

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –  
Part 2-86: Particular requirements for electric fishing machines**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-86: Règles particulières pour les équipements électriques de pêche**

IEC 60335-2-86:2002

<https://standards.iteh.ai/standards/iec/d5951cd1-0a4e-441f-8f8a-944e2cec70ab/iec-60335-2-86-2002>



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 65.150

ISBN 978-2-8322-0458-0

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-86: Particular requirements for electric fishing machines

#### FOREWORD

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This part of International Standard IEC 60335 has been prepared by sub-committee 61H: Safety of electrically-operated farm appliances, of IEC technical committee 61: Safety of household and similar electrical appliances.

This consolidated version of IEC 60335-2-86 consists of the second edition (2002) [documents 61H/165/FDIS and 61H/170/RVD], its amendment 1 (2005) [documents 61H/219/FDIS and 61H/220/RVD] and its amendment 2 (2012) [documents 61H/270/CDV and 61H/278/RVC].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 2.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

The French version of this standard has not been voted upon.

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.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for electric fishing 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 associated noun are also in bold.

The following differences exist in the countries indicated below:

- Clause 1: The use of electric fishing machines is limited to research purposes only (Denmark, Finland, Sweden)

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

2 | NOTE 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 the amendment 2 be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

## 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.

- 2 | 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 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 which 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 2-86: Particular requirements for electric fishing machines

### 1 Scope

This clause of Part 1 is replaced by the following.

This standard deals with the safety of **electric fishing machines** by means of which water may be electrified for the purpose of catching fish or for providing barriers to all animals living in water.

The **rated voltage** of **electric fishing machines** is not more than 250 V for single phase machines and 480 V for other machines, except that the **rated voltage** of **electric fishing machines** for permanent connection to fixed wiring is not more than 1 000 V.

Additional requirements for boat mounted **electric fishing machines** are given in Annex AA.

NOTE 101 Examples of **electric fishing machines** coming within the scope of this standard are:

- **mains-operated electric fishing machines** which include those supplied from portable or stationary generator sets;
- **battery-operated electric fishing machines**.

NOTE 102 Attention is drawn to the fact that

- for appliances intended to be used on board ships or boats, 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, the national water supply authorities and similar authorities.

NOTE 103 This standard does not apply to

- electric fence energizers (IEC 60335-2-76);
- electric animal stunning equipment (IEC 60335-2-87);
- 2 | – shark deterrent devices that are carried by the user.

### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60068-2-52:1996, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

- 2 | IEC 61558-2-4, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*



## 2 | 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

### 3.1.1 Addition:

The **rated voltage** is the rated input voltage

### 3.1.6 Addition:

The **rated current** is the rated input current

### 3.1.9 Replacement:

#### **normal operation**

operation of the appliance under the following conditions.

The **electric fishing machine** is operated as in normal use when connected to the supply with an adjustable non-inductive resistor connected between its output terminals. The resistor is adjusted so as to give an **output current** just sufficient not to cause any **protective device** to operate

### 3.6.3 Addition:

NOTE 101 It also includes terminals for the connection of the battery and other metal parts in a battery compartment that become accessible when batteries are replaced, even with the aid of a **tool**.

### 3.6.4 Replacement:

#### **live part**

conductive part that may cause an electric shock

### 3.101

#### **electric fishing machine**

appliance, comprising **electrodes** and an energizer, that is designed or used for the control, taking, killing of any species of fish or invertebrate living in water or for the production of electronarcosis, by means of electric current

NOTE 1 An **electric fishing machine** may be used to provide a barrier effective for all animals living in water.

NOTE 2 A given **electric fishing machine** may only perform some of the functions specified.

### 3.102

#### **mains-operated electric fishing machine**

**electric fishing machine** designed for direct connection to a supply other than a battery supply at a voltage greater than **safety extra-low voltage**. It may also be supplied from a generator set

### 3.103

#### **electrode**

that part of an **electric fishing machine** that transfers the electric power into the water. The catching **electrode** is the **electrode** used by the fisherman, the return **electrode** is the **electrode** trailed in the water

2 | NOTE 1 The catching **electrode** is usually the anode and the return **electrode** is usually the cathode.

NOTE 2 This does not preclude the return **electrode** being held by the user.

**3.104****output circuit**

all conductive parts or components within an **electric fishing machine** that are connected or intended to be connected galvanically to the **electrode** terminals

**3.105****output voltage**

voltage between the **electrodes**

**3.106****output current**

current in the **output circuit** that the **electric fishing machine** is designed to supply

**3.107****impulse**

that part of the **pulsed voltage** output that exceeds 12 V

**3.108****pulsed voltage**

voltage **impulse** of any form and any duration

**3.109****battery-operated electric fishing machine**

**electric fishing machine** deriving its energy solely from non-rechargeable batteries, rechargeable batteries or other sources of energy, with a voltage meeting the requirements for **safety extra-low voltage**

**3.110****biased-off switch**

switch which automatically returns to the **off position** when its actuating member is released

**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.

**5.8.1 Addition:**

*For **battery-operated electric fishing machines** where the supply terminals for the connection of the battery have no indication for polarity, the more unfavourable polarity is applied.*

**5.101** *If there is no indication as to which of the output terminals is to be connected to the return **electrode**, the terminal that gives the most unfavourable result is connected to the return **electrode**.*

**5.102** ***Electric fishing machines** are tested as **motor-operated appliances**.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Replacement:

**Electric fishing machines** that are intended to be permanently connected to fixed wiring shall be **class I** or **class II** with respect to protection against electric shock. Other **electric fishing machines** shall be **class II** or **class III**.

Accessories intended to be supplied with **portable electric fishing machines** shall be **class III**.

