

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-27: Particular requirements for appliances for skin exposure to optical
radiation**

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IECNORM.COM : Click to view the full text of IEC 60352-21:2024 RLV



IEC 60335-2-27

Edition 7.0 2024-01
REDLINE VERSION

INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-27: Particular requirements for appliances for skin exposure to optical
radiation**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.120, 97.170

ISBN 978-2-8322-8212-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	2
1 Scope.....	8
2 Normative references	9
3 Terms and definitions	9
4 General requirement.....	10
5 General conditions for the tests	10
6 Classification.....	11
7 Marking and instructions.....	11
8 Protection against access to live parts.....	17
9 Starting of motor-operated appliances	18
10 Power input and current.....	18
11 Heating.....	18
12 Void Charging of metal-ion batteries.....	20
13 Leakage current and electric strength at operating temperature.....	20
14 Transient overvoltages	20
15 Moisture resistance	20
16 Leakage current and electric strength.....	20
17 Overload protection of transformers and associated circuits	20
18 Endurance.....	21
19 Abnormal operation	21
20 Stability and mechanical hazards.....	21
21 Mechanical strength	22
22 Construction	22
23 Internal wiring.....	26
24 Components	26
25 Supply connection and external flexible cords	26
26 Terminals for external conductors.....	27
27 Provision for earthing	27
28 Screws and connections	27
29 Clearances, creepage distances and solid insulation	27
30 Resistance to heat and fire.....	27
31 Resistance to rusting.....	27
32 Radiation, toxicity and similar hazards.....	27
Annexes	34
Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances	35
Annex R (normative) Software evaluation	36
Annex AA (normative) Measurement of luminance	37
Annex BB (informative) Detailed classification of UV appliances	38
Annex CC (informative) Fluorescent UV lamp equivalency code	40

Annex DD (informative normative) Guidelines for the development of an exposure time schedule for UV exposure UV exposure schedule	41
Annex EE (informative) Irradiance limits set by regional or national authorities	43
Bibliography	45
 Figure 101 – Not for household use	 31
Figure 102 – Probe for measuring surface temperatures	31
Figure 103 – Erythema action spectrum	32
Figure 101 104 – Measuring points for appliances that are arranged over a person	32
Figure 102 105 – Measuring points for appliances exposing a sitting person	33
 Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions	 20
Table 101 102 – Maximum transmission of goggles	31
Table BB.1 – Limits of effective irradiance	39
Table EE.1 – Europe: EN 60335-2-27 limits	43
Table EE.2 – Australia and New Zealand: AS/NZS 60335.2.27 limits	43
Table EE.3 – USA: 21 CFR 1040.20 limits	44

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-27: Particular requirements for appliances
for skin exposure to optical radiation**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-27:2019. 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 60335-2-27 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2019. 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) modification or conversion of some notes to normative text (Clause 1, 7.1);
- c) clarification of product risk and liability (7.1);
- d) modification of Annex DD as a normative annex, and modification of relevant text (7.12, Annex DD);
- e) clarification of requirement for product use links provided (7.12.9);
- f) clarification of the application of test probe 18 for appliances for use in tanning salons, beauty parlours and similar premises (8.1.1, 20.2);
- g) introduction of accessible surface temperature limits (Clause 11);
- h) removal of redundancy between 22.113 and 22.114;
- i) clarification that 32.2 is not applicable for UV emitted for the tanning function of the appliance.

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

Draft	Report on voting
61/7071/FDIS	61/7094/RVD

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. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/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 appliances for skin exposure to optical radiation.

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 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.

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.

- 6.101: Commercial tanning sunbed services are illegal (Australia).
- Annex DD: Exposure doses are based on the Fitzpatrick Skin Phototype classification system (New Zealand).

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 2-27: Particular requirements for appliances for skin exposure to optical radiation

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrical appliances incorporating emitters for exposing the skin to optical radiation (wavelength 100 nm to 1 mm), for household and similar use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances and **battery-operated appliances**.

~~NOTE 101—Battery-operated appliances and other DC supplied appliances are within the scope of this standard. Dual supply appliances, either mains-supplied or battery-operated, are regarded as **battery-operated appliances** when operated in the battery mode.~~

As far as practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons using the appliances in tanning salons, beauty parlours and similar premises or at 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 102—Attention is drawn to the fact that~~

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can 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.

