NEPAL STANDARDS

Household and similar electrical appliances – Safety – Particular Requirements for Fans

Forward

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the radiation hazards for safe operation of appliances.

This standard takes into account the requirements as far as possible so that there is compatibility with the national wiring rules when the appliance is connected to the supply mains. However, in case of any deviation, wiring rules take precedence.

If an appliance within the scope of this standard also incorporates functions that are covered by another Part 2 of NS xxxx Part 1 or any IEC part, the relevant Part 2 or IEC part is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a Part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

> NOTE— This means that in such a case, it has been decided that for the part 2 standards, it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features which impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

This standard is to be read in conjunction with the latest edition of NS 564 'Safety of household and similar electrical appliances – Safety - Part 1: General Requirements' and its amendments. This standard was formulated on the basis of NS 564 Part 1.

> NOTE — When “Part 1” is mentioned in this standard, it refers to NS 564 part 1.

When a particular sub-clause of Part 1 is not mentioned in this Part 2, that sub-clause applies as far as is reasonable. When this standard state addition, modification or replacement, the relevant text in Part 1 is to be adapted accordingly.

> NOTE —The following numbering system is used:
>
> a) Sub-clauses that are numbered starting from 101 are additional to those in Part 1;
>
> b) Tables and figures that are numbered starting from 1 are additional to those in Part 1;
>
> c) Unless notes are in a new sub-clause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or sub-clause;

Contents

1. Scope

This 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.

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

a) ceiling fans;
b) duct fans;
c) partition fans;
d) pedestal fans;
e) table fans.

This standard also applies to separate controls supplied with fans.

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

Fans operating with rated voltage other than single phase are excluded from this scope.

As far as is practicable, 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,

a) persons (including children) whose
   (i) physical, sensory or mental capabilities; or
   (ii) lack of experience and knowledge

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

b) children playing with the appliance.

NOTE 102 Attention is drawn to the fact that

a) for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;

b) 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

a) appliances intended exclusively for industrial purposes;

b) 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);

c) fans incorporated in other appliances.

2. Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

1. N.S:564: Household and similar electrical appliances – Safety – Part 1: General requirements
2. IEC 60529 : Degrees of protection provided by 2001 enclosures (IP CODE)
3. IEC 60252-1: AC motor capacitors - Part 1: General - Performance, testing and rating - Safety requirements - Guidance for installation and operation
4. IEC 60245-3: Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 3: Heat resistant silicone insulated cables
5. IEC 60245-4:Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables
6. NS 344: PVC Insulated Cable for Fixed Wiring with Copper Conductor
7. IEC 61032: Protection of persons and equipment by enclosures - Probes for verification

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 NS 17 (Rules for Rounding of Numerical Values). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

3. Terms and definitions

This clause of N.S:564 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 center 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.

Additional sub-clauses

3.101

duct fan

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

3.102

ceiling or deck-head type fan

a propeller-bladed fan having two or more blades and provided with a device for suspension from the ceiling of a room so that the blades rotate in a horizontal plane.

3.103

table or cabin type fan

a smaller-diameter propeller-bladed fan having two or more blades and intended for use with free inlet and outlet of air. It may be a table fan or bracket-mounted fan for wall or ceiling mounting.

3.104

pedestal type fan

a propeller type fan having two or more blades mounted on a pedestal of fixed or variable height and intended for use with free inlet and outlet of air driven by electric motors.

3.105

blade sweep

the diameter of the circle traced out by the extreme tips of the fan blades.

3.106

size of fan

the sweep in millimetres.

3.107

plane of fan blades

the middle plane of the solid of revolution traced out by the fan blades.

3.108

plane of anemometer vanes

the middle plane of the solid of revolution traced out by the vanes of the anemometer.

3.109

test plane

the horizontal (in the case of ceiling type fans) and vertical (in the case of table and pedestal type fans) plane containing the plane of the anemometer vanes.

3.110

types of enclosures of motors

3.110.1

totally Enclosed Type Enclosure

an enclosure which does not provide for circulation of air between the inside and outside of the case, but not necessarily air-tight.

3.110.2

ventilated type enclosure

an enclosure in which the ventilations not materially obstructed while the live and internal rotating parts are protected mechanically against accidental or careless contact.

