

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Household and similar electrical appliances – Safety –  
Part 2-53: Particular requirements for sauna heating appliances and infrared  
cabins**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-53: Règles particulières pour les appareils de chauffage de saunas et les  
cabines infrarouges**



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### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-53: Particular requirements for sauna heating appliances and infrared cabins

#### 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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International Standard IEC 60335-2-53 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This fourth edition cancels and replaces the third edition published in 2002 and its Amendment 1 (2007). It constitutes a technical revision.

The principal changes in this edition as compared with the third edition of IEC 60335-2-53 are as follows (minor changes are not listed):

- the scope is changed to cover infrared cabins;
- additional requirements for recessed sauna heaters are added;
- requirements of electronic interlocks are added (22.108).

The text of this standard is based on the following documents:

FDIS	Report on voting
61/4135/FDIS	61/4157/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 fifth edition (2010) 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 sauna heating appliances and infrared cabins.

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.

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.

The committee has decided that the contents of this publication 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.

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 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: Class 0I appliances are allowed (Japan).
- 11.2: The temperature rises in front of the sauna heater are not measured (USA).
- 11.8: The temperature rise limits are different (USA).
- 13.2: Leakage current tests are carried out on sauna heaters having a supply cord (USA).
- 16.2: Leakage current tests are carried out on sauna heaters having a supply cord (USA).
- 19.1: The volume of the sauna room is different (USA).
- 19.5: The test is also carried out on appliances intended to be permanently connected to fixed wiring (Norway).
- 19.102: The test is not applicable (USA).
- 22.101: The mass of rocks is different (USA).
- 22.103: The requirement is not applicable (USA).
- 24.102: The 125 °C limit is not applicable (USA).
- 25.7: The supply cords are different (USA).
- Annex AA: The sauna room is different (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.

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.

NOTE 1 For example, if **sauna heating appliances** within the scope of this part 2 include a humidifier unit, then IEC 60335-2-98 is applicable as far as is reasonable.

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

NOTE 2 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.

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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 3 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 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 2-53: Particular requirements for sauna heating appliances and infrared cabins

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric **sauna heating appliances** and **infrared emitting units** having a **rated power input** not exceeding 20 kW, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

The appliances covered by this standard are intended for use in the home and in public saunas located in blocks of flats, hotels and similar locations.

NOTE 101 **Sauna heating appliances** may be of the thermal storage type.

This standard also deals with the safety of electric **sauna heating appliances** provided with a humidifier unit, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances. The room air is humidified by evaporating or atomising water.

NOTE 102 A humidifier may be part of a **sauna heating appliance** or may be incorporated in the **sauna heater**. The **sauna heating appliance** or **sauna heater** may be operated with or without the humidifier.

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.

NOTE 103 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 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);
- appliances intended to cause perspiration to only a part of the human body;
- sweating baths where the head of the user remains outside the heated space;
- tents and other collapsible sauna baths;
- room heaters (IEC 60335-2-30);
- humidifiers intended for use with heating, ventilation, or air-conditioning systems (IEC 60335-2-88);
- humidifiers (IEC 60335-2-98);
- appliances intended for medical purposes (IEC 60601).

## 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs in workplaces and public areas*

## 3 Terms and 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:

**Sauna heating appliances, sauna heaters, infrared emitters and infrared emitting units** are installed in the sauna room specified in Annex AA and in accordance with the instructions. The volume of the sauna room is the minimum value specified in the instructions.

The rock container is filled in accordance with the instructions. If the capacity of the rock container is adjustable, the container is filled with the most unfavourable quantity of rocks. If the rock container has a lid, the lid is positioned in accordance with the instructions.