~~— IEC 60598-1 is applicable as far as is reasonable.~~

~~NOTE 103—~~ This standard does not apply to

- appliances for skin or hair care (IEC 60335-2-23);
- sauna heating appliances and infrared cabins (IEC 60335-2-53);
- cosmetic and beauty care appliances incorporating lasers and intense light sources (IEC 60335-2-113);
- appliances for medical purposes (IEC 60601);
- appliances that use UV radiation for purposes other than tanning the skin;
- 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60598-1:2020, *Luminaires – Part 1: General requirements and tests*

IEC 61228, *Fluorescent ultraviolet lamps used for tanning – Measurement and specification method*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.101

effective irradiance

irradiance of electromagnetic radiation weighted according to a specified action spectrum

3.1.102

luminous transmission

percentage of incident light passing through a material weighted by the spectral sensitivity of the human eye and integrated over the wavelength range 380 nm and 780 nm

3.5 Definitions relating to types of appliances

3.5.101

UV appliance

appliance incorporating **UV emitters** for tanning purposes

3.5.102

IR appliance

appliance *not for tanning purposes* incorporating one or more **IR emitters**

3.5.103

VIS appliance

appliance *not for tanning purposes* incorporating one or more **VIS emitters**

3.5.104

UV type 1 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths longer than 320 nm and characterized by a relatively high irradiance in the range 320 nm to 400 nm

3.5.105

UV type 2 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance in the range 320 nm to 400 nm

3.5.106

UV type 3 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a limited irradiance over the whole UV radiation band

3.5.107

UV type 4 appliance

UV appliance such that the biological effect is mainly caused by radiation having wavelengths shorter than 320 nm

3.5.108

UV type 5 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance over the whole UV radiation band

3.6 Definitions relating to parts of an appliance

3.6.101

ultraviolet UV emitter

radiating source constructed to emit electromagnetic energy at wavelengths between 200 nm and 400 nm

Note 1 to entry: A fluorescent UV lamp for tanning is an example of a **UV emitter**.

Note 2 to entry: UV radiation with wavelengths below 200 nm is not easily transmitted through air and usually exists only in a vacuum.

Note 3 to entry: **Ultraviolet UV emitters** are also referred to as **UV ultraviolet emitters**.

3.6.102

infrared IR emitter

radiating source constructed to emit electromagnetic energy at wavelengths between 780 nm and 1 mm

Note 1 to entry: **Infrared IR emitters** are also referred to as **IR infrared emitters**.

3.6.103

visual VIS emitter

radiating source constructed to emit electromagnetic energy at wavelengths of 400 nm to 780 nm

Note 1 to entry: **Visual VIS emitters** are also referred to as **VIS visible emitters**.

3.6.104

UV filter

~~device used to modify the ultra-violet radiation passing through it, generally by altering the spectral distribution~~

optical element for attenuation of UV radiation

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.

5.101 Appliances with **IR emitters** only are tested as **heating appliances**. All other appliances are tested as **motor-operated appliances**.

6 Classification

This clause of Part 1 is applicable except as follows.

6.101 UV appliances shall be one of the following types with respect to the emission of ultraviolet radiation:

- appliances suitable for household use;
- appliances for commercial use only.

NOTE 1 Appliances for household use can also be for commercial use, such as in tanning salons, beauty parlours and similar premises.

NOTE 2 Detailed classification of the appliances is described in informative Annex BB.

Compliance is checked by inspection and by the relevant tests.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

UV appliances intended for commercial use, such as in tanning salons, beauty parlours and similar premises shall be marked with the prohibition ~~sign "not for household use"~~ pictogram of Figure 101 or with the substance of the following:

Not for household use

Appliances having fluorescent UV lamps for tanning shall be marked with the fluorescent UV lamp equivalency code range. This equivalency code range identifies the fluorescent UV lamps for tanning that shall be used in the appliance.

NOTE 101 Details of the fluorescent UV lamp code that is marked on the lamp are given in IEC 61228 and are reproduced in informative Annex CC for information. An example of the fluorescent UV lamp equivalency code range to be marked on the appliance is given in 22.111.

For **UV emitters** other than fluorescent UV lamps for tanning, the appliance shall be marked with the type reference of the emitters that are recommended for use.

