

# JIS

JAPANESE INDUSTRIAL STANDARD

Electric Pots

JIS C 9213-1988

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Translated

by

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## 1. Scope

This Japanese Industrial Standard specifies electric pots intended mainly for household use having a rated power consumption not exceeding 1.5 kW and consisting of a container and an integrated heating element, hereinafter referred to as the "pots". However, exposed electric heating wire type and electrode type ones are excluded.

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

## 2. Definitions

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

- (1) appliance body The generic name of the main body and the lid of appliance.
- (2) main body A portion of the appliance body not including the lid.
- (3) container A portion of the main body which contains water.
- (4) lid (upper lid) A portion of a pot which belongs the main body and functions as a means to open and close a part of the enclosure.
- (5) intermediate plug A portion of a pot the function of which is to close the opening of the container.
- (6) water pouring mechanism A portion of a pot which has such a function that the hot or cold water in the container can be poured by means of air pressure or the like without lifting or inclining the main body.

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### Applicable Standards:

- JIS C 2520-Wires and Rolled Wires for Electrical Heating
- JIS C 3301-Rubber Insulated Flexible Cords
- JIS C 3306-Polyvinyl Chloride Insulated Flexible Cords
- JIS C 3312-600 V Grade Polyvinyl Chloride Insulated and Sheathed Portable Power Cables
- JIS C 3327-600 V Rubber Insulated Flexible Cables
- JIS C 8303-Plugs and Receptacles for Domestic and Similar General Use
- JIS C 8304-Small Switches for Indoor Use
- JIS C 8358-Appliance Couplers for Domestic and Similar Use
- JIS G 3555-Woven Wire Cloth
- JIS K 2240-Liquefied Petroleum Gases
- JIS K 5400-Testing Methods for Organic Coatings
- JIS K 7202-Method of Rockwell Hardness Test for Plastics
- JIS S 6006 -Pencils and Coloured Pencils

### Corresponding International Standards:

- IEC 335-2-15 Safety of household and similar electrical appliances. Part 2 : Particular requirements for appliances for heating liquids
- IEC 530 Methods for measuring the performance of electric kettles and jugs for household and similar use

3. Classification

Pots are classified as given in Table 1.

Table 1. Classification

Class	Type	Water pouring system	Remark	
Normal pot	General type	Water is poured in such a way that the handle equipped on the pot is gripped and then the pot is inclined.	Appliances which can not continuously maintain the water temperature at a constant temperature (below the boiling temperature).	
	Drip type	Water is poured in such a way that a cock is provided in the bottom of container and water is naturally dripped by opening the cock.		
Auto-automatic pot	General type	Water is poured in such a way that the handle equipped on the pot is gripped and then the pot is inclined.	1 Appliances which can continuously maintain the water temperature at a constant temperature (below the boiling temperature). 2 There are two kinds of temperature setting, one is fixed and the other is variable.	
	Drip type	Water is poured in such a way that a cock is provided in the bottom of container and water is naturally dripped by opening the cock.		
	Pump type	by air pressure (manual) <sup>(1)</sup>		Water is poured by means of a manually operated water pouring mechanism.
		by air pressure (motor operated) <sup>(2)</sup>		Water is poured by means of a motor driven water pouring mechanism.
by pumping up (motor operated) <sup>(3)</sup>		Water is poured by means of a motor driven suction pump.		

Notes <sup>(1)</sup> This is a pot having a water pouring mechanism which utilizes air pressure, for pouring water, in such a way that water surface is pressed by the compressed air in the bellows produced by operation of the push plate or lever.

<sup>(2)</sup> This is a pot having a water pouring mechanism which utilizes air pressure, for pouring water, in such a way that water surface is pressed by the compressed air in the bellows produced by telescopic motion of the bellows driven by the motor which is started by pushing of the push-button switch.

<sup>(3)</sup> This is a pot which utilizes a motor driven suction pump, for pouring water, in such a way that water is pumped up by a suction pump driven by a motor which is started by pushing of the push-button switch.

4. Rated Voltage

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

5. Performances

5.1 Voltage Fluctuation Characteristic There shall be no trouble detrimental to practical service when the test is carried out in accordance with the method of 8.2.

5.2 Power Consumption When the test is carried out as specified in 8.3, the difference between the measured power consumption and the rated power consumption shall fall within the values given in Table 2. The measurement specified in 8.3 shall be carried out with the motor operated, for a specimen which is equipped with a motor and running of the motor is possible during the test of 8.3.

Table 2. Tolerances on Power Consumption

Unit: %	
Rated power consumption	Tolerances
Up to and including 1 kW	± 10
Over 1 kW	± 5

5.3 Insulation Performances

5.3.1 Insulation Resistance The insulation resistance shall be 1 MΩ or more when the test is carried out as specified in 8.4.1.

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

5.3.3 Insulation Resistance at Water Overflow The insulation resistance at water overflow shall comply with the following requirements:

- (1) The insulation resistance shall be not less than 0.3 MΩ when measured in accordance with the method of 8.4.3 (1).
- (2) The insulation resistance shall be not less than 1 MΩ when measured in accordance with the method of 8.4.3 (2).

5.4 Temperature

5.4.1 Normal Temperature When the normal temperature is measured in accordance with the method of 8.5.1, the temperature of any part shall not exceed the appropriate value given in Table 3.

Table 3. Temperature Limits

Measurement position		Unit: °C
		Temperature
Handle for transport	Made of metals, ceramics or glass	65
	Made of others	80
Knob and push button of switch	Made of metals, ceramics or glass	60
	Made of others	75
Handle operated by a man during service	Made of metals, ceramics or glass	55
	Made of others	70
Surface of wooden base on which specimen is placed		95
Rectifier	Made of silicon	135
Winding	Of Class A insulation	100
	Of Class E insulation	115
	Of Class B insulation	125
	Of Class F insulation	150
Cord	Of Class H insulation	170
	Of p.v.c. mixture (excluding heat resistant ones) and of natural rubber mixture	60
	Of p.v.c. mixture (heat resistant ones only), of styrene-butadiene rubber mixture and of chloroprene rubber mixture	75
	Of silicon rubber mixture, of ethylene-propylene rubber mixture and of chlorosulfonized polyethylene rubber mixture	90

Remark: The reference ambient temperature is 30°C.

**5.4.2 Abnormal Temperature** When the test is carried out as specified in 8.5.2, the pot or the wooden base shall not burn, and the insulation resistance between live parts and dead metal parts liable to be earthed measured with a d.c. 500 V insulation resistance tester shall be not less than 0.1 MΩ.

**5.5 Automatic Switch** When the test is carried out as specified in 8.6, the specimen shall show no abnormality at any part, the average value of the temperatures at which the circuit opens in the test of 8.6 (2) carried out before the test of 8.6 (1) shall fall within  $\pm 10^{\circ}\text{C}$  from the set temperature, and the average value of the temperatures 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 measured value before the test for appliances with a temperature setting less than  $100^{\circ}\text{C}$ , or fall within  $\pm 5\%$  for appliances with a setting  $100^{\circ}\text{C}$  or more.

