

JIS

JAPANESE INDUSTRIAL STANDARD

Electric washing machines

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J I S

Electric washing machines

C 9606-1993

1. Scope This Japanese Industrial Standard specifies the electric washing machine for domestic use, consisting of electric motor and washing tank as one body (including water extracting device), with standard washing capacity not exceeding 10 kg (hereafter referred to as "washing machine").

Remarks 1. The following standards are cited in this Standard:

JIS C 0602	General rules of colour identification for protective conductor and neutral conductor and terminal marking for apparatus
JIS C 0702	General rules for insulation construction of class II electrical appliances
JIS C 1502	Sound level meters
JIS C 1505	Precision sound level meters
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 F 8832	Marine watertight type plugs
JIS K 1465	Sodium tripolyphosphate
JIS K 2240	Liquefied petroleum gases
JIS K 5400	Testing methods for paints
JIS K 7202	Method of Rockwell hardness test for plastics
JIS K 8150	Sodium chloride
JIS K 8218	Oleic acid
JIS K 8350	Cholesterol
JIS K 8625	Sodium carbonate
JIS K 8987	Sodium sulfate
JIS K 9003	Liquid paraffin
JIS S 6006	Pencils and coloured pencils
JIS Z 2371	Methods of neutral salt spray testing
JIS Z 8731	Methods of measurement and description of A-weighted sound pressure level

2. 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 shall apply:

- (1) washing capacity The washing capacity means the mass (kg) of laundry in dry state washable at one time at each water level. The laundry in this case is the artificial laundry specified in Annex 1 (hereafter referred to as "laundry").
- (2) standard washing capacity The standard washing capacity means the maximum mass (kg) of laundry in dry state washable at a time among the washing capacities.
- (3) standard water-extracting capacity The standard water-extracting capacity means the maximum mass (kg) of laundry in dry state extractable at a time.
- (4) standard water-extracting and rinsing capacity The standard water-extracting and rinsing capacity means the maximum mass (kg) of laundry in dry state which can be dehydrated and rinsed at a time.
- (5) quantity of water The quantity of water means the approximate quantity of water in tank most suitable for washing the laundry of washing capacity, and shall be determined in accordance with Annex 2 and expressed in L.
- (6) standard quantity of water The standard quantity of water means the quantity of water most suitable for washing the laundry of standard washing capacity.
- (7) water level and water level line The water level and water level line mean the water level and water level line when dry laundry of the washing capacity and water of suitable quantity for it are put together into the tank.
- (8) standard quantity of used water The standard quantity of used water means the quantity of water used for one whole process in automatic electric washing machine and full automatic electric washing machine, and shall be determined in accordance with Annex 3.
- (9) manual electric washing machine The manual electric washing machine means the washing machine in which the processes of washing, rinsing and water-extraction are shifted manually.
- (10) automatic electric washing machine The automatic electric washing machine means the washing machine in which any two processes among washing, rinsing and water-extraction are shifted automatically without manual operation.
- (11) full automatic electric washing machine The full automatic electric washing machine means the washing machine in which each process of washing, rinsing and water-extraction is shifted automatically without manual operation.

(12) water-extracting system

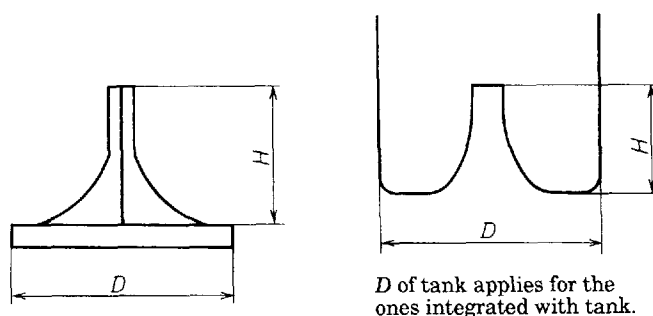
- (a) water-extracting device The water-extracting device means a device which performs water-extraction by means of pressure or centrifugal force.
- (b) extractor The extractor means a machine which performs water-extraction by centrifugal force and is installed independently to the washing part.
- (c) others Machines other than (a) and (b).

(13) washing system

- (a) jet system A system in which washing is performed by the rotation of one or more rotating impellers equipped on the side face of water tank.
- (b) vortex system A system in which washing is performed by the rotation of a rotating impeller equipped on the bottom face of water tank.
- (c) agitator system A system in which washing is performed by the motion of agitator blades equipped on the bottom face of water tank.

