

JIS

JAPANESE INDUSTRIAL STANDARD

Electric Rice-Cookers and Electric Rice-Warmers

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Electric Rice-Cookers and Electric Rice-Warmers

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1. Scope

This Japanese Industrial Standard specifies electric rice-cookers and electric rice-cooker/warmer of the maximum capacity not exceeding 3.6 l and a rated power consumption not exceeding 2 kW, and electric rice-warmer of a rated power consumption not exceeding 100 W mainly used for household.

Remark: The units and numerical values given in { } in this Standard are based on the traditional unit system and are appended as the informative references.

2. Definitions

For the purpose of this Standard the following principal definitions apply:

- (1) electric rice-cooker An appliance which mainly cooks rice by utilizing electric heat. Rice-cookers which have the function to keep the rice warm for a short period are included.
- (2) electric rice-warmer An appliance which keeps boiled rice warm in such means that the container of rice covered by heat reserving materials are heated by a heat emitting semiconductor of positive characteristic or by a heating element and the temperature is controlled by an electric component or circuit.
- (3) electric rice-cooker/warmer An electric rice-cooker which has also warming function of a rice-warmer.
- (4) maximum rice-cooking capacity The maximum capacity of rice which can be cooked by a rice-cooker or a rice-cooker/warmer in one operation (1).
- (5) maximum rice-warming capacity The maximum capacity of rice before cooking which, after cooked, can be contained in the inner container of a rice-warmer and kept warm in one operation (1).
- (6) direct heating system Such a system of cooking rice that the rice and water are placed in an inner pot and directly heated.
- (7) indirect heating system Such a system of cooking rice that the rice and water are placed in an inner pot, water of a certain quantity is placed between the inner pot and outer pot, and the inner pot is indirectly heated.
- (8) outer case The part of an appliance excluding the lid, and inner pot or inner container.
- (9) appliance body The generic name of the outer case, lid and inner pot or container.

Applicable Standards: See page 30.

- (10) inner pot A removable container in which rice and water are placed of an electric rice-cooker or electric rice-cooker/warmer.
- (11) outer pot A container in which the inner pot of indirect heating system is placed.
- (12) inner container A removable container for boiled rice.

3. Classification

Electric rice-cookers and electric rice-warmers are classified into the three kinds according to their function as given below.

- (1) Electric rice-cooker
- (2) Electric rice-warmer
- (3) Electric rice-cooker/warmer

4. Rated Voltage

The rated voltage shall be single-phase a.c. 100 V.

5. Performances

5.1 Voltage Fluctuation The appliances shall be capable of being used without any practical trouble when tested by the method of 8.2.

5.2 Power Consumption When the test of 8.3 is carried out, the difference between the measured power consumption and the rated power consumption shall fall within the appropriate values given in Table 1.

Table 1. Tolerance on Power Consumption

Unit: %

Rated power consumption	Tolerance
Up to and including 20 W ⁽¹⁾	+ 20
Over 20 W up to and including 100 W	± 15
Over 100 W up to and including 1 kW	± 10
Over 1 kW	± 5

Note ⁽¹⁾ This is applicable to electric rice-warmers.

5.3 Insulation Performance

5.3.1 Insulation Resistance The insulation resistance shall be not less than 1 MΩ when tested by the method of 8.4.1.

5.3.2 Dielectric Withstand Voltage When the test is carried out as specified in 8.4.2, the specimen shall withstand the test voltage.

5.3.3 Insulation Resistance at Water Overflow This insulation resistance shall comply with the requirements given below. However, appliance with removable inner pot or container is exempted from the requirements.

- (1) The insulation resistance shall be not less than $0.3\text{ M}\Omega$ when the test is carried out as specified in 8.4.3 (1).
- (2) The insulation resistance shall be not less than $1\text{ M}\Omega$ when the test is carried out as specified in 8.4.3 (2).

5.3.4 Insulation Resistance at Water Pouring The insulation resistance shall be not less than $0.3\text{ M}\Omega$ when an electric rice-cooker or electric rice-cooker/warmer of direct heating system with a removable inner pot is tested as specified in 8.4.3 (3).

5.3.5 Insulation Property under Damp This property shall comply with the following requirements:

- (1) The insulation resistance shall be not less than $1\text{ M}\Omega$ when the test is carried out as specified in 8.4.4 (1).
- (2) The specimen shall withstand the test voltage when the test is carried out as specified in 8.4.4 (2).

