

JIS

JAPANESE INDUSTRIAL STANDARD

Electric fans

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.



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Electric Fans

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1. Scope

This Japanese Industrial Standard specifies electric fans having axial flow blades of 20 cm to 40 cm in diameter driven by induction motors in the category of desk, Japanese room (ZASIKI), wall, pedestal, ceiling oscillating and special type fans mainly used in general household (hereafter referred to as "fans").

Remarks 1. The applicable Standards are given below.

JIS C 0601-1961	Operation of Handles and Indication of Electric Installations
JIS C 3301-1987	Rubber Insulated Flexible Cords
JIS C 3306-1987	Polyvinyl Chloride Insulated Flexible Cords
JIS C 4908-1988	Capacitors for Electrical Apparatus
JIS C 8303-1988	Plugs and Receptacles for Domestic and Similar General Use
JIS K 2240-1987	Liquefied Petroleum Gases
JIS K 5400-1990	Testing Methods for Paints
JIS K 7202-1982	Method of Rockwell Hardness Test for Plastics
JIS S 6006-1984	Pencils and Coloured Pencils

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) table type fan A fan which is mainly used on a desk, which has no height adjusting mechanism and in which the blade driving motor is mounted on the vertical angle adjusting mechanism or the stand.
- (2) Japanese room (ZASIKI) type fan A fan which is mainly used on a floor, which has a height adjusting mechanism and the maximum height (the vertical angle adjustment being horizontal) is less than 1.3 m.
- (3) pedestal type fan A fan which is mainly used on a floor and which has the maximum height of 1.3 m or more (the vertical angle adjustment being horizontal).
- (4) wall type fan A fan which is mounted on a wall for service.

- (5) ceiling oscillating type fan A fan which is mounted on a ceiling for service, in which the axis of air flow is changed automatically by the motion of the blade driving motor frame along a turning locus.
- (6) special type fan This means a fan in which the air velocity distribution in front of the fan is quite different from concentric distribution. Box type fan, fan with louver, etc. are included in this category.

3. Classification

Fans are classified into the following five classes according to the diameter of the circle drawn by the extreme tips of fan blades.

20 cm, 25 cm, 30 cm, 35 cm and 40 cm

4. Rated Voltage and Rated Frequency

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

5. Performances

5.1 Starting When the test of 8.3 is carried out, the fan shall start irrespective of the position of fan blades.

5.2 Voltage Fluctuation When the test of 8.4 is carried out, the fan shall be capable of continuing the operation without any trouble.

5.3 Power Consumption When the test of 8.5 is carried out, the power consumption shall comply with the relevant value given in Table 1 and shall not deviate from the rated power consumption by more than the relevant value given in Table 2.

Table 1. Power Consumption

Unit: W	
Class	Power consumption
20 cm	35 max.
25 cm	50 max.
30 cm	65 max.
35 cm	80 max.
40 cm	100 max.

Table 2. Tolerance on Power Consumption

Rated power consumption W	Tolerance %
Up to and including 30	±25
Over 30 up to and including 100	±20

5.4 Temperature When the test of 8.6 is carried out, the temperature of each part shall not exceed the relevant value given in Table 3.

Table 3. Temperatures

Unit: °C

Measurement position		Temperature	Measuring method
Winding	of class A insulation	100	Resistance method
	of class E insulation	115	
	of class B insulation	120	
	of class F insulation	140	
	of class H insulation	165	
Accessible enclosure		65 (70) ⁽¹⁾	Thermoelectric thermometer method
Surface of each layer of wire in cord reel mechanism	P.V.C. compound (excluding heat resistant mes)	60	

Note ⁽¹⁾ The numerical values in parentheses are applicable to ceiling oscillating type fans.

Remark: The reference ambient temperature is 30°C.

5.5 Insulation

5.5.1 Insulation Resistance When the test of 8.7 is carried out, the insulation resistance shall be not less than 1 MΩ.

5.5.2 Dielectric Withstand Voltage When the test of 8.8 is carried out, the specimen shall withstand the test voltage.

5.6 Air Velocity When the test of 8.9 is carried out, the air velocity shall comply with the relevant value given in Table 4.

