IEC 60335-2-41

Edition 5.1 2026-10

INTERNATIONAL STANDARD

CONSOLIDATED VERSION

Household and similar electrical appliances - Safety -
Part 2-41: Particular requirements for pumps

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Household and similar electrical appliances - Safety - Part 2-41: Particular requirements for pumps

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60335-2-41 edition 5.1 contains the fifth edition (2024-01) [documents 61/7007/FDIS and 61/7079/RVD] and its amendment 1 (2026-10) [documents 61/7654/FDIS and 61/7673/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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IEC 60335-2-41 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 2012. 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) modification or conversion of some notes to normative text (Clause 1, 7.12.1, 25.7);
c) introduction of IEC 60417 symbol for maximum operating depth and indoor use only (7.1, 7.6, 7.12~~.1~~);
d) clarification of requirements for aquarium pumps and garden pond pumps;
e) addition of legibility requirements for markings exposed to solar radiation (7.14);
f) clarification of pumps subjected to test probe 18 (8.1.1, 20.2);
g) introduction of accessible surface temperature limits (Clause 11);
h) addition of requirements for IEC 61984 connectors for pumps intended for permanent connection to fixed wiring (22.107, 24.1.5, 24.1.101, 25.3).
i) clarifications on remote operation for pumps in scope of this standard (22.40, 22.49, 22,51)

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

Draft	Report on voting
61/7007/FDIS	61/7079/RVD

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

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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 pumps**.**

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;

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– 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 and its amendment 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.

The following differences exist in the countries indicated below.

– 6.1: Pumps intended to be used in or close to swimming pools, garden ponds and similar places may be class 0I if their supply circuit incorporates a residual current device. Other pumps may be class 0I (Japan).

– 7.14: Marking and labelling systems complying with UL 969 for outdoor use are considered to meet the UV exposure compliance criteria (USA).

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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 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.

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

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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.

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1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric pumps for liquids having a temperature not exceeding 90 °C, intended for household and similar purposes, 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**.

Examples of appliances within the scope of this standard are

– **aquarium pumps**;
– **garden pond pumps**;
– **shower-boost pumps**;
– **sludge pumps**;
– **submersible pumps**;
– table fountain pumps;
– **vertical wet pit pumps**.

Appliances not intended for normal household use, but that nevertheless 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.

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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

– **stationary circulation pumps** for heating and service water installations (IEC 60335-2-51);
– pumps for flammable liquids;
– pumps intended exclusively for industrial purposes;
– pumps intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
– pumps incorporating chlorinators of the electrolytic type.

Pumps incorporated in appliances are not covered by this standard unless a specific reference is made.

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2 Normative references

This clause of Part 1 is applicable, except as follows.

Addition:

IEC 60068-2-5:2018, *Environmental testing − Part 2-5: Tests − Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering*

IEC 60364-7-701, *Low voltage electrical installations – Part 7-701: Requirements for special installations or locations – Locations containing a bath or shower*

IEC 60364-7-702, *Low voltage electrical installations – Part 7-702: Requirements for special installations or locations – Swimming pools and fountains*

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

IEC 61984:2008, *Connectors – Safety requirements and tests*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 *Modification:*

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Replace the first paragraph with the following:

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operation of the appliance under the following conditions:

Pumps are operated with the inlet in liquid at zero pressure, and the discharge outlet is maintained between the minimum and maximum total head, so that the highest power input is attained. The total head is measured between the inlet and the discharge outlet.

Sludge pumps are operated with water.

Vertical wet pit pumps are operated with water unless they can also pump sludge, in which case they are operated with sludge having a density not less than the maximum density specified in the instructions and not more than 105 % of the specified maximum density.

3.5 Definitions relating to types of appliances

3.5.101
submersible pump
pump having the electrical part completely or partially immersed in liquid during normal use

Note 1 to entry: The motor windings may be dry, immersed in oil or in the pumped liquid.

3.5.102
vertical wet pit pump
pump having the electrical part separated from the hydraulic part and not immersed in liquid during normal use

Note 1 to entry: Controls such as water level switches may be immersed in the liquid.

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3.5.103
sludge pump
pump intended for moving a mixture of water and small solids

Note 1 to entry: **Sludge pumps** may be **submersible pumps** or **vertical wet pit pumps**.

3.5.104
shower-boost pump
pump for installation in the water supply system to increase the water flow for showering purposes

3.5.105
deep well pump
multistage **submersible pump** intended to be used in bore wells

3.5.106
aquarium pump
pump intended to be used indoors with an aquarium

3.5.107
garden pond pump
pump intended to be used outdoors with a garden pond

4 General requirement

This clause of Part 1 is applicable.

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5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

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5.7 *Addition:*

The liquid temperature is maintained between 0 °C and –5 °C of the temperature marked on the pump.

5.101 *Pumps are tested as **portable appliances**, unless they are **fixed appliances**.*

5.102 ***Stationary pumps** having a three-phase motor that does not incorporate a **protective device** are installed with an appropriate device, in accordance with the instructions.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Modification:*

Replace the first paragraph with the following:

Submersible pumps for use in swimming pools when persons are in the pool shall be **class III** with a **rated voltage** not exceeding 12 V.

Other **submersible pumps** for use in water and other conducting liquids shall be **class I** or **class III**. However, **aquarium pumps** may be **class II**. Table fountain pumps for indoor use may also be **class II** as long as their **rated power input** does not exceed 25 W.

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Portable pumps for cleaning and other maintenance of swimming pools shall be **class I** or **class III**.

Other pumps shall be **class I**, **class II** or **class III**.

6.2 *Addition:*

Submersible pumps shall be IPX8.