**5.6 Performances of Thermostat and Self-resetting Temperature Limiter** When the test is carried out as specified in 8.7, the following requirements shall be complied with:

- (1) **Make-Break Property** No abnormality shall appear at any part.
- (2) **Operating Temperature** The operating temperature shall comply with Table 4.

Table 4. Permissible Range of Operating Temperature

Classification		Permissible range
Before make-break test	Thermostat	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 appliances with a temperature setting of less than $100^{\circ}\text{C}$ , within $\pm 5\%$ for the ones with setting of $100^{\circ}\text{C}$ to $200^{\circ}\text{C}$ incl., and within $\pm 10^{\circ}\text{C}$ for the ones with a setting of over $200^{\circ}\text{C}$ .
	Self-resetting temperature limiter	The average value of temperatures at which the circuit opens shall fall within $\pm 15^{\circ}\text{C}$ from the set temperature.
After make-break test	Thermostat	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 make-break test for appliances with a temperature setting of less than $100^{\circ}\text{C}$ and within $\pm 5\%$ from the value before test, for the ones with a setting of $100^{\circ}\text{C}$ or more.
	Self-resetting temperature limiter	The average value of temperatures at which the circuit opens shall fall within $\pm 5^{\circ}\text{C}$ from the value measured before the make-break test for appliances with a temperature setting of less than $100^{\circ}\text{C}$ , and within $\pm 5\%$ from the value before test for the ones with a setting of $100^{\circ}\text{C}$ or more.

**5.7 Performance of Non-self-resetting Temperature Limiter** When the test is carried out as specified in 8.8, the following requirements shall be complied with:

- (1) **Make-Break Property** No abnormality shall appear at any part.
- (2) **Operating-Temperature** The operating temperature shall comply with Table 5.

Table 5. Permissible Range of Operating Temperature

Classification	Permissible range
Before make-break test	The average value of temperatures at which the circuit opens shall fall $\pm 15^{\circ}\text{C}$ from the set temperature.
After make-break test	The average value of temperatures at which the circuit opens shall fall within $\pm 5^{\circ}\text{C}$ from the temperature set before the make-break test for appliances with a temperature setting less than $100^{\circ}\text{C}$ , and within $\pm 5\%$ for the ones with a setting of $100^{\circ}\text{C}$ or more.

5.8 Thermal Fuse When the test is carried out as specified in 8.9, the measured temperature shall fall within  $\pm 7^{\circ}\text{C}$  from the rated operating temperature for the ones with rated operating temperature less than  $200^{\circ}\text{C}$  and with  $\pm 10^{\circ}\text{C}$  for the ones with a rating of  $200^{\circ}\text{C}$  or more.

5.9 Guarantee of Water Temperature When the test is carried out as specified in 8.10, the measured value shall be not less than  $85^{\circ}\text{C}$ , and the minimum value, if there is, shall be not less than  $80^{\circ}\text{C}$ .

5.10 Efficiency When the test is carried out as specified in 8.11, the measured efficiency shall be not less than 75 %.

5.11 Water Flow at Tumble When an automatic pots of pump type is subjected to the test of 8.12, the volume of water flows out shall not exceed 50 ml in each of lateral direction and rear direction.

5.12 Endurance of Heating Wire for Boiling When the test is carried out as specified in 8.13, the heating wire shall not break.

5.13 Endurance of Container When the test is carried out as specified in 8.14, there shall be no holes through which water leaks.

#### 5.14 Flexure of Cord Joint

- (1) When the joint between appliance body and cord is test as specified in 8.15 (1), an appliances without cord reel mechanism, the rate of broken component wires shall not exceed 20 % and no short circuit shall appear.
- (2) When the joint of cord and non-rewirable plug is tested as specified in 8.15 (2), the rate of broken component wires shall not exceed 20 % and no short circuit shall appear.

5.15 Resistance to Falling Shock The pot shall comply with the requirements given below immediately after subjected to the falling test specified in 8.16. However, this test is not carried out on a pot of 4 kg or more in mass of appliance body.

- (1) The live parts shall not be exposed. However, exposure of such degree that the live parts do not come in contact with the test finger when tested by the test finger illustrated in Attached Figure is an exception.
- (2) No short circuit shall occur when the appliance is connected to the power source.
- (3) The insulation resistance between the live parts and dead metal parts liable to be earthed measured by a d.c. 500 V insulation resistance tester shall be not less than  $0.1\text{ M}\Omega$ .

5.16 Flame Retardance of Heat Reserving and Heat Insulating Materials When heat reserving and heat insulating materials to be stuffed near the electrical parts are tested in accordance with the method of 8.17, they shall not burn out after removal of test flame and the time until extinction of flame shall not exceed 10 sec. However, if there is no risks of electric shock, fire, etc. even when the heat reserving or the heat insulating material burn, such a case is an exception.

## 6. Construction

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

- (1) The appliance body shall have no possibility of causing any hazard under normal service conditions, enough endurance and correct shape, shall be assembled well, and shall operate smoothly.
- (2) The part of metal cover or box to which arc may reach when the switch is opened or closed shall be lined with arc resistant insulating materials.
- (3) Moisture proof treatment shall be applied to the part moisture absorption of which may result in risks of burning of component, exposure of live parts, etc.
- (4) A pot which may cause any hazard due to temperature rise shall be equipped with a temperature limiter and the limiter shall not operate under normal service conditions.
- (5) If a connector is used for connection of appliance body and cord, the connecting operation can be done easily, surely and safely.

- (6) In a pot equipped with a switch, the on-off operation or state shall be marked on an easily visible position by means of letter, symbol, colour or light. However, ones in which the marking is difficult are exempted from the above requirement.
- (7) Pots having synthetic resin enclosure (the portions which require translucency or transparency, or flexibility, mechanical strength, etc. for their function are excluded.) shall be so designed that in a flat square of the enclosure of 9 cm<sup>2</sup> or more (a square test specimen with one side length 3 cm cut out from the enclosure with its original thickness, if there is no flat square portion of 9 cm<sup>2</sup> or more on the enclosure.) shall not continue to burn, when a tip of flame approximately 2 mm long produced by burning the gas of Class 1 No. 1 specified in JIS K 2240 by means of a gas burner having a nozzle inside diameter 0.5 mm with its air inlet closed, is applied to the center of the said test plane inclined from the horizontal by approximately 45° along the vertical line from below for 5 sec and then removed.
- (8) Pots shall not overturn in any direction when inclined through an angle of 10°, if they might overturn under normal service conditions.
- (9) Pots which may produce water vapour from the inside shall be so constructed that water drops resulted from the vapour do not fall on the switch, connector, cord, etc. attached to appliance body under normal service conditions. However, if the said parts have waterproof construction or wetting thereof does not result in risks of electric shock, fire, etc., such a case is an exception.
- (10) The generated noise level shall comply with the following requirements:
  - (10.1) The noise power, measured with an absorbing clamp, shall not exceed 55 dB in a frequency range from 30 MHz to 300 MHz (both ends are included). The dB means the value calculated assuming that 1 pW is 0 dB.
  - (10.2) The noise terminal voltage, measured between a 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 6 corresponding to the frequency range given in the left column of the table. The dB in the table means the value calculated assuming that 1 μV is 0 dB [the same principle applies in (b) below].

