

# INTERNATIONAL STANDARD

**Household and similar electrical appliances – Safety –  
Part 2-66: Particular requirements for water-bed heaters**



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# INTERNATIONAL STANDARD

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**Household and similar electrical appliances – Safety –  
Part 2-66: Particular requirements for water-bed heaters**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

|                                                                        |    |
|------------------------------------------------------------------------|----|
| FOREWORD.....                                                          | 3  |
| INTRODUCTION.....                                                      | 6  |
| 1 Scope.....                                                           | 7  |
| 2 Normative references .....                                           | 7  |
| 3 Terms and definitions .....                                          | 8  |
| 4 General requirement.....                                             | 8  |
| 5 General conditions for the tests .....                               | 8  |
| 6 Classification.....                                                  | 9  |
| 7 Marking and instructions.....                                        | 9  |
| 8 Protection against access to live parts.....                         | 10 |
| 9 Starting of motor-operated appliances .....                          | 10 |
| 10 Power input and current.....                                        | 10 |
| 11 Heating.....                                                        | 10 |
| 12 <del>Void</del> Charging of metal-ion batteries.....                | 11 |
| 13 Leakage current and electric strength at operating temperature..... | 11 |
| 14 Transient overvoltages .....                                        | 11 |
| 15 Moisture resistance .....                                           | 11 |
| 16 Leakage current and electric strength.....                          | 11 |
| 17 Overload protection of transformers and associated circuits .....   | 12 |
| 18 Endurance.....                                                      | 12 |
| 19 Abnormal operation .....                                            | 12 |
| 20 Stability and mechanical hazards.....                               | 12 |
| 21 Mechanical strength .....                                           | 12 |
| 22 Construction .....                                                  | 13 |
| 23 Internal wiring.....                                                | 13 |
| 24 Components .....                                                    | 13 |
| 25 Supply connection and external flexible cords .....                 | 14 |
| 26 Terminals for external conductors.....                              | 15 |
| 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 .....                                                          | 17 |
| Bibliography.....                                                      | 18 |
| Figure 101 – Wood block .....                                          | 16 |
| Table 12 – Pull force and torque .....                                 | 14 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –****Part 2-66: Particular requirements for water-bed heaters****FOREWORD**

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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 60335-2-66:2002+AMD1:2008+AMD2:2011 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 60335-2-66 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2002, Amendment 1: 2008 and Amendment 2:2011. 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) conversion of some notes to normative text (Clause 1, 19.4, 22.101);
- c) clarification of requirements for remote operation (22.40, 22.49, 22.51).

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

| Draft       | Report on voting |
|-------------|------------------|
| 61/7249/CDV | 61/7356/RVC      |

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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 water-bed heaters.

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](https://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.

## 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~~ 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.

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~~ 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. ~~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 2-66: Particular requirements for water-bed heaters

#### 1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **water-bed heaters** and their associated control units, for household and similar purposes, their **rated voltage** being not more than 250 V, **including direct current (DC) supplied appliances**.

Appliances not intended for normal household use, but that nevertheless ~~may~~ **can** be a source of danger to the public, such as appliances intended to be used in hotels, 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 in 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, the national water supply authorities and similar authorities.

**NOTE 102**—This standard does not apply to appliances

- for medical purposes (IEC 60601 series);
- intended for immersion in water during use.

#### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

ISO 2439, *Flexible cellular polymeric materials – Determination of hardness (indentation technique)*

### 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:

Replace the first paragraph with the following:

operation of the appliance after the heater has been installed under a water mattress, taking into account the installation instructions

Note 101 to entry: See 5.10 for additional details of the appliance installation for **normal operation**.

#### 3.5 Definitions relating to types of appliances

##### 3.5.101

##### **water-bed heater**

appliance incorporating a heating element within an enclosure and intended for use under a water mattress

Note 1 to entry: The appliance ~~may~~ can be contained in an envelope of the mattress.

Note 2 to entry: The appliance ~~may~~ can incorporate a **thermostat** having a sensing element that ~~has to be~~ is positioned during installation.

### 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.

#### 5.3 Addition:

*The test of 21.101 is carried out immediately after the test of Clause 11.*

#### 5.10 Addition:

*For **normal operation**, the appliance is supported by a wooden base that is consistent with the size of the mattress. The top of the base consists of plywood approximately 13 mm thick and is supported 150 mm above the floor by pinewood boards approximately 20 mm thick. The boards are assembled to form a rectangular framework that includes a longitudinal and two transverse members to produce six approximately equal sections.*

*The wooden base is completely covered by a sheet of open-cell polyether approximately 25 mm thick. The polyether has the following composition:*

- cell count:  $18^{+2}_0$  per cm;
- specific mass:  $30 \text{ kg/m}^3^{+10\%}_0$  ;
- hardness: 120 N to 170 N at 40 % impression, measured according to ISO 2439.