3.111

methods of mounting (for table/cabin and pedestal type fans)

3.111.1

rigid mounting

the type of mounting in which direction of air flow can be changed only by changing the position of the fan.

3.111.2

semi-rigid mounting

the mounting incorporating a trunnion and/or swivel arrangement so that the direction of the air flow can be altered to suit requirements.

3.111.3

oscillating mounting

the mounting provided with a device by which the direction of the axis of the air flow is changed automatically and continuously in one plane.

3.111.4

double oscillating (or gyrostatic)mounting

the mounting provided with a device by which the direction of the axis of the air flow is changed automatically and continuously in more than one plane.

3.112

rated speed

the rotational speed specified by the manufacturer at which the fan develops the specified output at the rated frequency or frequency range and rated voltage of voltage range.

3.113

ambient temperature

the temperature of the surrounding atmosphere in which the fan or regulator operates.

3.114

mounting

the mounting of a fan is the means of attaching the fan system (motor and blades) to its base.

3.115

clamping device

a means by which any positioning device, that is, swivel, trunnion, oscillating mechanism, etc, may be held in the desired position.

3.116

suspension system

system which is used to secure the ceiling fan unit to the ceiling

3.117

safety suspension system device

device used to secure the motor with blades of the ceiling fan to the mounting rod of the fan

4. General requirements

This clause as given under N.S:564 are applicable.

5. General conditions for the tests

This clause as given under N.S:564 are applicable.

6. Classification

This clause as given under N.S:564 are applicable.

7. Marking and Instructions

This clause as given under N.S:564 are applicable except as follows:

7.1 *Replacement:*

Appliances shall be marked with the:

a) rated voltage or rated voltage range in volts;
b) symbol for nature of supply;
c) rated power input in watts;
d) rated power factor;
e) name, trade mark or identification mark of the manufacturer or assembler or importer or responsible vendor from whom the finished good is delivered;
f) model or type reference;
g) IP number according to degree of protection against ingress of water, other than IPX0;

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 fixing means for attachment to the ceiling such as hooks or other devices shall be fixed with a sufficient strength to withstand 4 times the weight of the ceiling fan (for ceiling fans);
- 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 as given under N.S:564 are applicable except as follows:

8.1.1 *Replacement:*

The requirement of 8.1 applies for all positions of the appliance when it is operated as in normal use, and after the removal of **detachable parts**.

Test probe B of IEC 61032 is applied with a force not exceeding 1 N, the appliance being in every possible position except that appliances normally used on the floor and having a mass exceeding 40 kg are not tilted. Through openings, the test probe is applied to any depth that the probe will permit and is rotated or angled before, during and after insertion to any position. If the opening does not allow the entry of the probe, the force on the probe in the straight position is increased to 20 N. If the probe then enters the opening, the test is repeated with the probe in the angled position.

It shall not be possible to touch **live parts** or **live parts** protected only by lacquer, enamel, ordinary paper, cotton, oxide film, beads, or sealing compound except self-hardening resins, with the probe.

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 as given under N.S:564 are not applicable.

10. Power input and current

This clause as given under N.S:564 are applicable except as follows.

10.1 ***Addition:***

Appliances are tested with shutters or similar devices in the open position. The appliance is supplied at rated frequency. Capacitors, if any, associated with the appliance shall be retained in the circuit. Regulator, if provided, shall be set at the highest speed position.

10.2 ***Addition:***

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

11. Heating

This clause as given under N.S:564 are 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 as given under N.S:564 are applicable.

14. Transient overvoltages

This clause as given under N.S:564 are applicable.

15. Ingress protection

The enclosure of the appliance shall be tested for the degree of protection against moisture, in accordance with IEC 60529 matching the classification of the appliance.

Compliance is checked as specified in 15.1.1 taking into account 15.1.2, the appliance not being connected to the supply mains.

15.1.1 Appliances other than those classified IPX0 are subjected to the tests of IEC 60529 as follows:

– IPX1 appliances as described in Subclause 14.2.1;

– IPX2 appliances as described in Subclause 14.2.2;

– IPX3 appliances as described in Subclause 14.2.3a;

– IPX4 appliances as described in Subclause 14.2.4a;

– IPX5 appliances as described in Subclause 14.2.5;

– IPX6 appliances as described in Subclause 14.2.6;

– IPX7 appliances as described in Subclause 14.2.7. For this test the appliance is immersed in water containing approximately 1 % NaCl.