Table 4. Air Velocity

Unit: m/min

Class	Maximum air velocity
20 cm	115 min.
25 cm	145 min.
30 cm	170 min.
35 cm	190 min.
40 cm	205 min.

5.7 Air Delivery When the test of 8.10 is carried out, the air delivery shall comply with the relevant value given in Table 5.

Table 5. Air Delivery

Unit: m ³ /min	
Class	Air delivery
20 cm	12.5 min.
25 cm	18 min.
30 cm	28 min.
35 cm	38 min.
40 cm	54 min.

5.8 Switch The switch shall comply with the following:

5.8.1 Make-Break When the make-break test is carried out as specified in 8.11.1, no trouble shall be found at any part.

5.8.2 Temperature When the test of 8.11.2 is carried out, the temperature of the contacts of a switch with a maximum load current not less than 1 A shall not exceed the relevant value given in Table 6.

Table 6. Temperature of Switch

Unit: °C	
Material of contact	Temperature
Copper or copper alloys	70
Silver or silver alloys	95

Remark: The reference ambient temperature is 30°C.

5.9 Bending of Cord When the test of 8.12 is carried out, the relative breakage of component wires shall not exceed 20% and no short circuit or other hazards shall occur. However, this test is not applicable to wall type fans, ceiling oscillating type fans and fans equipped with cord reel mechanism.

5.10 Cord Reeling When the fan equipped with a cord reel mechanism is tested in accordance with 8.13, the relative breakage of component wires shall not exceed 20% and no short circuit or other hazards shall occur.

5.11 Oscillation When the test of 8.14 is carried out, no abnormality shall appear on the oscillating mechanism.

5.12 Vertical Angle Adjust When the test of 8.15 is carried out, no abnormality shall appear on the vertical angle adjusting mechanism.

5.13 Height Adjust When the test of 8.16 is carried out, there shall be no abnormality or trouble detrimental to practical service on the height adjusting mechanism.

Remark: Above-mentioned "no trouble detrimental to practical service" means that the cord is not damaged or broken, or function of the screw is not lost.

6. Construction

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

- (1) Fans shall be assembled to have correct shape and the appearance shall be good.
- (2) Fans shall be handled easily and shall comply with the following requirements:
 - (2.1) The cord specified in 6.6.1, a connector, a terminal board or a terminal box shall be attached to a fan at a suitable place.
 - (2.2) A speed regulator or a switch shall be attached to a fan.
 - (2.3) An indication which shows the speed shall be placed on the speed regulator and that which shows on and off states shall be placed on the switch in accordance with JIS C 0601.
However this indication may be omitted for such components as pull switches, on which it is difficult to indicate the speed.
 - (2.4) Wall type fans and ceiling oscillating type fans shall be capable of being mounted on the structural member easily and firmly.
- (3) Fans shall be good in motion and shall comply with the following requirements:
 - (3.1) Fans shall not generate abnormal sound and abnormal oscillation during operation.
 - (3.2) Operation of a speed regulator or a switch shall be smooth and secure.
- (4) Fans shall have robust construction, shall be durable and shall not cause mechanical or electrical failure due to loosening or the like during service.
- (5) Fans shall not cause any hazard under normal service conditions and shall comply with the following requirements:

