

भारतीय मानक
Indian Standard

IS 374 : 2019

विद्युत छत के प्रकार के पंखों — विशिष्टि
(चौथा पुनरीक्षण)

**Electric Ceiling Type Fans —
Specification**
(*Fourth Revision*)

ICS 621.631 - 83

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FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, on recommendation of the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first published in 1951 and subsequently revised in 1960, 1966 and 1979. The fourth revision of this standard has been undertaken due to the following:

- a) To bring it in line with International Standards on safety, performances and construction of electric circulating fans and regulators.
- b) Requirements of brushless DC motor fans have been incorporated.
- c) Additional definitions have been incorporated.
- d) The details of the safety requirements are separately given in IS 302 (Part 2/Sec 80), 'Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 80 Electric fans.

This Standard is based on IEC 60879 : 1986 'Performance and construction of electric circulating fans and regulators' issued by the International Electrotechnical Commission (IEC).

For the purpose of deciding whether a particular requirement of this Standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this Standard.

Indian Standard

ELECTRIC CEILING TYPE FANS — SPECIFICATION

(Fourth Revision)

1 SCOPE

1.1 This Standard covers the performance requirements for single phase 50 Hz a.c. ceiling fans driven by squirrel cage induction motor, capacitor type and brushless d.c. motor fans up to and including 250 V for household and similar purposes.

NOTES

- 1** The provision of speed regulator operated manually or using remote control device is optional unless demanded by the buyer or user.
- 2** For the purpose of testing by the inspecting and/or testing authority and/or the buyer, the manufacture shall ensure that the required fan/speed regulator compatible with the fan are supplied along with the fans under testing.

1.2 The requirements for safety have been covered in IS 302 (Part 2/Sec 80).

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
302 (Part 1) : 2008	Safety of household and similar electrical appliances: Part 1 General requirement (<i>fifth revision</i>)
302 (Part 2 /Sec 80) : 2017	Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 80 Fans
648 : 2006	Cold rolled non-oriented electrical steel sheet and strip — Fully processed type (<i>fifth revision</i>)
1248 (Part 2) : 2003	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 2 Special requirements for ammeters and voltmeters (<i>third revision</i>)

<i>IS No.</i>	<i>Title</i>
1248 (Part 3) : 2003	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 3 Special requirements for wattmeter and varmeters (<i>third revision</i>)
4905 : 1968	Method of random sampling
11037 : 1984	Electronic type fan regulators
14700 (Part 3 /Sec 2) : 2018	Electromagnetic compatibility: Part 3 Limits, Section 2 Limits for harmonic current emissions

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 302 (Part 2/Sec 80), and the following definitions shall apply.

3.1 Air Delivery

Quantity of air delivered in a given time under specified conditions.

3.2 Rated Air Delivery

Air delivery of the fan assigned by the manufacturer.

3.3 Service Value

The air delivery in cubic meters per minute divided by electrical power input to the fan in watts at the voltage and frequency specified for the test.

3.4 Canopy

A cover intended to partly or wholly conceal the hook and the shackle.

4 GENERAL REQUIREMENTS

4.1 The fans shall comply with the following requirements in addition to those given in IS 302 (Part 2/Sec 80).

4.2 Stampings

The stampings of fan motors shall be made from electrical steel sheet and shall meet the requirements given in IS 648. Alternate material to be used can be electrical grade cold rolled close annealed (CRCA) semi processed after decarburization .

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4.3 Blades

Fan blades shall be fitted with two or more well balanced blades made from metal or any other suitable rigid material. The blades and motors shall be securely fixed so that they do not become loose during its operation.

4.4 Bearings

The instruction for proper lubrication of bearings shall be furnished by the manufacturer in the instruction sheet.

4.5 Brushless DC Motor

High efficiency fans may be developed using any motor and control technology provided they meet the clauses of this standard. Brushless DC motor technology may be offered with electronic controllers that use sensors or are sensorless. The motor design may be PMDC or PMSM or any other concept that can meet the requirements of this standard.

4.6 Enclosure

Motors of ceiling fans shall be of the totally enclosed type. The enclosures of all insulated fans may form part or whole of the supplementary or reinforced insulation.

