GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 27.010

CCS F 01

GB 21456-2024

Replacing GB 12021 .6-2017, GB 21456-2014, GB 24849-2017, GB 39177-2020

Minimum allowable values of the energy efficiency and energy efficiency grades for household and similar kitchen appliances

家用和类似用途厨房电器能效限定值及能效等级

Issued on: August 23, 2024 **Implemented on: September 01, 2025**

Issued by: State Administration for Market Regulation;
Standardization Administration of the People's Republic of China.

Table of Contents

Minimum allowable values of the energy efficiency and energy efficiency grades for household and similar kitchen appliances

1 Scope

This document specifies the energy efficiency grades and heating efficiency calculation, technical requirements and test methods for household and similar kitchen appliances.

This document applies to the following types of household and similar kitchen appliances with a rated voltage not exceeding 250V AC:

a) Electric rice cookers with a rated power not exceeding 2200 W and heated by electric heating elements or electromagnetic induction;

b) Electric pressure cookers with the ability to automatically control working pressure, heated by electric heating elements or electromagnetic induction, with a rated power not exceeding 2200 W, a rated volume not exceeding 10L, and a rated cooking pressure of 40 kPa~140 kPa (gauge pressure);

c) Electric stew pots and electric stew cookers with a rated power not exceeding 2200 W;

d) Electric kettles that can pour water from the spout by holding the handle and tilting the kettle body, are only used to boil water and heat water to boiling point, and do not have an automatic water filling function;

e) Induction cooktops with one or more heating units, each with a rated power of 700 W~3500 W;

f) Microwave ovens with a maximum rated input power of 2500 W or less, which use electromagnetic energy in the ISM band of 2450 MHz and resistive heating elements to heat items and food in the oven cavity, including combination microwave ovens.

NOTE: The ISM band is an electromagnetic frequency range determined by the International Telecommunication Union (ITU) and adopted in the standard numbered CISPR11 developed by the International Special Committee on Radio Interference (CISPR).

This document does not apply to the following types of kitchen appliances:

- Commercial electromagnetic cookers, industrial frequency electromagnetic

Any mode of the kitchen appliance that provides one or more of the following user-oriented functions or protection functions, and is continuous, when the kitchen appliance is connected to the mains power supply:

a) Other modes (including active mode start or stop) can be triggered by triggering remote switches (including remote control), internal sensors, and timers;

b) Continuous functions: information or status display including clock;

c) Continuous functionality: sensor-based functionality.

NOTE: A timer is a clock function (with or without a display) that can perform a periodic, predetermined task (such as switching on and off) and can work continuously.

[Source: GB/T 35758-2017, 3.6]

3.3 off mode (s)

Any mode of the kitchen appliance that is continuous when the power supply unit of the kitchen appliance is connected to the mains and no standby mode, network mode or active mode is present. Indicators that only alert the user that the product is in the off position are included in the category of off mode.

[Source: GB/T 35758-2017, 3.5]

3.4 network mode (s)

A mode of the kitchen appliance when it is connected to the mains power supply and at least one network function has been activated (e.g., restarted by a network command or complete network communication), but the main function has not yet been activated.

NOTE: This mode is not applicable if the network function is not enabled and/or if there is no connection to the network. The network function can be triggered by a pre-defined set of instructions or a response to a network request. "Network" in this standard includes the communication between two or more independently powered devices or kitchen appliances. The network does not include one or more controls for individual kitchen appliances. Network mode may include one or more standby functions.

[Source: GB/T 35758-2017, 3.7]

3.5 warm-keeping energy consumption

The amount of electricity consumed by kitchen appliances when they are in keep warm mode.

3.6 energy consumption for grill-function

The power consumption per unit temperature rise of the microwave oven in the grill function state.

5 Technical requirements

5.1 Minimum allowable values of energy efficiency for electric rice cookers

The minimum allowable values of energy efficiency for electric rice cookers are the requirements of energy efficiency grade 3 in Table 1.