Table 6. Continuous Noise Terminal Voltage

Unit: dB	
Frequency range	Continuous noise terminal voltage
From 526.5 kHz up to and including 5 MHz	56
Over 5 MHz up to and including 30 MHz	60

- (b) Discontinuous noise terminal voltage shall not exceed the sum of the relevant value in Table 6 and the relevant correction value given in Table 7.

Table 7. Correction Value

Unit: dB	
Click factor	Correction value
Less than 0.2	44
From 0.2 up to and including 30	$20 \log_{10} \frac{30}{n}$

Remark:  $n$  = click factor

- (11) The rated capacity shall be marked on the container or the like.



- (12) The pot shall be so constructed that the hot water does not boil over during service with water of the rated capacity contained.
- (13) The insulating materials used as the enclosure, pilot lamps, fuse holders, similar components and their protective covers shall not cause cracks, splits or other abnormalities which might result in risks of electric shock, fire, etc. when a weight of 250 g in mass having a hemispherical face of polyamide having a Rockwell hardness of HRR 100 as specified in JIS K 7202 with a radius of 10 mm, is allowed to fall on them from a height of 20 cm; or the same impact is applied by a hammer-head having the same hemispherical face. However, such exposed components and their covers which have a surface area not exceeding 4 cm<sup>2</sup> and are not projecting 10 mm or more are exempted from the above requirement.
- (14) Appliances in which the temperature or the like is controlled by semi-conductor elements, loss of control ability of the semi-conductor elements shall not result in burning of the components connected in the control circuits.
- (15) An appliance equipped with a motor shall not involve such dangers as electric shock and fire, when the motor is locked and a voltage equal to the rated voltage is applied continuously (up to the maximum time setting if a time switch is equipped).

6.2 Live Parts The live parts shall comply with the following requirements:

- (1) The live parts shall not touch the test finger shown in Attached Figure with easily removal parts dismantled. In this procedure, the force applied to the test finger shall be 10 N {1 kgf} at the bottom and 30 N {3 kgf} at the external surfaces and openings.
- (2) The insulation distance (clearance and creepage distance are included) between live parts of different polarity, between live parts and dead metal parts liable to be earthed or surfaces of accessible non-metallic parts shall comply with Table 8. However, if the following requirements are satisfied, as the results of tests, such a case is an exception.
  - (a) When live parts of different polarity is short-circuited, the components connected to the shorted circuit shall not burn. However, if other parts will not burn even when the shorted part burns, such a case is an exception.
  - (b) When live parts of different polarity are connected each other, or live parts and accessible dead metal parts are connected, the voltage to earth and the line voltage of the dead metal parts or exposed live parts shall not exceed 30 V for a.c. or 45 V for d.c.; or alternatively when a 1 k $\Omega$  resistor is connected between a line and the earth, between lines, and between dead metal parts and live parts, the current passes through the resistor shall not exceed 1 mA in any case excluding such a case that there is no risk of electric shock at frequencies not less than power frequency.
  - (c) The insulation resistance between live parts and accessible dead metal parts measured after the test of (a) with a d.c. 500 V insulation resistance tester shall be not less than 0.1 M $\Omega$  [except such cases that the voltage to earth and line voltage are not exceeding 30 V for a.c. or 45 V for d.c. and that the current flowing through the 1 k $\Omega$  resistor that is connected between the live parts and the earth or between the lines does not exceed 1 mA, in any case (it is not necessarily be 1 mA or below if there is no risk of electric shock at frequencies not less than power frequency)].

Table 8. Insulation Distance

Line voltage or voltage to earth		Unit: mm			
		Up to and including 15 V	Over 15 V up to and including 50 V	Over 50 V up to and including 150 V	
Portion					
Mount of power supply wire	Between terminals connected by manufacturer		—	3	
	Between terminals connected by manufacturer and dead metal parts liable to be earthed or accessible non-metallic parts		—	2.5	
Other parts	Between live parts of different polarity (including wire mounting terminals of switching mechanism if provided)	Fixed parts where ingress of dust is not anticipated and deposition of metal powder is difficult	—	1.2	1.5
		With moisture resistant insulating film	0.5	—	—
		Other parts	1	1.5	2.5
	Between live parts and dead metal part liable to be earthed or accessible non-metallic parts	Fixed parts where ingress of dust is not anticipated and deposition of metal powder is difficult	—	1.2	1.5
		With moisture resistant insulating film	0.5	—	—
		Other parts	1	1.2	2

Remark: The clearance means that when a force 30 N {3 kgf} is applied to the outside of appliance body and a force 2 N {200 gf} is applied to the inside so as to minimize the distance.

- (3) The joint between live parts or between live part and dead part shall not work loose under normal service conditions.
- (4) The insulation distances of external terminals of capacitors shall comply with Table 9.

Table 9. Insulation Distance of External Terminals of Capacitor

Line voltage or voltage to earth		Unit: mm		
		Up to and including 50 V	Over 50 V up to and including 150 V	
Portion				
Between live parts of different polarity	Fixed parts where ingress of dust is not anticipated and deposition of metallic powder is difficult		1	1.5
	Other parts		1.2	2
Between live parts and dead metal parts liable to be earthed	Fixed parts where ingress of dust is not anticipated and deposition of metallic powder is difficult		1	1.5
	Other parts		1	1.5

- (5) Where a conductor accommodated in porcelain tubes passes through a metal part, the conductor shall not come in contact with the metal part.
- (6) The thickness of insulating materials shall comply with the following requirements:
- (6.1) When the material of appliance body enclosure also serves as the insulation, the insulation shall be free from pinholes and shall have a thickness of 0.8 mm (0.5 mm if it is not accessible) or more excluding portions built in the apparatus. However, if the insulation is free from pinholes and does not cause cracks, splits or other abnormalities which might result in risks of electric shock, fire, etc. when a weight of 250 g in mass having a hemispherical face of polyamide having a Rockwell hardness of HRR 100 as specified in JIS K 7202 with a radius of 10 mm, is allowed to fall vertically on it three times from the height given in the right column of Table 10 relevant to the classification given in the same table, or the similar impact force is applied three times by means of hammer head having a semispherical face of polyamide having Rockwell hardness of HRR 100 as specified in JIS K 7202 with a radius of 10 mm, such insulation is exempted from the above requirement.

Table 10. Height of Fall of Weight

Unit: cm	
Classification	Height
Ones which are not accessible	14
Others	20

- (6.2) The insulation, except that specified in (6.1), used for the parts where external injury is anticipated shall be free from pinholes and have a thickness of at least 0.3 mm. However, the insulation which passes the tests of (a) and (b) below and is free from pinholes is exempted from the above requirement.
- (a) When the a.c. voltage given in the right column of Table 11 in relation with the classification of the voltage under which the insulation serves given in the left column of the same Table is applied, the insulation shall withstand the voltage continuously for 1 min.