5 GENERAL NOTES ON TESTS

Clause 4 of IS 302 (Part 2/Sec 80) shall apply.

6 RATING

6.1 Clause 5 of IS 302 (Part 2/Sec 80) shall apply.

6.2 The sizes of ceiling fans shall be 900, 1 050, 1 200, 1 400 and 1 500 mm.

NOTE — Sizes of fans specified above are subject to a tolerance of ±5 mm.

7 CLASSIFICATION

Clause 6 of IS 302 (Part 2/Sec 80) shall apply

8 MARKING

8.1 Each fan shall be indelibly marked with the following information in addition to those given in clause 7 of IS 302 (Part 2/Sec 80):

- a) Manufacturer's name, trade-name of fan (if any) and number;
- b) Rated voltage(s) or voltage range;
- c) Type of fan, ac or dc;
- d) Frequency or frequency range of power supply, if of ac;
- e) Input in watts;
- f) Size of fan; and
- g) Country of manufacture.

8.2 In the case of a fan provided with an earthing terminal or contact, it shall be indelibly marked with the symbol \perp .

8.3 For additional information, the manufacturer may be requested to supply the following:

- a) Power factor;
- b) Number of blades;
- c) Type of regulator and number of running positions;
- d) Type of bearings; and
- e) Service value.

8.4 BIS Certification Marking

Electric ceiling type fans may also be marked with the Standard Mark.

8.4.1 The use of the standard mark is governed by the provisions of *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the standard mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

9 SAFETY REQUIREMENTS

The fans shall comply with the requirements given in clause 8 to 32 of IS 302 (Part 2/Sec 80), before they are subjected to test given in this standard.

10 SPEED REGULATORS

10.1 Regulators operated manually and using remote control shall be capable of reducing the speed of the fan by at least 50 percent of the full speed at the voltage and frequency specified for the test. Fans shall be capable of running continuously on any of the contacts of the regulators at the rated voltage or voltages or within the whole rated voltage range, whichever is applicable.

10.2 The regulator shall have an 'off' position preferably next to the lowest speed contact, and shall be provided with not less than five running positions except in case of continuously variable speed regulators. The speed difference at any running position shall not deviate by more than ±50 percent (for induction motor) and ±20 percent (for BLDC motor) from the ideal speed difference calculated on the basis of maximum and minimum speeds divided by the number of steps provided in the speed regulator.

NOTE — The following example illustrates the significance of this clause for a 5 speed regulator for Induction motor

Let the maximum speed of the fan be 400 rev / min and the minimum speed be 200 rev/min.

Then the ideal speed difference will be $(\text{Speed}_{\text{max}} - \text{Speed}_{\text{min}}) / (\# \text{ of speeds} - 1) = (400 - 200) / (5 - 1) = 200 / 4 = 50 \text{ rpm/min}$ The speed difference between any

two running position should be between 75 rev/min and 25 rev/min.

10.3 Where a regulator is provided with a capacitor not permanently connected across the motor terminals, provision shall be made so that the capacitor is discharged when the regulator is moved to 'off' position.

10.4 The regulator handle or knob shall either be an insulating material or, if of metal, shall be adequately insulated electrically and thermally so that temperatures rise above ambient is limited to 20°C. All metallic parts associated with it shall be protected from accidental contact.

10.5 The mechanism of the regulator shall be so designed as to ensure positive contact at each running position. In the case of inductance type regulator, it is essential that no portion of the inductive winding should remain permanently short-circuited in any of the running positions.

10.6 Adequate precautions shall be taken to prevent accidental contact of moving current carrying parts with the metallic body of the regulator.

10.7 Electronic type regulators and remotes shall be provided with radio and television interference suppressing devices, if required, so as to ensure that there is no appreciable noise/disturbance on radio/television when operated outside a radius of 2 m from the regulator. Electronic type fan regulators and remotes shall comply with the requirements given in IS 11037 and IS 14700 (Part 3/Sec 2).

10.8 The voltage drop across the electronic type regulator at the maximum speed position shall not exceed 2 percent of the rated voltage of the fan.

