

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –
Part 2-87: Particular requirements for electrical animal-stunning equipment**

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-87: Règles particulières pour les appareils électriques
d'insensibilisation des animaux**

IEC 60335-2-87:2002

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-87: Particular requirements for electrical animal-stunning equipment

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 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 60335-2-87 consists of the second edition (2002) [documents 61H/167/FDIS and 61H/172/RVD], its amendment 1 (2007) [documents 61H/236/CDV and 61H/241/RVC] and its amendment 2 (2012) [documents 61H/271/CDV and 61H/279/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 animal-stunning equipment.

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:

- 25.7: Ordinary PVC sheathed supply cords are permitted (Australia, New Zealand).

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 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 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.

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 2-87: Particular requirements for electrical animal-stunning equipment

1 Scope

This clause of Part 1 is replaced by the following.

This standard deals with the safety of **electric animal-stunning equipment** the **rated voltage** of which is not more than 250 V for single-phase appliances and 480 V for other appliances.

This standard is applicable to **electric animal-stunning equipment** for industrial or commercial use, for use on farms or for use in areas where they may be a source of danger to the public.

So far as is practical, this standard deals with the common hazards presented by these types of appliances.

NOTE 101 Examples of **electric animal-stunning equipment** within the scope of this standard are those used to stun:

- bovines such as cattle, calves, cows, heifers and bulls;
- ovines such as sheep and lambs;
- caprines such as goats;
- cervids such as deer;
- solipeds such as horses, donkeys and mules;
- birds such as chickens, turkeys and guinea fowl;
- porcines such as pigs;
- fur animals such as foxes, chinchilla, rabbits and possums;
- mustelids such as mink and polecats;
- other ruminants such as camels.

NOTE 102 The following types of **electric animal-stunning equipment** are covered by this standard:

- manual, semi-automatic and automatic.

NOTE 103 Attention is drawn to the fact that:

- for **electric animal-stunning equipment** intended to be used on board ships, 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;
- in many countries, additional requirements are specified concerning the humane slaughter of animals.

NOTE 104 This standard does not apply to:

- 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);
- electric fence energizers (see IEC 60335-2-76);
- electric fishing machines (see IEC 60335-2-86);
- meat tenderizers, carcass immobilizers, carcass stiffeners, spinal discharge equipment or similar equipment.

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.

3.1.9 *Replacement:*

normal operation

the **electric animal-stunning equipment** is operated as in normal use when connected to the supply with **electrodes** connected to the output terminals of the **stunning equipment**. An adjustable non-inductive resistor is connected between the **electrodes**. The resistor is adjusted so that **output current** can flow

3.6.3 *Addition:*

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

3.6.4 *Replacement:*

live part

a conductive part that may cause an electric shock

3.101

electric animal-stunning equipment

appliance that is designed or used to cause electronarcosis in an animal by means of an electric current. It may also cause irreversible cardiac arrest

NOTE In this standard, for convenience, this term is abbreviated to **stunning equipment**.

3.102

mains-operated stunning equipment

stunning equipment designed for direct connection to a supply, other than a battery supply or a **safety extra-low voltage** supply

3.103

battery-operated stunning equipment

stunning equipment deriving its energy solely from chargeable or non-rechargeable batteries

**3.104
electrode**

parts of **stunning equipment** that transfer the electric current to the animal

NOTE The **stun electrode** is the **electrode** used to apply the stun voltage, the **return electrode** is the other **electrode**.

**3.105
stunning circuit**

conductive parts or components within **stunning equipment**, that are connected or intended to be connected galvanically to the **electrode** terminals

**3.106
output voltage**

voltage required to sustain the **output current** under **normal operation**

**3.107
output current**

current in the **stunning circuit** that the **stunning equipment** is designed to supply

**3.108
biased-off switch**

switch that 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 stunning equipment** where the supply terminals for the connection of the batteries have no indication for polarity, the application of the more unfavourable polarity is used.*

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

5.102 ***Stunning equipment** is tested as a **motor-operated appliance**.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

Stunning equipment that is suitable for connection to the supply mains shall be of **class I**, **class II** or **class III** with respect to protection against electric shock.

Stunning equipment that is suitable for connection to the supply mains and that is directly connected to the water supply mains shall be of **class I** with respect to protection against electric shock.

Portable and **hand-held stunning equipment** shall be **class II** or **class III** with respect to protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

6.2 Addition:

Parts of **stunning equipment** that contain electrical components and that may be cleaned with a water jet according to the instructions, shall be at least IPX5.

Hand-held stunning equipment shall be at least IPX5.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Stunning equipment shall be marked with:

- duty cycle, if applicable;
- **output current**;
- no-load **output voltage**;
- 2 | – “read the instructions” or with symbol ISO 7000-0790 (2004-01);
- a symbol indicating the presence of a dangerous voltage in accordance with symbol number IEC 60417-5036 (2002-10).

NOTE 101 This symbol forms a warning sign for which the rules in ISO 3864-1 are applicable.

- the stun **electrode** and return **electrode** terminals shall be identified by appropriate symbol IEC 60417-5036 (2002-10) and symbol IEC 60417-5017 (2006-08) respectively. If the return **electrode** is not grounded it need not be marked.

Battery-operated stunning equipment shall also be marked with:

- the **rated input current** in amperes;
- WARNING: Do not connect to mains-operated equipment.
- the type of battery, unless the type is irrelevant for the operation of the stunning equipment, distinguishing between chargeable and non-rechargeable batteries if necessary.

7.6 Addition:



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

7.8 Addition:

For **battery-operated stunning equipment** the supply terminals for connection of the battery shall be clearly indicated by the symbol "+" or the colour red if of positive polarity, and by the symbol "-" or the colour black if of negative polarity, unless the polarity is irrelevant.

7.12 Addition:

The instructions shall contain the substance of the following:

- for **stunning equipment** parts of which are hand-held, the power supply switch shall be visible from any point that the piece held in the hand may be used;
- for **stunning equipment** parts of which are hand-held, the hand-held sub-assembly when not in use shall be kept in a holder placed alongside the supply unit, or be otherwise suspended at a minimum height of 1,6 m;
- the **supply cord** shall be placed such that it is not accessible to animals;
- recommendations concerning functional tests to be carried out to ensure the continuing correct operation of safety controls and interlocks;
- the stunner shall be disconnected from the power supply during cleaning;
- isolate the **stunning equipment** from the power supply when it is not in use.

The instructions for **battery-operated stunning equipment** shall in particular emphasize the warning marked on the **stunning equipment** that states:

WARNING: Do not connect to mains-operated equipment.

The instructions for **class III portable stunners**, shall state that the stunner shall only be used with the isolating transformer with which it is supplied.

If symbol IEC 60417-5017 (2006-08) or symbol IEC 60417-5036 (2002-10) are marked on the appliance its meaning shall be explained

Modification:

The instructions concerning persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge and children playing with the appliance are not required.

7.12.1 Addition:

The instructions shall include the substance of the following:

- a wiring diagram;
- for **fixed stunning equipment**, the installation shall be integrated into an effective equipotential bonding system;
- parts that are not marked IPX5 shall be installed in a location where they are not likely to be cleaned with the aid of a water jet;
- the stunner shall be installed in a well drained position;
- the **stunning equipment** is to be installed according to the relevant sections of the wiring rules and health and safety rules.

NOTE 101 Attention is drawn to IEC 60364-7-705.