UV appliances shall be marked with the substance of the following:

~~WARNING: Ultraviolet radiation can cause injury to eyes, internal tissues of the mouth and skin, such as skin aging and eventually skin cancer. Read instructions carefully. Wear the protective goggles provided. Certain medicines and cosmetics may increase sensitivity.~~

DANGEROUS ULTRAVIOLET (UV) RADIATION! FOLLOW ALL INSTRUCTIONS! WEAR PROTECTIVE GOGGLES PROVIDED! Ultraviolet can cause injury to eyes and skin and can result in skin aging and skin cancers. Certain medicines can increase sensitivity. Do not use any sunscreens or cosmetics and follow the recommended exposure schedule.

~~NOTE 102~~ For **UV appliances** intended only for use in tanning salons, beauty parlours and similar premises, this warning may be given on a permanent label intended to be fixed on the wall adjacent to the UV appliance. ~~The wording "Read instructions carefully" may be replaced by "Consult the attendant for further information".~~

UV appliances with a luminance exceeding 100 000 cd/m² shall be marked with the substance of the following:

WARNING: Intense light. Do not stare at the emitter.

NOTE 403102 The method for measuring luminance is given in normative Annex AA.

Appliances shall be marked with the substance of the following unless they are in the exempt group (see IEC 62471:2006):

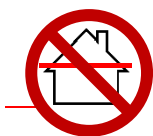
WARNING: Do not stare at the emitter. It is required to wear the provided eyewear due to intense optical radiation. Read instructions carefully.

Appliances incorporating **VIS emitters** or **IR emitters** shall be marked with the manufacturer, model name and technical specification of appropriate replacement lamps.

Unless the intended exposure distance is controlled by their construction, **UV appliances** shall be marked with symbol IEC 60417-6301 (2015-03) with the recommended exposure distance and its unit in centimetres (cm) included between the dimensional arrow heads. Goggles shall be marked with name, trademark or identification mark of the manufacturer and the following alpha-numeric characters IEC 60335-2-27.

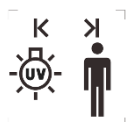
NOTE 404103 If these warnings are combined, the word "warning" need not be repeated.

7.6 Addition:



Prohibition sign

not for household use



[symbol IEC 60417-6301 (2015-03)]

ultra-violet light source, exposure distance

7.12 Addition:

~~The instructions shall give clear information with regard to the proper use of the appliance.~~

~~**UV appliances** shall include a statement that non-users, especially children, must not be present when the appliance is being operated.~~

~~The instructions for **UV appliances** shall include the substance of the following:~~

~~— a statement that **UV appliances** are not to be used by~~

- ~~• persons under the age of 18 years;~~
- ~~• persons who tend to freckle;~~
- ~~• persons with a natural red hair colour;~~
- ~~• persons having abnormal discoloured patches on the skin;~~
- ~~• persons having a large number of moles;~~

- ~~persons having asymmetrical irregularly shaped moles larger than 5 mm in diameter with variable pigmentation and irregular borders; in case of doubt, seek medical advice;~~
- ~~persons suffering from sunburn;~~
- ~~persons not able to tan at all or persons that burn easily when exposed to the sun;~~
- ~~persons having a history of frequent severe sunburn during childhood;~~
- ~~persons suffering from or previously suffering from skin cancer or predisposed to skin cancer;~~
- ~~persons under a doctor's care for diseases that involve photosensitivity;~~
- ~~persons receiving photosensitising medications.~~
- ~~a statement that if unexpected side effects, such as itching, occur within 48 h of the first session of using a UV appliance, medical advice should be sought prior to further UV exposure;~~
- ~~a statement that exposures should not exceed the minimal amount of UV radiation exposure required to cause perceptible reddening of the skin (a person's minimal erythemal dose (MED));~~
- ~~a statement that if skin reddening (erythema) is visible approximately 16 h to 24 h after any exposure, further exposure should cease. After one week, exposures may be restarted from the beginning of the schedule of exposure;~~
- ~~a statement that the appliance must not be used if the timer is faulty or the filter is broken or removed;~~
- ~~identification of components that may influence the ultraviolet radiation, such as filters and reflectors;~~
- ~~identification of replaceable UV emitters and a statement that they are only to be replaced by types marked on the appliance. For fluorescent UV lamps for tanning, it shall be stated that they are only to be replaced by types marked with an equivalency code, the UV component of which falls within the UV component equivalency code range that is marked on the appliance. In this case, an example of the equivalency code shall be given and the UV component aspect of the fluorescent UV lamp for tanning equivalency code shall be explained.~~

