

**Draft**

**SAUDI STANDARD**

**No. 15382**

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES-  
SAFETY –  
PART 2-80: PARTICULAR REQUIREMENTS FOR FANS**

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	8
3 Definitions.....	8
4 General requirement .....	8
5 General conditions for the tests .....	8
6 Classification .....	9
7 Marking and instructions.....	9
8 Protection against access to live parts .....	10
9 Starting of motor-operated appliances .....	11
10 Power input and current .....	11
11 Heating .....	11
12 Void.....	12
13 Leakage current and electric strength at operating temperature .....	12
14 Transient overvoltages .....	12
15 Moisture resistance .....	12
16 Leakage current and electric strength .....	12
17 Overload protection of transformers and associated circuits .....	13
18 Endurance .....	13
19 Abnormal operation .....	13
20 Stability and mechanical hazards.....	14
21 Mechanical strength .....	14
22 Construction .....	15
23 Internal wiring .....	16
24 Components .....	16
25 Supply connection and external flexible cords .....	16
26 Terminals for external conductors .....	17
27 Provision for earthing .....	17
28 Screws and connections .....	17
29 Clearances, creepage distances and solid insulation .....	17
30 Resistance to heat and fire .....	17
31 Resistance to rusting.....	17
32 Radiation, toxicity and similar hazards .....	17

Annexes.....	18
Annex AAA (normative) National modifications.....	19
Annex AAA/1 (normative) National modifications on the clauses of the IEC standard.....	19
Annex AAA/2 (normative) Rated voltages and frequencies.....	27
Bibliography .....	28

**FOREWORD**

The Saudi Arabian Standards Organization (SASO) has adopted the international standard IEC 60335-2-80/2002 "Household and Similar Electrical Appliances - Part 2-80: Particular Requirements for Fans", including its amendments No.1/2004 and No. 2/2008, issued by the International Electrotechnical Commission (IEC).

SASO has stated the National Modifications that must be done on both Arabic and English text of this adopted SASO standard according to the Annex "AAA" mentioned at the end of this standard.

This standard after its approval will cancel and replace the Saudi Standard No. SASO 112/1979 and SASO 113/1979.

Note: On implementing this Saudi Standard, the Saudi Standards corresponding to the International Standards, if any, mentioned in this adopted Saudi Standard shall be taken into consideration.

## Introduction

The Saudi Arabian Standards Organization (SASO) has adopted the International Standard 60335-1/ 2006 " Household and Similar Electrical Appliances – Safety – Part 1: General Requirements", and approved as Saudi Standard SASO 1062/ 2007 . SASO has also issued a number of standards each of which is concerned with the requirements of a particular electrical appliance and among which is IEC 60335-2-80/2002 " Household and Similar Electrical Appliances – Safety – Part 2-80: Particular Requirements for Fans" including its Amendments No. 1/2004 and No. 2/2008.

In order to apply this Saudi Standard, it should be read in conjunction with SASO 1062/ 2007 because the Clause numbers herein are the same as those of Part 1. If a Clause in Part 1 is not applicable to this standard, the Clause number is included herein but with the words "Not applicable". And if a Clause in Part 1 has been replaced by new text to suit this standard, the Clause number herein is followed by the word "Replacement" and the new text of this Clause then follows on the next line. And if any addition has been added to this standard, the Clause number herein is followed by the word "Addition" and the new addition then follows on the next line. And if any modification has been done on a Clause of Part 1, the Clause number herein is followed by the word "Modification" and the modified text then follows on the next line. In case of introducing new Sub-clause, they should take the Clause number of Part 1 followed by the divisions 101, 102, ... etc. In case of introducing new Figures, they should take the numerals 101, 102, ... etc. In case of introducing new Annexes and/or Figures for the Annexes, they should take the numerals AA, BB, etc.

