applicable) of all new water heaters manufactured on or after the date specified in Table E-2 shall be certified to be not less than the values shown and the standby loss shall be certified not to exceed the values shown.

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TABLE E-2

<u>Effective Date</u>	<u>Appliance</u>	<u>Standby Loss</u>	<u>Recovery Efficiency or Thermal Efficiency</u>
Dec. 22, 1978	Water heaters		
	Electric, mobile home storage type	4 watts per square foot	no requirement
	Electric, all other storage type	35 watts or 4 watts per square foot, whichever is larger	no requirement
	Gas, mobile home with storage capacity of		
	less than 25 gallons	7.5 percent	75 percent
	25 up to 35 gallons	7.0 percent	75 percent
	35 gallons or more	6.0 percent	75 percent
	Gas, small storage type, other than mobile home type, with height less than 48 inches.	$2.3 + \frac{67}{\text{Cap}}$ percent	74 percent
	with height of 48 inches or more (basic standard)	$2.3 + \frac{67}{\text{Cap}}$ percent	76 percent
	(alternative standard at manufacturer's option)	$1.3 + \frac{67}{\text{Cap}}$ percent	74 percent
Gas, all others	no requirement	75 percent	
Dec. 22, 1979	Gas, small storage type other than mobile home type, with height less than 48 inches (basic standard)	$2.3 + \frac{67}{\text{Cap}}$ percent	76 percent
	(alternative standard at manufacturer's option)	$1.3 + \frac{67}{\text{Cap}}$ percent	74 percent

where Cap is the storage capacity in gallons.

(f) Plumbing Fittings

The maximum flow rate of all new showerheads, lavatory faucets, and sink faucets manufactured on or after the date specified in Table F shall be certified not to exceed the values shown.

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TABLE F

<u>Effective Date</u>	<u>Appliance</u>	<u>Test Pressure</u>	<u>Maximum Flow Rate</u>
December 22, 1978	Plumbing Fittings		
	Showerheads	20-45 psig	2.75 gpm
		45-80 psig	3.00 gpm
	Lavatory faucets	20-80 psig	2.75 gpm
	Sink faucets	20-80 psig	2.75 gpm

1605. Certification.

(a) No new gas appliance of the type described in Table G may be sold or offered for sale in California on or after the effective date shown, unless it has been certified by the Commission to comply with the requirements of Subsections 1603(d)(4), 1603(d)(5), 1603(d)(6), 1603(e)(3), 1603(e)(4), 1603(g) and 1603(h) of this Article.

TABLE G

Effective Date	Appliance
July 8, 1978	Fan-type central furnaces Household cooking appliances
February 10, 1979	Clothes dryers
December 22, 1979	Fan-type wall furnaces
24 months after certification of the first swimming pool heater	Swimming pool heaters

(b) No new appliance described in subsections 1601(a) through (f) of these regulations (except swimming pool heaters) may be sold or offered for sale in California on or after the effective dates listed in Section 1604 of these regulations unless the manufacturer has provided sufficient information about the model number or other identification by which the date of manufacture can be readily ascertained.

(c) No new appliance described in Subsections 1601(a) through (f) of these regulations, (except swimming pool heaters), which was manufactured on or after the effective dates listed in Section 1604 of these regulations, shall be sold or offered for sale in California, which is not certified by its manufacturer to be in compliance with the provisions of this Article. One year after such effective date, no new appliance described in Section 1601 of these regulations, regardless of the date of manufacture, may be sold or offered for sale in California, which is not certified by its manufacturer to be in compliance with the provisions of this Article. Certification is not required, however, for

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models of appliances whose production ceased before November 3, 1977 if it can be readily ascertained from the label or nameplate that its efficiency meets the applicable value specified in Section 1604 of this Article. The requirements referred to in subsection 1665(a) are excluded from the requirements of this subsection.

(d) A split system central air conditioner, or a compressor-containing unit, may be sold if, and only if, the manufacturer of the compressor-containing unit certifies that that unit, when tested with at least one non-compressor-containing unit, is in compliance with the provisions of this Article.

(e) The manufacturer shall submit a certification statement to the executive director for each model, containing the following information, except as provided in Subsection (f):

- (1) Name and address of manufacturer.
- (2) Type of appliance.
- (3) Brand name.
- (4) Model number, as it appears on the appliance name plate.
- (5) Name and address of laboratory where test for efficiency was performed.
- (6) Date of test for efficiency.
- (7) Results of the test for efficiency as follows:

(A) Refrigerators and freezers

1. Energy consumption (kilowatt-hours per month, until September 30, 1978).
2. Energy consumption with antisweat heater switches on (kilowatt-hours per year, commencing October 1, 1978).
3. Energy consumption with antisweat heater switches off (kilowatt-hours per year, commencing October 1, 1978).
4. Mean of items 2 and 3.
5. Fresh food refrigerated volume (in cubic feet).
6. Freezer refrigerated volume (in cubic feet).
7. Total refrigerated volume (in cubic feet).
8. Energy factor (commencing October 1, 1978).

