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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 21456-2024

Replacing GB 21456-2014

**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

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1 Scope

GB 21456-2024 is the Chinese national standard on minimum allowable values of the energy efficiency and energy efficiency grades for household and similar kitchen appliances, in the field of energy and heat transfer engineering. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 23 August 2024 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 September 2025. Classification: ICS 27.010, CCS F01. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

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 cookers and concave cookers; - Commercial microwaves, industrial microwaves and microwaves with cooker hoods.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 4706.1, Safety of household and similar electrical appliances - Part 1. General requirements

GB/T 4706.14, Safety of household and similar electrical appliances - Part 14. Particular requirements for grills, toasters and similar portable cooking appliances

GB/T 4706.19, Safety of household and similar electrical appliances - Part 19. Particular requirements for appliances for heating liquids

GB/T 4706.21, Safety of household and similar electrical appliances - Part 21. Particular requirements for microwave ovens, including combination microwave ovens

GB 4706.29, Household and similar electrical appliances - Safety - Particular requirements for portable electromagnetic cooker

GB/T 18800-2017, Household microwave oven - Methods for measuring performance

GB/T 22089, Performance requirements and measuring methods for electric kettles

GB/T 35758, Household electrical appliances - Measurement of standby power QB/T 4408,

Electric saucepans and similar appliances

2.2 V and rated frequency

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 $\pm 0.5\%$;

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 $\pm 0.5\%$;

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 $\pm 0.1\%$ 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. A.1.5 Initial conditions of tests Before each test, the temperature difference between the rice cooker and the ambient temperature is within 5°C or the appliance is left to stand for at least 6 h. A.1.6 Control device settings The test is conducted at the normal cooking function. For rice cookers with multiple cooking functions, the test is conducted at the most energy-saving cooking function specified in the instructions. When the instructions do not specify the energy-saving function and the normal cooking function, the default cooking function is used. A.2 Test methods A.2.1 Determination of heating efficiency During the test, the initial water temperature is $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The initial water temperature shall be consistent with the ambient temperature (temperature difference is not greater than 1°C). Use the weighing method to add water to the container to reach 80% of the rated volume of the container. Measure the initial water temperature t

1. Pass the thermocouple through the pot cover, which shall not affect the normal working state of the rice cooker. Try to place the thermocouple temperature measurement point in the cylindrical space area of $\phi 50$ mm in the center of the container, and the test point 10 mm $\pm$ 2 mm away from the bottom of the pot. Connect the rated voltage and use an electric meter to measure the power consumption (amount) of the appliance. When the water temperature in the container rises to 90°C , immediately cut off the power supply and read the power consumption (amount). After the power is cut off, due to the heat capacity and hysteresis of the heating device, the water temperature in the container will rise after the power is cut off. Observe and read the highest temperature value t_2 after 1 min of power off. A.2.2 Calculation of heating efficiency The heating efficiency of the rice cooker is calculated according to formula (A.1). Where, η - Heating efficiency of the rice cooker, accurate to

one decimal place; c - Specific heat capacity of water, taking 4.1875, in kilojoule per kilogram Celsius [$\text{kJ}/(\text{kg}\cdot^{\circ}\text{C})$]; λ - Correction coefficient. For products with electromagnetic induction heating, the λ value is 1.15; for products with electric heating elements, the λ value is 1.0; for products 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 ($^{\circ}\text{C}$), accurate to one decimal place; t_1 - The initial water temperature before the test, in degrees Celsius ($^{\circ}\text{C}$), 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 $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$. 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, $10\text{ mm}\pm 2\text{ mm}$ away from the bottom of the pot;
 - c) Turn on the power to heat, and when the water temperature reaches 90°C , 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°C . 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.

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB 4706.1, GB 4706.14, GB 4706.19, GB 4706.21, GB 4706.29, GB/T 18800-2017, GB/T 22089, GB/T 35758 and QB/T 4408 as well as the followings apply.

3.1 heating efficiency The ratio of effective energy output to input energy of kitchen appliances.

3.2 standby mode (s) Any mode of the kitchen appliance that provides one or more of the