SASO reviews also the Saudi Standards adopted from the corresponding International Standards in order to know to which extent they are appropriate to the conditions of the Kingdom. When SASO assures that there is a necessity to carry out Deletion (or not applicable) and/or Replacement and/or Addition and/or Modification, etc. on any Clause and/or Sub-clause of the adopted Standard, SASO will list these in **the Annexes of the National Modifications** which will be added at the end of the relevant Standard.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – PART 2-80: PARTICULAR REQUIREMENTS FOR FANS

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## 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric fans for household and similar purposes, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

NOTE 101 Examples of fans that are within the scope of this standard are

- Ceiling fans;
- Duct fans;
- Partition fans;
- Pedestal fans;
- Table fans.

This standard also applies to separate controls supplied with fans.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended for use in shops, in light industry and on farms, are within the scope of this standard

As far as is applicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- Persons (including children) whose
  - Physical, sensory or mental capabilities; or
  - Lack of experience and knowledge

prevents them from using the appliance safely without supervision or instruction;

- Children playing with the appliance.

NOTE 102 Attention is drawn to the fact that

- For appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- In many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

NOTE 103 This standard does not apply to

- Appliances intended exclusively for industrial purposes;
- Appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- Fans incorporated in other appliances.

## 2 Normative references

This clause of Part 1 is applicable.

## 3 Definitions

This clause of Part 1 is applicable except as follows.

### 3.1.9 Replacement:

#### **normal operation**

Operation of the appliance under the following conditions

Table and pedestal fans are operated with any oscillating mechanism in operation.

Ceiling fans are fixed to a ceiling.

Partition fans are installed in the centre of a suitable partition having dimensions at least four times the diameter of the air inlet.

Duct fans are installed in a duct in accordance with the installation instructions, the length of the duct being approximately four times the diameter of the fan.

### 3.101 Duct fan

Fan for installation within an enclosed airway so that the airflow is ducted on both the inlet and outlet sides]

## 4 General requirement

This clause of Part 1 is applicable.

## 5 General conditions for the tests

This clause of Part 1 is applicable except as follows.



**5.7 Addition:**

For fans intended to be used in tropical climates, the tests of Clauses 10, 11 and 13 are carried out at an ambient temperature of  $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ .

For fans marked with an ambient operating temperature, the tests of Clauses 10, 11 and 13 are carried out at the marked value  $\pm 2\text{ }^{\circ}\text{C}$

**6 Classification**

This clause of Part 1 is applicable except as follows

**6.2 Addition:**

Duct fans shall be at least IPX2.

**6.101** Fans shall be of one of the following classes with respect to climatic conditions:

- Fans for temperate climates;
- Fans for tropical climates.

Compliance is checked by inspection.

**7 Marking and instructions**

This clause of Part 1 is applicable except as follows.

**7.1 Addition:**

Fans for tropical climates shall be marked with the letter T.

Fans intended for operation in locations where the local ambient temperature exceeds  $40\text{ }^{\circ}\text{C}$  shall be marked with the ambient operating temperature.

**7.12 Addition:**

If the instructions state that the guard has to be removed for cleaning purposes, the instructions shall state the substance of the following:

Ensure that the fan is switched off from the supply mains before removing the guard.

**7.12.1 Addition:**

The installation instructions shall include the substance of the following:

- The model or type reference of a luminaire that may be installed in a fan constructed for this purpose;
- Whether the fan is intended for mounting in outside windows or walls (for partition fans);
- That the fan is to be installed so that the blades are more than 2,3 m above the floor (for fans intended to be mounted at high level);
- That precautions must be taken to avoid the back-flow of gases into the room from the open flue of gas or other fuel-burning appliances(for duct and partition fans).

**8 Protection against access to live parts**

This clause of Part 1 is applicable except as follows.

**8.1.1 Modification**

Lamps are not removed. However, during insertion or removal of lamps, protection against contact with **live parts** of the lamp cap shall

be ensured.