5.3.6 Leakage Current The leakage current shall be not more than 1 mA when tested as specified in 8.4.5.

5.4 Temperature

5.4.1 Normal Temperature When electric rice-cookers and electric rice-cooker/warmers are tested as specified in 8.5.1 and 8.5.2, and electric rice-warmers are tested as specified in 8.5.2, the temperature at each part shall not exceed the appropriate value given in Table 2.

Table 2. Temperature Limit

Unit: °C

Measurement position		Temperature
Handles for transfer (excluding ones operated by a man during on-current state)	Made of metals, ceramics and glass	65
	Made of others	80
Knob of switch ⁽²⁾ and push button	Made of metals, ceramics and glass	60
	Made of others	75
Handle operated by a man during warming ⁽³⁾	Made of metals, ceramics and glass	55
	Made of others	70
Surface of wooden board on which specimen is placed		95
Rectifier	Made of silicon	135
Winding	Class A insulation	100
	Class E insulation	115
	Class B insulation	125
	Class F insulation	150
	Class H insulation	170
Surface of cord and each layer of wire in cord reel mechanism	p.v.c. mixture (excluding heat resistant ones) and natural rubber mixture	60
	p.v.c. mixture (heat resistant ones only), styrene-butadiene rubber mixture and chloroprene rubber mixture.	75
	Silicone rubber mixture, ethylene-propylene rubber mixture and chlorosulfonic polyethylene rubber mixture	90

Notes ⁽²⁾ Applicable to knob of lid made of synthetic resin only (excluding knob of inner lid).

⁽³⁾ Applicable at the time of test for normal temperature at warming.

Remark: The reference ambient temperature is 30°C.

5.4.2 Abnormal Temperature When the tests are carried out as specified in 8.5.3 and 8.5.4, the electric rice-cooker, electric rice-cooker/warmer, electric rice-warmer and the wooden base shall not burn.

Further, the insulation resistance between the live parts and dead parts liable to cause earth fault shall be not less than 0.1 MΩ.

5.5 Automatic Switch When the test is carried out as specified in 8.6, the automatic switch shall show no abnormality at any part and show such characteristics that the average temperature at which the circuit opens in the test of 8.6 (2) carried out before the test of 8.6(1) falls within $\pm 10^{\circ}\text{C}$ from the set temperature, and that the average temperature at which the circuit opens in the test of 8.6 (2) carried out after the test of 8.6 (1) shall fall within $\pm 5^{\circ}\text{C}$ from the value measured before the test for ones with temperature setting of less than 100°C or within $\pm 5\%$ for temperature setting of 100°C or over.

5.6 Thermostat When the test is carried out as specified in 8.7, the thermostat shall show no abnormality at any part, and shall comply with the following requirements:

- (1) In the test of 8.7 (2) carried out before the test of 8.7 (1), the average value of the average temperature at which the circuit opens and the average temperature at which the circuit closes shall fall within $\pm 5^{\circ}\text{C}$ from the set temperature for the ones with a temperature setting of less than 100°C , within $\pm 5\%$ for the ones with a setting of 100°C to 200°C and within $\pm 10^{\circ}\text{C}$ for the ones with a setting of over 200°C .
- (2) In the test of 8.7 (2) carried out after the test of 8.7 (1), the average value of the average temperature at which the circuit opens and the average temperature at which the circuit closes shall fall within $\pm 5^{\circ}\text{C}$ from the value measured before the test of 8.7 (1) for the ones with a temperature setting of less than 100°C and within $\pm 5\%$ for the ones with a temperature setting of 100°C or over.

5.7 Thermal Fuse When the test is carried out as specified in 8.8, the operating temperature measured shall fall within $\pm 7^{\circ}\text{C}$ from the rated operating temperature, if the rated operating temperature is less than 200°C and within $\pm 10^{\circ}\text{C}$ if the rating is 200°C or more.

5.8 Rice-Cooking Performance

5.8.1 Rice Cooking When the test is carried out as specified in 8.9.1, the rice shall be cooked without half boiling, remarkable uneven boiling, remarkable scorch or soaking.

5.8.2 Boiling Over When the test is carried out as specified in 8.9.2, the sticky over boiled liquid shall not drip on the base and also shall not cause electrical trouble by entering electrical components such as switches.