NOTE — The test for **10.1** to **10.8** shall be applicable only in case the fans are supplied with speed regulators

11 STARTING

11.1 The fan shall be capable of starting up from rest with the regulator or remote, if any, at the lowest speed step when 85 percent of the rated voltage or 85 percent of the lowest declared voltage in the voltage range is applied.

11.2 For BLDC type fan should start its rotation in its normal direction of rotation, as specified by the manufacturer. During 'start' it should not move in the reverse direction before resuming its normal direction of rotation.

12 INTERCHANGEABILITY

The motor of the fan of the particular size and model and its associated regulator and set of blades shall be interchangeable such that the performance of the fan keeps within limits specified in this standard.

13 SILENT OPERATION

Precautions shall be taken in the manufacturer of fans and regulators to ensure a reasonable degree of silence at all speeds.

NOTE — The need for specifying limits of noise levels (acoustical) of the fan is recognized. However, it has not been found possible to specify these limits at present on account of:

- a) Dependency of these limits on the actual location of the fans;
- b) Lack of data on the acceptable noise levels for different applications; and
- c) Lack of agreed definition of noise level and method of evaluating the same.

The criterion of noise level may, therefore, be subject to an agreement between the manufacturer and the purchaser.

14 GENERAL CONDITION OF TEST AND METHOD OF MEASUREMENT OF PERFORMANCE REQUIREMENTS

14.1 Limits of Error of Electrical Measuring Instruments

Ammeters, voltmeters and watt meters used for type tests shall have accuracy of class 0.5 or better [see IS 1248 (Part 2) : 2003 and IS 1248 (Part 3) : 2003].

14.2 Test Voltage and Frequency

The voltage and frequency at which the tests are conducted shall be as follows:

14.2.1 When a rated voltage is indicated on the name plate, the tests shall be conducted at the rated voltage. If the fan is specified for two or more distinct rated voltages, the tests shall be carried out at the most unfavorable voltage.

When a voltage range is indicated on the name plate, the test voltage shall be:

- a) the highest and the lowest values of the range when voltage range is in excess of 10 percent of the mean of the range; and
- b) the mean of the upper and lower limits when the voltage range is 10 percent or less of the mean of the range.

14.2.2 Fans shall be Tested at Rated Frequency, if Marked

For a fan with a range of frequencies, the tests shall be made at the frequency which gives the most unfavorable results. For a fan not marked with rated frequency, the tests shall be made at 50 Hz.

14.2.3 Limits of Voltage Variation

The variation in the voltage shall not exceed ± 1 percent of the test voltage during air performance tests. While taking the current and wattage readings during these tests, however, the voltage shall be the test voltage.

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14.3 Test for Air Performance

The method for determining the air performance shall be as follows. The test shall be carried out at any ambient temperature between 15°C and 35°C.

14.3.1 Test Chamber

The fan shall be tested in a test chamber having the following dimensions:

- a) Length : 4.50 m,
- b) Width : 4.50 m, and
- c) Height : 3 m (See Fig. 1).

The material used for fabricating the test chamber shall be made of plywood.

The top of the test chamber shall be covered except for a centrally situated circular opening (top-opening), the diameter of which shall be between 1.1 and 1.2 times the blade sweep. The central diaphragm in which the top opening is located shall be not more than 6 mm thick.

The observer shall take readings from a position between the chamber and outer screen, and a small shelf for electrical instruments may be provided in this space. Except for these, the space between the chamber and the outer screen and the space inside the test chamber shall be clear of all obstructions, and there shall be no heating or cooling apparatus anywhere in the system.

The room in which the test chamber and the outer screen are erected shall be suitably protected from extraneous draughts.

14.3.2 Height of Fan

The fan shall be placed at such a height that the plane of the fan blades is 3 m (tolerance ± 10 mm) from the ground level and lies in the plane of the top edge of the diaphragm containing the top opening in the roof of the test chamber.

Any ceiling external to the test chamber or any projecting beam which might interfere with the air flow shall be not less than 1 m above the top opening, that is not less than 4 m from the ground level at this point.