- (5.1) For fan blade which is dangerous when touched by a man under normal service conditions, a suitable protective frame or netting which does not allow easy access shall be provided.
- (5.2) Table type fans and Japanese room type fans shall be capable of being carried by hand safely while in service.
- (5.3) Various clamping devices of a fan shall be operated easily and shall not result in any hazard even if they are operated carelessly.
- (5.4) Fans shall be so constructed that they will not overturn when they are inclined, in standstill, in any direction by 10 degrees, while the vertical angle adjustment is vertical for table and Japanese room type fans and at the maximum angle in every direction for pedestal type fans. Fans whose height is adjustable shall not overturn even if they are inclined by 10 degrees at the height adjusted to the maximum. However, the above requirement does not apply to wall type fans and ceiling oscillating fans.
- (5.5) An oscillating fan shall be such that the cord is not damaged by the oscillating motion, and the fan can serve without causing any trouble when the oscillating motion is externally disturbed.
- (5.6) A fan with removable head for storage shall have no possibility to cause danger by abrupt motion in overhauling or assembling.
- (5.7) In a fan equipped with a remote control mechanism, its power supply circuit can not be closed by the operation of other things than the switch on appliance body and the controller.
- (5.8) The controller separated from the appliance body (except that which is fixed to a wall or pillar under normal service conditions) shall not cause such hazards as electric shock and fire, when it is dropped from a height of 70 cm three times on the center of a lauan board of 30 mm thick with flat surface placed on a concrete floor.
- (5.9) A fuse, overcurrent protector or other protective device which operates when the wire which connects the appliance body and the controller causes such abnormalities as short circuit and overcurrent shall be provided. However, if the occurrence of short circuit, overcurrent, etc. will not result in risks of burning of components, exposure of live parts, etc., such a case is an exception.
- (5.10) In a fan which employs a fuse as the overload protective device, the rated current or the rated operating temperature shall be indelibly marked on the nameplate or the fuse mount for the current fuse or thermal fuse, respectively. However, if the fuse is not replaceable, such a case is an exception.

- (5.11) A fan in which the speed or the like is controlled by a semiconductor element shall be such that the components connected to the control circuit will not burn if the semiconductor element loses its control ability.
- (5.12) When the circuit in secondary of an insulating transformer or beyond a rectifier to which electron tubes, capacitors, semiconductor elements, resistors, etc. are connected is tested as prescribed below, the components connected to the circuit shall not burn. However, when other components will not burn even if a component burns, such a case is an exception.
- (a) Electronic tube, display lamp or the like shall be short-circuited at their terminals. Also the heater or filament terminals shall be opened.
 - (b) The capacitor, semiconductor element, resistor, transformer, coil and other similar articles, shall be short-circuited or opened at their terminals.
 - (c) The components described in (a) and (b), which are contained in a metal enclosure shall be short-circuited at their terminal and enclosure. If the part connected to the terminal inside such enclosed unit is not liable to contact with the metal enclosure, however, the above requirements need not be fulfilled.
 - (d) In the tests of (a), (b) and (c), the insulation resistance between live part and dead metal part accessible by a man shall be $0.1\text{ M}\Omega$ or more, when measured with a d.c. 500 V insulation resistance tester, at every short-circuit and open-circuit.
- (5.13) The insulation used as the enclosure, together with the pilot lamp, fuse holder and similar components exposed outside the appliance body and their protective covers shall not cause flaws, cracks or other abnormalities which may result in risks of electric shock, fire, etc. when a weight of 250 g in mass having a hemispherical face of polyamide with the Rockwell hardness of HRR 100 specified in JIS K 7202 and with a radius of 10 mm is allowed to fall vertically on them once from a height of 20 cm, or an impact force of $0.5 \pm 0.05\text{ N}\cdot\text{m}$ ($0.051 \pm 0.005\text{ kgf}\cdot\text{m}$) is applied once by means of the impact-test apparatus shown in Attached Fig. 2. However, the pilot lamp, fuse holder and similar components exposed outside the appliance body and their protective covers each having a surface area not exceeding 4 cm^2 and not projecting 10 mm or more from the surface of appliance body, are excepted.
- (5.14) The fan with enclosure of synthetic resin (except those which needs translucency or transparency, or those which needs flexibility, mechanical strength, etc. due to the function) shall be such that, a square plane of 9 cm^2 or more on outside surface of the enclosure (if there is no square plane of 9 cm^2 or more on the enclosure, the test piece of original thickness cut into $3 \times 3\text{ cm}$) shall not burn when the tip of the flame of about 20 mm in height produced by burning the gas of class 1 and No. 1