Table 11. Classification of Voltage under Which Insulation Serves

Unit: V	
Classification of voltage under which insulation serves	A.C. voltage
Up to and including 30 V	500
Over 30 V up to and including 150 V	1000

- (b) When the pencil scratch test specified in 6.14 of JIS K 5400 is carried out, the break of test piece shall not reach the test plate. The value of pencil scratch shall be that due to a pencil of hardness symbol 8 H specified in JIS S 6006.
- (6.3) The insulation used for the parts where no external injury is anticipated (excluding the coil of transformer which withstands continuous 5 min application of twice the primary rated voltage at a frequency at least equal to twice the rated frequency and the intermediate part of coil and brought out lead wire, and the motor windings and intermediate part between the winding and brought out lead wire) shall pass the test of (6.2) (a) and be free from pinholes. However, if the insulation has a thickness of 0.3 mm or more and is free from pinholes, such a case is an exception.
- (7) When the circuits in secondary side of an insulating transformer or beyond a rectifier to which capacitors, semiconductor elements, resistors, etc. are connected are subjected to the tests below, the components connected to such circuits shall not burn. However, if other components do not burn when a component burns, such a component is an exception.

- (a) Terminals of pilot lamps and similar components shall be short-circuited [excluding the case complying with 6.2 (2); this note is effective in (b) and (c) below] and terminals of heaters or filaments shall be opened.
- (b) For capacitors, semiconductor elements, resistors, transformers, coils and similar components the terminals shall be short-circuited or opened.
- (c) For components stated in (a) and (b) which are contained in metal cases, the terminals and the case shall be short-circuited. However, such components that the parts connected to the terminals do not come in contact with the metal case inside the component are exempted from the above test.
- (d) The insulation resistance between live parts and dead metal parts liable to be earthed, measured with a d.c. 500 V insulation resistance tester by short circuit or open circuit in the tests of (a), (b) and (c), shall be not less than 0.1 MΩ.

6.3 Wiring The wiring shall comply with the following requirements:

- (1) The entry hole for cord and wire which is unavoidably exposed outside the appliance body due to its function shall be chamfered or suitably treated so as not to damage the cord and wire unless protective spring, protective bushing or other suitable protection is provided. However, if the cord entry hole is provided on non-metallic part, the part is smooth and will not damage the cord or wire, such a case is an exception.
- (2) The internal wiring of appliance body shall comply with the following requirements:
  - (a) The wiring which might come in contact with high temperature parts when a force of 2 N {200 gf} is applied shall not cause any abnormality if it comes in contact.
  - (b) The wiring shall not come in contact with movable parts when a force 2 N {200 gf} is applied to it. However, if there is no possibility of danger, such a case is an exception.
  - (c) When a covered wire is fixed, passed through a hole, or comes in contact with other parts when a force 2 N {200 gf} is applied to it, any means to avoid damage of the covering shall be employed. However, if there is no possibility of danger, such a case is an exception.
  - (d) The wires connected by a connector shall not separate when a force of 5 N {500 gf} is applied to the joint. However, if separation of the connector by application of a force 2 N {200 gf} or more but less than 5 N {500 gf} does not result in any danger, such a case is an exception.
- (3) When a tension equal to three times the own weight of appliance body (100 N {10 kgf} if three times the own weight exceeds 10 kg, or 30 N {3 kgf} if three times the own weight is less than 3 kg) is applied to the cord or the wire which is unavoidably exposed outside the appliance body due to its function for 15 sec toward outside of appliance body, and when the cord or wire is pushed toward inside of appliance body being gripped at a position 5 cm from the appliance body, no tension shall be applied to the joint of cord or wire and internal terminal, and the bushing shall not be detached.
- (4) The power supply wire mount shall comply with the following requirements:
  - (a) The wire mount shall be so constructed that the wire can be mounted firmly.
  - (b) When two or more wires are mounted on a mount, nuts or washers shall be located between the wires. However, if firm mounting is ensured by means of crimp-style terminals or other devices, such a case is an exception.
  - (c) The terminal screws for mounting power supply wires shall not also serve for mounting of things other than the wires. However, if things other than the wires will not come out when the wires are attached or detached, such a case is an exception.
- (5) The cords and wire which is unavoidably exposed outside the appliance body due to its function shall comply with the following requirements:
  - (a) If the temperature exceeds the permissible temperature of the wire under normal service conditions, effective heat resistant protection shall be provided.

- (b) If the cord or wire might come in contact with a part where the temperature is exceeding 100°C, cords or wires other than p.v.c. insulated cords, p.v.c. insulated cabtyre cords and p.v.c. insulated cabtyre cables shall be used.

6.4 Attachment Plug The attachment plugs specified in JIS C 8303 shall be used as the connector of power supply side of cord.

6.5 Connector Used for Connection of Appliance Body and Cord The connector shall comply with the following requirements:

- (1) The dimensions of blade (pin) and blade (pin) clip shall be those given in JIS C 8303 or JIS C 8358. However, magnet type connectors are excluded.
- (2) The mating parts of blade (pin) and blade (pin) clip shall be so constructed that elasticity at least equal to that exerted by the slitted type ones is ensured. However, magnetic type connectors are excluded.
- (3) The connector having blade (pin) clip shall not cause loosening, blister, cracks, splits, deformation or other abnormalities when it is allowed to stand in air at  $150 \pm 3^\circ\text{C}$  for 1 h and then cooled naturally.
- (4) The insertion and extraction property of connector shall be such that no damage, short circuit, welding nor other electrical or mechanical damage shall appear when the connector is mounted as in normal service and the mating one is inserted and extracted at a rate of 20 cycles per minute. In this procedure, 10000 cycles of insertion and extraction shall be carried out under the rated current.
- (5) The retention force of the connector which connects the cord to the appliance body shall have the value given below.
  - (a) The connector of insertion type shall show a force 5 to 60 N {0.5 to 6 kgf} when subjected to the test specified in 6.2 (1) of JIS C 8358.
  - (b) The connector of magnet type shall show a force 10 to 60 N {1 to 6 kgf} when subjected to the test specified in 6.2 (1) of JIS C 8358, and a force not exceeding 20 N {2 kgf} when subjected to the test of 6.2 (2) in JIS C 8358.

6.6 Cord The rubber insulated flat braided cords of JIS C 3301, the p.v.c. insulated flat flexible cords of JIS C 3306, the cabtyre, the cabtyre cables specified in JIS C 3312 or JIS C 3327, or cords at least equivalent thereto in characteristics shall be used. The minimum value of nominal sectional area shall be as specified in Table 12, and the length (effective length) shall be as least 1.4 m.

Table 12. Nominal Sectional Area of Cord

Current <sup>(4)</sup> A	Nominal sectional area of cord <sup>(5)</sup> mm <sup>2</sup>
Up to and including 7	0.75
Over 7 up to and including 12	1.25
Over 12 up to and including 17	2.0

Notes <sup>(4)</sup> This means the value of rated power divided by rated voltage

<sup>(5)</sup> The values, when the insulating material of cord is p.v.c. mixture (excluding heat resistant ones) or natural rubber mixture, are shown.

6.7 Switch The switch shall be that specified in JIS C 8304 or at least the equivalent, and it shall have resistance to heat or be protected against heat appropriate to its location.

6.8 Automatic Switch The automatic switch shall be structured robust, operate surely, and not cause continuous arc at the time of opening the circuit.