5.2 Minimum allowable values of energy efficiency for electric pressure cookers

The minimum allowable values of energy efficiency for electric pressure cookers are the requirements of energy efficiency grade 3 in Table 2.

5.3 Minimum allowable values of energy efficiency for electric stew pots and electric stew cookers

The minimum allowable values of energy efficiency for electric stew pots and electric stew cookers are the requirements of energy efficiency grade 3 in Table 3.

5.4 Minimum allowable values of energy efficiency for electric kettles

The minimum allowable values of energy efficiency for electric kettles are the requirements of energy efficiency grade 3 in Table 4.

5.5 Minimum allowable values of energy efficiency for electromagnetic cookers

The minimum allowable values of energy efficiency for electromagnetic cookers are the requirements of energy efficiency grade 3 in Table 5. All heating units of electromagnetic cookers shall meet the corresponding requirements.

5.6 Minimum allowable values of energy efficiency for microwave ovens

The minimum allowable values of energy efficiency for microwave ovens are the requirements of energy efficiency grade 3 in Table 6.

6 Test methods

6.1 Test methods for electric rice cookers

The test conditions and methods for the heating efficiency, standby power and warm-keeping energy consumption of electric rice cookers shall be in accordance with Annex A.

6.2 Test methods for electric pressure cookers

The test conditions and methods for the heating efficiency, standby power and warm-keeping energy consumption of electric pressure cookers shall be in accordance with

Annex A

(normative)

Test method for energy efficiency of electric rice cookers

A.1 Test conditions

A.1.1 Test environment

Unless otherwise specified, the test shall be carried out indoors in accordance with the following environmental requirements:

a) Ambient temperature: 23℃±2℃, wind speed <0.5m/s, no obvious influence of heating radiation;

b) Relative humidity: 45%~75%;

c) Atmospheric pressure: 98 kPa~106 kPa.

A.1.2 Power supply

It shall be carried out under the conditions of rated voltage 220 V±2.2 V and rated frequency 50 Hz±1 Hz.

A.1.3 Test measuring instruments and meters

Test instruments and meters shall meet the following requirements:

a) The accuracy of voltmeter, power meter and electric energy meter shall not be less than ±0.5%;

b) The resolution of the instrument used to measure temperature is 0.1°C. The accuracy of the temperature measuring instrument shall not be less than ±0.5%;

c) The timer resolution is 0.01 s, and the accuracy is ±2 s/h;

d) When the scale is at full capacity, the relative error shall not exceed ±0.1% and the minimum display (scale) value shall be 1 g;

e) Thermocouples shall use thin-wire thermocouples with a wire diameter not exceeding 0.3 mm.

A.1.4 Water

Use drinking water for tests.

with non-metallic inner pot materials, the λ value is 1.2;

G - The mass of water before the test, in kilograms (kg);

t_2 - The highest water temperature after the test, in degrees Celsius (℃), accurate to one decimal place;

t_1 - The initial water temperature before the test, in degrees Celsius (℃), accurate to one decimal place;

E - Power consumption, in watt-hours (W·h), accurate to two decimal places.

A.2.3 Test of warm-keeping energy consumption

When testing the warm-keeping energy consumption of the rice cooker, the initial water temperature is 23℃±2℃. The test procedure is as follows:

a) Add 80% of the rated volume of water to the inner pot;

b) Try to fix the temperature measuring thermocouple in the cylindrical space of 50 mm in the center of the inner pot, 10 mm±2 mm away from the bottom of the pot;

c) Turn on the power to heat, and when the water temperature reaches 90℃, the rice cooker is forced to enter the keep warm state. At the same time, it starts recording the time and power consumption;

d) Measure the power consumption within 5 h. Calculate the power consumption per hour as the warm-keeping energy consumption. At the same time, start measuring the temperature value at the 4th hour. Continue monitoring until the 5th hour. The temperature value in the pot during the process shall be above 60℃.