The instructions for **UV appliances** shall contain the substance of the following information and precautions:

- ~~ultraviolet radiation from the sun or from UV appliances can cause skin or eye damage that may be irreversible. Avoid exposure to the internal tissues of the mouth as it may be more susceptible to UV damage than the skin. These biological effects depend upon the quality and quantity of the radiation as well as the skin sensitivity of the individual;~~
- ~~the skin may develop sunburn after overexposure. Excessively repeated exposures to ultraviolet radiation from the sun or from UV appliances may lead to premature ageing of the skin as well as increased risk of development of skin tumours. These risks increase with increasing cumulative UV exposure. Exposure at an early age increases the risk of skin damage later in life;~~
- ~~the unprotected eye may develop surface inflammation and in some cases damage may occur to the retina after excessive exposure. Cataracts may develop after many repeated exposures;~~
- ~~in cases of pronounced individual sensitivity or allergic reaction to ultraviolet radiation, medical advice is recommended before starting exposure;~~
- ~~information concerning the intended exposure distance (unless this is controlled by the construction of the UV appliance);~~
- ~~recommended schedule of exposure specifying duration and intervals (based on the UV emitter characteristics, distances and skin sensitivity), see Annex DD;~~
- ~~recommended number of exposures that should not be exceeded in one year, see Annex DD;~~

- ~~the type reference of the protective goggles to be used;~~
- ~~the following precautions must be taken:~~
 - ~~always use the protective goggles provided. Contact lenses and sun glasses are not a substitute for goggles;~~
 - ~~remove cosmetics, fragrances, and skin care products well in advance of exposure and do not use any sunscreens or products that accelerate tanning;~~
 - ~~certain medical conditions or side effects of certain medicines may be aggravated by ultraviolet exposure. In case of doubt, seek medical advice;~~
 - ~~allow at least 48 h between the first two exposures;~~
 - ~~do not sunbathe and use the appliance on the same day;~~
 - ~~follow the recommendations concerning exposure durations, exposure intervals and distances from the lamp;~~
 - ~~seek medical advice if persistent lumps or sores appear on the skin or if there are changes in pigmented moles;~~
 - ~~protect sensitive skin parts such as scars, tattoos and genitals from exposure.~~

~~For appliances having a lid that has to be opened in normal use, the instructions shall include a warning that the appliance must not be switched on with the lid in the closed position and that, before closing the lid for storage, the appliance must be disconnected from the supply and allowed to cool down.~~

NOTE 101 ~~This warning is not required if the appliance complies with the tests of 19.2 and 19.3.~~

~~For appliances having parts that are intended to support a person, the instructions shall include the substance of the following:~~

~~This appliance shall not be used by persons exceeding the maximum load of xxx kg. (The value of xxx is to be stated by the manufacturer).~~

~~The instructions for appliances incorporating **VIS emitters** or **IR emitters** shall include the substance of the following:~~

- ~~advice for the protection of the eyes against exposure to visible and infrared radiation and advise that adequate precautions must be taken to safeguard the user against the dangers of excessive exposure;~~
- ~~a statement that VIS appliances and IR appliances are not to be used by~~
 - ~~persons suffering from sunburn;~~
 - ~~persons under medical care for diseases that involve photosensitivity;~~
 - ~~persons receiving photosensitising medications;~~
- ~~a statement that if unexpected side effects, such as itching, occur within 48 h of the first session of using an appliance, medical advice should be sought prior to further exposure;~~
- ~~information concerning the intended exposure distance (unless this is controlled by the construction of the appliance);~~
- ~~recommended schedule of exposure specifying duration and intervals (based on the **emitter** characteristics, distances);~~
- ~~a statement that the appliance must not be used if the timer is faulty or the filter is broken or removed;~~
- ~~identification of alternative components that may influence the radiation, such as filters and reflectors;~~
- ~~identification of replaceable **emitters** and a statement that they are only to be replaced by types marked on the appliance;~~

~~— instruction to use goggles and an information about the maximum exposure time (not necessary if the appliance complies with the limits for the exempt group as defined in 6.1.1 of IEC 62471:2006 when tested as required by 32.103).~~

~~If the Prohibition sign “Not for household use” or symbol IEC 60417-6301 (2015-03) is used, its meaning shall be explained.~~

The instructions for **UV appliances** shall include the following information:

- identification of components that can influence the ultraviolet radiation, such as filters and reflectors;
- identification of replaceable **UV emitters**;
- information concerning the intended exposure distance (unless this is controlled by the construction of the **UV appliance**);
- schedule of exposure specifying duration and intervals according to normative Annex DD;
- recommended number of exposures that should not be exceeded in one year, see normative Annex DD;
- the type reference of the protective goggles to be used.

