

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-28: Particular requirements for sewing machines**



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**Household and similar electrical appliances – Safety –
Part 2-28: Particular requirements for sewing machines**

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**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-28: Particular requirements for sewing machines****FOREWORD**

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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 60335-2-28:2002+AMD1:2008 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.

IEC 60335-2-28 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2002 and Amendment 1:2008. This edition constitutes a technical revision.

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

- a) the text has been aligned with IEC 60335-1:2020;
- b) some notes have been converted to normative text (Clause 1, 11.7, 22.14, 22.101);
- c) clarification of requirements for battery-operated appliances (Clause 1, 3.1.9, 11.7, B.11.1);
- d) introduction of limits on the temperature rise of external accessible surfaces (Clause 11);
- e) application of test probe 19 has been introduced (8.1.1, 20.2).

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

Draft	Report on voting
61/6380/FDIS	61/6430/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/standardsdev/publications.

A list of all parts in the IEC 60335 series, published 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 sewing machines.

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;*

— 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,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 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~~ 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-28: Particular requirements for sewing machines

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric sewing machines 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**.

Overlock machines and **electrical sets** are within the scope of this standard.

Appliances not intended for normal household use, but that nevertheless ~~may~~ can be a source of danger to the public, such as sewing machines intended to be used by laymen in shops and in light industry, 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 knowledgeprevents 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~~ 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 102~~ 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60320-2-1, *Appliance couplers for household and similar general purposes – Part 2-1: Sewing machine couplers*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 ~~Replacement~~ Addition: ~~normal operation~~

operation of the appliance under the following conditions:

The appliance is operated without thread and fabric, the presser foot being in its lifted position and the spool-winding device disengaged. The stitch length and zigzag stitch width are adjusted so that the highest load is obtained.

Note ~~101~~ 1 to entry: The highest load is normally obtained with the stitch length and zigzag stitch width adjusted to their maximum values.

3.5 Definitions relating to types of appliances

3.5.101

electrical set

assembly comprising a motor and its control for mounting on a non-electric sewing machine

Note 1 to entry: An **electrical set** may incorporate a lamp.

3.5.102

overlock machine

sewing machine having more than one needle and incorporating a means for trimming the material

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.

5.101 *Electrical sets are mounted on the sewing machine specified in the instructions that gives the most unfavourable results.*

5.102 *Sewing machines used on a table are tested as portable appliances.*

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Appliances shall be marked on or near the lampholder with the maximum ~~power input~~ **rated wattage** of replaceable lamps as follows:

lamp max....W

The word "lamp" may be replaced by symbol IEC 60417-5012 (2002-10).

The ~~rated~~ voltage **rating** of a lamp shall be marked if it is lower than the **rated voltage** of the appliance.

7.10 Addition:

The requirement does not apply to switches controlling lamps.

7.11 Addition:

The requirement does not apply to motor controls.

7.12 Addition:

The instructions shall state the ~~maximum power input~~ **rated wattage** of any lamp and its ~~rated~~ voltage **rating** if it is lower than the **rated voltage** of the appliance.

The instructions shall state the substance of the following:

- switch off or unplug the appliance when leaving it unattended; **and**
- unplug the appliance before carrying out maintenance or replacing lamps.

7.12.1 Addition:

The instructions for **electrical sets** shall indicate the sewing machines for which they are intended and shall state how they are to be installed.

7.101 Electrical sets shall be marked with:

- **rated voltage** in volts;
- **rated current** in amperes;
- name, trade mark or identification mark of the manufacturer or responsible vendor; **and**
- model or type reference.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 Addition:

For foot pedals and other parts of appliances that are situated on the floor in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18.

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.

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 $4\text{ N} \pm 1\text{ N}$ 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.

11.7 ~~Replacement~~ Modification:

The appliance is operated until steady conditions are established by actuating the motor control in cycles. Each cycle comprises

- 2,5 s operation from start to full speed;
- 5,0 s operation at full speed;
- 7,5 s at rest.