The agitator blades mean an assembly of blade which has a relation $H \geq 0.75 D$ as shown in Fig. 1.

Fig. 1. Agitator blade



- (d) drum system A system in which washing is performed in such a way that a drum is placed in the water tank and the laundry falls down due to rotation of the drum.

3. Classification Washing machines are classified as follows:

- (1) Manual electric washing machine
- (2) Automatic electric washing machine
- (3) Full automatic electric washing machine

4. Rated voltage and rated frequency The rated voltage of the washing machine shall be single-phase a.c. not exceeding 300 V and rated frequency shall be 50 Hz, 60 Hz, or 50 Hz/60 Hz.

5. Performances

5.1 Start When starting test is carried out as specified in 8.2, the motor shall start irrespective of the position of the rotor.

5.2 Voltage fluctuation When voltage fluctuation test is carried out as specified in 8.3, the machine shall continue its running without any trouble.

5.3 Power consumption The power consumption shall not exceed 115% of the rated power consumption when the test is carried out as specified in 8.4.

5.4 Temperature

5.4.1 Normal temperature When the normal temperature test is carried out by the method specified in 8.5.1, the temperature of each part of the washing machine shall be not more than the value shown in Table 1, and no abnormal heat shall be produced on other places.

5.4.2 Abnormal temperature When the abnormal temperature test of washing machine equipped with electric heating device is carried out by the method specified in 8.5.2, the washing machine under test (specimen) or the wooden base shall not burn and the insulation resistance between the live part and the surface of machine body measured with a d.c. 500 V insulation resistance tester shall be 0.1 MΩ or more.

5.5 Insulation performances

5.5.1 Insulation resistance The insulation resistance, when measured by the method specified in 8.6.1, shall be 1 MΩ or more.

5.5.2 Dielectric withstand voltage When the dielectric withstand voltage test is carried out by the method specified in 8.6.2, the washing machine shall withstand the voltage.

5.6 Noise When the noise test is carried out by the method specified in 8.7, the noise level shall be 65 dB or less.

5.7 Leakage current The leakage current, when measured by the method specified in 8.8, shall be 1 mA or less.

5.8 Insulation under damp When the insulation under damp test is carried out by the method specified in 8.9, the insulation resistance measured shall be 0.3 MΩ or more.

5.9 Insulation at water overflow When the insulation at water overflow test is carried out by the method specified in 8.10, the insulation resistance measured shall be 1 MΩ or more.

5.10 Insulation at water spray When the insulation at water spray test is carried out by the method specified in 8.11, the insulation resistance measured shall be 1 MΩ or more. The specimen shall withstand the dielectric withstand voltage test of 8.6.2.

Table 1. Temperatures of various parts

Unit: °C

Measurement position		Temperature	
Winding	of Class A insulation	100	
	of Class E insulation	115	
	of Class B insulation	125 (120)	
	of Class F insulation	150 (140)	
	of Class H insulation	170 (165)	
Rectifier	of selenium	75	
	of germanium	60	
	of silicon	135	
Contact of fuse clip		90	
Knob or push button of switch or the like	of metal of ceramics of glass	60	
	of others	75	
Manually operated handle during service	of metal of ceramics of glass	55	
	of others	70	
Handle for transportation	of metal of ceramics of glass	65	
	of others	80	
Enclosure	In contact with a man during service	of metal of ceramics of glass	55
		of others	70
	Easily accessible by a man	of metal of ceramics of glass	85
		of others	100
	Not accessible by a man		100

Remarks 1. The values in parentheses shall apply to the winding of rotary machines.

2. The reference ambient temperature is 30°C.

5.11 Water-extracting performance When the water-extracting performance test is carried out by the method specified in 8.12, the water-extracting efficiency shall satisfy Table 2.

Table 2. Water-extracting efficiency

Unit: %

Water-extracting system		Water-extracting efficiency
Extractor		50 min.
Water-extracting device	Vertical type	45 min.
	Horizontal type	40 min.
Other types		40 min.

Remarks: The water-extracting device with vertical rotating spindle is called vertical type and others are called horizontal type.

5.12 Rinsing performance When the rinsing performance test is carried out by the method specified in 8.13, the rinsing efficiency shall be 1 or more.