The instructions for **UV appliances** shall include the substance of the following statements:

- non-users, especially children, must not be present when the appliance is being operated;
- tanning appliances are not to be used by
 - persons under the age of 18 years;
 - persons who tend to freckle;
 - persons with a naturally red hair;
 - persons having abnormal discoloured patches on the skin;
 - persons having a large number of moles;
 - persons having asymmetrical irregularly shaped moles larger than 5 mm in diameter with variable pigmentation and irregular borders; in case of doubt, seek medical advice;
 - persons suffering from sunburn;
 - persons not able to tan at all or persons that burn easily when exposed to the sun;
 - persons having a history of frequent severe sunburn during childhood;
 - persons suffering from or previously suffering from skin cancer or predisposed to skin cancer;
 - persons under a doctor's care for diseases that involve photosensitivity;
 - persons receiving photosensitising medications;
- if unexpected side effects, such as itching, occur within 48 h of the first session of using a tanning appliance, medical advice should be sought prior to further UV exposure;
- exposures should not exceed the minimal amount of UV radiation exposure required to cause perceptible reddening of the skin (a person's minimal erythema dose (MED));
- if skin reddening (erythema) is visible approximately 16 h to 24 h after any exposure, further exposure should cease. After one week, exposures may be restarted from the beginning of the schedule of exposure;
- the appliance must not be used if the timer is faulty or the filter is broken or removed;
- replaceable **UV emitters** are only to be replaced by types marked on the appliance
- ultraviolet radiation from the sun or from tanning appliances can cause skin or eye damage that can be irreversible. Avoid exposure to the internal tissues of the mouth as it can be more susceptible to UV damage than the skin. These biological effects depend upon the quality and quantity of the radiation as well as the skin sensitivity of the individual;

- the skin can develop sunburn after overexposure. Repeated exposures to ultraviolet radiation from the sun or from tanning appliances can lead to premature ageing of the skin as well as increased risk of development of skin tumours. These risks increase with increasing cumulative UV exposure. Exposure at an early age increases the risk of skin damage later in life;
- the unprotected eye can develop surface inflammation (photokeratitis) and in some cases damage can occur to the retina after exposure. Cataracts can develop after many repeated exposures;
- in cases of pronounced individual sensitivity or allergic reaction to ultraviolet radiation, medical advice is recommended before starting exposure;
- the first exposure, as indicated in the exposure schedule, is a necessary test exposure to identify unexpected side effects when exposed to UV. Therefore, the first recommended exposure in the exposure schedule is much shorter than later exposures and is not intended to provide a tan.
- the following precautions must be taken:
 - always use the protective goggles provided. Contact lenses and sunglasses are not a substitute for goggles;
 - remove cosmetics, fragrances, and skin care products well in advance of exposure and do not use any sunscreens or products that accelerate tanning;
 - certain medical conditions or side effects of certain medicines can be aggravated by ultraviolet exposure. In case of doubt, seek medical advice;
 - allow at least 48 h between the first two exposures;
 - do not sunbathe and use the appliance on the same day;
 - follow the recommendations concerning exposure durations, exposure intervals and distances from the lamp;
 - seek medical advice if persistent bumps or sores appear on the skin or if there are changes in pigmented moles;
 - protect sensitive skin parts such as scars, tattoos and genitals from exposure.

For fluorescent UV lamps for tanning, it shall be stated that they are only to be replaced by types marked with an equivalency code, the UV component of which falls within the UV component equivalency code range that is marked on the appliance. In this case, an example of the equivalency code shall be given and the UV component aspect of the fluorescent UV lamp for tanning equivalency code shall be explained.

For appliances, other than those complying with the tests of 19.2 and 19.3, having a lid that has to be opened in normal use, the instructions shall include a warning that the appliance must not be switched on with the lid in the closed position and that, before closing the lid for storage, the appliance must be disconnected from the supply and allowed to cool down.