If the heating method is electromagnetic induction heating, the magnetic field will excessively affect the measurement results. The energy consumption can be determined by twisted platinum resistance or other equivalent methods.

A.2.4 Standby power test

The test method for standby power is as follows:

a) Standby power without network mode

Measure the power consumption of the rice cooker in standby mode for 4 h. The power consumption per hour is calculated as the standby power. For rice cookers with wake-up function, they shall be kept in non-wake-up mode during the test.

b) Standby power with network mode

Measure the power consumption of the rice cooker in network standby mode for 4 h. The power consumption per hour is calculated as the network standby power.

Annex B

(normative)

Test method for energy efficiency of electric pressure cookers

B.1 Test conditions

B.1.1 Test environment

Unless otherwise specified, the test shall be conducted indoors in accordance with the following environmental requirements:

a) Ambient temperature: 23°C±2°C; wind speed <0.5 m/s; no obvious influence of heating radiation;

b) Relative humidity: 45%~75%;

c) Atmospheric pressure: 98 kPa~106 kPa.

B.1.2 Power supply

The rated voltage shall be 220 V±2.2 V. The rated frequency shall be 50 Hz±1 Hz.

B.1.3 Test measuring instruments and meters

Test instruments and meters shall meet the following requirements:

a) The accuracy of voltmeter, power meter and electric energy meter shall not be less than ±0.5%;

b) The resolution of the instrument used to measure temperature is 0.1°C. The accuracy of the temperature measuring instrument shall not be less than ±0.5%;

c) The timer resolution is 0.01 s. The accuracy is ±2 s/h;

d) When the scale is at full capacity, the relative error shall not exceed ±0.1% and the minimum display (scale) value shall be 1 g;

e) Thermocouples shall use thin-wire thermocouples with a wire diameter not exceeding 0.3 mm.

B.1.4 Water

Use drinking water for tests.

B.1.5 Initial conditions of tests

Before each test, the temperature difference between the electric pressure cooker and the ambient temperature is within 5°C or the appliance is left to stand for at least 6 h.

B.2 Test methods

B.2.1 Test preparation

Preparation before testing:

a) The test is carried out under the maximum cooking pressure function specified in the instructions for use of the electric pressure cooker and at a setting where the pressure-cooking time is greater than 30 min;

b) For electric pressure cookers equipped with two or more types of inner pots, if the instructions for use clearly indicate the use of an inner pot, the test shall be conducted according to the specified inner pot;

c) The relevant testing process involved in this document shall not change or damage the structure and sealing of the electric pressure cooker.

B.2.2 Power consumption measurement

During the test, the initial water temperature is 23℃±2℃. The initial water temperature shall be consistent with the ambient temperature (temperature difference is not greater than 1℃). The test procedure is as follows:

a) Add 50% of the rated volume of water to the inner pot. Measure the initial water temperature t_1;

b) Place the temperature detection device into the inner pot. The temperature measurement point shall be immersed within 10 mm~30 mm of the water surface. Try to fix the temperature measurement point in the cylindrical space area of φ50 mm in the center of the inner pot;

c) Connect the rated voltage as specified, select the gear with the maximum steaming pressure and pressure cooking time greater than 30 min. Use the energy meter to start recording the power consumption of the electric pressure cooker;

d) When the internal cooking temperature of the electric pressure cooker reaches 100℃, start to record the temperature value continuously. Record once per second. After working continuously for 30 min, read the power consumption E. Stop recording the temperature value t. Calculate the average value $\bar{t}$ according to formula (B.3).