**Prefabricated saunas and prefabricated infrared cabins** are installed in accordance with the instructions.

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### 3.101

#### sauna heater

appliance incorporating heating elements having a container filled with appropriate rocks

### 3.102

#### sauna heating appliance

appliance comprising a **sauna heater**, controls, **protective devices** and control board

### 3.103

#### prefabricated sauna

assembly comprising a sauna room and a **sauna heating appliance**

### 3.104

#### infrared emitter

assembly that emits infrared radiation

### 3.105

#### infrared emitting unit

appliance comprising at least one **infrared emitter**, controls, **protective devices** and control board

### 3.106

#### prefabricated infrared cabin

assembly comprising a cabin and at least one **infrared emitting unit**

### 3.107

#### fireguard

part of the enclosure of an **infrared emitter** through which the **infrared emitter** is normally visible and which is intended to guard against direct access to the **infrared emitter**

## 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.

### 5.2 Addition:

*If the appliance comprises more than one **sauna heater** or more than one **infrared emitter**, these are tested together.*

### 5.3 Addition:

*For appliances where both sauna and humidifying operation is possible, the tests for sauna operation are made first, followed immediately by the tests for humidifying. The thermostats and humidity controls, if any, are initially set to their maximum setting.*

**5.101** *If a ventilating fan operates independently of the heating element, the tests are carried out with or without the fan in operation, whichever is more unfavourable.*

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**5.102** *When a combination of **sauna-heating appliances** and **infrared emitting units** is to be tested, the tests are carried out under the most unfavourable conditions.*

## 6 Classification

This clause of Part 1 is applicable except as follows.

### 6.1 Modification:

Appliances shall be **class I**, **class II** or **class III**.

### 6.2 Addition:

Appliances, controls, **protective devices** and control boards intended to be mounted inside a sauna room shall be at least IPX4.

Electrical components of **prefabricated saunas** shall be at least IPX4.

**Infrared emitters**, controls and **protective devices** intended to be mounted inside a cabin shall be at least IPX2.

**Infrared emitters**, controls and **protective devices** intended to be mounted inside a cabin in combination with a **sauna-heating appliance** shall be at least IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

**Sauna heaters** and **infrared emitters** shall be marked with symbol ISO 7000-0790 (2004-01) or with the substance of the following:

Read operators manual.

They shall also be marked with

- the minimum distance between the top of the heater and the ceiling of the sauna room;
- the minimum distance between the bottom of the heater and the floor of the sauna room, unless this distance is determined by the construction of the heater;
- the minimum horizontal distance between the heater and any combustible material of the sauna room, including a protective rail, unless these distances are determined by the construction of the heater;
- the maximum depth and minimum width of the recess for **sauna heaters** intended to be installed in a recess.

**Sauna heaters** and **infrared emitters** shall be marked with symbol IEC 60417-5641 (2002-10) combined with the prohibition sign of ISO 3864-1, except for colours, or with the substance of the following:

WARNING: Do not cover.

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The inside wall of **prefabricated saunas** or **prefabricated infrared cabins** shall be marked near the **sauna heater** or **infrared emitter** with the substance of the following:

WARNING: Covering the heater or infrared emitter causes fire risk

**Sauna heaters** shall be marked with the substance of the following:

WARNING: An inadequately filled rock container causes fire risk

NOTE 101 This warning is not required if the **sauna heater** complies with Clause 11 without rocks in the container.

### 7.6 Addition:



Do not cover

NOTE 101 This symbol incorporates symbol IEC 60417-5641(2002-10) combined with the prohibition sign of ISO 3864-1, except for colours.

### 7.7 Addition:

Control boards shall have a connection diagram that gives details of the electrical connections for controls and **protective devices**.

NOTE 101 The connection diagram may also show connections, other than those required, provided the additional information does not cause confusion.

NOTE 102 If more than one control board is provided, the connection diagram may be divided so that each control board has its own connection diagram and a reference to the other control boards.

### 7.12 Addition:

The instructions for **sauna heaters** shall state how to fill the rock container.

The instructions for appliances for public saunas that do not have a timer shall state that the appliance is to be continuously attended. The instructions for other **sauna heating appliances** and **infrared emitting units** shall state that the sauna room or cabin is to be inspected before either restarting the timer or by switching on the appliance by a separate remote-control system.

Unless the **sauna heater** for public saunas complies with the test of 19.101, the instructions for **sauna heaters** for public saunas and **sauna heating appliances** and **infrared emitting units** for public saunas that may be switched on by a separate remote-control system shall state that the sauna room or cabin is to be inspected before setting the appliance to a stand-by mode for a delayed start.