5.9 Rice-Warming Performance

5.9.1 Rice-Warming Temperature The rice-warming temperature shall satisfy the following requirements:

- (1) When electric rice-cookers equipped with warming mechanism are subjected to the warming test of 8.10.1, the temperature of boiled rice shall be not less than 80°C and there shall be no remarkable progress of scorching.
- (2) When the rice-warming test is carried out on electric rice-cooker/warmers as specified in 8.10.2 (1), and on electric rice-warmers as specified in 8.10.2 (2), the temperatures at various measurement positions on boiled rice shall be 67 to 78°C, and there shall be no remarkable progress of scorching, nasty smell, nor remarkable browning.

5.9.2 Uneven Rice-Warming Temperature When the rice-warming test is carried out on electric rice-cooker/warmers as specified in 8.10.2 (1), and on electric rice-warmers as specified in 8.10.2 (2), the difference, in temperature at each point, between the average value of the maximum and minimum values measured and each measured value shall be within 1.5°C.

5.10 Endurance of Electric Heating Wire The electric heating wire shall not break when tested as specified in 8.11.

5.11 Endurance of Lid Opening and Closing Mechanism The electric rice-cooker/warmer and electric rice-warmer shall be capable of being used without practical trouble, when their opening and closing mechanisms are tested as specified in 8.12.

5.12 Endurance of Cord Reel Mechanism When the test is carried out as specified in 8.13, the rate of broken component wires shall not exceed 20 %, and no short circuit shall occur.

5.13 Flexure of Cord Joint The cord joint shall comply with the following requirements:

- (1) When the joint of cord and the appliance body is tested on an appliance without cord reel mechanism as specified in 8.14 (1), the rate of broken component wires shall not exceed 20 % and no short circuit shall occur.
- (2) When the joint of cord in a non-rewirable attachment plug with cord is tested as specified in 8.14 (2), the rate of broken component wires shall not exceed 20 % and no short circuit shall occur.

5.14 Resistance to Impact by Fall The specimen shall comply with the requirements prescribed below immediately after subjected to the test of 8.15. However, appliances exceeding 4 kg in mass are exempted from the requirements.

- (1) No live parts shall be exposed. However, exposure of live parts in such a degree that the live parts are not touched by the test finger when tested with the test finger shown in Attached Figure is an exception.
- (2) No short circuit shall appear when the appliance is connected with the power supply.
- (3) The insulation resistance between the live parts and dead metal parts liable to cause earth fault or accesible by a man shall be not less than 0.1 MΩ when measured with a d.c. 500 V insulation resistance tester.

5.15 Flame Retardance of Heat Reserving Materials and Heat Insulating Materials
When the heat reserving materials, heat insulating materials or the like to be inserted in the vicinity of electrical components are tested as specified in 8.16, the specimen shall not burn out after removal of the test flame and the duration of flaming until extinction shall not exceed 10 s. However, when there is no possibility of risks of electric shock or fire even if the heat reserving materials, heat insulating materials or the like burn such a case is an exception.

6. Construction

6.1 Construction in General The construction of appliance shall comply with the following requirements:

- (1) The appliance shall not cause any hazard under normal service conditions, shall have enough endurance and correct shape, and shall be good in assembling and smooth in operation.
- (2) The appliance shall not tumble when the appliance body is inclined from the horizontal plane through an angle of 10 degrees under normal service conditions.
- (3) The parts of metallic cover or box to which the arc may reach due to opening or closing of the switch, shall be lined with an arc resistant electrical insulating material.
- (4) The parts which might cause such risks as burning of the components and exposure of the live parts due to moisture absorption shall be treated moisture proof.
- (5) An appliance which might cause hazards due to temperature rise shall be equipped with a temperature limiter (including a thermal fuse) which does not operate under normal service conditions.
- (6) Appliances with synthetic resin enclosure, (excluding the one requiring translucency, transparency, flexibility or mechanical strength for its functions) shall not burn when tested in such a way that a square plane of 9 cm² or more of the outside surface of enclosure (a specimen cut into a square with one side length of 3 cm leaving the original thickness as it is, if there is no square plane of 9 cm² or more on the enclosure) is inclined by about 45 degrees to the horizontal, the tip of flame about 20 mm long produced by burning LP gas of class 1 No. 1 specified in JIS K 2240 using a gas burner having a nozzle of inside diameter 0.5 mm with the air inlet closed is applied to the central part of the above surface from the bottom vertically for 5 s and then removed.
- (7) The insulating materials used as the enclosure, and the pilot lamps, fuse holders, similar components together with their protective covers exposed on the outside surface of appliance body shall not cause cracked splits or other abnormalities which may result in risks of electric shock, fire, etc., when a weight of 250 g in mass having a hemispherical polyamide-processed surface of 10 mm radius with a Rockwell hardness HRR 100 specified in JIS K 7202, is dropped thereon from a height of 20 cm, or the equivalent impact force is applied by means of a device having the same hemispherical surface.