NOTE: The hand-held spray nozzle may be used for testing appliances that cannot be placed under the oscillating tube specified in IEC 60529.

Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains are subjected to the test specified for IPX7 appliances.

15.1.2 Hand-held appliances are turned continuously through the most unfavourable positions during the test.

Built-in appliances are installed in accordance with the instructions.

Appliances normally used on the floor or table are placed on a horizontal unperforated support having a diameter of twice the oscillating tube radius minus 15 cm.

Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted as in normal use in the centre of a wooden board having dimensions which are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the board. The wooden board is placed at the centre of the oscillating tube.

For IPX3 appliances, the base of wall-mounted appliances is placed at the same level as the pivot axis of the oscillating tube.

For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube. However, for appliances normally used on the floor or table, the movement is limited to two times 90° from the vertical for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube.

If the instructions for wall-mounted appliances state that the appliance is to be placed close to the floor level and specifies a distance, a board is placed under the appliance at that distance. The dimensions of the board are 15 cm more than the horizontal projection of the appliance.

Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support that is constructed to prevent water spraying onto its top surface. The pivot axis of the oscillating tube is located at the same level as the underside of the support and aligned centrally with the appliance. The spray is directed upwards. For IPX4 appliances, the movement of the tube is limited to two times 90º from the vertical for a period of 5 min.

Appliances with type X attachment, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in Table 13.

Detachable parts are removed and subjected, if necessary, to the relevant treatment with the main part. However, if the instructions state that a part has to be removed for user maintenance and a tool is needed, this part is not removed.

16. Leakage current and electric strength

This clause as given under N.S:564 are applicable.

17. Overload protection of transformers and associated circuits

This clause as given under N.S:564 are applicable.

18. Endurance

This clause is not applicable.

19. Abnormal operation

This clause as given under N.S:564 are 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 closedor open position, whichever is more unfavourable.

20. Stability and mechanical hazards

This clause as given under N.S:564 are 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 104 Suitable means can 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 with a radius of not less than 0,5 mm 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.

Compliance is checked by inspection and by measurement.

20.102 There shall be no risk of entrapment or injury caused by movement of the oscillating head of pedestal fans or table fans.

Compliance is checked by the following test.

Unless the entrapment point is guarded so that it cannot be touched by test probe 18 of IEC 61032, the appliance is operated at **rated voltage** and test probe 18 is placed at the entrapment point across the width and height of its opening.

If test probe 18 is touched by the moving part, it shall not be subjected to a force exceeding 15 N.

20.103 Static Load Test for Ceiling Suspended Fan Blade Brackets

20.103.1 A blade brackets used on a ceiling suspended fan shall be subjected to the static load test-described in 20.102.2.

20.103.2 The mounting feet of the blade brackets shall be fixed by a support, vice or other securing means. The brackets shall be oriented as intended for actual use. After securing the bracket mounting feet, a crossbar is secured across the top of the outer-most blade mounting hole(s). The load is suspended from the centre of the crossbar for 1 min. The combined weight of the crossbar, load and means of load suspension shall be in accordance with Table 1.

Table 1: Static Loads for Blade Brackets

(Clause 20.103.2)

Sl.No.	Size of Ceiling Fan[1]	Total Static Load on Sample Blade Bracket[2] in kg
(1)	(2)	(3)
i.	Upto and including 1.14 m	9.07
ii.	Above 1.14 m	15.88

21. Mechanical strength

This clause as given under N.S:564 are applicable except as follows.

21.1*Addition:*

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.

[1] Fan blade span (sweep) in meters

[2] Include weight of crossbar and means of load suspension in kilogram

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** including any **safety suspension system device** 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.

NOTE 105 The intent is to test the parts of the ceiling fan and not the capability of the ceiling materials.

22. Construction

This clause of Part 1 is applicable except as follows.

22.1 ***Addition:***

NOTE 106 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. The internal wiring associated with the luminaire shall have insulation at least equivalent to silicone rubber compound type IE2 complying with IEC 60245-3. This requirement is not applicable to fans incorporating a luminaire that cannot be replaced without breaking the appliance.

Compliance is checked by inspection.

22.102 The ceiling fan shall be constructed so that a failure of the fixing device of the motorto the mounting rod could not give rise to risk of injury to the user or surroundings.