(B) Room air conditioners

1. Type (heating and cooling or cooling only).

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2. Test procedure used.
3. Voltage.
4. Cooling capacity (Btu per hour).
5. Power input, while cooling (watts).
6. Energy efficiency ratio (Btu per watt-hour).
7. Heating capacity (Btu per hour).
8. Power input, while heating (watts).
9. Thermal efficiency (percent)

(C) Central air conditioners

1. Type (heat pump or cooling only).
2. Test procedure used.
3. Voltage
4. Number of phases
5. Cooling capacity (Btu per hour).
6. Power input, while cooling (watts).
7. Energy efficiency ratio (Btu per watt-hour).
8. Seasonal energy efficiency ratio (Btu per watt-hour, commencing October 1, 1978).
9. Coefficient of Performance and Adjusted Coefficient of Performance (of heat pumps), commencing December 22, 1978.
10. Standby Electrical Input (of heat pumps, commencing December 22, 1978).
11. Heating capacity of heat pumps (Btu per hour, commencing December 22, 1978).
12. Power input of heat pumps, while heating (watts, commencing December 22, 1978).

(D) Gas Space Heaters

1. Steady state efficiency (of central fan-type furnaces in percent).
2. Seasonal Efficiency and components thereof (of central fan-type furnaces in percent, commencing June 22, 1978).

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3. Thermal Efficiency (of all gas space heaters except central fan-type furnaces).

4. Energy consumption During Standby (of all gas space heaters).

(E) Water Heaters

1. Tank Surface Area (of electric water heaters).

2. Description of Method of Calculating Tank Surface Area (of electric water heaters).

3. Height (in inches, of gas small storage-type water heaters).

4. Recovery Efficiency (percent).

5. Standby Loss (percent).

6. Standby Loss (watts and watts per square foot).

(F) Plumbing Fittings

1. Maximum flow rate (showerheads at 20-45 psig).

2. Maximum flow rate (showerheads at 45-80 psig).

3. Maximum flow rate (lavatory faucets and sink faucets at 20-80 psig).

(8) Sufficient information about the model number or other identification by which the date of manufacture can be readily ascertained.

(9) A declaration that the appliance model complies with Article 4, Subchapter 4, of Title 20, of the California Administrative Code. The executive director may, at his discretion, prescribe a standard form for the certification statement.

(f) The manufacturer may, at his discretion, submit a copy of the sales literature used in California describing each model being certified, and the following information in his certification statement in place of the information described in subsections (d)(3) through (7) inclusive of this section. If the model number in the sales literature is not identical to the model number identified in the directory, the manufacturer shall indicate which model number in the directory corresponds with the model number in the sales literature.

(1) For refrigerators, refrigerator-freezers, freezers, a copy of those pages of the latest directory published by the Association of Home Appliance Manufacturers which apply to the manufacturer's models. Each model being certified shall be clearly identified on the directory pages.

(2) For air conditioners, excluding air conditioning heat pumps, a copy of those pages of the latest directory published by either the Association of Home Appliance Manufacturers or the Air-Conditioning and Refrigeration Institute which apply to the manufacturer's models. Each model being certified shall be clearly identified on the directory pages.

In case of central air conditioning heat pumps, the manufacturer shall include a statement that the heat pump being certified is equipped with sufficient crankcase heat to create a temperature differential of at least 10^oF. between the crankcase and the coldest part of the system, or that the reliability of the compressor is otherwise adequately ensured. If the method of assuring reliability does not include crankcase heating, the manufacturer shall state what method was used.

(3) For gas floor heaters, room heaters, gravity type wall heaters, and boilers when reporting thermal efficiency, a copy of those pages of the latest directory published by the American Gas Association Laboratories which apply to the manufacturer's models. Each model being certified shall be clearly identified on the directory pages. This method of reporting shall not be accepted for reporting energy consumption during standby.

When certifying the efficiency of gas appliances designed expressly for use in mobile homes, the manufacturer may, in place of information described in subsection (d)(7), provide a statement from a nationally recognized testing laboratory that the appliance complies with the minimum efficiency requirement of the Department of Housing and Urban Development for appliances in mobile homes.

(g) Every certification statement shall be dated and signed by the manufacturer attesting to its truth and accuracy under penalty of perjury. Where the manufacturer is either a corporation or a business association, the certification statement shall be dated, signed and attested to by an officer thereof.

(h) Within 45 days after receipt of a certification statement, the executive director shall forward to the manufacturer, an acknowledgement that the statement has been received and that it is complete and accurate on its face.

For purposes of subsection (c), certification of a model shall be deemed to occur upon forwarding of the acknowledgement by the executive director. If acknowledgement is not forwarded in a timely manner, certification shall be deemed to occur on the 45th day after receipt of the certification statement.

