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NEPAL STANDARD

Household and similar electrical appliances – Safety – Part 2-xx: Particular Requirements for Electric Pressure Cooker

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Government of Nepal

Ministry of Industry, Commerce and Supplies

Nepal Bureau of Standards and Metrology (NBSM)

Kathmandu, Nepal

www.nbsm.gov.np

Nepal Bureau of Standards and Metrology

Balaju, Kathmandu, Nepal

Phone: +977 1 4350445/4350818

Email: info@nbsm.gov.np

Website: www.nbsm.gov.np

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Foreword

NBSM (Nepal Bureau of Standards and Metrology) is the National Standard Body involved in the development of standards in the country. The standard development process involves committee consisting of multi-stakeholders both from public and private sectors.

This standard is developed by **[Name of Technical Committee (TC XXX)] / [Name of sub Committee (SC YYY)]** and approved by Nepal Standard Council as per Nepal Standard (Certification) Act, 1980. The procedures used to develop this document and those intended for its further maintenance are described in the NBSM Standard Development Procedure (see www.nbsm.gov.np/workprecedure).

This standard pertains to Electric Pressure Cooker and 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 NS 564, the relevant Part 2 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 NS 564, NS 564 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: 2076 (NS 564) 'Safety of household and similar electrical appliances: NS 564 General Requirements' and its amendments. This standard was formulated on the basis of NS 564.

When a particular sub-clause of NS 564 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 NS 564 is to be adapted accordingly.

NOTE — The following numbering system is used:

Sub-clauses, tables and figures that are numbered starting from 101 are additional to those in NS 564;

Unless notes are in a new sub-clause or involve notes in NS 564, they are numbered starting from 101, including those in a replaced clause or sub-clause;

Household and Similar Electrical Appliances –Safety –

Part 2-xx: Particular requirements for Electric Pressure Cookers

1. Scope

This Standard deals with the safety of Electrical Pressure Cookers (EPC) for household and similar purposes having a **rated cooking pressure** not exceeding 140 kPa and a **rated capacity** not exceeding 10 l, their **rated voltage** being not more than 250 V single phase i.e. appliance being connected between one phase and neutral.

If the EPC is intended to be used professionally to process food for commercial consumption, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by

EPC 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 101 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;

– national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities may specify additional requirements.

All test specified in this standard are type test.

2. Normative references

This clause of NS 564 is applicable except as follows.

Addition:

NS 564:2076: Household and similar electrical appliances - Safety - General requirements

NS 116: Electric Plugs

NS 83: Domestic Pressure Cooker

IEC 60320-1-2016 Appliance couplers for household and similar general purposes

3. Terms and definitions

This clause of NS 564 is applicable except as follows.

3.1.9 Replacement:

Normal operation

Pressure cookers are operated in accordance with the instructions but with the container filled with water to a depth of 25 mm.

3.101 rated capacity

Capacity assigned to the EPC by the manufacturer.

3.102 rated cooking pressure

Pressure assigned to the EPC by the manufacturer.

3.103 pressure regulator

Control that maintains the pressure at a particular value during normal use.

3.104 Pressure-relief device

Control that limits the pressure under abnormal operating conditions.

3.105 Dynamic pressure cookers

Pressure cooker which reduces the pressure by a dynamic action of an elastic part.

4. General requirement

This clause of NS 564 is applicable.

5. General conditions for the tests

This clause of NS 564 is applicable except as follows.

5.3 Addition:

The test of 19.101 is carried out after the other tests.

6. Classification

This clause of NS 564 is applicable.

6.1 Replacement:

With respect to protection against electric shock, the appliances shall be of Class I or Class II

7. Marking and Instructions

This clause of NS 564 is applicable except as follows.

7.1 Addition:

If the closed position of the lid of a pressure cooker is not obvious, this position shall be marked on the appliance.

7.12 Addition:

The instructions for appliances shall include the substance of the following:

This EPC is intended to be used in household and similar applications such as:

– staff kitchen areas in shops, offices and other working environments;

– farm houses;

– by clients in hotels, motels and other residential type environments;

– bed and breakfast type environments.

If the manufacturer wants to limit the use of the appliance to less than the above, this must be clearly stated in the instructions.