*For appliances incorporating **integral batteries** or **separable batteries** not disconnected from the appliance for charging purposes:*

- the **battery** that has been **fully discharged** is charged for 1 h, while the appliance is operated as specified, if allowed by the construction of the appliance;
- the **battery** that has been **fully discharged** is charged, for a duration of 24 h or until it is **fully charged** whichever is shorter, without the **battery-operated appliance** performing its intended function.

11.8 Modification:

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

Addition:

~~NOTE 101 — The actuating member of a motor control is considered to be a handle that is held for short periods only.~~

The temperature rise of the actuating member of a motor control 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.

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

Surface	Temperature rise of external accessible surfaces ^a K
Bare metal	42
Coated metal ^b	49
Glass and ceramic	56
Plastic and plastic coating > 0,4 mm ^{c, d}	62
NOTE The temperature rise limits of knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Temperature rises are not measured on surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end, applied with a force not exceeding 1 N. ^b Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel or a non-substantially plastic coating is used. ^c The temperature rise limit applies also for plastic material having a metal finish of thickness less than 0,1 mm. ^d When the thickness of plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal or glass and ceramic 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.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable.

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.

19.7 *Modification:*

Stalled conditions are obtained by locking the rotor, the appliance being operated for 15 s.

19.9 Not applicable

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Addition:*

The requirement concerning moving parts of appliances does not apply to moving parts, such as needles, needle bars, spool winding devices and take-up levers, which are accessible for the operation and maintenance of the sewing machine.

Spokes of wheels, cutting blades of **overlock machines** and the point where a transmission belt first contacts the hand-wheel shall be adequately guarded.

For foot pedals and other parts of appliances that are situated on the floor in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied as specified for test probe 18.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.14 Addition:

~~NOTE 101~~—The risk of injury while feeding material under the presser foot during straight stitch and zigzag sewing ~~has to~~ shall be taken into account. An upward bend of the toe of the pressure foot by at least 6 mm or a wire guard is considered ~~satisfactory~~ to comply.

~~NOTE 102~~—This requirement does not apply to presser feet and attachments for particular purposes such as sewing buttonholes. It also does not apply to moving parts, such as needles, needle bars, spool winding devices and take-up levers, which are accessible for the operation and maintenance of the sewing machine.

22.101 Lamps having a ~~rated~~ voltage ~~rating~~ lower than the **rated voltage** of the appliance shall be supplied through an isolating transformer.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

~~24.1.3 Addition:~~

~~NOTE 101—Motor controls are not considered to be switches.~~

24.1.5 Addition:

The relevant standard for appliance couplers used for the connection of motor controls is IEC 60320-2-1.

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 motor controls and appliance connectors.

25.7 Addition:

Light polyvinyl chloride sheathed cords (code designation 60227 IEC 52) may be used regardless of the mass of the appliance.

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.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

~~30.2.3 Not applicable.~~

30.2 Modification:

Replace the two dashed items in the compliance criteria with the following:

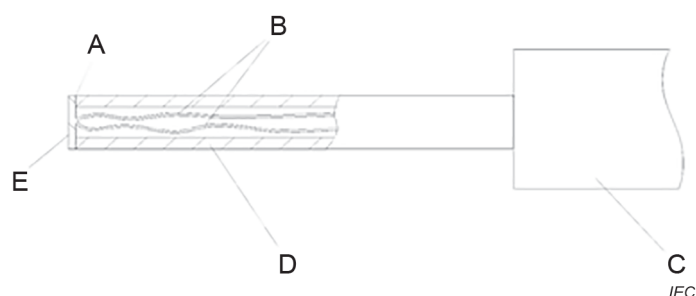
– *for sewing machines, 30.2.2 is applicable.*

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 $4\text{ N} \pm 1\text{ N}$
- D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with flat contact face

Figure 101 – Probe for measuring surface temperatures

Annexes

The annexes of Part 1 are applicable **except as follows**.