The energy efficiency test of electric pressure cookers can use thermocouples or real-time temperature measurement and wireless signal transmission instruments with equal or higher accuracy. When there is a dispute over the test results, the test data of real-

B.2.4 Test of warm-keeping energy consumption

When testing the warm-keeping energy consumption of electric pressure cookers, the initial water temperature is 23℃±2℃. The test procedure is as follows:

a) Add 50% of the rated volume of water to the inner pot;

b) Try to fix the temperature measuring thermocouple in the cylindrical space of φ50 mm in the center of the inner pot, 10 mm±2 mm away from the bottom of the pot;

c) Turn on the power to heat, and when the water temperature reaches 90℃, the electric pressure cooker will be forced to enter the keep warm state. At the same time, it will start recording the time and power consumption;

d) Measure the power consumption within 5 h. Calculate the power consumption per hour as the warm-keeping energy consumption. At the same time, start measuring the temperature value at the 4th hour. Continue monitoring until the 5th hour. The temperature value in the pot during the process shall be above 60℃.

If the heating method is electromagnetic induction heating of the electric pressure cooker, its magnetic field excessively affects the measurement results. The energy consumption can be determined by twisted platinum resistance or other equivalent methods.

B.2.5 Standby power test

The test method for standby power is as follows:

a) Standby power without network mode

Measure the power consumption of the electric pressure cooker in standby mode for 4 h. Then calculate the power consumption per hour as the standby power. For electric pressure cookers with wake-up function, keep them in non-wake-up mode during the test.

b) Standby power with network mode

Measure the power consumption of the electric pressure cooker in the network standby state for 4 h. Then calculate the power consumption per hour as the network standby power. For networked electric pressure cookers with wake-up function, keep them in the non-wake-up state during the test.

Annex C

(normative)

Test methods for energy efficiency of electric stew pots and electric stew cookers

C.1 Test conditions

C.1.1 Test environment

Unless otherwise specified, the test shall be carried out indoors in accordance with the following environmental requirements:

a) Ambient temperature: 23℃±2℃. Wind speed < 0.5 m/s. No obvious influence of heating radiation;

b) Relative humidity: 45%~75%;

c) Atmospheric pressure: 98 kPa~106 kPa.

C.1.2 Power supply

The rated voltage shall be 220 V±2.2 V and the rated frequency shall be 50 Hz±1 Hz.

C.1.3 Test measuring instruments and meters

Test instruments and meters shall meet the following requirements:

a) The accuracy of voltmeter, power meter and electric energy meter shall not be less than ±0.5%;

b) The resolution of the instrument used to measure temperature is 0.1°C, and the accuracy of the temperature measuring instrument is not less than ±0.5%;

c) The timer resolution is 0.01 s. The accuracy is ±2 s/h;

d) When the scale is at full capacity, the relative error shall not exceed ±0.1% and the minimum display (scale) value shall be 1 g;

e) Thermocouples shall use thin-wire thermocouples with a wire diameter not exceeding 0.3 mm.

C.1.4 Water

Use drinking water for tests.

C.1.5 Initial conditions of tests

Annex D

(normative)

Test methods for energy efficiency of electric kettles

D.1 Test conditions

D.1.1 Test environment

Unless otherwise specified, the test shall be carried out indoors in accordance with the following environmental requirements:

a) Ambient temperature: 23℃±2℃. Wind speed <0.5 m/s. No obvious influence of heating radiation;

b) Relative humidity: 45%~75%;

c) Atmospheric pressure: 98 kPa~106 kPa.

D.1.2 Power supply

It shall be carried out under the conditions of rated voltage 220 V±2.2 V and rated frequency 50 Hz±1 Hz.

D.1.3 Test measuring instruments and meters

Test instruments and meters shall meet the following requirements:

a) The accuracy of voltmeter, power meter and electric energy meter shall not be less than ±0.5%;

b) The resolution of the instrument used to measure temperature is 0.1°C. The accuracy of the temperature measuring instrument shall not be less than ±0.5%;

c) The timer resolution is 0.01 s. The accuracy is ±2 s/h;

d) When the scale is at full capacity, the relative error shall not exceed ±0.1% and the minimum display (scale) value shall be 1 g;

e) Thermocouples shall use thin-wire thermocouples with a wire diameter not exceeding 0.3 mm.

D.1.4 Water

Use drinking water for tests.

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