The instructions for pressure cookers, other than dynamic pressure cookers, shall state that the ducts in the pressure regulator allowing the escape of steam should be checked regularly to ensure that they are not blocked.

The instructions for pressure cookers shall also give details of how to open the container safely and state that the container must not be opened until the pressure has decreased sufficiently.

The instructions for EPCs shall include:

– a warning to avoid spillage on the connector

– details on how to clean the surfaces in contact with food

– a warning of potential injury from misuse

– a statement that the heating element surface is subject to residual heat after use.

8. Protection against access to live parts

This clause of NS 564 is applicable.

9. Starting of motor-operated appliances

This clause of NS 564 is not applicable.

10.Power input and current

This clause of NS 564 is applicable.

11.Heating

This clause of NS 564 is applicable.

The EPC and its surroundings should not reach excessive temperatures in normal use to endanger the safety of the personnel and the property. Contact for less than 30 seconds with the outer body surface should not burn the hands of the cook or any third person. For this, the temperature of outer body surface should not exceed 60 ℃ when the inner temperature of EPC is 110 ℃. For inner temperature 110 ℃, temperature of the lid shall not exceed 65 ℃.

External parts of non- metallic material, parts of insulating material supporting live parts including connections, and parts of thermoplastic material providing supplementary insulation or reinforced insulation, should be sufficiently resistant to heat. Design and construction of EPC should ensure this.

EPC shall be equipped with temperature sensor to cut-off the power supply once the operating temperature is reached. As the second line of defense to control the temperature from reaching beyond safe limits in the event of failure of temperature sensor, a thermal fuse shall be provided to cut-off the power supply when temperature reaches above expected.

11.2 Addition:

EPC are tested away from the walls of the test corner.

11.7 Replacement:

EPCs are operated for the duration specified in 11.7.101

11.7.101 EPCs are operated for 15 min after attaining the maximum cooking pressure.

11.8 Addition:

When EPC connector incorporates a thermostat, the temperature rise limit for the pins of the inlet does not apply.

12.Void

13.Leakage current and electric strength at operating temperature

This clause of NS 564 is applicable.

14.Transient over-voltages

This clause of NS 564 is applicable.

15.Moisture resistance

This clause of NS 564 is applicable.

16.Leakage current and electric strength

This clause of NS 564 is applicable.

17.Overload protection of transformers and associated circuits

This clause of NS 564 is not applicable.

18.Endurance

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19.Abnormal operation

This clause of NS 564 is applicable except as follows.

19.2 Addition:

Appliances are placed as near as possible to the walls of the test corner. They are tested empty with lids open or closed whichever is more unfavorable.

19.4 Addition:

For tests of electric pressure cookers for safety against abnormal operation as per NS 564,

– all pressure regulating devices are rendered inoperative; and

– in other than dynamic pressure cookers, all protective devices that vent steam and intentionally weak parts that vent steam are rendered inoperative; and

– in dynamic pressure cookers, all protective devices, other than intentionally weak parts, that vent steam are rendered inoperative.

19.13 Addition:

During the test of 19.4, protective devices of pressure cookers other than dynamic pressure cookers shall operate before the pressure has reached 350 kPa.

During the test of 19.4, protective devices or intentionally weak parts of dynamic pressure cookers shall operate before the pressure has reached 250 kPa.

19.101 Addition

The electronic control system of EPC should detect following abnormal position:

(i) the inner pot is not placed inside but lid is in locked in position

(ii) lid is not in the desired fully closed position.

After detecting these abnormal positions, the control system should not allow the "switching on" of the power for heating.

Similarly, a mechanical and/or electrical interlock should prevent the unsafe operation of turning EPC to lid not locked in position by mistake from lid locked in position when significant amount of pressure has already been generated. For this purpose, EPC should be provided with a float valve, a pin lock mechanism to prevent the lid from being accidentally opened while there is significant amount of pressure inside. If there is enough pressure inside the inner pot, the float valve should be pushed up by the pressure. Once pushed up, the pin of the float valve should serve as latch lock and prevent the lid from turning, even under force. However, protections that block the heating operation corresponding to lid position, should not block the function while EPC is to be used for open air cooking methods.