6.9 Thermostat The thermostat shall comply with the following requirements:

- (1) The thermostat shall be structured robust, operate surely and not cause continuous arc at the time of opening the circuit.
- (2) The operating temperature control of thermostat of variable temperature type shall be so constructed that it is operated easily and surely.

#### 6.10 Temperature Limiting Device

6.10.1 Temperature Limiter The temperature limiter shall be structured robust, operate surely, and not cause continuous arc at the time of opening the circuit.

6.10.2 Thermal Fuse The thermal fuse and its mount shall comply with the following requirements:

- (1) The material of fuse element shall not deteriorate easily.
- (2) The material of mounting terminal shall have a hardness not to cause trouble in mounting the fuse.
- (3) The fuse shall be capable of interrupting the circuit completely by its fusion.
- (4) No short circuit or earth fault shall appear due to arc at the time of fusion.
- (5) The box, lid and base containing the thermal fuse shall not be damaged at the time of fusion of the fuse.
- (6) The mounting terminal shall allow easy and sure mounting of the thermal fuse without rotation of the fuse lug at clamping.
- (7) The size of fuse mounting surface shall be not less than the bottom size of the conical washer, if used.
- (8) The screw of the mounting terminal shall not also serve as a means for mounting components other than the thermal fuse. However, if there is no possibility of loosening components other than the thermal fuse when the fuse is attached or detached, such a case is an exception.
- (9) If non-enclosed thermal fuse is attached, the clearance between the thermal fuse and the appliance body shall be 4 mm or more.
- (10) The rated operating temperature shall be indelibly marked on the fuse mount. This marking may be in the nameplate. However, non-replaceable thermal fuses are exempted from the above requirement.

6.11 Heating Element The heating element shall comply with the following requirements:

- (1) The electric heating wire (ribbon) shall be the iron chromium heating wire of Class 2 specified in JIS C 2520 or the equivalent in quality.
- (2) The heating element shall be fixed firmly.
- (3) The heating wire shall be so fixed that it will not come in contact with accessible dead metal parts or dead metal parts electrically connected thereto, when it breaks.
- (4) The mounting surface of heating element shall not easily move due to the gravity or vibration.

#### 7. Materials

The materials shall comply with the following requirements:

- (1) Materials for appliance body shall withstand the temperature under normal service conditions.
- (2) Electrical insulating materials and thermal insulating materials shall be of less hygroscopic that withstand the temperature of the part in contact with or in the vicinity of them. However, if hygroscopic thermal insulating material does not cause danger under normal service conditions, such a case is an exception.
- (3) Material for components and appliance body shall not be celluloid of nitrocellulose system or similar flammable materials.
- (4) The electrical insulating materials used for the part to which the arc might reach shall not cause such deteriorations as detrimental deformation and detrimental decrease of insulation resistance due to the arc.

- (5) The iron and steel (excluding stainless steel) shall be treated deterrent to rusting by means of metal coating, painting, oil backing or other suitable means. However, iron and steel used for the part where their oxidation does not result in danger are excepted.
- (6) The blades and blade clips of connectors and switches shall be made of copper, copper alloys or at least the equivalent.
- (7) Conductive materials for the parts other than stated in (6) shall be copper, copper alloys, stainless steel, plated iron or steel, or materials with at least equivalent electrical, thermal and mechanical stability. However, the part which requires elasticity and the part where use of other materials is unavoidable due to its construction are exempted from the above requirement if use of other material does not result in any danger.
- (8) Materials for the parts which come in contact with water during service, shall not cause detrimental chemical change nor elution of detrimental substance.

## 8. Test Procedures

8.1 Construction Test Examine whether the specimen is complying with 6., 7. and 11. or not.

8.2 Voltage Fluctuation Test In the voltage fluctuation test, pass the current under the conditions shown in 8.5.1 with the supply voltage changed by 10 % above and below the rated voltage.

8.3 Power Consumption Test Measure the power consumption when it stabilizes in the test of 8.5.1.

### 8.4 Insulation Performance Test

8.4.1 Insulation Resistance Test Measure the insulation resistance between live parts and dead metal parts liable to be earthed with a d.c. 500 V insulation resistance tester, before and after the test of 8.5.1. For a pot equipped with a sheathed heater, carry out the measurement after charging the said live parts and dead metal parts with a d.c. voltage of 500 V for 1 min at the maximum.

8.4.2 Dielectric Withstand Voltage Test Carry out the dielectric withstand voltage test after the insulation resistance test immediately follows the test of 8.5.1, by applying an a.c. voltage of 1000 V between live parts and dead metal parts liable to be earthed for 1 min. However, if lots of specimens are tested, application of a voltage equal to 1.2 times the above test voltage for 1 sec may substitute for the above test.

8.4.3 Test for Insulation Resistance at Water Overflow Carry out the test as follows:

- (1) Fifteen minutes after 8.5.1 Normal Temperature Test, let water to overflow continuously for five min, wipe off water adhering on enclosure surface of appliance body, and then measure the insulation resistance between live parts and dead metal parts liable to be earthed with a d.c. 500 V insulation resistance tester.

The rate of water overflow shall be 0.2 l/min per 1 cm periphery of spout (max. 20 l).

- (2) After the test of (1), apply the rated voltage and measure the insulation resistance between live parts and dead metal parts liable to be earthed with a d.c. 500 V insulation resistance tester when the temperature of hot water almost stabilizes. For a pot equipped with a sheathed heater, carry out the measurement after charging the said live parts and dead metal parts with a d.c. voltage of 500 V for 1 min at the maximum.

## 8.5 Temperature Tests

8.5.1 Normal Temperature Test In the normal temperature test, carry out the measurements by thermoelectric thermometer method under the test conditions given below.

- (1) Place the specimen on a wooden base with flat surface and a thickness of 10 mm or more.
- (2) Put water of the rated capacity into the container, set a specimen equipped with a thermostat at the highest temperature scale, pass the current by applying the rated voltage, and measure the temperature of each part when it is almost stabilized, or the temperature at the top point if it decreases at a point.
- (3) Draw out the cord by 30 cm if cord reel mechanism is provided.

**8.5.2 Abnormal Temperature Test** Place the specimen on a wooden base with flat surface and a thickness of 10 mm or more, short-circuit the contacts of the thermostat or automatic switch, (the control semiconductor for semiconductor type ones) if provided, leave the specimen without thermostat or automatic switch as it is, and put no water in the container. Apply the rated voltage, under the conditions stated above, continuously until the temperatures of various parts are almost stabilized (until the instant when the thermal fuse or non-self-resetting temperature limiter operates).

**8.6 Test of Automatic Switch** Remove the automatic switch from the main body and subject it to the tests specified below. However, if the removal is difficult, the test may be made on the switch as mounted.

- (1) Subject the specimen to 1000 cycles of such operation that the circuit is broken by heating caused by applying the rated voltage of the circuit to which the automatic switch is connected and passing the maximum working current of the circuit. Further, subject the specimen to 4000 cycles of operation (4000 makes and 4000 breaks) without the current passed.
- (2) Place the automatic switch in a thermostatic chamber, apply a voltage equal to the voltage of the circuit to which the automatic switch is connected to pass a current equal to the maximum working current of the circuit, and raise the temperature at a rate of 1°C per minute to open the circuit. Carry out the above opening operation 15 times before and after the test specified in (1), and measure the temperatures of air in proximity of the automatic switch when the circuit opens, by thermoelectric thermometer method (exclude the temperatures in the first to fifth operations).