**8.2** Addition:

After the removal of **detachable parts** for the purposes of **user maintenance**, the **basic insulation** of internal wiring may be touched provided that it is electrically equivalent to the insulation of cords complying with IEC 60227 or IEC 60245.

**9 Starting of motor-operated appliances**

This clause of Part 1 is not applicable.

**10 Power input and current**

This clause of Part 1 is applicable except as follows.

**10.1** Addition:

Appliances are tested with shutters or similar devices in the open position.

**10.2** Addition:

Appliances are tested with shutters or similar devices in the open position.

**11 Heating**

This clause of Part 1 is applicable except as follows.

**11.7** Replacement:

Appliances are operated until steady conditions are established.

**11.8** Addition:

The temperature rise limits for appliances for tropical climates are reduced by 15 K.

The temperature rise limits for fans marked with an ambient operating temperature are reduced by the difference between the marked value and 25 °C.

## **12 Void**

## **13 Leakage current and electric strength at operating temperature**

This clause of Part 1 is applicable.

## **14 Transient overvoltages**

This clause of Part 1 is applicable.

## **15 Moisture resistance**

This clause of Part 1 is applicable except as follows.

### **15.1.1 Addition:**

The outer part of fans intended to be installed in the external structure of a building is subjected to the test of Subclause 14.2.4 a) of IEC 60529, the part of the fan not mounted on the outside surface being protected against spray from the oscillating tube. The test is carried out with the appliance in the rest position and then in operation while supplied at **rated voltage**, shutters or similar devices being in the open position.

Fans marked with the second numeral of the IP system are subjected to the appropriate test of IEC 60529 both at rest and in operation while supplied at **rated voltage**.

## **16 Leakage current and electric strength**

This clause of Part 1 is applicable.

**17 Overload protection of transformers and associated circuits**

This clause of Part 1 is applicable.

**18 Endurance**

This clause of Part 1 is not applicable.

**19 Abnormal operation**

This clause of Part 1 is applicable except as follows.

**19.1 Addition:**

Fans incorporating shutters or similar devices operated by a control are also subjected to the test of 19.101.

**19.7 Addition:**

Separate controls are mounted on a dull black-painted plywood board. Approximately 50 % of the area of each ventilating opening is blocked. The temperature of windings shall not exceed the values specified in Table 8 and the temperature rise of the board shall not exceed

- 50 K, for appliances with T marking;
- 65 K, for other appliances.

**19.9 Not applicable.**

**19.101** Fans incorporating shutters or similar devices that are operated automatically are supplied at **rated voltage** and operated with the shutters or similar devices held in the closed or open position, whichever is more unfavourable

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.1 Addition:

**Portable pedestal fans** having a height exceeding 1,7 m and a mass exceeding 10 kg are placed on a horizontal surface. A force of 40 N is applied to the appliance at a height of 1,5 m in the most unfavourable horizontal direction.

The appliance shall not overturn.

NOTE 101 Suitable means may be used to prevent the appliance from sliding.

**20.101** Fan blades, other than those of fans for mounting at high level, shall be guarded unless their leading edges and tips are rounded and

- They have a hardness less than D 60 Shore, or
- They have a peripheral speed less than 15 m/s when the fan is supplied at **rated voltage**, or
- The fan has a power output not exceeding 2 W when supplied at **rated voltage**.

NOTE An edge with a radius of not less than 0,5 mm is considered to be rounded.

Compliance is checked by inspection and by measurement.

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

**21.1** Appliances are also subjected to the test of 21.101.

**21.101** Fan guards are subjected to a push force and a pull force of 20 N applied along the axis of the fan motor. After the test, it shall not be possible to touch dangerous moving parts with a test probe that is similar to test probe B of IEC 61032, but having a circular stop face with a diameter of 50 mm instead of the non-circular face. The test probe is applied with a force not exceeding 5 N.

**21.102** Ceiling fans shall have adequate strength.

Compliance is checked by the following test.