5.13 Switch and time switch The switches and time switches shall comply with the following requirements:

- (1) **Make and break performance** Each part shall not show any trouble when make-break test is carried out in accordance with 8.15.1.
- (2) **Temperature rise** The temperature of contact shall be not more than the value shown in Table 3 when the test is carried out in accordance with 8.15.2.

Table 3. Temperature of contact

Unit: °C

Material of contact	Temperature
Copper or copper alloys	70
Silver or silver alloys	95

Remarks: The reference ambient temperature is 30°C.

5.14 Flexure of power supply cable joint When the flexure test of power supply cable joint is carried out by the method specified in 8.16, the power supply cable shall not cause short circuit and the disconnection rate of the component wires shall be 20% or less.

5.15 Performance of hose The performances of hoses shall be as follows:

- (1) **Drain hose** The drain hose, when tested by the method of 8.17.1(1), shall be free from any crack, deformation and other abnormalities.

In the test of 8.17.1(2), the variation rate in length shall be $\pm 3\%$. However, shrinkable hoses are exempted from the above requirement.

- (2) **Water supply hose** The water supply hose, when tested by the method of 8.17.2, shall not cause any leakage.

6. Construction

6.1 Construction in general The construction of washing machine shall comply with the following requirements:

- (1) The washing machine shall be so constructed that no danger will appear during normal service conditions, the shape is proper, the assembling and finishing of each part are good and the operation is smooth.
- (2) The operation shall be safe, without considerable vibration or noise during use.
- (3) Each part shall be so constructed that neither mechanical nor electrical failure will appear easily, and no danger will be caused.
- (4) The washing machine shall not turn over when inclined by an angle of 10° under normal service state. However, the washing machine with a body mass exceeding 40 kg and a height from the floor surface to the bottom of body not exceeding 5 cm or that which does not turn over when a force of 100 N {10 kgf} is applied to any position (excluding the bottom) of body is an exception.
- (5) The live parts shall not be splashed with water under normal service state.
- (6) The part which may cause such hazards as burning of component and exposure of live part due to moisture absorption shall be treated deterrent to moisture absorption.
- (7) The washing machine having a temperature control shall be equipped with a temperature limiter (including thermal fuse), if there is a risk of electric shock, fire, etc. when a voltage equal to the rated voltage is applied continuously (up to the maximum time if a time switch is provided) to the heating device, while the temperature control is short-circuited. The one which may cause hazards due to overcurrent, overload, etc. shall be equipped with an overload preventive device. These protective devices shall not operate under normal service state.
- (8) The construction shall ensure not to disturb rotation of the motor under normal service state. If the disturbance of motor rotation does not result in any hazard such a case is an exception.
- (9) The moving part which is accessible by a man under normal service state shall be equipped with a suitable protective frame or netting to prevent easy access. However, the moving part exposure of which is unavoidable due to its function, and that touching to which does not result in risks of electric shock, injury, etc. are exempted from the above requirement.
- (10) The washing tank shall be of such construction as to be free from any leakage of water when it is filled with water of normal temperature and of 50°C .

The machine with water-extracting device shall be so constructed that water is not splashed out of the machine during water-extracting operation.

- (11) The washing tank shall be equipped with drain valve or drain pipe. However, for the machine of the standard washing capacity of 1 kg or under, it may be omitted.
- (12) The washing machine shall be of such construction that it will not give any damage to the laundry under normal service state.
- (13) The vertical distance between the water supply inlet (base of hose holder) and the highest water level shall be 40 mm or more.
- (14) The washing machine of such construction that rinsing is performed by connecting the city water cock with the opening which serves as water supply inlet and also drain outlet, shall be equipped with a non-return device. If this device employs a hole at the joint with hose, the area of the hole shall be 30 mm² or more, and the vertical distance between the overflow surface and the working point of non-return device shall be 40 mm or more.
- (15) The washing machine with an electric heating device shall be so constructed that heating at empty state and overheating are prevented. However, the one which has no risks due to excess temperature rise due to heating at empty state or overheating, and the one equipped with a temperature limiter are exceptions.
- (16) The washing machine equipped with extractor shall comply with one of the following requirements:
 - (16.1) The construction shall be such that current cannot flow when the lid of laundry throwing part of the extractor tank is opened, and the lid of the extractor tank cannot be opened unless the revolution of extracting tank is stopped.
 - (16.2) The construction shall be such that the revolving extractor tank cannot be touched directly when the lid of the laundry throwing part (hereafter referred to as "external lid") which is at the outermost part of the extractor is opened. The construction shall also comply with the following requirements:
 - (a) The construction shall be such that the current to the extractor motor is cut off and the extractor tank is braked when the external lid is opened.
 - (b) The construction shall be such that the rotor of the extractor motor is locked, when the external lid open-close operation and the above braking device are not interlocked.
 - (c) The stopping time of the extractor tank before, after and during such a test that the rated voltage of rated frequency is applied to the extractor motor and an operation to stop the extractor tank by opening the external lid when the revolution of the tank becomes stable is performed 10000 times (hereafter referred to as "working test") shall comply with the specification of Table 4.