**8.7 Performance Test of Thermostat and Self-resetting Temperature Limiter** Remove the thermostat and self-resetting temperature limiter which are actuated by the heat produced by the electric heater and control the temperature by opening and closing the contacts mechanically, from the appliance body, then test them as prescribed below. However, if it is difficult to remove the apparatus, the test may be made on the apparatus as mounted.

- (1) **Make-Break Test** Apply the rated voltage of the circuit to which the thermostat or self-resetting temperature limiter is connected and pass the maximum working current of the circuit through the specimen to open the test circuit by heating, and then cool the specimen to close the test circuit. Count this operation as one cycle, and carry out 5000 cycles of operation.
- (2) **Operating Temperature Test** Place the specimen in a thermostatic chamber, raise the temperature of chamber at a rate of 1°C per minute to open the test circuit and then lower the temperature at a rate of 1°C per minute to close the test circuit. Carry out the above operation 15 times before and after the test specified in (1), and measure the temperatures, by thermometer method, when the circuit opens and when the circuit closes (discard the temperatures in the first to fifth operations). In the above procedure, apply the rated voltage of the circuit to which the specimen is to be connected and pass the maximum working current of the circuit through the specimen.

**8.8 Performance Test of Non-self-resetting Temperature Limiter** Remove the non-self-resetting temperature limiter which is actuated by temperature from the appliance body and then test it as prescribed below. However, if it is difficult to remove the limiter, the test may be made on the limiter as mounted.

- (1) **Make-Break Test** Apply the rated voltage of the circuit to which the non-self-resetting temperature limiter is connected and pass the maximum working current of the circuit through the specimen to open the test circuit by heating. Count this operation as one cycle, and carry out 1000 cycles of operation.
- (2) **Operating Temperature Test** Place the specimen in a thermostatic chamber, raise the temperature of chamber at a rate of 1°C per minute to open the test circuit. Carry out 15 cycles of the above operation before and after the test specified in (1), and measure the temperatures when the test circuit opens (discard the temperatures in the first to fifth cycles) by thermometer method. In the above procedure, apply the rated voltage of the circuit to which the specimen is to be connected and pass the maximum working current of the said circuit through the specimen.

**8.9 Test of Thermal Fuse** Place the thermal fuse horizontal in a thermostatic chamber, raise the temperature of chamber at a rate of 1°C per minute and measure the temperature of air in proximity to the thermal fuse at fusion of the thermal fuse, by thermoelectric thermometer method.



8.10 Test for Guarantee of Water Temperature Carry out this test under the conditions of 8.5.1 Normal Temperature Test, and measure the temperature of water at almost centre of the container when it is almost stabilized. If there are the highest value and the lowest value in the measured values, obtain the average value of the highest value and the lowest value.

For normal pot equipped with an automatic switch measure the temperature at the instant when the automatic switch operates. The ambient temperature shall be  $20 \pm 2^\circ\text{C}$ .

8.11 Efficiency Test Carry out this test under the conditions specified in 8.5.1 Normal Temperature Test, and calculate the efficiency during the water temperature increases from  $30^\circ\text{C}$  to  $90^\circ\text{C}$  (the temperature at which the automatic switch, thermostat or the like operates, if such controls operate below  $90^\circ\text{C}$ ) from the formula given below. The ambient temperature at the test shall be  $20^\circ\text{C}$ , and the water temperature at initiation of passing the current shall be  $20^\circ\text{C}$ .

$$\eta = \frac{Q(T_2 - T_1)}{0.24 P \cdot t} \times 100$$

where

$\eta$ : efficiency (%)

$Q$ : quantity of water (rated capacity ml)

$T_2$ :  $90^\circ\text{C}$  (the temperature below  $90^\circ\text{C}$  when the control operates)

$T_1$ :  $30^\circ\text{C}$

$P$ : electric power (W)

$t$ : time necessary to raise water temperature from  $30^\circ\text{C}$  to  $90^\circ\text{C}$  (sec)  
(time to the operation of control if it operates below  $90^\circ\text{C}$ )

Remark: Cover the container with the lid, and measure the water temperature at the middle of pot.

8.12 Test for Water Flow at Tumble Put water of the rated capacity into the specimen, apply the rated voltage until the water temperature is almost stabilized, then place the specimen on a base lined with rubber to prevent slipping located horizontally, gradually tilt the base as illustrated in Fig. 1 to tumble the specimen on lauan plate of 30 mm in thickness and measure the outflow of hot water during 10 sec. The directions of tumbling shall be lateral and rear to the spout as shown in Fig. 2. Carry out the test in one tumbling direction, and then carry out the next test under the conditions not affected by the former test (e.g. hot water in the bellows is taken out). In the above procedures place the handle upwards.

Fig. 1

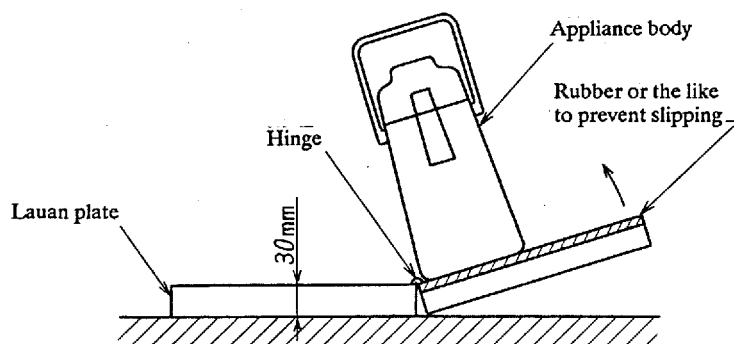
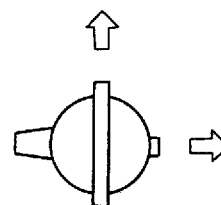


Fig. 2



8.13 Endurance Test of Heating Wire for Boiling Put water of about 80 % of the rated capacity into the container of the pot, short-circuit the thermostat and control circuit, and carry out 50 cycles of such operation that the current is passed for 30 min by applying 120 V to the heating wire and rested for 10 to 15 min.

