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Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Household and Similar Microwave Ovens

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB 24849-2010, *Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Household and Similar Microwave Ovens*. Compared with GB 24849-2010, the major changes are as follows, in addition to editorial changes:

-- the definition of efficiency for microwave ovens is added (see 3.1);

-- the off mode (see 3.4; 3.5 of edition 2010) and standby mode (see 3.5; 3.4 of edition 2010) are redefined;

-- the basic requirements are deleted (4.1 of edition 2010);

-- the definition of and requirements for “evaluating values of energy conservation” are deleted (3.2 and 4.7 of edition 2010);

-- the calculation formula of microwave ovens is moved to the text part (Article 4; A.2.2 of edition 2010);

-- the energy efficiency grades are adjusted from 5 energy efficiency grades in the original standard to 3 energy efficiency grades (see 4.1; 4.2 of edition 2010);

-- the expression of heating time t in the calculation formula of efficiency for microwave ovens (see 4.2) and the determination method for heating time (see A.2.1) are explained;

-- the method for the determination of the geometrical centre of the chamber of microwave ovens is added (see B.3);

-- the test methods for the off-mode power and standby-mode power are modified (see Annex C; Annex C of edition 2010).

This Standard was proposed by the National Development and Reform Commission Resource Saving and Environmental Protection Department and the Ministry of Industry and Information Technology Energy Saving and Comprehensive Utilization Department.

This Standard shall be under the jurisdiction of the National Standardization Technical Committee on Energy Base and Management (SAC/TC 20).

The drafting organizations of this Standard: China National Institute of Standardization, Guangdong Midea Kitchen Appliances Manufacturing Co., Ltd., China Household Electric Appliance Research Institute, China Standard Certification (Beijing) Co., Ltd., Ningbo Fotile Kitchen Ware Co., Ltd., Hangzhou Robam Electrical Appliances Co., Ltd., Guangdong Glanz Group Co., Ltd., Panasonic Appliances Microwave Oven (Shanghai)

Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Household and Similar Microwave Ovens

1 Application Scope

This Standard specifies the minimum allowable values of energy efficiency, efficiency grades, test methods and inspection rules for household and similar microwave ovens (hereinafter referred to as microwave ovens).

This Standard applies to microwave ovens of maximum rated input power 2 500 W and below, including combination microwave ovens, which heat materials and foods in the chamber with the electromagnetic energy of ISM frequency band, 2450 MHz, and resistive electrical heating elements.

This Standard does not apply to commercial microwave ovens, industrial microwave ovens and microwave ovens with range hoods.

NOTE ISM frequency band is the electromagnetic frequency range which was decided by the International Telecommunications Union (ITU) and adopted in the standard numbered CISPR 11. The standard was developed by the International Special Committee on Radio Interference (CISPR).

2 Normative References

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

GB 4706.21, *Household and Similar Electrical Appliances – Safety – Particular Requirements for Microwave Ovens Including Combination Microwave Ovens*

GB/T 18800, *Household Microwave Oven – Methods for Measuring Performance*

IEC 62301, *Household Electrical Appliances – Measurement of Standby Power*

3 Terms and Definitions

For the purposes of this document, the following terms and definitions and those defined in GB 4706.21, GB/T 18800 and IEC 62301 apply.

Annex A

(Normative)

Test Method for Efficiency for Microwave Ovens

A.1 Test conditions

A.1.1 Test environment

The test shall be conducted in a site: there is no forced-convection air; the environmental temperature is 20°C ± 5°C; the relative humidity is 45% ~ 75%.

A.1.2 Test power supply

The microwave ovens to be tested are powered at the voltage 220 × (1 ± 1%) V and the frequency 50 × (1 ± 1%) Hz; the total harmonic distortion shall not be greater than 5%.

NOTE When the microwave ovens to be tested are started and stay in the microwave heating mode, the above sinusoidal wave test voltage shall be maintained.

A.1.3 Measuring apparatus

When water temperature is measured, the accuracy of the temperature measuring system used shall be ± 0.5°C within the temperature range of 0°C ~ 50°C.