14.3.3 Testing Instrument

The air movement shall be measured by means of the rotating vane anemometer having an internal diameter not exceeding 80 mm.

NOTE — In the absence of rotating vane anemometer of analogue type which can read the air movement in meters, digital type vane anemometer having an internal diameter not exceeding 80 mm may be used. Unlike the analogue vane anemometer which can measure the air movement/displacement in meters, the digital type vane anemometer, can measure the air velocity in meters per second.

14.3.4 Arrangement of Apparatus

The arrangement of the apparatus shall be such as to permit the anemometer being moved in either direction along both diagonals of the test chamber in a test plane 1.50 m (tolerance ± 10 mm) below the plane of the fan blades. The anemometer shall be supported in such a manner as to offer as little obstruction as possible to the air flow.

14.3.5 Procedure of Test Using Analogue Type Vane Anemometer

Before taking any steps towards testing a fan according to this standard, it is essential that it should have been 'run-in' to steady conditions at the test voltage. A period of 2 h is considered adequate for this purpose.

The measurements shall be carried out with the fan running at full speed at the test voltage.

Air velocity readings shall be taken along each of the four semi-diagonals of the test chamber commencing at a point 40 mm from the vertical axis of the fan motor by increments of 80 mm so that each reading represents an air velocity at the mean radius of an annulus 80 mm wide. The readings shall be continued until the velocity falls below 15.0 m per min.

Each reading shall consists of the time taken by an air movement of 300 m measured by the anemometer, except when such air movement taken more than 2 min; the reading shall than consists of the time taken by a movement of some convenient and reliable quantity of air requiring approximately 2 min.

The average air velocity over any annulus shall be the mean of the readings on the four semi-diagonals at each mean radius of annulus.

The average velocity so obtained, multiplied by the area of the corresponding annulus shall be taken as the total air delivery through that annulus.

The sum of the air deliveries through all such annulus up to the limit of readings shall be taken as the measured air delivery of the fan for the purposes of this standard.

Ambient air conditions (temperature, relative humidity and pressure) obtained at the test chamber during test shall be recorded with the test result.

NOTES

- 1 Correction factor for temperature, relative humidity and pressure is under consideration.
- 2 The test for air delivery may be carried out using a digital type vane anemometer as per the method described in 14.3.6.

14.3.6 Procedure of Test Using Digital Type Vane Anemometer

The test chamber, mounting of fan, testing instruments and arrangements of apparatus shall be as described in 14.3.1 to 14.3.4.

The anemometer shall be rigidly mounted and positioned inside the test chamber. However the handset device which reads the air velocity shall be kept outside the test chamber connected through a flexible cord with the vane anemometer. The handset device shall have the provisions of a selector switch having the option to select a measurement pulse of two seconds to sixteen seconds.

Before taking any steps towards testing of a fan in accordance with this standard, it is essential that it should have been run for a period of two hours to achieve a steady state conditions.

The measurement shall be carried out with the fan running at full speed at the test voltage.

Readings shall be taken along each of the four semi-diagonals of the test chamber commencing at a point of 40 mm from the vertical axis of the fan motor by increments of 80 mm so that each reading represents an air velocity at the mean radius of the annulus 80 mm wide.

Before taking each reading, the vane anemometer shall be allowed to run for 2 min in order to have proper stabilization.

After the stabilization period, eight readings shall be taken in each position of the annulus on the semi-diagonals at sixteen seconds pulse. The procedure shall be repeated for all the positions of the annulus and average of all the thirty two readings for each annulus shall be calculated and recorded. The readings shall be continued until the actual air velocity falls below 15 m/min.

The average air velocity over any annulus shall be the average of all the thirty-two readings on the four semi-diagonals at each mean radius of annulus.

The average velocity over each annulus so obtained, multiplied by the multiplying factor as shown in the table of Annex B shall be taken as the total air velocity through that annulus.

The sum of the air velocity through all such annuli up to the limits of the readings mentioned above multiplied by the area constant of the annuli shall be taken as the measured air delivery of the fan for the purpose of this standard.

The temperature, relative humidity and pressure inside the test chamber during the test shall be recorded with the test result.