Compliance is checked by the requirement and inspection or test of 22.102.1, 22.102.2, 22.102.3, 22.102.4 or 22.102.5, as appropriate for the design. After the test, the ceiling fan shall not be damaged to such an extent that compliance with Clause 8.1, 16.3, 29.1 and 29.2 are impaired.

22.102.1 The ceiling fan shall incorporate a device that disconnects the fan from the supply before the suspension system fails. An example of this construction is shown in **Error! R eference source not found.**.

Compliance is checked by the following test.

The bolt that connects the down rod to the motor is replaced with the specially prepared testpin shown in **Error! Reference source not found.** that simulates wear on the bolt. The p in is fully inserted so that it connects the down rod to the motor.

The fan is supplied at **rated voltage** and operated at maximum speed. The pin is then partially withdrawn so that the motor is connected to the down rod by that part of the pin having diameter b.

The supply to the ceiling fan shall be automatically disconnected and the fan shall not be capable of operation without replacing the worn bolt.

22.102.2 The ceiling fan shall be constructed so that the fan motor and blades do not fall more than 300 mm after failure of the **suspension system** and the fan shall be disconnected from the supply. An example of this construction is shown in **Error! R eference source not found.**.

Compliance is checked by the following test.

The ceiling fan is installed in accordance with the manufacturer's instructions.

A load equal to two times the mass of the ceiling fan is suspended from its body.The fan is supplied at **rated voltage** and operated at maximum speed.

The **suspension system** is then simulated to fail by disconnecting the motor from the down rod.

The motor and fan blades shall not drop more than 300 mm from their original position and the supply to the ceiling fan shall be automatically disconnected.

22.102.3 The ceiling fan shall be constructed so that the fan blades and motor are connected to the **suspension system** via a threaded down rod that is locked by means of oneor more setscrews. An example of this construction is shown in **Error! Reference s ource not found.**.

Compliance is checked by inspection.

22.102.4 The ceiling fan shall be constructed so that an additional through bolt, lock washer and nut, or the like limits the distance of drop by no more than 75 mm in case of the **suspension system** failure. An example of this construction is shown in **Error! Reference s ource not found.**.

Compliance is checked by inspection and measurement

22.102.5 The ceiling fan shall be constructed so that all components required to prevent the failure of the **suspension system** are treated or coated to resist corrosion. Any fixing bolts shall have a minimum diameter of 5 mm and a minimum tensile strength of 200 MPa. Any such bolts shall have provision to prevent them working loose due to vibration. An example of this construction is shown in **Error! Reference source not found.**.

Compliance is checked by inspection and measurement.

23. Internal wiring

This clause as given under N.S:564 are 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 as given under N.S:564 are applicable except as follows.

***24.4 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 as given under N.S:564 are applicable except as follows.

25.5 ***Addition:***

Type Z attachment is allowed for portable fans.

26. Terminals for external conductors

This clause as given under N.S:564 are applicable

27. Provision for Earthing

This clause as given under N.S:564 are applicable except as follows.

27.3 ***Addition:***

The allowed travel of the live and neutral brushes due to wear shall be less than the allowed travel of the earth brush so that the earthing circuit is maintained even after the appliance ceases to operate due to live and neutral brush wear.

Compliance is checked by inspection.

28. Screws and connections

This clause as given under N.S:564 are applicable.

29. Clearances, creepage distances and solid insulation

This clause as given under N.S:564 are 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 as given under N.S:564 are applicable except as follows.

30.2.2 Not applicable.

31. Resistance to rusting

This clause as given under N.S:564 are applicable except as follows.

31.1 Addition:

Compliance is checked by the following test:

All grease is removed from the parts to be tested by immersion in carbon tetrachloride or trichlorethane for 10 min.

The parts are then immersed for 10 minutes in a 10 percent solution of ammonium chloride in water at a temperature between 15°C and 35°C.

Without drying but after shaking off any drops, the parts are placed for 10 min in a box containing air having not less than 90 percent relative humidity and temperature between 15°C and 35°C.

After the parts have been dried for 10 min in a heating cabinet at a temperature of 100 ± 5°C, their surfaces shall show no signs of rust.

Traces of rust on sharp edges and any yellowish film removable by rubbing are ignored.