**NOTE 101**—*This polyether sheet is omitted if the instructions state that the heater is unsuitable for use on a soft support.*

**NOTE 102**—Additional material is placed on the polyether sheet if this is stated in the instructions.

The heater, together with any control, is positioned on the polyether sheet. A piece of the bottom layer of water mattress material, having dimensions 100 mm × 200 mm, is folded to form a crease 50 mm × 200 mm. It is placed on the upper surface of the heater, parallel to the shortest side and approximately in the centre of the longest side.

The mattress is placed over the heater, filled with water and completely covered by ~~a similar~~ *another* piece of polyether sheet approximately 36 mm thick.

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Addition:

The **rated voltage** of **class III appliances** shall not exceed 24 V.

### 6.2 Addition:

Parts of the appliance, other than those of **class III**, that are intended to be placed under the water mattress shall be at least IPX7.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

The appliance shall be marked with the substance of the following:

- read the instructions carefully;
- check that the heater, the mattress and any envelope are laid flat and without folds before filling the mattress with water;
- place the heater centrally under the mattress so that it does not project from the sides of the mattress enclosure;
- the support under the heater is to be flat, continuous and without sharp edges;
- use only to heat water-beds;
- this side up, if applicable.

The appliance shall be marked with the model or type reference of a **detachable control unit**, if applicable, *intended for use with the appliance*.

### 7.12 Addition:

The instructions shall include the substance of the following:

- the heater is only to be used with the type of detachable control unit that is marked on the appliance, if applicable;
- the appliance is not intended for use in hospitals;
- the appliance is intended only to heat water-beds;
- sharp objects such as needles and pins must not be inserted in the appliance;
- bedding is not to come into contact with the heater.

The instructions for appliances other than those with a polarized plug shall describe the orientation of the plug in the socket-outlet of **class II appliances** provided with a metal screen to minimize the capacitive leakage current and the electrostatic field. The means of checking the orientation shall be ~~given~~ specified.

~~NOTE 101—This does not apply to appliances having a polarized plug.~~

#### 7.12.1 Addition:

The installation instructions shall include ~~the substance of~~ the following:

- the details of the installation of the heater and its control. In particular, details shall be given regarding the correct positioning and installation of any temperature sensing element of the control unit, to ensure that it does not easily slip out of position;
- the minimum dimensions of the water mattress and the minimum depth of water with which it is to be filled;
- details of any additional supporting material required if the heater is installed on a soft support, or a statement that the heater is unsuitable for such installation.

**7.101 Detachable control units** shall be marked with:

- **rated voltage** or **rated voltage range** in volts;
- symbol for nature of supply, unless the **rated frequency** is marked;
- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- identification of the relevant **water-bed heater**.

*Compliance is checked by inspection.*

## 8 Protection against access to live parts

This clause of Part 1 is applicable.

## 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.

### 11.2 Replacement:

*The appliance is installed as specified for **normal operation**.*

### 11.3 Addition:

*The temperature rise of the surface of the **water-bed heater** and the surface temperature of the mattress are determined by means of fine-wire thermocouples attached to oxidized copper or brass plates measuring 65 mm × 65 mm × 0,5 mm.*

#### 11.4 Addition:

**Thermostats** are short-circuited if their sensing elements are not fixed in relation to the heater after installation.

NOTE 101 Sensing elements are not considered to be fixed if they are positioned outside the enclosure of the heater and without provision for fixing.

#### 11.7 Modification:

Replace the first paragraph with the following:

*The appliance is operated until steady conditions are established.*

#### 11.8 Addition:

*The temperature rise of the surface of the **water-bed heater** shall not exceed 35 K except under the folded material where the limit is 60 K.*

**11.101** The appliance shall operate without risk of heat-stroke to the user.

*Compliance is checked by the following test.*

*The appliance is operated as specified in 11.1 to 11.7 except that **thermostats** are not short-circuited. Controls are set in the lowest position.*

*The temperature of the upper surface of the water mattress shall not exceed 37 °C.*

## 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 except as follows.

#### 13.2 ~~Modification~~ Addition:

*The leakage current of **class II appliances** provided with a metal screen connected to **live parts** shall not exceed 0,25 mA when the selector switch is in one position and 0,75 mA in the other position.*

