

JIS

JAPANESE INDUSTRIAL STANDARD

Ventilating Fans

 **JIS C 9603—1988**

Translated and Published

by

Japanese Standards Association

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



1. Scope

This Japanese Industrial Standard specifies ventilating fans with axial flow type blades, driven by single-phase induction motors, to be used in homes, offices and the like.

Remark: The units and numerical values given in { } in this Standard are based on the traditional units and are currently the criteria in force.

2. Definitions

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

- (1) wind pressure shutter A shutter which is opened by the wind pressure produced by rotation of blades.
- (2) manually operated shutter A shutter the opening and closing operations of which are done manually.
- (3) switch linked shutter A manually operated type shutter which is linked with operation of the motor switch.
- (4) electrical shutter A shutter which is opened and closed by the power of an electrical machinery or apparatus.
- (5) circulating function The function of a fan to circulate and ventilate room air.

Applicable Standards:

JIS B 8330-Testing Methods for Turbo-Fans and Blowers

JIS C 0601-Operation of Handles and Indication of Electric Installations

JIS C 1502-Sound Level Meters

JIS C 3306-Polyvinyl Chloride Insulated Flexible Cords

JIS C 4908-Capacitors for Electrical Apparatus

JIS C 8303-Plugs and Receptacles for Domestic and Similar General Use

JIS C 8304-Small Switches for Indoor Use

JIS K 5400-Testing Methods for Organic Coatings

JIS S 6006-Pencils and Coloured Pencils

JIS Z 8806-Methods of Humidity Measurement

3. Classification

The ventilating fans are classified according to the diameter (cm) of a circle drawn by the tips of blades into six classes e.i. 15, 20, 25, 30, 40 and 50. Fans of classes 15, 20, 25 and 30 are classified into household use and others according to the usage.

4. Rated Voltage and Rated Frequency

The rated voltage of the fan shall be single phase a.c. 100 V, and the rated frequency shall be 50 Hz only, 60 Hz only, or 50 Hz and 60 Hz in common.

5. Performance

5.1 Starting When tested by the method of 8.3, the fan shall start regardless of the position of the fan blades.

In this procedure, the wind pressure type or electrical type shutter shall open when the impeller rotates.

5.2 Voltage Fluctuation When tested by the method of 8.4, the fan shall be able to operate continuously without any difficulty.

5.3 Electrical Power Consumption When tested by the method of 8.5, the electrical power consumption shall comply with Table 1, and the tolerances on indicated value shall comply with Table 2.

Table 1. Power Consumption

Unit: W

Class	Electrical power consumption
15	35 max.
20	45 max.
25	60 max.
30	80 max.
40	120 max.
50	175 max.

Table 2. Tolerances on Power Consumption

Marked electrical power consumption W	Tolerances %
Up to and including 30	± 25
Over 30 up to and including 100	± 20
Over 100	± 15

5.4 Temperature Rise When tested by the method of 8.6, the temperature rise shall not exceed the values in Table 3, and the specimen shall comply with the provisions of 5.5.1 and 5.5.2.

Table 3. Temperature Rise

Unit: °C

Position of measurement	Class of insulation	Temperature rise	Measuring method
Insulated winding	Class A	60	Resistance method
	Class E	75	
	Class B	80	
	Class F	100	
	Class H	125	
Enclosure	—	40	Thermoelectric thermometer method

Remark: The limit of reference ambient temperature shall be 40°C.

5.5 Insulation

5.5.1 Insulation Resistance When tested by the method of 8.7.1, the insulation resistance shall be not less than 1 MΩ.

5.5.2 Withstand Voltage When tested by the method of 8.7.2, the fan shall withstand the test voltage.

5.5.3 Insulation Performance under Damp and Heat When tested by the method of 8.7.3, the insulation resistance shall be not less than 0.3 MΩ.

5.5.4 Insulation Performance under Water Spray When tested by the method of 8.7.4, the insulation resistance shall be not less than 1 MΩ, and the withstand voltage shall comply with 5.5.2.

5.6 Air Delivery When calculated by the method of 8.8, the air delivery shall comply with Table 4.

Table 4. Air Delivery

Unit: m³/min

Class	Air delivery
15	4.5 min.
20	6.0 min.
25	10 min.
30	15 min.
40	28 min.
50	45 min.

Remark: The static pressure is 0 Pa{0 mmH₂O}

5.7 Noise When tested by the method of 8.9, the noise shall comply with Table 5.

Table 5. Noise

Unit: dB

Class		Value of noise
15, 20, 25, 30	Household use	55 max.
	Others	65 max.
40, 50		70 max.

Remark: "Others" designate fans having large air delivery or static pressure, and marked other than household use, for example industrial use or business use.

5.8 Switch The switch shall comply with the following particulars:

- (1) Switching When tested by the method of 8.10 (1), there shall be no fault at any part.
- (2) Temperature When tested by the method of 8.10 (2), the temperature rise of the contact parts shall not exceed the appropriate value of Table 6.

Table 6. Temperature Rise of Switch

Unit: °C

Class of contact	Temperature rise
Copper or copper alloy	40
Silver or silver alloy	65

Remark: The limit of reference ambient temperature shall be 40°C.

6. Construction

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

- (1) The ventilating fan shall be assembled to have a correct shape and good appearance.
- (2) The ventilating fan shall be easily handled and shall comply with the following items:
 - (a) The cord specified in 6.5.1, a connector, a terminal board, a terminal box shall be attached to a suitable position of a ventilating fan.
 - (b) A speed regulator or the switch specified in 6.5.4 shall be attached to a ventilating fan as needed.