- (d) The rated voltage of rated frequency is applied continuously under the condition that a rotor of the extractor motor is locked until the protective device actuates for the washing machine which has protective device such as a thermal fuse, overcurrent protective device, or until the time limiting device being set to the maximum time actuates for the washing machine which has a time limiting device. In the above procedure, there shall be no burning of the extractor motor, and the insulation resistance between the live part and dead metallic part liable to be earthed shall be 1 MΩ or more when measured with a d.c. 500 V insulating resistance tester.

Table 4. Stopping time of extractor

Test condition		Stopping time s	
Before working test	No-load	Revolving of extractor tank is visible when external lid is opened (hereafter referred to as "transpicious").	7 max.
		Others	5 max.
	On-load	Transpicious	10 max.
		Others	7 max.
During working test	On-load	Transpicious	15 max.
		Others	10 max.
After working test	On-load	Transpicious	15 max.
		Others	10 max.

Remarks: "On-load" means a condition that laundry, specified in Annex 1, weighed equivalent to the standard water-extracting capacity and dipped in water or artificial load equivalent to it, is put into the extractor tank.

- (17) The washing machine with enclosure made of synthetic resin (except enclosure which needs translucency or transparency or those which needs flexibility, mechanical strength due to the function) shall be such that the square plane part of 9 cm² or more on outside surface of the enclosure (if there is no square plane part of 9 cm² or more on the enclosure, the test piece of original thickness cut into a square of 3 cm × 3 cm shall be used) shall not burn when the tip of the flame of approx. 20 mm in length produced by burning the glass class 1 no. 1 specified in JIS K 2240 or at least equivalent thereto, using a gas burner whose nozzle bore is 0.5 mm with its air vent closed is applied from underneath vertically for 5 s to the center of plane part inclined approx. 45° from horizontal, and removed.
- (18) The enclosure shall not cause cracks, splits or other abnormalities which may result in risks of electric shock, fire, etc. when a weight of 250 g in mass with a hemispherical surface of 10 mm radius finished with polyamide having Rockwell hardness of HRR 100 specified in JIS K 7202 is dropped vertically from a height of 20 cm once or the equivalent shock is applied once by means of the shock tester shown in Attached Fig. 1. However, the

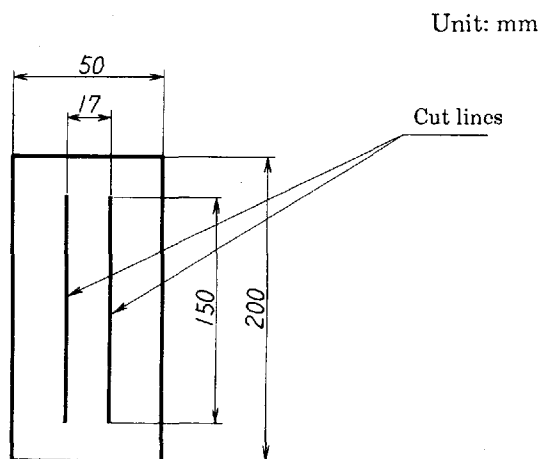
pilot lamp, fuse holder or the like exposed to outer surface of body and their protective covers which have a surface area not exceeding 4 cm² and do not protrude 10 mm or more from the surface of enclosure of body are exceptions.

The test temperature shall be ordinary temperature.

- (19) As for the enclosure having painted surface, the test piece shown in Fig. 2 is cut out from the enclosure, lines are cut with a new single-edged safety razor blade to reach the base material, the test piece is placed in the salt mist chamber specified in JIS Z 2371, 5% salt water is sprayed in the atmosphere at $35 \pm 2^\circ\text{C}$ for 24 h, the substance adhering to the surface of test piece is completely rinsed with water and then the corroded width by salt from the cut line is measured. The width so measured shall not exceed 1 mm.