20.Stability and mechanical hazards

This clause of NS 564 is applicable.

21.Mechanical strength

This clause of NS 564 is applicable except as follows.

21.1 Addition:

Breakage of glass parts is neglected provided that compliance with 8.1, 15.1 and 15.1.1 is not impaired.

22.Construction

This clause of NS 564 is applicable except as follows.

22.6 Addition:

Drain holes, if any, shall be at least 5 mm in diameter or 20 mm^2 in area with a width of at least 3 mm.

Compliance is also checked by measurement.

22.7 Addition

For pressure cookers other than dynamic pressure cookers, the pressure is gradually increased hydraulically to two times the operating pressure of the pressure relief device during the test of 19.4.

For dynamic pressure cookers, the pressure is gradually increased hydraulically to 50 kPa in excess of the operating pressure of the pressure relief protective device or intentionally weak part during the test of 19.4.

The container shall not rupture.

22.101 EPC for boiling water that have a rated capacity exceeding 3 l, and which are liable to overturn, shall be constructed so that the rate of discharge is limited.

Compliance is checked by the following test, appliances incorporating an appliance inlet being fitted with a cord set.

The EPC is filled with water to its rated capacity and the lid closed in accordance with the instructions. It is placed on a horizontal plane in any position of normal use but orientated to produce the most unfavourable result.

The plane is slowly inclined to an angle of 25°. If the appliance overturns, it is left in this

position for 10 s and then returned to its normal position. The quantity of water remaining is measured. The rate of discharge of water is determined from the formula:

$D = 60 (C_1 – C_2) /t$

where

D is the rate of discharge of water;

C1 is the rated capacity in litres;

C2 is the remaining quantity of water in litres;

t is the duration of the discharge in seconds, measured from the time the appliance overturns.

The rate of discharge of water shall not exceed 16 l/min.

NOTE Suitable means can be used to prevent the appliance from slipping on the inclined plane.

22.102 Pressure cookers shall incorporate a non-self-resetting pressure or temperature responsive pressure-relief device.

Compliance is checked by inspection.

22.103 Pressure cookers shall be constructed so that the lid cannot be removed while the pressure within the container is excessive. They shall incorporate a means to release the pressure to a value such that the lid can be removed without risk.

Compliance is checked by the following test.

The pressure cooker is operated as specified in Clause 11 until the pressure regulator operates for the first time.

The pressure cooker is then disconnected from the supply and the pressure allowed to decrease until the pressure is 4 kPa. A force of 100 N is applied to the most unfavourable point where the lid or its handle can be gripped. It shall not be possible to remove the lid.

The internal pressure is then gradually reduced, the force of 100 N being maintained. There shall be no hazardous displacement of the lid when it is released.

This test is not carried out on pressure cookers when the lid is secured by screw clamps or other devices that ensure that the pressure is automatically reduced in a controlled manner before the lid can be removed.

22.104 Pressure cookers shall be constructed so that the pressure in the container is not excessive when the lid is not closed or is incorrectly fitted.

Compliance is checked by the following test.

The pressure cooker is operated under the conditions of Clause 11 with the lid fitted in the most unfavorable position that allows the pressure cooker to operate.

The pressure in the container shall not exceed 4.0 kPa.

22.105 EPC shall be constructed so that food or liquids are prevented from penetrating into places that could cause electrical or mechanical faults.

Compliance is checked by inspection.

22.106 A three-level pressure regulating, and excessive pressure safety shall also be provided on or in the Lid of EPC. For cooking in normal condition, the pressure inside the EPC shall be regulated such that the retained pressure suits the cooking of a particular type of food as well as does not increase to unsafe limits. As the first level of regulating the pressure, the pressure sensor which is electronic based sensing circuitry shall cut off the power supply when operating pressure is reached. Additionally, the EPC shall be provided with a pneumatic pressure regulating mechanism i.e., a pressure release valve on or in the lid, to regulate the pressure inside EPC for normal cooking. The pressure release valve shall have an anti-block shield inside the lid.

