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REDLINE VERSION

INTERNATIONAL STANDARD

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

IEC 60335-2-98:2023-12 RLV(en)

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INTERNATIONAL
ELECTROTECHNICAL
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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-98: Particular requirements for humidifiers

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-98:2002+AMD1:2004+AMD2:2008 CSV. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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IEC 60335-2-98 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2002, Amendment 1:2004 and Amendment 2:2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) alignment with IEC 60335-1:2020;
b) additional requirements for a humidifier shaped or decorated like a toy (7.12, 8.1.1, 21.101, 22.12, 22.44, 22.54, 22.105);
c) additional requirements are included for the temperature of accessible surfaces (11.8);
d) application of test probes 18 and 19 has been introduced (Clause 8, 20.2, B.22.3, B.22.4);
e) additional guidance is provided for humidifiers for remote operation.

The text of this International Standard is based on the following documents:

Draft	Report on voting
61/7013/FDIS	61/7086/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Particular requirements for electric humidifiers.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
– unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
– additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

– requirements: in roman type;
– *test specifications: in italic type*;

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– notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

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INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

https://www.iec.ch/tc61/supportingdocuments

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

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 way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules ~~may~~ can differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, 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 Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 ~~Horizontal and generic standards~~ Horizontal publications, basic safety publications and group safety publications covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. ~~For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.~~

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 that 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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

– IEC standards published by TC 59 concerning methods of measuring performance;
– CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
– CISPR 14-2 concerning electromagnetic immunity;
– IEC standards published by TC 111 concerning environmental matters.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-98: Particular requirements for humidifiers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric humidifiers for household and similar use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances, including direct current (DC) supplied appliances and **battery-operated appliances**.

~~NOTE 101~~ Examples of appliances that are within the scope of the standard are

– appliances that atomize water;
– appliances that evaporate water by heating;
– appliances that blow air through a moist element.

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

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

– 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~~ can 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 for heating liquids (IEC 60335-2-15);
– humidifiers intended for use with heating, ventilation or air-conditioning systems (IEC 60335-2-88);
– appliances for medical purposes (IEC 60601 series);
– 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).

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2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

3 Terms and Definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.6 ~~*Addition:*~~

Note 101 to entry: For **electrode-type appliances**, if no current is assigned to the appliance, the **rated current** is calculated from the **rated voltage** and the mean value of the power input during the first 2 min of operation, the appliance being supplied at **rated voltage** and operated under **normal operation**.

3.1.9 ~~*Replacement*~~ *Modification:*

Replace the first paragraph with the following:

~~**normal operation**~~
operation of the appliance under the following conditions:

The appliance is filled with the maximum quantity of water in accordance with the instructions, unless the appliance is connected to the water mains and the supply is automatically controlled.

For **electrode-type appliances**, the water has a resistivity of approximately 500 Ωcm at a temperature of 20 °C.

Note 101 to entry: The appropriate resistivity may be obtained by adding sodium chloride to the water.

3.5 Definitions relating to types of appliances

3.5.101
electrode-type appliance
appliance in which a conductive liquid is heated by a current flowing through it

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.

5.6 *Addition:*

Humidistats are short-circuited or rendered inoperative.

6 Classification

This clause of Part 1 is applicable.

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7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 ~~*Modification*~~ *Addition:*

Electrode-type appliances shall be marked with their **rated power input**.

~~*Addition:*~~

Appliances that are manually filled shall have a level mark or other means to indicate when they are filled to their rated capacity, unless they cannot be filled beyond this capacity. This indication shall be visible when the appliance is being filled.

If the temperature of the water vapour exceeds 60 °C, the appliance shall be marked with symbol IEC 60417-5597 (~~2002-10~~2014-06) or with the substance of the following:

CAUTION: Hot water vapour

NOTE 101 This symbol is a warning sign and the rules of ISO 3864-1 apply.

7.6 *Addition:*

[symbol IEC 60417-5597 ~~(2002-10~~ (2014-06)] Steam, low jet

7.12 *Addition:*

The instructions shall include details regarding filling, cleaning and descaling.

The instructions shall state the substance of the following:

– care should be taken when using the appliance due to the emission of hot water vapour;
– unplug the appliance during filling and cleaning.

The instructions for **electrode-type appliances** shall include the substance of the following:

– the composition and quantity of solution to be used and advice not to use an excessive amount of salt;
– the appliance is not to be operated from a DC supply.

If symbol IEC 60417-5597 (~~2002-10~~2014-06) is used, its meaning shall be explained.