The same material painted under the same conditions as the enclosure may be used as the test piece.

Fig. 2. Test piece



- (20) The strength of noise generated shall comply with the following requirements:
- (20.1) 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 decibel (dB) means the value calculated on the basis of 1 pW = 0 dB.
- (20.2) 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 shown in the right column of Table 5 in correlation with the frequency range given in the left column of the same table. The decibel (dB) means the value calculated on the basis of 1 μV = 0 dB.

Table 5. Continuous noise terminal voltage

Range of frequency f	Continuous noise terminal voltage dB
$526.5 \text{ kHz} \leq f \leq 5 \text{ MHz}$	56
$5 \text{ MHz} < f \leq 30 \text{ MHz}$	60

- (b) The intermittent noise terminal voltage caused by a contact mechanically closed and opened (excluding manual switch) shall not exceed the appropriate value given in Table 5 plus the correction value given in the right column of Table 6 in correlation with the click factor given in the left column of the same table.

Table 6. Correction value

Click factor n times/min	Correction value dB
$n < 0.2$	44
$0.2 \leq n \leq 30$	$20 \log_{10} \left(\frac{30}{N} \right)$
$30 < n$	0

Remarks: N means the click factor, and the unit is times/min.

- (21) It is recommended to use components and structure which can be used as reproduction resources.

6.2 Live part The live part shall comply with the following requirements:

- (1) The live part shall be so constructed as not to be splashed with water, and the live part, the lowest plane of the motor and the joint of the cord shall be at a height not less than 5 cm from the floor surface, except table-type ones.
- (2) The live part inside the washing tank, if provided, shall be so constructed that it is protected from ingress of water.
- (3) The live part shall not be touched by the test finger shown in Attached Fig. 2, with the easily removable parts removed, except the cases given below. In this procedure, the force applied to the test finger shall be 30 N {3 kgf}. However, for the bottom of the table-type and for the backside and the bottom of the floor-type (stationary-type only) (for a washing machine having a body weight of more than 40 kg and a height of 5 cm or less from the floor surface to the bottom of the body, the area within the distance equal to twice the height from outer edge of bottom) a force of 10 N {1 kgf} shall be applied.

- (a) The live part on mounting surface which will not be touched easily by a man under mounted state.
 - (b) The live part 40 cm or more away from the opening part on the bottom of the body weighing more than 40 kg.
 - (c) The live part exposed unavoidably for constructional reason of the machine, connected to the secondary circuit of an insulating transformer where the voltage to earth and the line voltage are 30 V or less for a.c. or 45 V or less for d.c., or where the current flows through a 1 k Ω resistance connected between live part and the earth or between the lines, the current is 1 mA or less. However, such a case that the current does not result in a risk of electric shock at a frequency not less than commercial frequency is an exception.
- (4) The insulation distance (clearance and creepage distance) between live parts of different polarity, between live parts and the surface of machine body, and between live parts and surfaces of non-metallic part which may be touched by a man shall have at least the relevant values given in Table 7. This clearance shall be the distance measured when a force of 30 N {3 kgf} for outside of body, or of 2 N {200 gf} for inside of body is applied to minimize the distance.

Table 7. Clearance (including creepage distance)

Unit: mm

Classification	Line voltage or voltage to earth (<i>E</i>)	<i>E</i> ≤ 15 V		15 V < <i>E</i> ≤ 50 V	50 V < <i>E</i> ≤ 150 V	150 V < <i>E</i> ≤ 300 V
		With moisture resistant insulating covering	Others			
Mount of power cable	Between terminals connected by manufacturer	—	—	—	3.0	4.0
	Between terminals connected by manufacturer and surface of body or accessible surface of non-metallic part	—	—	—	2.5	3.0
Other parts	Between live parts of different polarity	0.5	1.0	1.2	1.5	2.0
	Rigid part protected against ingress of dirt and deposition of metallic powder					
	Other position	0.5	1.0	1.5	2.5	3.0
	Between live part and body surface or accessible surface of non-metallic part	0.5	1.0	1.2	1.5	2.0
Commutator part of motor (between live part and dead metallic part)	Rigid part protected against ingress of dirt and deposition of metallic powder					
	Other position	0.5	1.0	1.2	2.0	2.5
		1.6				1.6 (6.4)

Remarks: The numerical value in parentheses are applicable to a voltage exceeding 250 V but not exceeding 300 V.