NOTE — Correction factor for temperature, relative humidity and pressure are under consideration.

14.3.7 Test Report Format

The test report format and the method of calculations of air delivery using digital type vane anemometer are given in Annex B. Format of Annex B is suitable only for digital type anemometer.

14.4 Measurement of Speed of the Fan

The speed of rotation of the fan shall be determined by running the fan at the test voltage and at its rated frequency. The method of measurement shall be such that the speed of the fan is not affected. The regulator, if any, shall be at the highest speed position. The measured speed shall not differ from the rated or declared value by ± 10 percent.

14.4.1 The peripheral speed of the fan at test voltage and rated frequency shall be as follows:

<i>Sl No.</i>	<i>Size of Fan (mm)</i>	<i>Maximum Peripheral Speed (m/s)</i>
(1)	(2)	(3)
i)	900 to 1400	30
ii)	1500	20

14.5 Measurement of Power Factor and Power Input

The fan shall be connected to the supply at the test voltage and frequency. Capacitors, if any, associated with the fan shall be retained in the circuit. The regulator, if provided, shall be set at the highest speed position.

Power input (W) shall be noted and power factor of the fan shall be either measured directly with the help of a power factor meter or calculated from the readings of ammeter, voltmeter and wattmeter. The power factor under above conditions shall not be less than 0.90. The power input shall be as given in 10 of IS 302 (Part 2/Sec 80).

15 PERFORMANCE REQUIREMENTS

15.1 The minimum air delivery and minimum service value at test voltage and at rated speed when tested in accordance with 14 shall be as given in Table 1.

15.2 Tolerance on Ratings

The tolerances to be applied to the rated quantities, when assigned and declared by the manufacturer, shall be as given below. However, the rated quantities shall not be inferior to those specified in Table 1.

- a) Power factor: $-1/6 (1 - \cos \phi)$, minimum 0.02, maximum 0.07
- b) Fan speed: ± 10 percent

Where a tolerance in one direction is omitted, there is no restriction on the value in that direction.

16 ENDURANCE

Fans are subjected to 1 000 cycles of operation at rated voltage and frequency, each cycle of operation shall comprise the blades to reach maximum rated speed and then shutting off the fan and allow the blades to come to a complete stop.

Table 1 Performance Values for Fans
(Clauses 15.1 and 15.2)

Sl No.	Fan Size mm	Minimum Air Delivery m ³ /min	Minimum Service Value m ³ /min/W
(1)	(2)	(3)	(4)
i)	900	130	3.1
ii)	1050	150	3.1
iii)	1200	210	4.0
iv)	1400	245	4.1
v)	1500	270	4.3

NOTE — Air delivery values are on the basis of air velocity measurement upto 15. m/min.

Speed regulators shall be subjected to 2500 operations. The regulators shall be connected to a fan of locked rotor or an electrical load of equivalent impedance supplied at the maximum rated voltage.

One operation includes a full cycle of movement from the ‘off’ position to the full speed load position or to the maximum position and back to off position. The test shall be made approximately at the rate of 6 operations per minute.

After the completion of the test, the fan and the regulator shall meet the requirements of **8** and **16.4** of IS 302 (Part 1). Also the fan and the regulator shall continue to function satisfactorily.

NOTE — The test for speed regulators shall be applicable only in case the fans are supplied with speed regulators.

17 TEST FOR HARMONIC DISTORTION

This test is applicable for brushless dc motor fans. The BLDC fan shall comply with the requirements given in IS 14700 (Part 3/Sec 2) . Total harmonic distortion shall be less than 20 percent.

18 TESTS

18.1 Categories of Tests

Tests are classified as type, acceptance and routine tests.

18.2 Type Tests

The tests specified in Table 2 shall constitute the type tests and shall be carried out on two samples of the same type and rating selected preferably at random from a regular production lot. Before commencement of the tests, the ceiling fans shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, mechanical hazards, markings, provision of suitable terminals for supply connections, earthing and the effectiveness of screws and connections. The external surface finish shall be even and free from finishing defects.