The instructions for a humidifier shaped or decorated like a toy shall include the substance of the following:

This is not a toy. This is an electrical appliance and must be operated and maintained by an adult. In addition to the water to be vaporised, only any additional liquids advised by the manufacturer for cleaning or fragrance shall be used.

7.12.1 *Addition:*

The installation instructions for appliances intended to be connected to the water mains shall state the maximum permissible water pressure in pascals.

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Instructions for **fixed appliances** intended for installation more than 850 mm from the floor in normal use shall include the substance of the following:

Mount this product more than 850 mm from the floor.

7.15 *Addition:*

Symbol IEC 60417-5597 (~~2002-10~~2014-06) or the marking relating to hot water vapour shall be near the vapour outlet.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use according to the instructions, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18. For humidifiers shaped or decorated like a toy, test probe 19 of IEC 61032 is also applied to parts situated more than 850 mm above the floor according to the instructions.

Test probe 18 of IEC 61032 is not applied to appliances that, according to the instructions, are required to be mounted at a height of more than 1,8 m above the floor.

*When test probes 18 and 19 of IEC 61032 are applied to the functional part of a humidifier shaped or decorated like a toy, any **detachable parts** shall be removed unless a **tool** is required for removal.*

8.1.3 *Addition:*

Test probe 19 of IEC 61032 is not applied.

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:*

For **electrode-type appliances**, the negative deviation is not limited.

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11 Heating

This clause of Part 1 is applicable except as follows.

11.3 *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 101 is used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of 4 N ± 1 N to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

11.4 ~~*Modification*~~ *Addition:*

***Electrode-type appliances** are supplied at 1,06 times **rated voltage**.*

Addition:

*If the temperature rise limits are exceeded in appliances incorporating motors, transformers or **electronic circuits**, and the power input is lower than the **rated power input**, the test is repeated with the appliance supplied at 1,06 times **rated voltage**.*

11.6 *Replacement:*

***Combined appliances** are operated as **heating appliances**.*

11.7 ~~*Replacement*~~ *Modification:*

Replace the first paragraph with the following:

Appliances are operated until steady conditions are established.

11.8 *Modification:*

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.

Addition:

*The temperature rise limits of motors, transformers and components of **electronic circuits**, including parts directly influenced by them, may be exceeded when the appliance is operated at 1,15 times **rated power input**.*

The temperature rise of handles or grips of vents and air shutters shall not exceed the value specified in Table 3 for surfaces of handles, knobs, grips and similar parts which are held for short periods only in normal use.

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Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	*Temperature rise of external accessible surfaces* [a] *K*		
	Surfaces of appliances shaped or decorated like a toy	***Surfaces of appliances not more than 850 mm above the floor***	***Surfaces of other appliances more than 850 mm above the floor when installed or in normal use***
Bare metal	*29*	*38*	*42*
Coated metal [b]	*30*	*42*	*49*
Glass and ceramic	*40*	*51*	*56*
Plastic and plastic coating > 0,4 mm [c, d]	*45*	*58*	*62*
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.			

[a] *Temperature rise on surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end are not measured.*

[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.*

[c] *The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.*

[d] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.1 ~~*Modification*~~ *Addition:*

Electrode-type appliances *are supplied at 1,06 times* ***rated voltage****.*

13.2 *Addition:*

For ***electrode-type appliances****, the leakage current is measured between a metallic mesh placed in the water vapour, 10 mm from the outlet, and* ***accessible metal parts*** *including the metal foil.*

The leakage current shall not exceed 0,25 mA.

14 Transient overvoltages

This clause of Part 1 is applicable.

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15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 *Addition:*

In case of doubt, the spillage test is carried out with the appliance deviating from the normal position of use by an angle not exceeding 5°.

Appliances intended to be connected to the water mains are operated until the maximum water level is reached. The inlet valve is held open and the filling continued for 15 min after the first evidence of overflow or until the inflow stops automatically.

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.

19.2 *Addition:*

*The container of **electrode-type appliances** is filled with a saturated solution of NaCl at 20 °C ± 5 °C, the appliance being supplied at **rated voltage**.*

NOTE 101 A solution is saturated when no more salt can be dissolved.

19.3 *Addition:*

*The test is not applicable to **electrode-type appliances**.*

19.4 ~~*Modification*~~ *Addition:*

Appliances are only filled with ~~*sufficient*~~ *the amount of water necessary to cover the heating elements.*

Fans are switched off.

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20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use according to the instructions, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18. For humidifiers shaped or decorated like a toy, test probe 19 of IEC 61032 is also applied to parts situated more than 850 mm above the floor according to the instructions.