- (5) When the parts in the secondary circuit of an insulating transformer or a rectifier and the like where decrease of the distance is unavoidable due to constructional reason, are subjected to the following tests and are successful in these tests, the requirement of (4) does not apply to the said parts.
- (a) When the live parts of different polarity are short circuited, the parts connected to the shorted circuit shall not burn. However such a case that the other parts will not burn, even if one part connected to the circuit is burned, is an exception.
 - (b) When connection is made between the live parts of different polarity, between live part and surface of machine body, or between live part and non-metallic part accessible by a man, the voltage to earth and line voltage of the surface of body or the exposed live part shall be 30 V or less for a.c. and 45 V or less for d.c., or when a 1 k Ω resistance is connected between the live part and the earth, between the lines, or between the surface of body and live part, the current which flows through the resistance shall be 1 mA or less. However, such a case that the current does not result in a risk of electric shock at a frequency not less than commercial frequency is an exception.
 - (c) After the test (a), the insulation resistance between the live part [except the case that the voltage to earth and the line voltage are 30 V or less for a.c., 45 V or less for d.c. or the current flows through a 1 k Ω resistance connected between live part and the ground or between the lines, is 1 mA or less (it is not applicable when the current does not result in a risk of electric shock at a frequency not less than commercial frequency)] and the surface of machine body measured by a d.c.500 V insulation resistance tester shall be 0.1 M Ω or more.
- (6) The joints between live parts or between live part and dead metallic parts shall not work loose and shall withstand the temperature under normal service conditions.
- (7) In a washing machine which controls its temperature and revolutionary speed, etc. by means of semiconductor elements (rectifier only is not included), the parts connected to the control circuit shall comply with the requirements given below when those semiconductor elements lose control ability.
- (7.1) The parts connected to the control circuit shall not burn. However, such a case that the other parts will not burn, even if one part connected to the circuit is burned, is an exception.
 - (7.2) The dead metallic parts liable to be earthed or exposed live parts shall comply with either of the following requirements.
 - (a) The voltage to earth and voltage between lines shall not exceed 30 V for a.c. or 45 V for d.c.
 - (b) When 1 k Ω resistors are connected between the live part and the earth, between lines, or between the surface of body and the live part, the current that flows through the resistor shall not exceed 1 mA, unless there is no risk of electric shock at a frequency not less than commercial frequency.

- (7.3) The insulation resistance between the live part [excluding such a case that the voltage to earth and line voltage are not exceeding 30 V for a.c. or 45 V for d.c. or that neither the current flowing through a 1 k Ω resistor connected between the live part and the earth nor that between lines exceeds 1 mA (it is not necessarily be 1 mA or less if there is no risk of electric shock at a frequency not less than commercial frequency)] and the surface of machine body measured after this test by a d.c. 500 V insulation resistance tester shall be not less than 0.1 M Ω .

6.3 Electrical insulating material The electrical insulation shall comply with the following requirements:

- (1) When the enclosure of appliance body also serves as the electrical insulation, excluding the portions built in the appliance, the insulation shall have a thickness not less than 0.8 mm (0.5 mm or more for the one not accessible by a man) and shall be free from pinholes. If the insulation is free from pinholes and does not cause cracks, splits or other abnormalities which will result in risks of electric shock and fire when a weight of 250 g in mass having a semi-spherical surface of 10 mm radius finished with polyamide to have a Rockwell hardness HRR 100 specified in JIS K 7202 is dropped vertically three times from the height specified in Table 8, or the impact force equivalent thereto is applied three times by means of the impact test apparatus shown in Attached Fig. 1, such a case is an exception.

Table 8. Falling height of weight

Unit: cm	
Classification	Height
Insulation not accessible by a man	14
Others	20

- (2) The insulation used for the parts other than (1), where external injury is expected (only the one used to comply with the provisions of 6.2, and this note is applicable in 6.3), shall have a thickness not less than 0.3 mm and shall be free from pinholes. If the insulation satisfies the following requirements (a) and (b) as the test results and is free from pinholes, such a case is an exception.
- (a) The insulation shall withstand continuous application for 1 min of the a.c. voltage specified in right column of Table 9 in relation with the voltage classification under which the insulation serves given in the left column of the table.