18.2.1 Criteria of Acceptance

Both samples shall successfully pass all the type tests for proving conformity with the requirements of the

Table 2 Schedule of Type Tests
(Clause 18.2)

Sl No.	Test	Clause Reference
(1)	(2)	(3)
i)	Safety requirements	9
ii)	Performance requirements	15
iii)	Speed and power factor	14.4 and 14.5
iv)	Speed regulators	10
v)	Starting	11
vi)	Interchangeability	12
vii)	Silent operation	13
viii)	Power input	10 of IS 302 (Part 2/Sec 80)
ix)	Test for harmonic distortion	17
x)	Endurance test	16

standard. If any of the samples fails in any of the type tests, the testing authority, at its discretion, may call for fresh samples not exceeding twice the original number and subject them again to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat test(s).

18.3 Acceptance Tests

The following shall constitute the acceptance tests:

- a) Input **10** of IS 302 (Part 2 /Sec 80)
- b) Leakage Current at **13** of IS 302 (Part 2 operating temperature /Sec 80)
- c) Earthing connection **27** of IS 302 (Part 2 /Sec 80)
- d) Fan Speed **14.4**

- e) Power factor **14.5**
- f) Speed Regulators **10** (optional)
- g) Starting **11**

A recommended sampling plan for acceptance test is given in Annex A.

18.4 Routine Tests

The following shall constitute the routine tests:

- a) Earth continuity test (clause **A-1** of IS 302-1)
- b) Electric strength test (clause **A-2** of IS 302-1)
- c) Functional test (clause **A-3** of IS 302-1); and
- d) Simple running test (checking fan is operating or not).

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ANNEX A

(Clause 18.3.1)

Recommended Sampling Plan

A-1 SCALE OF SAMPLING

A-1.1 Lot

All fans along with associated regulator of the same type, grade, category and rating manufactured under similar conditions of production shall be grouped together to constitute a lot.

A-1.2 The number to be selected from the lot shall depend upon the size of the lot and shall be in accordance with Table 3.

A-1.2.1 These fans shall be selected from the lot at random. In order to ensure randomness of selection, procedures given in IS 4905 : 1968 may be followed.

A-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

The fans at the first stage, selected at random according to col 1 and 3 of Table 3 shall be subjected to the acceptance tests specified in **18.3**. A fan failing to satisfy any of the acceptance tests shall be considered as defective. The lot shall be considered as conforming to the requirements if the number of defectives found in the sample is less than or equal to the acceptance number (*see* col 5 of Table 3) and shall be rejected if it is greater than or equal to the rejection number (*see* col 6 of Table 3). If the number of defectives lies between the acceptance number and rejection number, the second sample of the same size shall be chosen at random and tested. If the number of defectives found in the combined samples is greater than or equal to the rejection number the lot shall be rejected, otherwise the lot shall be accepted.

Table 3 Sample Size and Criteria for Conformity

Lot Size	Stage	Sample Size	Cumulative Sample Size	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)
Up to 15	First	3	3	0	1
16 to 200	First	5	5	0	2
	Second	10	15	1	2
201 and above	First	7	7	0	2
	Second	14	21	2	3

NOTE — For lot size up to 15, decision regarding acceptance or rejection shall be taken at the first stage only.