1606. Identification of Complying Appliances. (a) Commencing January 1, 1978, for any appliance described in Subsections 1601(a) through 1601(c) and commencing December 22, 1978, for any appliance described in Subsections 1601(d) through 1601(f) sufficient information shall be shown on the outside of the shipping carton (and unit carton in the case of plumbing fittings) to permit the determination of whether the appliance complies with the requirements of this article. The manufacturer may display the following information on the outside of the carton to show compliance:

- (1) The Commission's compliance seal;
- (2) The appropriate measure of energy consumption or efficiency;
- (3) The model number as it has been certified and information to determine date of manufacture; or
- (4) Other information sufficient to show compliance.

The executive director or his designee may require additional information if necessary to permit determination of compliance.

(b) Commencing December 22, 1978, the name or brand of the manufacturer shall appear on each appliance.

(c) By January 1, 1978 the Executive Director shall publish the design of a seal which may be used by manufacturers to identify the appliance as complying with the requirements of this Article.

(d) Commencing the effective date identified in Section 1605, the marking plate of all gas appliances certified by the Commission as complying with its regulations for intermittent ignition devices shall have the statement, "This appliance is equipped with an intermittent type ignition device," or such other statement as the executive director determines will comply with the requirements of this Article.

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1607. Enforcement. (a) Notwithstanding the provisions of Section 1605 of these regulations, the executive director shall have authority to challenge the efficiency test results provided by the manufacturer and cause the appliance model to be retested.

(b) The executive director shall cause periodic inspections to be made of manufacturers, distributors or retailers of the new appliances described in Section 1601 of these regulations, including appliances that have been or are to be installed by contractors or builders at building sites, in order to determine their compliance with this Article.

(c) The test would involve one unit selected by the executive director.

(1) If the performance of the appliance falls within the tolerances listed below, no further action is necessary, and the Commission will pay the cost of testing.

<u>Appliance</u>	<u>Characteristic</u>	<u>Tolerance Limits</u> (percent of certified value)
Refrigerators	Volume	Not less than 98.5 percent
Refrigerator-Freezers	Energy Consumption	Not more than 110 percent
Room air conditioners (including heat pumps and packaged terminal air conditioners)	Cooling capacity	Not less than 95 percent
	Energy consumption when cooling	Not more than 110 percent
	Heating capacity	Not less than 95 percent
	Energy consumption when heating	Not more than 110 percent
Central air condi- tioners (including heat pumps)	Cooling capacity	Not less than 95 percent
	Energy consumption when cooling	Not more than 105 percent
Central air condi- tioning heat pumps, when heating	Heating capacity	Not less than 95 percent
	Energy consumption when heating	Not more than 105 percent
	Energy consumption during standby	Not more than 105 percent
Central gas furnaces	Seasonal efficiency	Not less than 95 percent
	Steady state efficiency	Not less than 100 percent

<u>Appliance</u>	<u>Characteristic</u>	<u>Tolerance Limits</u> (percent of certified value)
All other gas space heaters	Thermal efficiency Energy consumption during standby	Not less than 100 percent Not more than 100 percent
Small storage type water heaters	Recovery efficiency Standby loss	Not less than 97.5 percent Not more than 115 percent
Other water heaters	Recovery efficiency or Thermal efficiency	Not less than 100 percent
Plumbing fittings	Water flow rate	Not more than 110 percent

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(2) If the performance of the appliance does not fall within the tolerances listed above, the manufacturer must pay the cost of testing and take whatever steps are necessary either to recertify the appliance at a lower efficiency rating or to provide information to the satisfaction of the executive director that:

(A) in the initial certification of the model, the method of selecting the test sample complied with the requirements of Section 1603 and

(B) in the initial certification of the model, the value certified was in conformance with the requirements of Section 1603.

Even if this information is provided, the manufacturer shall be required to test a second unit, selected by the executive director, in a laboratory acceptable to the executive director, at the manufacturer's expense.

(3) If the performance of that second unit described in subsection (c)(2) falls within the tolerances listed in subsection (c)(1), no further action will be taken. If the performance of that second unit does not fall within those tolerances, the certification for that model shall be suspended by Commission order. The manufacturer may retest and recertify the model based on a new sample selected from his current production.

(4) If any of the tests of units required by the executive director pursuant to this subsection are not undertaken by a manufacturer, the certification for that model shall be suspended by Commission order.

1608. Release of Manufacturer Information. (a) Any manufacturer who submits information to an accepted laboratory for the purpose of complying with the intermittent ignition device requirements of this article may designate that such information be kept confidential as within an exception of the California Public Records Act (Sections 6250-6261 of the California Government Code) by so marking such information in a plain and legible manner. Thereafter, the Commission shall not disclose or otherwise make available to the public such information unless the procedures in this section have been followed.

(b) If the Commission or any person desires public disclosure of information designated confidential as presented above, the Commission shall promptly notify, in writing, the affected manufacturer and allow the manufacturer opportunity to demonstrate to the Commission that the requested information falls within an exception of the California Public Records Act (Sections 6250-6261 of the California Government Code), and therefore should not be disclosed. The Commission shall give written notice of its decision to the manufacturer and any other persons requesting notification. Information shall not be publicly disclosed until fifteen days after the Commission decision has been rendered and notice thereof has been received by the manufacturer.

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