For small helical springs and the like, and for parts exposed to abrasion, a layer of grease may provide sufficient protection against rusting. Such parts are only subjected to the test, if there is doubt about the effectiveness of the grease film, and the test is then made without previous removal of the grease.

32. Radiation, toxicity and similar hazards

This clause as given under N.S:564 are applicable.

33. Earth continuity test

This clause as given under Annex A.1 of N.S:564 are applicable.

34. Electric strength test

This clause as given under Annex A.2 of N.S:564 are applicable.

35. Functional Test

This clause as given under Annex A.3 of N.S:564 are applicable.

36. Schedule of Tests

36.1 Type Tests

The tests specified in Table 2 shall constitute the type tests and shall be carried out on a sample selected preferably at random from regular production lot. Before commencement of the tests, the appliance shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, mechanical hazards, marking, 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.

NOTE 107 —

(i) Additional samples may be required for some tests, as mentioned in specific clauses.
(ii) The procedure for selection of random samples shall be in accordance with NS 145 or as specified in Scheme for Testing & Inspection (STI) as notified by Nepal Bureau of Standards and Metrology.

Table 2: Schedule of Type Tests
(Clause 36.1)

S.No	Type Tests	Refer to clause
(1)	(2)	(3)
1	Protection against access to live parts	8
2	Power input and current	10
3	Heating	11
4	Leakage current and electric strength at operating temperature	13
5	Transient over voltages	14
6	Ingress Protection	15
7	Leakage current and electric strength	16
8	Overload protection of transformers and associated circuits	17
9	Endurance	18
10	Abnormal operation	19
11	Stability and mechanical hazards	20
12	Mechanical strength	21
13	Construction	22
14	Internal Wiring	23
15	Components	24
16	Supply connection and external flexible cords	25
17	Terminals for external conductors	26
18	Provision for earthing	27
19	Screws and connections	28
20	Clearances, creepage distances and solid insulation	29
21	Resistance to heat and fire	30
22	Resistance to rusting	31
23	Radiation, toxicity and similar hazards	32
24	Earth Continuity test	33
25	Electric strength test	34
26	Functional test	35

36.1.1 Criteria for Acceptance

Sample shall successfully pass all the type tests for proving conformity with the requirements of the standard. If the sample 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 all tests or to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat tests (s).

36.2 In process quality check tests (Routine Tests)

Routine tests are intended to be carried out by the manufacturer on each appliance to detect a production variation that could impair safety. They are normally carried out on the complete appliance after assembly but the manufacturer may perform the tests at an appropriate stage during production, provided that later manufacturing processes do not affect the results.

NOTE 108 – Components are not subjected to these tests if they have been previously subjected to routine tests during their manufacture.

The manufacturer may use a different routine test procedure provided that the level of safety is equivalent to that provided by the tests specified in this annex.

The following tests specified in Table 3 shall constitutes the routine tests and are the minimum considered tests necessary to be conducted to cover essential safety aspects. It is the manufacturer's responsibility to decide if additional routine tests are necessary.

Table 3: Schedule of Routine Tests
(Clause 36.2)

S.No	In process quality check tests (Routine Tests)	Refer to clause
(1)	(2)	(3)
1	Protection against access to live parts	8
2	Power input and current	10
3	Heating	11
4	Leakage current and electric strength at operating temperature	13
5	Ingress Protection	15
6	Leakage current and electric strength	16
7	Provision for earthing	27
8	Earth Continuity test	33
9	Electric strength test	34
10	Functional test	35

If a product fails any of the tests, it is to be retested after rework or adjustment.

Annexes

The annexes as given under N.S:564 are applicable.

Bibliography

The bibliography as given under N.S:564 are applicable in addition to below.

1. N.S:564: Household and similar electrical appliances – Safety – Part 1: General requirements
2. IEC 60529 : Degrees of protection provided by 2001 enclosures (IP CODE)
3. IEC 60252-1: AC motor capacitors - Part 1: General - Performance, testing and rating - Safety requirements - Guidance for installation and operation
4. IEC 60245-3: Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 3: Heat resistant silicone insulated cables
5. IEC 60245-4:Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables
6. NS 344: PVC Insulated Cable for Fixed Wiring with Copper Conductor
7. IEC 61032: Protection of persons and equipment by enclosures - Probes for verification
8. IEC 60227 (all parts): Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V

Index of defined words

The index of defined words as given under N.S:564 are applicable in addition to below.