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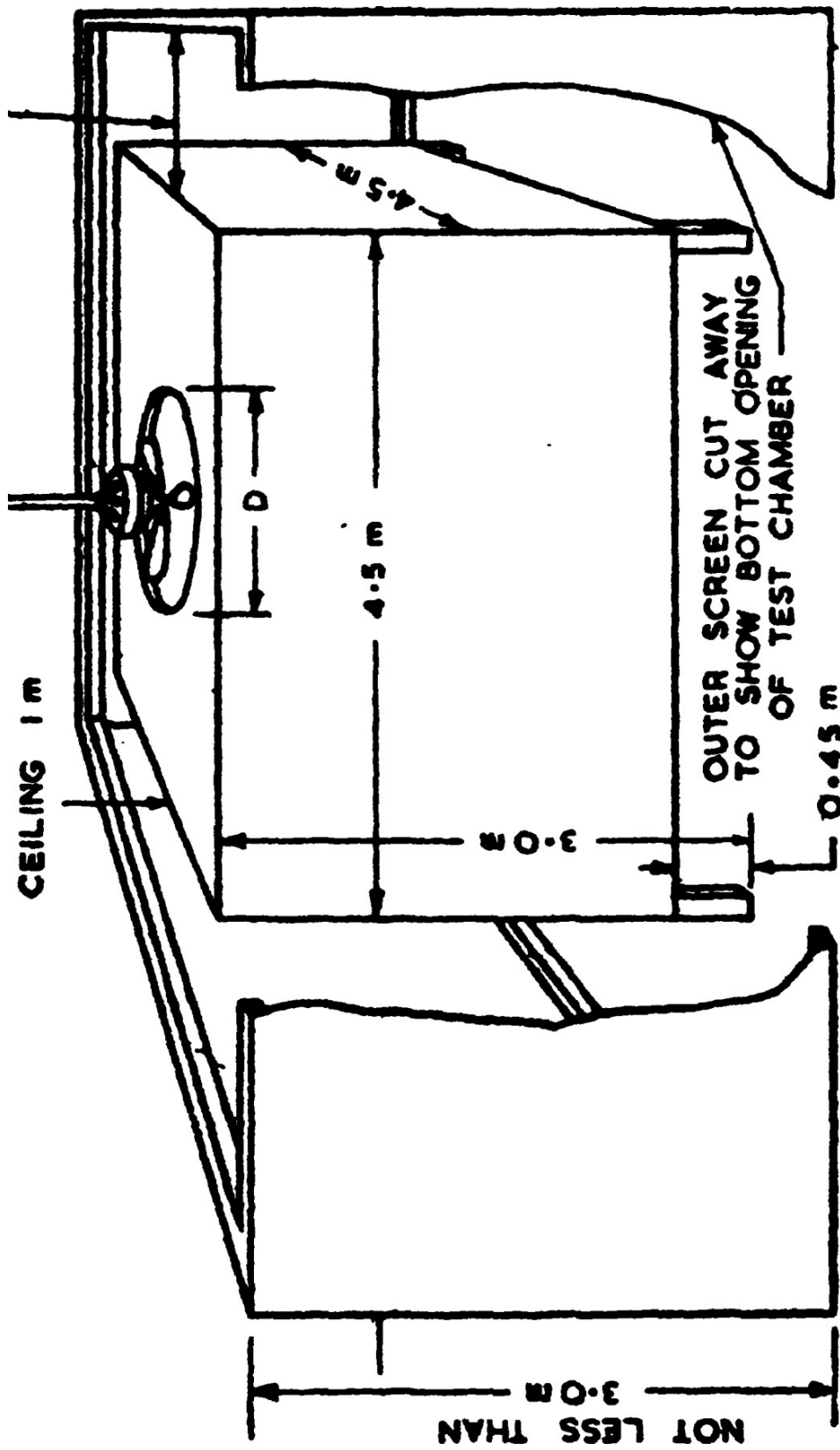


FIG. 1

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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TO

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(*Fourth Revision*)

(Page 1, clause 1.1) — Insert the following note at the end:

‘3 Air circulation ceiling fans meant for air circulation having rated speed less than or equal to 250 rev/min are optional unless required by manufacturer or purchaser.’

(Page 2, clause 6.2) — Substitute the following for the existing:

‘6.2 The preferred sizes of ceiling fans shall be 600, 750, 900, 1 050, 1 200, 1 320, 1 400 and 1 500 mm.

NOTES

1 Sizes of fans specified above are subject to a tolerance of ± 5 mm.

2 Sizes other than the preferred sizes within the range of 600 mm and 1 500 mm are allowed, provided it meets the performance values specified in Table 1.’

(Page 2, clause 10.2) — Substitute the following for the existing:

‘10.2 The regulator shall have an ‘off’ position prior to the lowest speed contact, and shall be provided with not less than five running positions except in case of continuously variable speed regulators. The speed difference at any running position shall not deviate by more than ± 50 percent from the ideal speed difference calculated on the basis of maximum and minimum speeds divided by the number of steps provided in the speed regulator.