## 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.

### 19.2 Addition:

*The test is carried out without the folded water mattress material.*

*The water mattress is empty.*

### 19.4 Addition:

**NOTE 101**—*This test is not carried out when the **thermostat** is short-circuited during the test of Clause 11.*

### 19.13 Addition:

*The temperature rise of the surface of the **water-bed heater** shall not exceed 100 K.*

*The tests shall not ~~affect~~ **impair** the degree of protection of the appliance against harmful ingress of water.*

**19.101** *The appliance is operated under the conditions of Clause 11 but without the folded water mattress material. The **water-bed heater** is positioned so that it extends outside the waterbed envelope by 10 cm along its longest side and it is supplied at **rated power input**.*

*The temperature rise of the surface of the **water-bed heater** that extends beyond the mattress enclosure shall not exceed 65 K but a first overshoot up to 95 K is allowed.*

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable.

## 21 Mechanical strength

This clause of Part 1 is applicable except as follows.

**21.101** Appliances provided with a flexible support for the heater shall withstand the mechanical stresses that the heater ~~may~~ **can** be subjected to during normal use.

*Compliance is checked by the following test.*

*The appliance is operated as specified in Clause 11 but without the covering sheet of polyether.*

*The water mattress is subjected to a downward force of  $950\text{ N} \pm 40\text{ N}$  by means of the wood block shown in Figure 101 that is positioned in the most unfavourable place. The force is applied 25 000 times at a rate of approximately 30 times per minute.*

*During the test, the power input shall not deviate from the power input measured at the start of the test by more than +5 % and –10 %.*

*After the test, the heater shall not be damaged to such an extent that compliance with this standard is impaired.*

## 22 Construction

This clause of Part 1 is applicable except as follows.

### 22.40 Addition:

These appliances are not considered to be appliances that could give rise to a hazard when operated continuously, automatically or remotely.

### 22.49 Not applicable.

### 22.51 Not applicable.

**22.101 Class II appliances** having a metal screen connected to **live parts** and without a polarized plug shall incorporate a means to indicate that the plug has been inserted in the socket outlet so that the leakage current is ~~minimum~~ minimized.

*Compliance is checked by inspection and by manual test.*

~~NOTE 1—This requirement does not apply to appliances having a polarized plug.~~

~~NOTE 2~~ The indicating means ~~may~~ can require a manual action. A light-emitting diode that glows when a surface is touched is an example of a device that can be used.

**22.102 Class I appliances** having an earthed metal screen shall incorporate **supplementary insulation** between the screen and the **accessible surfaces**.

*Compliance is checked by inspection.*

## 23 Internal wiring

This clause of Part 1 is applicable except as follows.

### 23.5 Addition:

Natural rubber shall not be used for the insulation of internal wiring.

## 24 Components

This clause of Part 1 is applicable except as follows.

### 24.1.4 Modification:

The number of cycles of operation for voltage-maintained **non-self-resetting thermal cut-outs** is increased to 10 000.

## 24.2 Modification:

Delete "switches, automatic controls," from the first dashed item.

### Addition:

Appliances may be fitted with switches and control units in flexible cords.

**24.101 Thermal cut-outs** shall not be **self-resetting thermal cut-outs**.

*Compliance is checked by inspection.*

## 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.

### 25.7 Modification:

~~Light polyvinyl chloride sheathed cords are allowed regardless of the mass of the appliance.~~

Delete "for appliances having a mass not exceeding 3 kg" from the first bullet under the third and fourth dashed items.

### 25.15 Modification:

~~Instead of marking the cord at a distance of 20 mm, the cord is marked as close as possible to the cord anchorage.~~

~~Instead of the pull force and torque specified in Table 12, the following applies:~~

~~— cord anchorage of the interconnection cord:~~

~~• pull force: 100 N;~~

~~• torque: 0,1 Nm~~

~~— cord anchorage of the supply cord:~~

~~• pull force: 60 N;~~

~~• torque: 0,1 Nm.~~

In the fourth paragraph, replace "at a distance of approximately 20 mm from the cord anchorage" with "at the cord anchorage".

Replace Table 12 with the following:

**Table 12 – Pull force and torque**

| Cord usage            | Pull force<br>N | Torque<br>Nm |
|-----------------------|-----------------|--------------|
| Interconnection cords | 100             | 0,1          |
| Supply cords          | 60              | 0,1          |



**25.23 Addition:**

The insulation of **interconnection cords** shall be at least equivalent to that of ordinary polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 53).