Ceiling fans are mounted in accordance with the installation instructions. A load equal to four times the mass of the fan is suspended from the body of the fan for 1 min.

A torque of 1 Nm is then applied to the fixed body of the fan for 1 min. The test is repeated with the torque applied in the reverse direction.

The suspension system shall not break and the fan shall not be damaged to such an extent that compliance with 8.1, 16.3 and Clause 29 is impaired.

## **22 Construction**

This clause of Part 1 is applicable except as follows.

**22.1** Addition:

NOTE 101 The enclosure defined in IEC 60529 does not include guards for fan blades.

**22.11 Modification:**

The 50 N force is not applied to clips used to fasten fan guards. Instead, a force of 15 N is applied in any direction to the clips in an attempt to release them.

**22.101** Appliances having provision for attaching a luminaire shall incorporate appropriate terminals and internal wiring.

Compliance is checked by inspection.

**23 Internal wiring**

This clause of Part 1 is applicable except as follows.

**23.3 Modification:**

Instead of moving the movable part backwards and forwards, fans with an oscillating mechanism are tested as follows.

Fans are supplied at **rated voltage** and operated under **normal**

**Operation**, the angle of oscillation being the maximum allowed by the construction. The test is carried out for 100 000 cycles of oscillation.

**24 Components**

This clause of Part 1 is applicable except as follows:

**24.2 Addition:**

Appliances having a **rated power input** not exceeding 25 W may be fitted with a switch in the **supply cord**.

**24.101 Thermal cut-outs** incorporated in duct fans in order to comply with

Clause 19 shall not be self resetting.

Compliance is checked by inspection.



**25 Supply connection and external flexible cords**

This clause of Part 1 is applicable except as follows.

**25.5 Addition:**

**Type Z attachment** is allowed for **portable fans**.

**26 Terminals for external conductors**

This clause of Part 1 is applicable.

**27 Provision for earthing**

This clause of Part 1 is applicable.

**28 Screws and connections**

This clause of Part 1 is applicable.

**29 Clearances, creepage distances and solid insulation**

This clause of Part 1 is applicable except as follows.

**29.2 Addition:**

The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

**30 Resistance to heat and fire**

This clause of Part 1 is applicable except as follows.

**30.2.2 Not applicable.****31 Resistance to rusting**

This clause of Part 1 is applicable.

**32 Radiation, toxicity and similar hazards**

This clause of Part 1 is applicable.

### **Annexes**

The annexes of Part 1 are applicable, in addition to the following annexs.

**Annex AAA****(normative)****NATIONAL MODIFICATIONS****Annex "AAA/1"****(normative)****National Modifications on the clauses of the Adopted IEC standard****1 Scope**

This Clause of the clauses of the Adopted IEC standard is replaced by the following;

This Standard is concerned with Domestic Electric Fans for domestic and similar purposes, designed for connection in ac circuits according to the voltages and frequencies stated in tables No.(AAA/2-1) and (AAA/2-2) of annex AAA/2.

**2 Normative references**

This clause of the clauses of the Adopted IEC standard is applicable except as follows:

**2.1** SASO 112/1979 "Domestic Electric Fans"

**2.2** SASO 113/1979 "Methods of test for Domestic Electric Fans"

**3 Definitions****3.102 Electric fan**

A propeller-bladed fan having two or more blades directly driven by an a.c. electric motor and intended for use with free inlet and outlet of air,

hereinafter referred to as a "fan"

**3.103 Blade sweep**

The diameter of the circle traced out by the extreme tips of the fan

Blades

**3.104 Size of fan**

The blade sweep in millimetres or centimetres

**3.105 Rated speed**

The rotational speed, specified by the manufacturer, at which the fan develops the specified air delivery

**3.106 Rated air delivery**

The air delivery, at the rated voltage and the rated frequency, when the fan is operating at its highest speed (m<sup>3</sup>/min.)