NOTE — The following example illustrates the significance of this clause for a 5 speed regulator for Induction motor.

Let the maximum speed of the fan be 400 rev / min and the minimum speed be 200 rev/min.

Then the ideal speed difference will be:

$(\text{Speed}_{\text{max}} - \text{Speed}_{\text{min}}) / (\text{No. of speeds} - 1)$ that is $(400 - 200) / (5 - 1) = 200/4 = 50$ rev/min

The speed difference between any two running position should be between 75 rev/min and 25 rev/min.’

(Page 3, clause 10.7) — Substitute the following for the existing entries:

‘10.7 Electronic type regulators and remotes shall be provided with radio and television interference suppressing devices, if required, so as to ensure that there is no appreciable noise/disturbance on radio/television when operated outside a radius of 2 m from the regulator. Electronic type fan regulators shall comply with the requirement given in IS 11037. In addition, the regulator shall comply with the EMC requirements in accordance with IS 14700 (Part 3/Sec 2).’

(Page 4, clause 14.3.1) — Substitute the following for the existing:

‘14.3.1 *Test Chamber*

The fan shall be tested in a test chamber having the following dimensions:

- a) Length: 4.50 m,
- b) Width: 4.50 m, and
- c) Height: 3 m (See Fig. 1).

The material used for fabricating the test chamber shall be made of plywood with glass windows as per requirement.

The top of the test chamber shall be covered except for a centrally situated circular opening (top-opening), the diameter of which shall be between 1.1 and 1.2 times the blade sweep. The central diaphragm in which the top opening is located shall be not more than 6 mm thick.

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The bottom of the test chamber shall be cut away all round to a height of 450 mm from the ground level to provide adequate outlet for the air.

An outer chamber shall be provided at a uniform distance of 1 to 1.25 m laterally around the test chamber and reaching from the ground level to a height of not less than 3 m. One or more walls of a room may be utilized as sides of the outer chamber provided they comply with all the necessary conditions.

The observer shall take readings from a position between the test chamber and outer chamber, and a small shelf for electrical instruments may be provided in this space. Except for these, the space between the chamber and the outer screen and the space inside the test chamber shall be clear of all obstructions, and there shall be no heating or cooling apparatus anywhere in the system.

The room in which the test chamber and the outer chamber are erected shall be suitably protected from extraneous draughts.'

(Page 5, clause 14.4.1) — Substitute the following for the existing:

'The peripheral speed of the fan at test voltage and rated frequency shall be as follows:

Sl No.	Size of Fan (mm)	Maximum Peripheral Speed (m/s)
(1)	(2)	(3)
i)	≥ 600 and ≤ 750	40
ii)	> 750 and ≤ 1 400	30
iii)	> 1 400 and ≤ 1 500	20

(Page 5, clause 15.1, Para 1) — Insert the following at the end:

'Before starting the tests, the fan and its attachments are adjusted in accordance with the manufacturer's instructions for normal operation. Any controls shall be set for maximum continuous air flow unless the manufacturer's instruction states otherwise. Any other accessories such as luminaires, air purifier etc, shall be turned off.'

(Page 6, Table 1) — Substitute the following for the existing:

Table 1 Performance Value of Fans

(Clause 15.1 and 15.2)

Sl No.	Fan Size mm	Minimum Air Delivery (m ³ /min)	Minimum Service Value (m ³ /min/W)
(1)	(2)	(3)	(4)
1	600	100	1.5
2	> 600 and ≤ 750	115	1.7
3	> 750 and ≤ 900	130	3.1
4	> 900 and ≤ 1 050	150	3.1
5	> 1 050 and ≤ 1 200	210	4.0
6	> 1 200 and ≤ 1 320	220	4.0
7	> 1 320 and ≤ 1 400	245	4.1
8	> 1 400 and ≤ 1 500	270	4.3

NOTES

1 Air delivery values are on the basis of air velocity measurement up to 15 m/min.

2 Performance values of fans as per Table 1 and other test parameters such as speed, input watt, power factor etc, shall be corresponding to the highest speed achievable from remote control or regulator. Any other devices or speed regulation features, if provided, shall be suitably set to achieve the highest speed.

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