**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 except as follows.

**29.3 Addition:**

If the insulation is in more than one layer, it shall not be accessible after installation of the heater.

**30 Resistance to heat and fire**

This clause of Part 1 is applicable except as follows.

**30.1 Addition:**

*The test is not applied to the enclosure of the heater.*

**30.2.2** Not applicable.

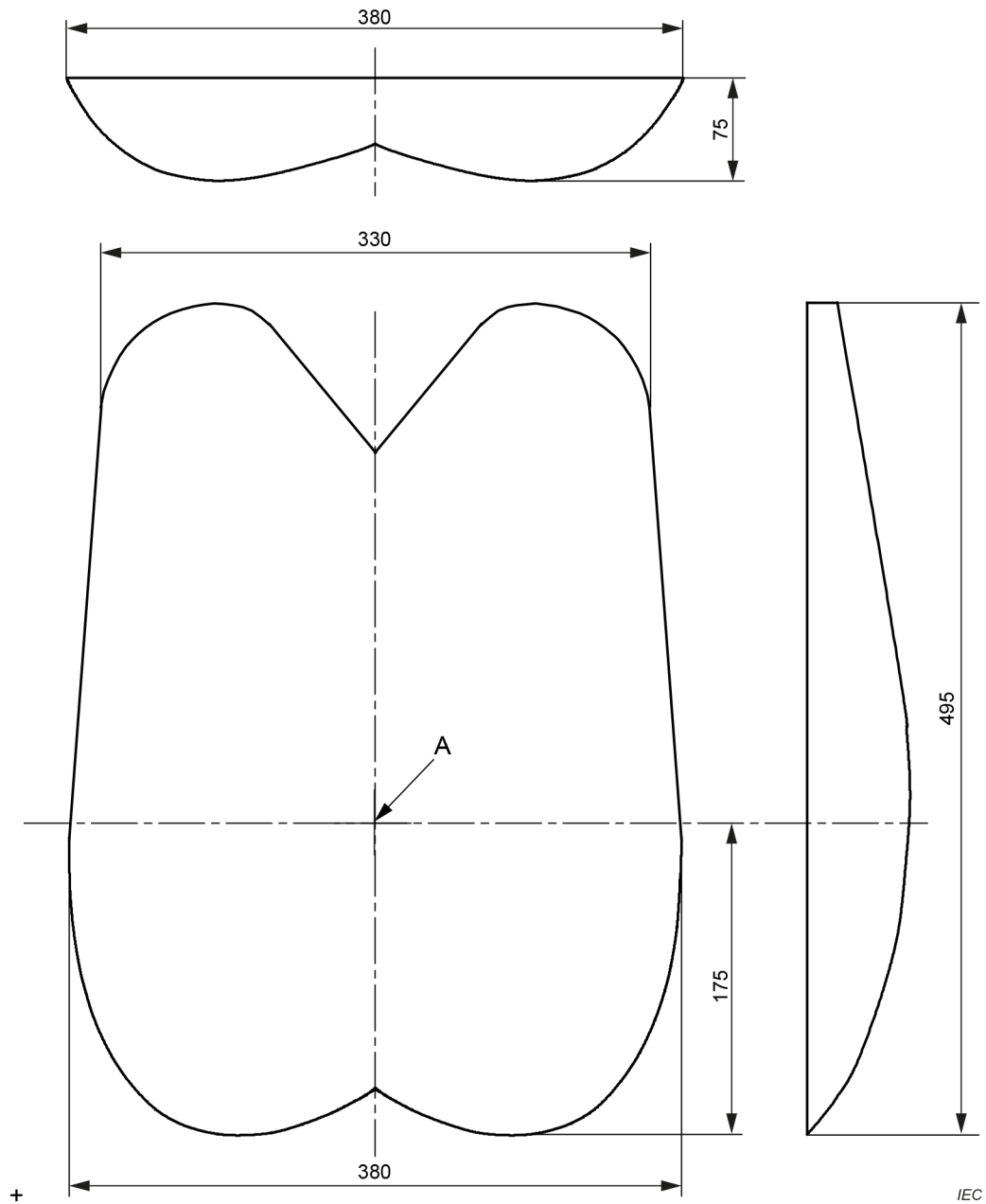
**31 Resistance to rusting**

This clause of Part 1 is applicable.

**32 Radiation, toxicity and similar hazards**

This clause of Part 1 is applicable.

*Dimensions in millimetres*



**Key**

A point of application of the load

**Figure 101 – Wood block**