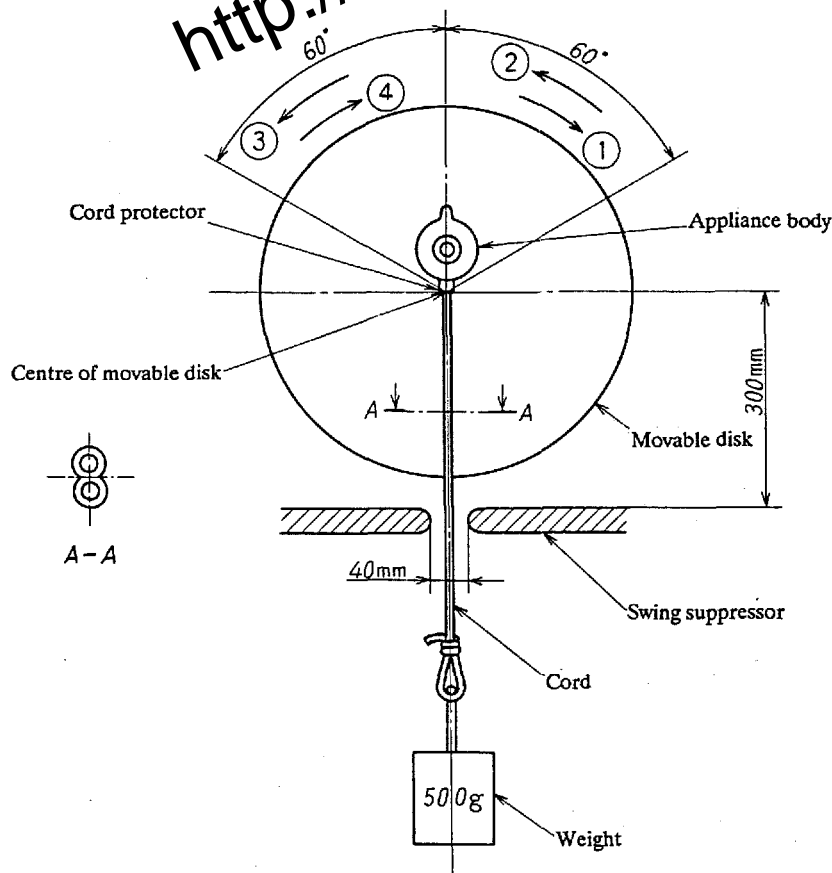
If there is a heating wire for warming through which the current is passed at the time of boiling, treat the heating wire for warming as the heating wire for boiling, and test it at the same time with the test of the heating wire for boiling.

8.14 Endurance Test of Container Carry out this test in accordance with the method of 8.13.

Remark: If the water decreases during the test of 8.13 and 8.14, adequately supply water so that water in the pot is maintained at 50 to 80 % of the rated capacity.

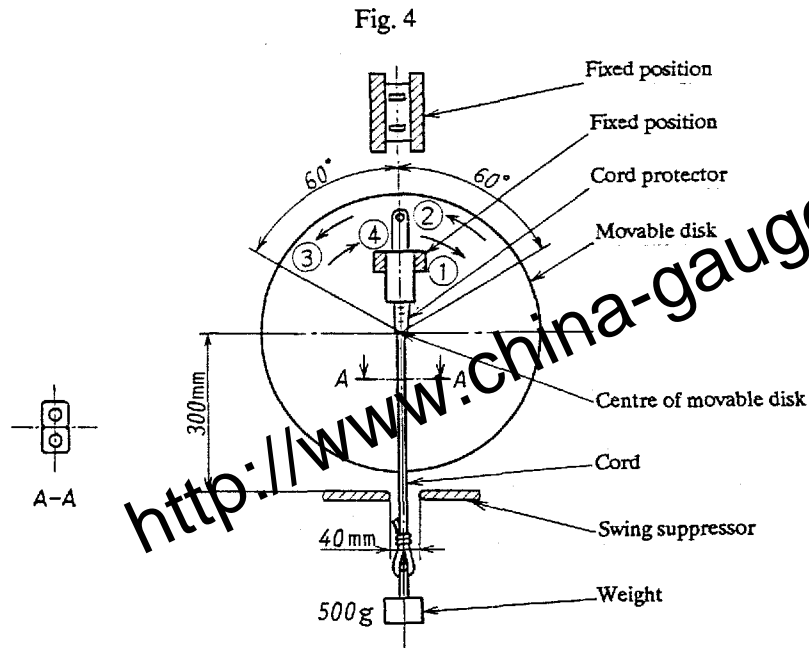
8.15 Flexural Test of Cord Joint

- (1) Flexural Test of Joint of Cord and Appliance Body When the cord is connected to the appliance body without use of a connector, mount the appliance body on the movable disk of the testing device shown in Fig. 3 so that the tip of protector attached to the cord entry (the part at which the cord passes through the appliance body) coincides with the centre of the disk and the cord becomes vertical without bending at the centre of the movable range, hang a weight of 500 g from the end of cord, and then rotate the movable disk through an angle of 60° right and left alternately at a rate of 40 cycles per minute for continuous 2000 cycles.



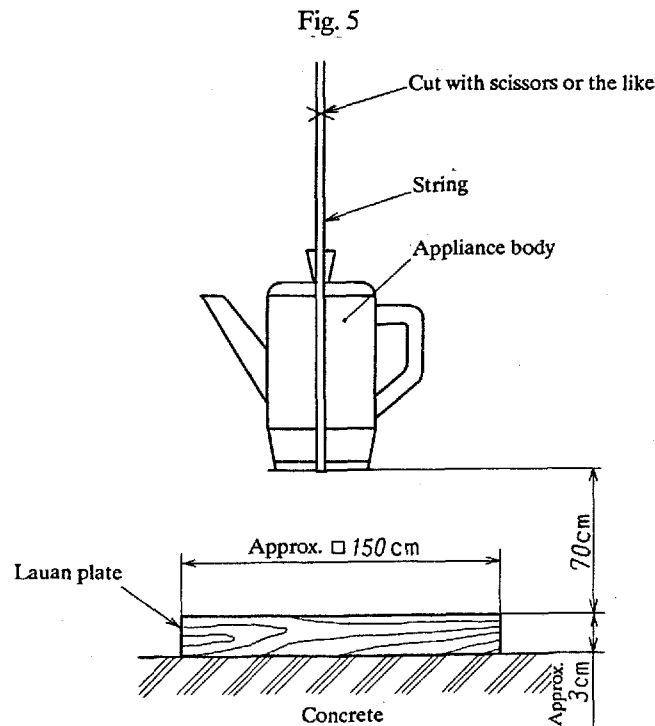
- Remarks 1. Count the motion ①-② one cycle, and ③-④ one cycle.  
2. Rotate the movable disk smoothly.

- (2) Flexural Test of Non-rewirable Connector with Cord Mount the non-rewirable connector with cord on the movable disk of the testing device as shown in Fig 4 so that the tip of protector coincides the centre of the movable disk and the cord becomes vertical without bending at the center of the movable range, hang a weight of 500 g from the end of cord, and then rotate the movable disk through an angle of 60° right and left alternately at a rate of 40 cycles per minute for continuous 5000 cycles.



- Remarks 1. Count the motion ①-② one cycle, and ③-④ one cycle.  
2. Rotate the movable disk smoothly.

8.16 **Falling Test** Place a lauan plate of a size approximately 150 cm x 150 cm and a thickness approximately 3 cm on a flat and horizontal concrete floor surface, suspend the appliance body with a string so that the bottom of appliance body is parallel to the surface of lauan plate at the centre of plate, then let the body to fall from a height 70 cm once (see Fig. 5).



- Remarks 1. Carry out the test without current.  
2. Carry out the test with detachable part without use of tools removed.  
3. Carry out the test with no water contained.  
4. Bundle the directly attached cord, then place it on the top of appliance body to avoid disturbance.