**4 General requirement**

This Clause of the clauses of the Adopted IEC standard is applicable.

**5 General conditions for the tests**

This Clause of the clauses of the Adopted IEC standard is applicable.

**6 Classification**

This Clause of the First Section is applicable.

**7 Marking and instructions**

This Clause of the clauses of the Adopted IEC standard is applicable except as follows:

**7.1 Addition:**

The fan size.

**7.12.1 Addition:**

- The number of speeds and the value of each (rev./min.).
- The power factor.

Compliance is checked by inspection and by the following test:

The fan shall be operated for a period not less than 15 minutes, at the test voltage and frequency, and at its highest speed setting with the oscillating device (if any) operating.

The power factor shall be measured.

- The rated air delivery (m<sup>3</sup>/min.).

Compliance is checked by inspection and by the following test:

For the purpose of this test, the fan shall be mounted in accordance with the manufacturers instructions. A cylindrical duct having a length of 3 times the size of the fan, and of suitable diameter, (1.2 to 1.5 times the fan size), shall be used.

The duct shall be placed in front of the fan. The fan shall be operated at the test voltage and at its highest speed setting, for one hour. The velocity of the air shall be measured by moving a suitable anemometer along a horizontal line perpendicular to the axis of the fan blades, and placed at a distance equal to 3 times the size of the fan.

Readings of the anemometer shall commence at a point 20 mm from the axis of the fan blades, and shall progress along the horizontal line in each direction, by increments of 4 cm. Readings shall be continued

in each direction until the anemometer reaches a point 4 cm from the edge of the duct. The readings shall be recorded.

The average air velocity shall be calculated from the previous readings.

The value of the air delivery of the fan shall be obtained by multiplying the average air velocity, by the cross-sectional area of the duct.

**7.101** The electric fan shall be visually examined and inspected to ensure conformity of the marking to their relevant requirements.

## **8 Protection against access to live parts**

This clause of the clauses of the Adopted IEC standard is applicable.

## **9 Starting of motor-operated appliances**

This clause is not applicable as for the clauses of the Adopted IEC standard.

## **10 Power input and current**

This clause of the clauses of the Adopted IEC standard is applicable.

## **11 Heating**

This clause of the clauses of the Adopted IEC standard is applicable.

## **12 Void**

## **13 Leakage current and electric strength at operating temperature**

This clause of the clauses of the Adopted IEC standard is applicable.

**14 Transient overvoltages**

This clause of the clauses of the Adopted IEC standard is applicable.

**15 Moisture resistance**

This clause of the clauses of the Adopted IEC standard is applicable.

**16 Leakage current and electric strength**

This clause of the clauses of the Adopted IEC standard is applicable.

**17 Overload protection of transformers and associated circuits**

This clause of the clauses of the Adopted IEC standard is applicable.

**18 Endurance**

This clause is not applicable as for the clauses of the Adopted IEC standard.

**19 Abnormal operation**

This clause of the clauses of the Adopted IEC standard Section is applicable.

**20 Stability and mechanical hazards**

This clause of the clauses of the Adopted IEC standard is applicable.

**21 Technical strength**

This clause of the clauses of the Adopted IEC standard is applicable.

## **22 Construction**

This clause of the clauses of the Adopted IEC standard is applicable except as follows.

**22/102** The external surfaces of the fan shall be painted to protect them from rust and corrosion under normal operating conditions. The paint shall be complete, and free from visual defects such as cracks, holes or roughness.

Compliance is checked by visual inspection of the fan in order to assure that the materials and construction are fulfil their relevant requirements.

**22.103** Each fan, except ceiling fans, shall be provided with a guard for protection purposes.

Compliance is checked by inspection.

## **23 Internal wiring**

This clause of the clauses of the Adopted IEC standard is applicable.