During the test with test probe 19, humidifiers having a filter system for air cleaning function are assembled without any filters removed. However, when test probe 18 and test probe 19 of IEC 61032 are applied to the functional part of a humidifier shaped or decorated like a toy, any ***detachable parts*** *shall be removed unless a* ***tool*** *is required for removal.*

Test probe 18 of IEC 61032 is not applied to appliances that, according to the instructions, are required to be mounted at a height of more than 1,8 m above the floor.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.101 The functional part of a humidifier shaped or decorated like a toy shall be constructed to withstand dropping that can be expected in normal use. Any parts that are loosened or become dislodged as a result of dropping shall not present a choking hazard.

Compliance is checked by the following test.

The functional part of the appliance is dropped from a height of 500 mm above a concrete or similar hard surface.

The test is carried out a total of five times with the functional part of the appliance being positioned so that it falls onto the surface in five different orientations.

The appliance shall not be damaged to such an extent that compliance with 20.2 is impaired. Any parts that become dislodged or loosened to the point that they are no longer ***non-detachable parts*** *shall not be contained within the small parts cylinder in Figure 13.*

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 *Addition:*

~~Drain holes~~ A drain hole that is needed to comply with this standard shall be at least 5 mm in diameter or 20 mm^2 in area with a minimum dimension of at least 3 mm. Holes that do not meet these dimensions are considered to be blocked when determining compliance.

Compliance is checked by measurement.

22.12 *Addition:*

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For humidifiers shaped or decorated like a toy, all **accessible parts** shall be fixed in a reliable manner so that they will not work loose in normal use if loosening could result in a choking hazard.

22.33 *Modification:*

Replace the second paragraph with the following:

Liquids may be heated using electrodes and may be in direct contact with their **live parts**.

22.40 *Addition:*

These appliances are not considered to be appliances that could give rise to a hazard when operated continuously, automatically or remotely.

22.44 *Modification:*

Replace the first paragraph with the following:

Humidifiers shall not be shaped or decorated like a toy unless:

– ultrasonic transducers are not accessible to test probe 19 of IEC 61032 during normal use;
– they do not evaporate water by heating; and
– the water reservoir capacity does not exceed 4 l.

22.49 Not applicable

22.51 Not applicable

22.54 *Addition:*

For humidifiers shaped or decorated like a toy, button **cells** and **batteries** designated R1 shall not be accessible without the aid of a **tool**.

22.101 The vapour outlet of appliances incorporating means for heating water shall be free from obstructions that could give rise to a significant pressure within the container. The container shall be vented to the atmosphere, the aperture being at least 5 mm in diameter or 20 mm^2 in area with a minimum dimension of at least 3 mm.

Compliance is checked by inspection and by measurement.

22.102 Appliances for wall mounting shall have ~~reliable~~ a provision for fixing to a wall, independent of the connection to the water mains.

Compliance is checked by inspection.

22.103 **Electrode-type appliances** shall be constructed to ensure that when the filling aperture of the container is open, both electrodes are disconnected to provide **all-pole disconnection** under overvoltage category III conditions.

This requirement does not apply to an appliance that requires the withdrawal of an appliance connector in order to gain access to the filling aperture.

Compliance is checked by inspection.

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22.104 Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use.

Compliance is checked by connecting the appliance to a water supply having a pressure equal to twice the maximum inlet water pressure or 1,2 MPa, whichever is the higher, for a period of 5 min.

There shall be no leakage.

22.105 The functional part of a humidifier shaped or decorated like a toy shall be **class III construction** with a **working voltage** of no more than 24 V.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.101 Thermal cut-outs incorporated in appliances for compliance with Clause 19 shall not be a **self-resetting thermal cut-out**.

Compliance is checked by inspection.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable.

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:*

For **electrode-type appliances**, the microenvironment of the insulation supporting the electrodes is pollution degree 3.

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30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

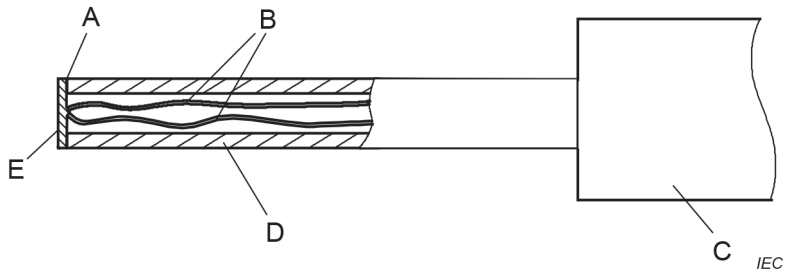
30.2.2 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

A adhesive

B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K

C handle arrangement permitting a contact force of 4 N ±1 N

D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm

E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

Figure 101 – Probe for measuring surface temperatures

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Annexes

The annexes of Part 1 are applicable except as follows.

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