- (c) The degree of speed or the open and close states shall be clearly stated on the speed regulator or the switch according to JIS C 0601. However, for switches like pull switches on which the indication of speed is difficult, the indication of operation may be performed in the vicinity of switch, or may be omitted.
 - (d) The mounting part of ventilating fan can be securely mounted mating with the mounting holes given in Appendix 2.
 - (e) The ventilating fan shall be so structured that the attaching, detaching and cleaning are easily done.
 - (f) The pull string of a manually operated shutter shall be robust and easily renewed.
- (3) The ventilating fan shall operate good and comply with the following items.
- (a) There shall be no remarkable noise or vibration during running.
 - (b) The fans equipped with wind pressure or electrical shutter shall be so structured that the shutter automatically closes when the fan stops and opens when the fan is in running.
 - (c) In a fan of such a construction that the shutter opens and closes linked with the switch operation, the shutter shall open without fail when the switch is closed. However, a fan which has circulating function is an exception.
 - (d) A fan having a shutter shall be so structured that no abnormal rattling appears due to the wind while the shutter is in closed state.
 - (e) The speed regulator or the switch shall operate smoothly and surely.
- (4) The ventilating fan shall have such construction that the endurance is excellent and neither mechanical nor electrical failure shall be caused due to loosening or the like.
- (5) The ventilating fan shall not cause any hazard under normal service conditions, and shall comply with the following items:
- (a) Suitable protective frame or netting shall be prepared for the impeller which may be easily accessed by a man under normal service conditions, to avoid easy access. However, fans marked with the notice that the fan is to be mounted to a high place and fans which will not cause any risk of injure or the like even if the impeller is accessed, are exceptions.
 - (b) Fans some parts of which are removed for cleaning or the like shall be so constructed that the said operations can be done easily, surely and safely.

- (c) Fans whose rotational speed or the like is controlled by means of semiconductor elements shall be so designed that the components connected to the control circuit shall not burn when the semiconductor elements lose the control ability.
- (d) The insulating materials used as the enclosure, together with the display lamps, fuse holders and the like exposed on the outer surface of appliance body and their protective covers shall not cause any cracks, splits or other defects which may result in such risks as electric shock and fire, when a weight of 250 g in mass having a hemispherical face of polyamide with a Rockwell hardness of HRR 100 and with a radius of 10 mm is dropped on them once vertically from a height of 20 cm, or when 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 display lamps, fuse holders and the like, and their covers on the outer surface of appliance body which are not exceeding 4 cm^2 in the area and not protruding over 10 mm from the outer surface of appliance body, are exempted from the above requirements.
- (e) The fan with synthetic resin enclosure (excluding the portions where translucency or transparency is necessary, or where flexibility, mechanical strength or the like is necessary due to their function) shall not burn when tested in such a way, that a flat square part of 9 cm^2 or more on the external surface of enclosure (a square test piece with a side length of 3 cm cut out with the original thickness, if there is no flat part of 9 cm^2 or more on the external surface of enclosure) is placed being about 45 degrees inclined from the horizontal plane, the tip of flame about 20 mm long produced by burning a gas using a burner of nozzle inside diameter 0.5 mm with its air inlet closed is applied, from the bottom, to the centre of the said plane for 5 sec and then removed.
- (f) The fan which may result in a risk of electric shock or fire when the rated voltage at rated frequency is applied, with the motor rotor locked, until the temperatures of various parts are almost stabilized, shall be equipped with an overload protective device. The overload protective device shall not operate under normal service conditions.

If the fan has plural motors, one motor shall be locked in turn.

- (g) When a fuse is employed as the overload protective device, the rated current of current fuse or the rated operating temperature of thermal fuse shall be indelibly marked on the nameplate or the fuse mount. However, if the fuse is non renewable, such a case is an exception.

- (h) When the secondary circuit of an insulating transformer or the circuit behind a rectifier to which electronic tubes, capacitors, semiconductor elements, resistors, etc. are connected is subjected to the following tests, the said components shall not burn. However, when other components do not burn if a component burns, such a case is an exception.
 - (i) For electronic tubes, display lamps, and the like, the terminals shall be short circuited, and the heater or filament terminals shall be opened.
 - (ii) For capacitors, semiconductor elements, resistors, transformers, coils and the like, the terminals shall be short circuited or opened.
 - (iii) For the component stated in (i) and (ii) accommodated in a metallic case, the terminals and the case shall be short circuited. However, in the case where a component connected to the terminal is not likely to contact with a metallic case in the components, the above requirement shall not be applied.
 - (iv) The insulation resistance between the live parts and the dead metallic parts accessible by a man measured by a d.c. 500 V insulation resistance tester at every short circuit or open circuit in the tests of (i), (ii) and (iii) shall be not less than 0.1 MΩ.

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

- (1) The test finger given in Attached Fig. 1 shall not contact with the live part under the condition that the easily removable live parts are removed beforehand, except the live parts on mounting face which are not easily accessed by a man when installed on the wall and the like. In this case, the force applied to the test finger shall be 10 N{1.02 kgf} for the external surfaces and openings of fans to be mounted to places not easily accessed by a man, and 30 N{3.06 kgf} for other external surfaces and openings.
- (2) The clearance (including creeping distance) between live parts of different polarity, or between the live part and the dead metallic part or the surface of non-metallic part accessible by a man shall be as given Table 7. In this case, the clearance shall be measured with a force of 30 N{3.06 kgf} applied to the external surface of the equipment body and 2 N{204 gf} to internal surface respectively, so that the clearance becomes the minimum. However, such parts as a secondary circuit of an insulation transformer and a rectified circuit, where decrease of clearance is necessary due to their construction are exempted from the above requirement if the following particulars are complied with by testing.