- (7) However, pilot lamps, fuse holders, similar components and their protective covers which are not exceeding 4 cm² in surface area and not projecting 10 mm or more from the surface of enclosure of the appliance body are exempted from the above requirements.
- (8) The appliance shall be equipped with a measure e.g. a pilot lamp by which the state of rice cooking (including rice-warming state for electric rice-cookers and electric rice-cooker/warmer; rice-warming state for electric rice-warmer) is understood.
- (9) An appliance which controls the temperature by use of semiconductor elements shall not cause burning of the components connected to the control circuits when the semiconductor elements lose their control ability.
- (10) Appliances shall be so constructed that water drops produced from steam under normal service conditions will not fall on the switch, connector, cord, etc. attached to the appliance body. However, if the above components have waterproof construction or do not cause hazards of electric shock, fire, etc. such a case is an exception.
- (11) If some parts of appliance body are attached and/or detached such operations can be done easily, surely and safely.
- (12) The strength of noise generated shall comply with the following requirements:
 - (12.1) The noise power shall be not more than 55 dB in a frequency range of 30 MHz to 300 MHz when measured with absorbing clamp. In this case, the dB means the value calculated assuming 1 pW to be 0 dB.
 - (12.2) The noise terminal voltage, measured between one line and the earth, shall comply with the following requirements:
 - (a) The continuous noise terminal voltage shall not exceed the value given in the right column of Table 3 in correlation with the frequency range given in the left column of the same table. In this case, the dB means the value calculated assuming 1 μ V to be 0 dB (same in (b) below).

Table 3. Continuous Noise Terminal Voltage

Unit: dB

Frequency range	Continuous noise terminal voltage
526.5 kHz or over up to and including 5 MHz	56
Over 5 MHz up to and including 30 MHz	60

- (b) The discontinuous noise terminal voltage shall not exceed the sum of the appropriate value in Table 3 and the appropriate correction value in Table 4.

Table 4. Correction Value

Unit: dB

Click factor	Correction value
Under 0.2	44
0.2 or over up to and including 30	$20 \log_{10} \frac{30}{n}$

Remark: n = click factor

- (13) The inner pot and inner container shall be well finished, shall not deform or be damaged remarkably and shall be so constructed that the cleaning can be done easily.
- (14) Appliances shall not cause mechanical or electrical trouble during service due to loosening of components and so on.

6.2 Live Part Live parts shall comply with the following requirements:

- (1) The live parts shall not touch the test finger shown in Attached Figure with the easily removable parts removed. The force to be applied to the test finger in this examination shall be 10 N {1 kgf} for the bottom face and 30 N {3 kgf} for outside face and opening.
- (2) The insulation distances between live parts of different polarity and between live parts and dead metal parts liable to cause earth fault or accessible surfaces of non-metallic parts shall be as given in Table 5 in relation with the part of appliance body. However, the insulation distances which comply with the following requirements as the test results are excluded.
 - (a) When live parts of different polarity is short-circuited, components connected to the shorted circuits shall not burn. However, if the burning of the said components does not result in burning of other parts such a case is allowed.
 - (b) When live parts of different polarity are connected together or live parts are connected to accessible dead metal parts the voltage to earth of the dead metal parts and the voltage to earth and the voltage between lines of the exposed live parts shall not exceed 30 V in the case of a.c. or 45 V in the case of d.c.; or alternately if a resistor of 1 k Ω is connected between live parts and the earth, between lines, and between the dead metal parts and live parts, the current flows through the resistor in any case shall not exceed 1 mA except such a case that there is no risk of electric shock at a frequency not less than the power frequency.