8.17 Flammability Test of Heat Reserving and Heat Insulating Materials Carry out this test as follows:

(1) Test Piece

- (a) Cut a test piece of the dimensions, as a rule, given below from the portion of the main body where density of such material is uniform and remove all the dust from the piece. However, if the specified thickness is not available the original thickness is allowed.

Width :  $50 \pm 1$  mm

Length :  $150 \pm 1$  mm

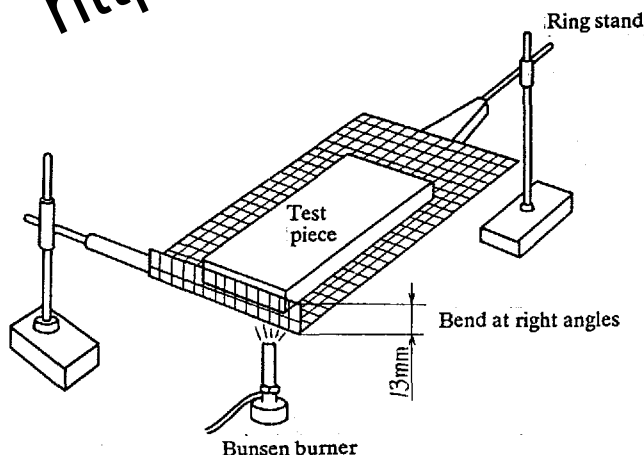
Thickness :  $13 \pm 1$  mm

- (b) Prepare two test pieces.

(2) Testing Device

- (a) The testing device shall be as illustrated in Fig. 6.

Fig. 6



- (b) The components for the testing device shall be as follows:

Use the woven wire cloth of JIS G 3555 with wire diameter 0.8 mm, opening 6.4 mm, length 216mm and width 76 mm, and bend one end of the wire cloth through an angle of 90 degrees to form a edge of 13 mm. Use Bunsen burner with a bore of 11 mm.

- (c) The testing room shall be free from draft of air.

(3) Testing Method

- (a) Support the wire cloth by means of two ring stands so that it is horizontal.
- (b) Adjust the Bunsen burner to produce a blue flame of 38 mm. Place the burner below the bend at right angle of the wire cloth and adjust the position so that the flame aligns with the vertical portion of the wire cloth.
- (c) Place the test piece so that its face on shorter side comes in contact with the bent portion of wire cloth. However, if the test piece is so deformed that it can not come in contact with the wire cloth surface, place the test piece most close to the burner flame.
- (d) Adjust the distance between the upper end of the Bunsen burner and the lower end of wire cloth to 13 mm.
- (e) Use the gas of Class 1 and Number 1 specified in JIS K 2240.
- (f) One minute after from application of the test flame to the test piece, keep away the Bunsen burner from the test piece at least 20 cm, and observe the burning conditions.

## 9. Inspection

9.1 Type Inspection The type inspection shall, as a rule, be carried out in the sequence given below according to the test procedures of 8., and the results shall comply with the provisions of 5., 6., 7. and 11. The inspection for items (1) and (9) to (14) is not necessarily carried out on the same specimen.

- (1) Construction
- (2) Voltage fluctuation characteristics
- (3) Power consumption
- (4) Insulation performance (insulation resistance and dielectric withstand voltage)
- (5) Normal temperature
- (6) Abnormal temperature
- (7) Guarantee of water temperature
- (8) Efficiency
- (9) Water flow at tumble
- (10) Endurance of heating wire for heating water
- (11) Endurance of container
- (12) Flexure of cord joint
- (13) Resistance to falling shock
- (14) Flame retardance of heat reserving and heat insulating materials

9.2 Acceptance Inspection The acceptance inspection shall be carried out for items (2) and (3) on all the delivered products and for item (1) by sampling inspection plan according to the test procedures of 8., and the results shall comply with the provision of 5. However, some or all of the inspection items may be omitted subject to agreement between the parties concerned with acceptance.

- (1) Power consumption
- (2) Dielectric withstand voltage
- (3) Insulation resistance

## 10. Designation of Product

The product shall be designated by the class.

- (1) Normal electric pots may be designated simply as electric pots.
- (2) Automatic electric pots may be designated simply as automatic pots.

## 11. Marking

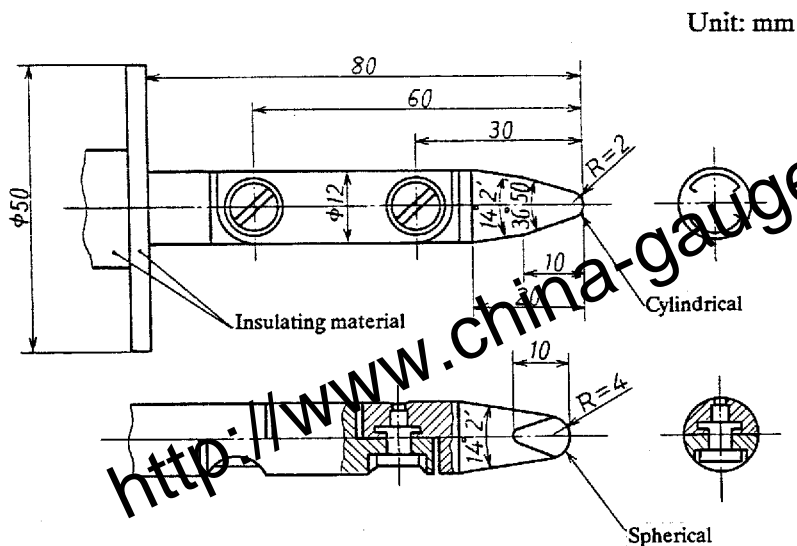
The following items shall be indelibly marked on an easily visible place of each product:

- (1) Class (normal ones may be abbreviated as electric pot, for automatic ones such marking as "automatic pot" which denotes automatic is enough.)
- (2) Rated voltage (V)
- (3) Rated power consumption (W)
- (4) Rated capacity (l)
- (5) Year of manufacture or its abbreviation
- (6) Manufacturer's name or abbreviation

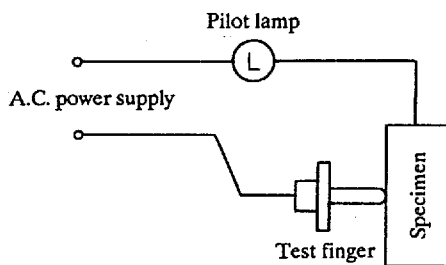
## 12. Precaution for Use

Particulars for use, if any, shall be clearly stated on the main body, tag, instruction manual, etc.

Attached Fig. Test Finger



Connection Diagram (Example)



- Remarks 1. This test finger is used to check exposure of live parts after 8.16 Falling Test in this text [see 5.15 and 6.2 (1) in this text].
2. Tolerances on angle are  $\pm 5'$ .
  3. Tolerances on dimension are  $\begin{matrix} 0 \\ -0.05 \end{matrix}$  mm for a dimension less than 25 mm, and  $\pm 0.2$  mm for a dimension not less than 25 mm.
  4. The material used shall be brass.
  5. Conductive parts of specimen shall be connected together.
  6. The power supply voltage may be an optional voltage (40 V or more) not exceeding a certain voltage.