

INTERNATIONAL STANDARD



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

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INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD	4
INTRODUCTION	2
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 General requirement	9
5 General conditions for the tests	9
6 Classification	9
7 Marking and instructions	10
8 Protection against access to live parts	11
9 Starting of motor-operated appliances	11
10 Power input and current	11
11 Heating	11
12 Charging of metal-ion batteries	12
13 Leakage current and electric strength at operating temperature	12
14 Transient overvoltages	12
15 Moisture resistance	12
16 Leakage current and electric strength	13
17 Overload protection of transformers and associated circuits	13
18 Endurance	13
19 Abnormal operation	13
20 Stability and mechanical hazards	13
21 Mechanical strength	13
22 Construction	13
23 Internal wiring	14
24 Components	14
25 Supply connection and external flexible cords	14
26 Terminals for external conductors	14
27 Provision for earthing	15
28 Screws and connections	15
29 Clearances, creepage distances and solid insulation	15
30 Resistance to heat and fire	15
31 Resistance to rusting	15
32 Radiation, toxicity and similar hazards	15
Annexes	16
Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances	17
Bibliography	18
Figure 101 – Probe for measuring surface temperatures	15

Table 101 – Maximum temperature rises for specified external surfaces under normal operating conditions.....	12
--	----

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-28: Particular requirements for sewing machines

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 60335-2-28:2002+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:

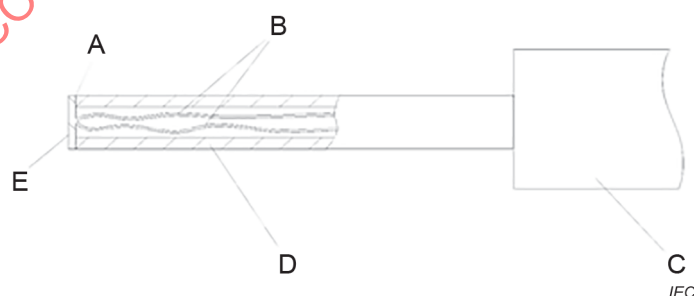
– *for sewing machines, 30.2.2 is applicable.*

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**.

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Annex B (normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

Annex B of Part 1 is applicable except as follows.

11 Heating

B.11.1 Modification:

Battery-operated appliances are tested under the conditions of **normal operation** with the appliance operating in cycles, where 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, and that cannot perform their intended function while the **batteries** are being charged, the appliance is operated as specified until it cannot perform its intended function due to the depletion of the **batteries**.

22 Construction

B.22.3 Addition:

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

B.22.4 Addition:

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

Bibliography

The bibliography of Part 1 is applicable ~~except as follows~~.

~~Addition:~~

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

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

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-28: Exigences particulières pour les machines à coudre**

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CONTENTS

FOREWORD	4
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 General requirement	9
5 General conditions for the tests	9
6 Classification	9
7 Marking and instructions	10
8 Protection against access to live parts	11
9 Starting of motor-operated appliances	11
10 Power input and current	11
11 Heating	11
12 Charging of metal-ion batteries	12
13 Leakage current and electric strength at operating temperature	12
14 Transient overvoltages	12
15 Moisture resistance	12
16 Leakage current and electric strength	12
17 Overload protection of transformers and associated circuits	12
18 Endurance	13
19 Abnormal operation	13
20 Stability and mechanical hazards	13
21 Mechanical strength	13
22 Construction	13
23 Internal wiring	14
24 Components	14
25 Supply connection and external flexible cords	14
26 Terminals for external conductors	14
27 Provision for earthing	14
28 Screws and connections	14
29 Clearances, creepage distances and solid insulation	14
30 Resistance to heat and fire	14
31 Resistance to rusting	15
32 Radiation, toxicity and similar hazards	15
Annexes	16
Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances	17
Bibliography	18
Figure 101 – Probe for measuring surface temperatures	15

Table 101 – Maximum temperature rises for specified external surfaces under normal operating conditions.....	12
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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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.

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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 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 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.

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 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.

Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements 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.

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*

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

3.1.9 Addition:

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 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 rated wattage of replaceable lamps as follows:

lamp max....W

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

The 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 rated wattage of any lamp and its 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 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:

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
<i>Bare metal</i>	42
<i>Coated metal ^b</i>	49
<i>Glass and ceramic</i>	56
<i>Plastic and plastic coating > 0,4 mm ^{c, d}</i>	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 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:

The risk of injury while feeding material under the presser foot during straight stitch and zigzag sewing 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 to comply.

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 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.

24.1.5 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 Modification:

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

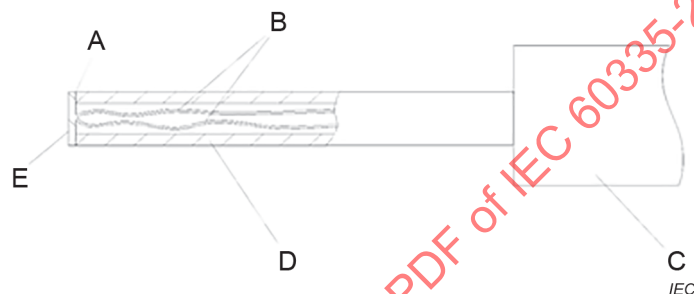
- for sewing machines, 30.2.2 is applicable.

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.

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Annex B (normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

Annex B of Part 1 is applicable except as follows.