The accuracy of voltmeter and wattmeter is ± 1%.

The accuracy of electronic balance is ± 1%.

The accuracy of timer is ± 1%.

A.1.4 Arrangement of microwave ovens to be tested

The microwave ovens to be tested shall be placed on a horizontal platform of plywood, which is about 20 mm in thickness and coated with matt black paint.

A.1.5 Initial conditions of microwave ovens to be tested

Before the test is started, the microwave ovens are stored without operating in the environment for at least 6 h at the temperature of 20°C ± 5°C.

NOTE 1 If the deviation of the temperature of magnetron and transformer from the environmental temperature is within 2 K, then the storage time of at least 6 h can be reduced accordingly.

NOTE 2 The method of forced cooling may be used to assist the reduction of the temperature

Annex B

(Normative)

Test Method for Energy Consumption for Grill-function

B.1 Test conditions

B.1.1 Test environment

The test shall be conducted in a site: there is no forced-convection air; the environmental temperature is 20°C ± 5°C; the relative humidity is 45% ~ 75%.

B.1.2 Test power supply

The microwave ovens to be tested are powered at the voltage 220 × (1 ± 1%) V and the frequency 50 × (1 ± 1%) Hz; the total harmonic distortion shall not be greater than 5%.

NOTE When the microwave ovens to be tested are started and stay in the grill heating mode, the above sinusoidal wave test voltage shall be maintained.

B.1.3 Measuring apparatus

When water temperature is measured, the accuracy of the temperature measuring system used shall be ± 1°C within the temperature range of 0°C ~ 300°C.

The accuracy of the voltmeter, wattmeter and electrical energy meter is ± 1%.

The accuracy of the timer is ± 1%.

B.1.4 Arrangement of microwave ovens to be tested

Built-in and wall-mounted microwave ovens shall be mounted as specified in the instructions to installation. The location of other microwave ovens shall ensure that their back is as close as possible to the wall of test corner and far from the other wall.

The microwave ovens intended to be used on the floor shall be placed on the base plate of test corner, as close to the two walls of test corner as possible.

B.1.5 Initial conditions for microwave ovens to be tested

Before the test is started, the microwave ovens are stored without operating in the environment for at least 6 h at the temperature of 20°C ± 5°C.

NOTE 1 If the deviation of the temperature of magnetron and transformer from the environmental temperature is within 2 K, then the storage time of at least 6 h can be reduced accordingly.

Annex C

(Normative)

Test Method for Off-mode and Standby-mode Power of Microwave Ovens

C.1 Test conditions

C.1.1 Test environment

The test shall be conducted in a site: there is no forced-convection air; the environmental temperature is 20°C ± 5°C; the relative humidity is 45% ~ 75%.

C.1.2 Test power supply

The microwave ovens to be tested are powered at the voltage 220 × (1 ± 1%) V and the frequency 50 × (1 ± 1%) Hz; the total harmonic distortion (including 2 ~ 3 harmonic waves) shall not be greater than 2%; the ratio of the peak value to the effective value of voltage (i.e. the crest factor) is between 1.34 ~ 1.49.

C.1.3 Measuring apparatus

The accuracy of voltmeter shall be ± 1%.

The accuracy of wattmeter and electrical energy meter shall not be greater than 0.01 W.

The accuracy of timer shall be ± 1%.

C.1.4 Arrangement of microwave ovens to be tested

The microwave ovens to be tested shall be placed on a horizontal platform of plywood, which is about 20 mm in thickness and coated with matt black paint.

C.1.5 Initial conditions for microwave ovens to be tested

Before the test is started, the microwave ovens are stored without operating in the environment for at least 6 h at the temperature of 20°C ± 5°C.

NOTE 1 If the deviation of the temperature of magnetron and transformer from the environmental temperature is within 2 K, then the storage time of at least 6 h can be reduced accordingly.

NOTE 2 The method of forced cooling may be used to assist the reduction of the temperature of microwave ovens; under such circumstances, the storage time of the microwave ovens can be reduced accordingly.

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