Portable pumps for cleaning and other maintenance of swimming pools shall be at least IPX7.

Shower-boost pumps intended for installation outside of zones 1 and 2, as specified in IEC 60364-7-701, shall be at least IPX2.

Other pumps shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

Pumps having a **rated power input** exceeding 50 W shall be marked with

– H_{min}, the minimum total head, in metres, if greater than zero;
– the direction of rotation (for pumps having three-phase motors).

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The maximum operating depth, in metres, with a minimum of 1 m, shall be marked using symbol IEC 60417-6444 (2020-12) for:

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– **submersible aquarium pumps**; and
– other **submersible pumps** having a **rated power input** exceeding 50 W.

Pumps shall be marked with the maximum liquid temperature, which shall not be less than 35 °C. If the temperature exceeds 35 °C, pumps shall be marked with the maximum period of operation, unless they are intended for continuous operation.

Pumps that are not intended for outdoor use shall be marked with symbol IEC 60417-5957 (2004-12) or with the substance of the following:

For indoor use only

7.6 *Addition:*



[symbol IEC 60417-6444 (2020-12)]

maximum operating depth where X specifies the value

Note 101 The indication of the maximum operating depth in metres can be located on the left or right side adjacent to the arrows.

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[symbol IEC 60417-5957 (2004-12)]

for indoor use only

7.12 *Addition:*

If symbol IEC 60417-6444 (2020-12) or symbol 60417-5957(2004-12) is used the meaning shall be explained.

The instructions for **class I portable pumps** for cleaning and other maintenance of swimming pools shall include the substance of the following:

– the pump must not be used when people are in the water;

– the pump must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

The instructions for pumps marked with a temperature exceeding 35 °C shall state the maximum period of operation and the minimum rest period, unless the pump is intended for continuous operation at this temperature.

For **vertical wet pit pumps**, the instruction shall indicate the maximum density (in kg/m^3) of the media intended for use with the pump.

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The instructions for **submersible pumps** for use in swimming pools shall state the substance of the following:

Disconnect the pump from the supply mains before carrying out user maintenance such as cleaning the filter.

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7.12.1 *Addition:*

The installation instructions shall provide information on requirements specified for the electrical installation and shall include reference to national wiring rules. If reference is made to zones, the corresponding drawings shall be included.

The installation instructions shall include the following:

– for pumps having a **rated power input** exceeding 50 W, the maximum total head, in metres;

– for **submersible pumps** and **vertical wet pit pumps** containing lubricants, the substance of the following:

Pollution of the liquid could occur due to leakage of lubricants.

– for **stationary pumps** having a three-phase motor not incorporating a **protective device,** the substance of the following:

A protective device is to be installed in the fixed wiring and its characteristics are to be specified.

The installation instructions for pumps intended to be used in outdoor fountains, garden ponds and similar places shall state that the pump is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

The installation instructions for **class I pumps** for swimming pools shall state that the pump is to be supplied by an isolating transformer or supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

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The installation instructions for **class III pumps** intended to be installed in zone 0 of a swimming pool, as defined in IEC 60364-7-702, shall state that the transformer is to be located outside zone 1.

The installation instructions for **class II pumps** intended to be fixed:

– in zone 1 of a swimming pool, as defined in IEC 60364-7-702;
– in a sump without an adequate outlet for the liquid; or
– close to a garden pond or similar place

shall state that the pump is to be located where flooding cannot occur.

For **fixed pumps** intended for permanent connection to fixed wiring, delivered with a separate connector to ease the installation and establish the supply connection, the instructions shall state the substance of the following:

Only use the supplied connector when installing the pump.

7.14.101 Markings on pumps intended for outdoor use in daylight shall remain legible after being exposed to solar radiation.

NOTE 1 Submersible pumps are not considered to be used in daylight.

NOTE 2 Markings located at a position without direct sunlight exposure in normal use (e.g. on the bottom of an enclosure) are not considered to be used in daylight.

This requirement does not apply to markings that are moulded in, engraved, or stamped and either raised above or have a depth below the surface of at least 0,25 mm and laser engraved markings.

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Compliance is checked by IEC 60068-2-5:2018 procedure Sb 1 using a xenon-arc lamp as the radiation source.

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The test conditions shall be as specified in IEC 60068-2-5:2018, Table 5. Both the narrowband irradiance level and the black panel temperature shall be controlled.

The test shall be in cycles for a total duration of 515 h.

After the test, the marking shall be clearly legible.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1.1 *Addition:*

Probe 18 of IEC 61032 is not applied to

– ***sludge pumps****;*
– ***vertical wet pit pumps****;*
– ***submersible pumps****, other than* ***aquarium pumps****, table fountain pumps and* ***garden pond pumps****; and*
– ***shower-boost pumps****, swimming pool pumps and other pumps, if they have instructions that indicate that the pump is not to be installed or used in areas accessible to children.*

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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 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.

11.7 *Modification:*

Sample Document

Replace the first paragraph with the following:

*Pumps are operated with the liquid maintained at the temperature marked on the pump. They are operated until steady conditions are established unless they are marked with a maximum period of operation. In this case, they are operated for the marked period followed by the rest period specified in the instructions, the test being carried out for three cycles of operation. **Shower-boost pumps** that are also supplied with cold water are operated with the cold water at 15 °C ± 2 °C.*

*Pumps, other than **shower-boost pumps**, marked with a maximum period of operation are also operated with the liquid maintained at 35 °C 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:

For pumps whose enclosure temperature arises mainly from the medium being pumped and where the pump is marked with a liquid temperature exceeding 35 °C, when applying Table 3, the temperature rise of the external enclosure is not measured and Table 101 is not applicable.

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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