11 Heating

B.11.1 Modification:

Battery-operated appliances are tested under the conditions of **normal operation** with the appliance operating in cycles, where 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, and that cannot perform their intended function while the **batteries** are being charged, the appliance is operated as specified until it cannot perform its intended function due to the depletion of the **batteries**.

22 Construction

B.22.3 Addition:

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

B.22.4 Addition:

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

Bibliography

The bibliography of Part 1 is applicable.

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SOMMAIRE

AVANT-PROPOS	22
INTRODUCTION	25
1 Domaine d'application	26
2 Références normatives	26
3 Termes et définitions	27
4 Exigences générales	27
5 Conditions générales d'essais	27
6 Classification	27
7 Marquage et instructions	28
8 Protection contre l'accès aux parties actives	29
9 Démarrage des appareils à moteur	29
10 Puissance et courant	29
11 Echauffements	29
12 Charge des batteries à ions métalliques	30
13 Courant de fuite et rigidité diélectrique à la température de régime	30
14 Surtensions transitoires	30
15 Résistance à l'humidité	30
16 Courant de fuite et rigidité diélectrique	31
17 Protection contre la surcharge des transformateurs et des circuits associés	31
18 Endurance	31
19 Fonctionnement anormal	31
20 Stabilité et dangers mécaniques	31
21 Résistance mécanique	31
22 Construction	31
23 Conducteurs internes	32
24 Composants	32
25 Raccordement au réseau et câbles souples extérieurs	32
26 Bornes pour conducteurs externes	32
27 Dispositions en vue de la mise à la terre	32
28 Vis et connexions	33
29 Distances dans l'air, lignes de fuite et isolation solide	33
30 Résistance à la chaleur et au feu	33
31 Protection contre la rouille	33
32 Rayonnement, toxicité et dangers analogues	33
Annexes	34
Annexe B (normative) Appareils alimentés par batteries, batteries séparables et batteries amovibles pour appareils alimentés par batteries	35
Bibliographie	36
Figure 101 – Calibre pour le mesurage des températures de surface	33

Tableau 101 – Echauffements maximaux pour les surfaces extérieures spécifiées en conditions de fonctionnement normal	30
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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-28: Exigences particulières pour les machines à coudre

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-28 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2002 et l'Amendement 1:2008. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) alignement du texte sur l'IEC 60335-1:2020;
- b) conversion en texte normatif de certaines notes (Article 1, 11.7, 22.14, 22.101);
- c) clarification des exigences relatives aux appareils alimentés par batteries (Article 1, 3.1.9, 11.7, B.11.1);

- d) introduction des limites d'échauffement des surfaces accessibles extérieures (Article 11);
- e) introduction de l'application du calibre d'essai 19 (8.1.1, 20.2).

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
61/6380/FDIS	61/6430/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

La présente Partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements, sauf si cette édition l'exclut. Dans ce cas, la dernière édition qui n'exclut pas la présente Partie 2 est utilisée. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente Partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les machines à coudre.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

- les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;
- à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;
- les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

- exigences: caractères romains;
- modalités d'essais: caractères italiques;
- notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

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- remplacé par une édition révisée, ou
- amendé.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit entériné au niveau national au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

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INTRODUCTION

Il a été considéré en établissant cette Norme internationale que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être consultés dans les documents de support du CE 61, accessibles sur le site web de l'IEC à l'adresse:

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

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et n'a pas pour objet de remplacer le texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils, lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

Cette norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre Partie 2 de l'IEC 60335, la Partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

Lorsqu'une Partie 2 ne comporte pas d'exigences complémentaires pour couvrir les risques traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les Parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

Cette norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un risque ne sont pas applicables parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de cette norme peut être examiné et essayé en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la norme.

NOTE 3 Les normes traitant des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

- les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure d'aptitude à la fonction;
- les normes CISPR 11 et CISPR 14-1, ainsi que les normes applicables de la série IEC 61000-3 concernant les émissions électromagnétiques;
- la norme CISPR 14-2 concernant l'immunité électromagnétique;
- les normes IEC publiées par le comité d'études 111 concernant l'environnement.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-28: Exigences particulières pour les machines à coudre

1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des machines à coudre électriques destinées à un usage domestique et analogue, dont la **tension assignée** est inférieure ou égale à 250 V pour les appareils monophasés et à 480 V pour les autres appareils, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

Les **surjeteuses-raseuses** et les **ensembles électriques** relèvent du domaine d'application de la présente norme.

Les appareils non destinés à un usage domestique normal, mais qui peuvent néanmoins constituer une source de danger pour le public, tels que les machines à coudre destinées à être utilisées par des usagers non avertis dans des magasins et chez des artisans, sont compris dans le domaine d'application de la présente norme.

Dans la mesure du possible, la présente norme traite des dangers courants que présentent les appareils et auxquels sont exposés tous les individus situés à l'intérieur et autour de l'habitation. Cependant, cette norme ne tient pas compte en général:

- des personnes (y compris des enfants) dont:
 - les capacités physiques, sensorielles ou mentales; ou
 - le manque d'expérience et de connaissanceles empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
- de l'utilisation de l'appareil comme jouet par des enfants.

L'attention est attirée sur le fait que:

- pour les appareils destinés à être utilisés dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires;
- dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas

- aux appareils prévus exclusivement pour des usages industriels;
- aux appareils destinés à être utilisés dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz).

2 Références normatives

L'article de la Partie 1 est applicable, avec l'exception suivante.