INTERNATIONAL STANDARD

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Edition 3.1

2004-03

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Household and similar electrical appliances – Safety –

Part 2-41: Particular requirements for pumps

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

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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 part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This consolidated version of IEC 60335-2-41 is based on the third edition (2002) [documents 61/2217/FDIS and 61/2292/RVD] and its amendment 1 (2004) [documents 61/2537/FDIS and 61/2581/RVD].

It bears the edition number 3.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) of that standard.

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

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 publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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).

– 6.1: Class 0 aquarium pumps are allowed (USA).

– 6.1: Class II table fountain pumps are not allowed (USA).

– 7.12.1: Stationary pumps not incorporating a protective device are to be marked with the characteristics of the device to be installed in the fixed wiring (USA).

– 15.1.1: The test is different (USA).

– 20.1: This test is only carried out on fountain pumps, the angle being 15° (USA).

– 22.105: The test is different (USA).

A bilingual version of this standard may be issued at a later date.

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.

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.

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.

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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-41: Particular requirements for pumps

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard 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.

NOTE 101 Examples of appliances within the scope of this standard are

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

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

– the use of appliances by young children or infirm persons without supervision;
– playing with the appliance by young children.

NOTE 102 Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
– in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

NOTE 103 This standard does not apply to

– **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.

NOTE 104 Pumps incorporated in appliances are not covered by this standard unless a specific reference is made.

2 Normative references

IEC 60364-7-701, *Electrical installations of buildings – Part 7: Requirements for special installations or locations – Section 701:Locations containing a bath tub or shower basin*

This clause of Part 1 is applicable.

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 *Replacement:*

normal operation
operation of the appliance under the following conditions

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

NOTE 101 The total head is measured between the inlet and the discharge outlet.

Sludge pumps are operated with water.

3.101
submersible pump
pump having the electrical part completely or partially immersed in liquid during normal use

NOTE The motor windings may be dry, immersed in oil or in the pumped liquid.

3.102
vertical wet pit pump
pump having the electrical part separated from the hydraulic part and not immersed in liquid during normal use

NOTE Controls such as water level switches may be immersed in the liquid.

3.103
sludge pump
pump intended for moving a mixture of water and small solids

NOTE **Sludge pumps** may be **submersible pumps** or **vertical wet pit pumps**.

3.104
shower-boost pump
pump for installation in the water supply system to increase the water flow for showering purposes

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.

5.7 *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:*

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.

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

– the minimum total head, in metres, if greater than zero;

– the maximum operating depth, in metres with a minimum of 1 m (for **submersible pumps**);

– the direction of rotation (for pumps having three-phase motors).

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.