The instructions for **prefabricated infrared cabins** and the instructions for **prefabricated saunas** incorporating **infrared emitters** shall state that cleaning with steam cleaners, high pressure cleaners and spraying water is not allowed.

If the appliances are marked with the symbol IEC 60417-5641 (2002-10) combined with the prohibition sign of ISO 3864-1 except for colours, their meaning shall be explained.

The instructions for **infrared emitters** shall include the substance of the following:

- it is recommended that the infrared cabin should not be used within 24 h after UV radiation exposure from artificial sources or sun-bathing;
- individuals who may be at risk from hyperthermia, such as individuals suffering from cardiovascular disease, should seek medical advice before use of infrared warming cabins;
- when persistent erythema (reddening of the skin lasting more than a day) and netlike colour changes persist after regular exposure to infrared radiation, exposure should not be repeated and medical advice should be sought to prevent development of erythema *ab igne*;
- if you are a person with compromised heat pain sensation or under the influence of alcohol or tranquilizers you should not use infrared warming cabins.

#### 7.12.1 Addition:

The installation instructions of **sauna heaters** intended for a recessed installation shall give details of the proper installation in a recessed area and state that means that prevent combustible objects being placed on the top of the heater have to be installed in the air channel above the heater.

NOTE 101 For example, an air outlet grill or guard spaced a minimum 40 mm from any heated surfaces beneath, whose dimensions of the opening do not exceed 53 mm × 20 mm or 126 mm × 12 mm, is considered to be a suitable means.

The installation instructions for **prefabricated saunas** and **prefabricated infrared cabins** shall give details on how to assemble the appliance.

The installation instructions for **sauna heating appliances** and **infrared emitting units** shall include the following details:

- the minimum and maximum volume, in cubic metres, of the sauna room or cabin in which the **sauna heater** or **infrared emitter** is intended to be installed;
- the minimum height of the sauna room or cabin;
- the materials to be used for the walls and the ceiling of the sauna room or cabin;
- the arrangement of the separate protective rail, if applicable;
- the means of ventilating the sauna room or cabin;
- the installation of adjacent **sauna heaters** or **infrared emitters** or a statement that the **sauna heater** or **infrared emitter** must be used alone;
- the connection and position of controls in the sauna room or cabin;
- that thermostat sensors shall be installed so that they are not influenced by incoming air;
- the installation of the control board, including a statement that the control board must be mounted outside the sauna room or cabin (not necessary if the control board is at least IPX4);
- the type of cable for supplying of the **sauna heater** or **infrared emitter**.

The instructions for **infrared emitters** shall state

- the minimum distance between the top of an **infrared emitter** and the ceiling of the cabin;
- the minimum distance between the bottom of an **infrared emitter** and the floor of the cabin, unless this distance is determined by the construction of the **infrared emitter**;
- the minimum horizontal distance between an **infrared emitter** and any combustible material of the cabin, including a protective rail, unless these distances are determined by the construction of the **infrared emitter**;
- the minimum distance between adjacent **infrared emitters**.

The installation instructions for appliances for public saunas or infrared cabins that do not have a timer shall state that a pilot lamp showing that the heater or **infrared emitter** is switched on is to be installed in the attendant's room.

Unless the **sauna heater** complies with the test of 19.101, the installation instructions for **sauna heating appliances** or **infrared emitting units** that incorporate a stand-by mode setting for **remote operation** shall state that the door of the sauna room or cabin shall be fitted with an interlock such that the stand-by mode setting for **remote operation** is disabled if the sauna door or cabin door is opened when the stand-by mode setting for **remote operation** is set.

#### 7.14 Addition:

The marking of distances to combustible material of the sauna room or cabin shall be clearly visible from the outside of the **sauna heater** or **infrared emitter** without removing covers.

The warnings concerning fire risks shall be visible after the **sauna heater** or **infrared emitter** has been installed and the lettering shall have a height of at least

- 5 mm, for headings;
- 3 mm, for other lettering.

NOTE 101 These warnings may be placed on a recessed low part of the **sauna heater** or **infrared emitter**.