Table 9. Withstand voltage of insulation

Unit: V

Classification of voltage under which insulation serves (E)	A.C. voltage
$E \leq 30$	500
$30 < E \leq 150$	1000
$150 < E \leq 300$	1500

(b) The insulation shall show no break to reach the test plate when subjected to the scratch test by pencil specified in 8.4.1 of JIS K 5400 using the pencil of hardness 8H specified in JIS S 6006.

(3) The insulation used for the part where external damage is not anticipated, (excluding the winding and the portion between winding and lead of a motor) shall comply with (2) (a) as the result of test and shall be free from pinholes. If the insulation has a thickness of 0.3 mm or more and is free from pinholes, such a case is an exception.

6.4 Earthing terminal and earthing lead wire The washing machine shall be equipped with the earthing terminal or earthing lead wire which complies with JIS C 0602 and the following items, at an easily visible place of the enclosure (for ones to be used by fixing whose earth wiring is not exposed outside, the terminal or lead wire shall be equipped with the body inside). However, the washing machine whose metal part is not exposed outside the body, or which is of class II insulating construction or is earthed by the earthing blade of power supply plug is excepted.

- (1) The earthing lead wire shall have a length (effective length) of 2.5 m or more and shall be one of the following wires, and shall be so fixed firmly that it will not become loose easily.
 - (a) Annealed copper wire of 1.6 mm in diameter or a corrosion resistant metal wire at least equivalent in strength and diameter.
 - (b) A single core cord or single core cable of not less than 1.25 mm² in nominal cross-sectional area.
 - (c) A two-core cable of not less than 0.75 mm² in nominal cross-sectional area, in which both ends of two conductors are twisted together and brazed or crimped.
 - (d) One core of a multi-core cord (except stranded cord) or multi-core cable of not less than 0.75 mm² in nominal cross-sectional area.
- (2) Washing machine equipped with earthing terminal shall comply with the following requirements.
 - (a) An earthing wire similar to the earthing lead wire complying with (1) shall be prepared and the length shall be 2.5 m or more.

- (b) The terminal shall be capable of fixing the earthing wire easily and firmly.
 - (c) The material of earthing terminal shall have enough mechanical strength and resistance to rusting. The nominal diameter of terminal screw shall be 4 mm or more (3.5 mm or more for slotted hexagon head screw, large fillister head machine screw, and pressure clamping type screw).
 - (d) The earthing terminal shall not serve as a means to mount other things than the earthing wire. If there is no risk of danger such a case is an exception.
- (3) Marking of earthing shall comply with the following requirements.
- (a) An indication expressing "for earthing" shall be indelibly marked on the earthing wire itself or in the vicinity thereof. However, an earthing wire colored with green and yellow is exempted from the above requirement.
 - (b) An indication expressing "for earthing" shall be indelibly marked on the earthing terminal itself (excluding easily removable terminal screws) or in the vicinity thereof. However, the terminal which is located inside the appliance body and does not allow replacement of earthing wire is exempted from the above requirement.

6.5 Power supply cable The power supply cable shall comply with the following requirements:

- (1) The power supply cable shall be of class 2 cabtyre cable specified in JIS C 3327, or any of the cables specified in JIS C 3301, JIS C 3306 and JIS C 3312, or a cable at least equal in quality to the above specified, shall be not less than 0.75 mm² in nominal sectional area, and not less than 1.9 m in length (effective length). However, other cables may be used subject to agreement between the parties concerned with acceptance.
- (2) The allowable current of the power supply cable shall be not less than the maximum working current of the load to be connected to the cable.
- (3) The attachment plug specified in JIS C 8303 or JIS F 8832, or the one at least equal thereto in quality, shall be attached to the power side end of the power supply cable. However, other plugs may be used subject to agreement between the parties concerned with acceptance.
- (4) For the power supply cord which may come in contact with a part where the temperature exceeds 100°C when the test of 8.5.1 is carried out, cables other than p.v.c. insulated cord, p.v.c. cabtyre cord and p.v.c. cabtyre cable shall be used.

6.6 Wiring The wiring shall comply with the following requirements:

- (1) The entry hole for power supply cable and lead wire (hereafter referred to as "power supply cable") shall be suitably protected by means of chamfering, etc., so as to protect the power supply cable from damage unless suitable protective device such as guard spring, guard bushing are used. If the entry hole is located on non-metallic part, and the part is smooth and will not damage the power cable, such a case is an exception.