*Compliance is checked by inspection and by the relevant tests.*

### 6.2 Addition:

**Electric fishing machines** intended for permanent connection to fixed wiring shall be at least IPX4. Other **electric fishing machines** shall be at least IPX5.

Hand-held parts of **electric fishing machines** shall be IPX7.

Battery compartments in **portable electric fishing machines** that contain voltages exceeding 24 V shall be IPX7.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

**Electric fishing machines** shall be marked with

- the words "Pulsed voltage machine", "Direct current machine", "Alternating current machine" as appropriate;
- the **output current**;
- the **output voltage**;
- "Read the instructions" or with symbol ISO 7000-0790 (2004-01);
- the catching **electrode** and return **electrode** terminals of alternating current machines and pulsed voltage machines using a.c. shall be identified by symbols IEC 60417-5036 (DB:2002-10) and IEC 60417-5017 (DB:2002-10) of respectively. If the return **electrode** is not grounded it need not be marked.
- the catching **electrode** and return **electrode** terminals of direct current machines and pulsed voltage machines using d.c. shall be identified by symbols IEC 60417-5005 (DB:2002-10) and IEC 60417-5006 (DB:2002-10) as appropriate.

**Battery-operated electric fishing machines** shall be marked with the substance of the following:

WARNING: Do not connect to mains-operated equipment.

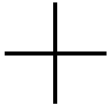
7.6 Addition:

2 |



[symbol IEC 60417-5017 (2006-08)]

Earth (ground)



[symbol IEC 60417-5005 (DB:2002-10)]

Plus; positive polarity



[symbol IEC 60417-5006 (DB:2002-10)]

Minus; negative polarity

7.8 Addition:

- 2 | For **battery-operated electric fishing machines**, the supply terminals for connection of the battery shall be clearly indicated by symbol IEC 60417-5005 (2002-10) if of positive polarity, and by symbol IEC 60417-5006 (2002-10) if of negative polarity, unless the polarity is irrelevant.

7.12 Addition:

The instructions for **battery-operated electric fishing machines** shall, in particular, emphasise the warning marked on the appliance that states the substance of the following:

WARNING: Do not connect to mains-operated equipment.

The instructions shall give details of the construction of the net that can be used with the appliance, in particular they shall indicate that net handles shall

- be constructed of non-conductive material,
- be of sufficient length to avoid hand contact with the water,
- not be wrapped or covered metallic handles,
- not have a metallic weighting chain extending beyond the bottom edge of the net proper.

- 2 | If symbol IEC 60417-5017 (2006-08), symbol IEC 60417-5036 (2002-10) or symbol ISO 7000-0790 (2004-01) are marked on the appliance, their meaning shall be explained.

#### 7.12.1 Addition:

For **electric fishing machines** supplied by an isolating transformer, the instructions shall include details concerning the fixing and location of the transformer to prevent it from falling into the water and from being otherwise impaired by water.

The instructions for **electric fishing machines** that are supplied from a motor-generator set with an accessible neutral or incorporate a motor-generator set or generator with an accessible neutral shall contain the substance of the following warning.

WARNING: Ensure the generator neutral is not connected to the enclosure of the motor-generator set or **electric fishing machine**.

#### 2) 7.14 Addition:

Markings required by the addition to 7.1 shall have a height not less than:

- 5 mm for headlines;
- 3 mm for other lettering.

#### 2) Symbol IEC 60417-5017 (2006-08), symbol IEC 60417-5036 (2002-10) and symbol ISO 7000-0790 (2004-01) shall have a height of at least 25 mm.

### 8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

#### 8.1.4 Addition:

The means for the connection of the **electrodes** is not a **live part**.

**8.101** For **battery-operated electric fishing machines**, the parts in a battery compartment that become accessible when batteries are being replaced, even with the aid of a **tool**, shall not be live.

*Compliance is checked by inspection and by the test specified for determining if a part is a **live part**.*

### 9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

### 10 Power input and current

This clause of Part 1 is applicable except as follows.

**10.101** The measured **output voltage** shall not deviate from the **output voltage** marked on the machine by more than 10 %.

*Compliance is checked by measurement, the **electric fishing machine** being operated under conditions of **normal operation** and supplied at **rated voltage**.*

## 11 Heating

This clause of Part 1 is applicable except as follows.

### 11.5 Replacement:

**Electric fishing machines** are operated under **normal operation**, supplied as follows:

- **mains-operated electric fishing machines**, are supplied with the most unfavourable supply voltage between 0,85 and 1,1 times **rated voltage**;
- **battery-operated electric fishing machines**, are supplied with the most unfavourable supply voltage between
  - 0,55 and 1,1 times **rated voltage**, if the **electric fishing machine** can be used with non-rechargeable batteries;
  - 0,75 and 1,1 times **rated voltage**, if the **electric fishing machine** is designed for use with rechargeable batteries only.

The values specified in Table 101 for the internal resistance per cell of the battery shall be taken into account.

**Table 101 – Battery source impedance**

Supply to the terminals for the connection of the battery	Internal resistance/cell $\Omega$	
	Non-rechargeable batteries	Rechargeable batteries
1,1 times <b>rated voltage</b>	0,08	0,0012
1,0 times <b>rated voltage</b>	0,10	0,0015
0,75 times <b>rated voltage</b>	0,75	0,0060
0,55 times <b>rated voltage</b>	2,00	-

NOTE For determining the internal resistance of a battery, two or more cells connected in parallel are considered to be one cell.

### 11.7 Replacement:

The **electric fishing machine** is operated until steady conditions are established.

## 12 Void

## 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

### 13.1 Modification:

Instead of all **electric fishing machines** being subjected to the tests of 13.2 and 13.3, the following applies.

Compliance is checked by the tests of 13.2 and 13.3 for **mains-operated electric fishing machines**.