But in case the pressure sensor fails, and the pressure continues to increase above the normal level, the pressure release valve shall automatically be pushed up to open likewise in the conventional pressure cookers that do not have pressure sensors and power cutoff feature. But if the pressure release valve fails to regulate the pressure and pressure inside EPC continues to grow beyond safe limit inviting the accident, likewise in the conventional stove top pressure cookers, the pin of the float valve is self-destroyed by excessive temperature or pressure as final line of defense. The float valve then, without the pin, becomes a pressure escape hole, and the pressure inside the chamber is released through this hole. Although in such a case the float valve is permanently damaged and possibly a lid replacement may be required, this is an effective last line of defense from the safety perspective. Advanced and relatively high- cost models of EPC may also employ an innovative push-down pressure release mechanism to release excessive pressure, even in the unlikely case where the pin of the float valve could not be destroyed. It is advisable to use the modern advanced models of EPC using push down pressure release mechanism.

23.Internal wiring

This clause of NS 564 is applicable.

24.Components

This clause of NS 564 is applicable except as follows.

24.1.4 Addition:

Self-resetting thermal cut-outs required for compliance with the test of 19.101 are subjected to 3000 cycles of operation.

24.1.5 Addition:

For appliance couplers incorporating thermostats, thermal cut-outs or fuses in the connectors, IEC 60320-1 is applicable except that

– the earthing contact of the connector is allowed to be accessible, provided that this

contact is not likely to be gripped during insertion or withdrawal of the connector;

– the temperature required for the test of Clause 18 is that measured on the pins of the appliance inlet during the test of Clause 11 of this standard;

– the breaking-capacity test of Clause 19 is carried out using the inlet of the appliance;

– the temperature-rise of current-carrying parts specified in Clause 21 is not determined.

Thermal controls are not allowed in connectors complying with the standard sheets of IEC 60320-1.

24.101 Devices incorporated in appliance, for compliance with 19.4, shall be non-self-resetting.

Compliance is checked by inspection and during the test of 19.4.

If EPC incorporate self-resetting thermal cut-outs, these shall be short-circuited or rendered inoperative for the test of 19.4.

25.Supply connection and external flexible cords

This clause of NS 564 is applicable except as follows.

25.1 Addition:

EPCs incorporating an appliance inlet, other than those standardized in IEC 60320-1, shall be supplied with a cord set.

25.101 The length of the cord is measured between the plug and the point where the cord or cord guard enters the appliance.

26.Terminals for external conductors

This clause of NS 564 is applicable.

27.Provision for earthing

This clause of NS 564 is applicable.

28.Screws and connections

This clause of NS 564 is applicable.

29.Clearances, creepage distances and solid insulation

This clause of NS 564 is applicable.

29.2 Addition:

The micro-environment is pollution degree 3 if the insulation can be polluted by condensation from steam produced during normal use of the appliance.

30.Resistance to heat and fire

This clause of NS 564 is applicable.

31.Resistance to rusting

This clause of NS 564 is applicable.

32.Radiation, toxicity and similar hazards

This clause of NS 564 is applicable.

Annexes

The annexes of NS 564 are applicable.

Bibliography

The bibliography of NS 564 is applicable except as follows.

Addition:

NS 564:2076: Household and similar electrical appliances – Safety – NS 564: General requirements

NS 116: Electric Plugs

NS 83: Domestic Pressure Cooker

GB 4706.29-2008 Household and similar electrical appliances - Safety - Particular requirements for portable induction cooker

IEC 60335-2-13, Household and similar electrical appliances – Safety – Part 2-13: Particular requirements for deep fat fryers, frying pans and similar appliances

IEC 60335-2-21, Household and similar electrical appliances – Safety – Part 2-21: Particular requirements for storage water heaters

IEC 60335-2-35, Household and similar electrical appliances – Safety – Part 2-35: Particular requirements for instantaneous water heaters

IEC 60335-2-54, Household and similar electrical appliances – Safety – Part 2-54: Particular requirements for surface-cleaning appliances for household use employing liquids or steam

IEC 60335-2-74, Household and similar electrical appliances – Safety – Part 2-74: Particular requirements for portable immersion heaters

IEC 60335-2-75, Household and similar electrical appliances – Safety – Part 2-75: Particular requirements for commercial dispensing appliances and vending machines

IEC 60335-2-98, Household and similar electrical appliances – Safety – Part 2-98: Particular requirements for humidifiers