## **24 Components**

This clause of the clauses of the Adopted IEC standard is applicable except as follows:

**24/102** The Fan shall be provided with two or more well-balanced blades made from metal or other suitable material, so as to be reasonably free from



vibration. The blades and blade carriers shall be securely fixed, so that they do not loosen while in operation.

Compliance is checked by inspection and by the following test:

The fan shall be operated for a sufficient period to ensure the workability of all parts, and that the fan is free from undue noise, friction or vibration. The run shall include operation at all speed settings with and without the oscillating device (if any) operating.

**24/103** The control knobs or switches shall be made of electrically and thermally insulating materials and shall be so designed, that there is no danger of inadvertent contact between the operators hand and any live part. They shall be so located that they can be safely and conveniently adjusted, and their settings, including the "off" position, shall be legibly and indelibly indicated.

Compliance is checked by inspection and test.

## **25 Supply connection and external flexible cords**

This clause of the clauses of the Adopted IEC standard is applicable except as follows:

**25.101** The length of the flexible cord shall be not less than, 0.5 m for ceiling and ventilating fans, 2 m for table fans and 5 m for pedestal fans.

Compliance is checked by inspection and by the following test:

The length of the cord shall be measured from the point at which it enters the fan. The length in metres, rounded off to the nearest 0.05 m, shall be recorded.

## **26 Terminals for external conductors**

This clause of the clauses of the Adopted IEC standard is applicable.

**27 Provision for earthing**

This clause of the clauses of the Adopted IEC standard is applicable.

**28 Screws and connections**

This clause of the clauses of the Adopted IEC standard is applicable.

**29 Clearances, creepage distances and solid insulation**

This clause of the clauses of the Adopted IEC standard is applicable.

**30 Resistance to heat and fire**

This clause of the clauses of the Adopted IEC standard is applicable.

**31 Resistance to rusting**

This clause of the clauses of the Adopted IEC standard is applicable.

**32 Radiation, toxicity and similar hazards**

This clause of the clauses of the Adopted IEC standard is applicable.

**Annex "AAA/2"****(Normative)****Rated voltages and frequencies****Table (AAA/2-1)****RATED SINGLE-PHASE A-C VOLTAGES AND FREQUENCIES  
AVAILABLE IN G.C.C COUNTRIES**

Country	Rated Voltage (V)	Rated Frequency (Hz)
United Arab Emirates	240	50
Bahrain	230	50
Kingdom of Saudi Arabia	127,220	60
Sultanate of Oman	240	50
Qatar	240	50
Kuwait	240	50

**Table (AAA/2-2)****RATED THREE-PHASE A-C VOLTAGES AND FREQUENCIES  
AVAILABLE IN G.C.C COUNTRIES**

Country	Rated Voltage (V)	Rated Frequency (Hz)
United Arab Emirates	-	-
Bahrain	-	-
Kingdom of Saudi Arabia	220	60
Sultanate of Oman	-	-
Qatar	-	-
Kuwait	-	-

## **Bibliography**

The bibliography of Part 1 is applicable except as follows.

*Addition:*

ISO 13732-1, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*

**DRAFT STANDARD****NO. 15382****HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –****Part 2-80: Particular requirements for Fans**

The preliminary draft of this Standard has been prepared by the work team composed of the following:

<b>Name</b>	<b>Agency</b>
Eng. Youssef Abdel-Hamid obaya	INTERTEK Testing Services

The draft Standard was accepted for distribution to the concerned bodies of the Technical Committee No. (1) "Household Appliances and Their Accessories" composed of the following:

<b>Name</b>	<b>Agency</b>
1. Dr Mohammed A Al-Kadi	King Saud University, Faculty of Engineering
2. Dr Abdul-Rahman Al-Badry	The technical Faculty - Riyadh
3. Eng. Youssef Abdel-Hamid obaya	INTERTEK Testing Services
4. Eng. Cherine Helmy Gohary	International
5. Eng Amro M. Mohammed	International SASO