For appliances having parts that are intended to support a person, the instructions shall include the substance of the following:

This appliance shall not be used by persons exceeding the maximum load of xxx kg. (The value of xxx shall be stated by the manufacturer).

The instructions for appliances incorporating **VIS emitters** or **IR emitters** shall include the following information:

- advice for the protection of the eyes against exposure to visible and infrared radiation and advise that precautions must be taken to safeguard the user against the dangers of overexposure;
- information concerning the intended exposure distance (unless this is controlled by the construction of the appliance);

- recommended schedule of exposure specifying duration and intervals (based on the emitter characteristics, distances);
- identification of alternative components that can influence the radiation, such as filters and reflectors;
- identification of replaceable emitters and a statement that they are only to be replaced by types marked on the appliance;
- instruction to use goggles and an information about the maximum exposure time.

The instructions for appliances incorporating **VIS emitters** or **IR emitters** shall include the substance of the following statements:

- VIS appliances and IR appliances are not to be used by
 - persons suffering from sunburn;
 - persons under medical care for diseases that involve photosensitivity;
 - persons receiving photosensitising medications;
- if unexpected side effects, such as itching, occur within 48 h of the first session of using an appliance, medical advice should be sought prior to further exposure;
- the appliance must not be used if the timer is faulty or the filter is broken or removed.

If the prohibition pictogram of Figure 101 or symbol IEC 60417-6301 (2015-03) is used, the meaning shall be explained.

7.12.9 Addition:

In addition, appliances having **UV emitters** shall be marked on the outside of the appliance with a QR-Code or similar system providing a direct link to all information on **UV appliance** use (manuals, tanning recommendations etc.), as required by this standard (see Clause 7).

7.14 Addition:

The diameter of the prohibition ~~sign “not for household use”~~ pictogram of Figure 101 shall be at least 10 mm.

The diameter of the UV lamp circle in symbol IEC 60417-6301 (2015-03) shall be at least 20 mm.

Compliance is checked by measurement.

7.15 Addition:

The additional warnings and markings specified in 7.1 shall be visible after the appliance has been installed and without removal of a cover.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 Addition:

During replacement of emitters, compliance is checked by the relevant requirements of IEC 60598-1:2008/2020, Section 8, unless the instructions forbid replacement by the user and tools are needed to replace the emitters.

8.1.1 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

8.1.3 Not 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 except as follows.

10.1 Modification:

~~The following deviations apply:~~

~~— appliances having **UV emitters** only: + 10 %;~~

~~— other appliances: 10 % to + 5 %.~~

Addition to Table 1:

Type of appliance	Rated power input W	Deviation
Appliances having UV emitters only	All	+10 %

10.2 Modification:

~~The following deviations apply:~~

~~— appliances having **UV emitters** only: + 10 %;~~

~~— other appliances: 10 % to + 5 %.~~

Addition to Table 2:

Type of appliance	Rated current A	Deviation
Appliances having UV emitters only	All	+10 %

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Modification:

Replace the first dashed item in the fourth and fifth paragraphs with the following:

- *appliances normally placed on a floor or table are placed on the floor of the test corner with their back as near as possible to one of the walls and away from the other wall.*

Addition:

If the direction of the radiation is adjustable, the appliance is adjusted to the most unfavourable position of normal use.

Addition:

Appliances having fluorescent lamps shall be fitted with a fluorescent lamp having either a short mount electrode or long mount electrode, whichever provides the more unfavourable results.

11.3 *Addition:*

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external accessible surfaces specified in Table 101. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

11.7 ~~Replacement~~ *Modification:*

Replace the first paragraph with the following:

The appliance is operated until steady conditions are established.

NOTE 101 If necessary, timers are reset immediately.

Parts operated by motors in appliances for wall mounting or ceiling mounting are fully raised and lowered five times without rest periods, or for 5 min, whichever is shorter.

11.8 *Modification:*

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.

Addition:

The temperatures of ballast windings and their associated wiring shall not exceed the values specified in IEC 60598-1:2008/2020, 12.4 when measured under the conditions stated.

The temperature rises for surfaces in contact with the skin during normal use shall not exceed those specified for handles that are continuously held in the hand in normal use.

Table 3 – Maximum normal temperature rises*Modification:*

Add the following to footnote "k": "Similar parts held for short periods include handles or grips of vents and air shutters."

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	Temperature rise of external accessible surfaces ^a K
Bare metal	38
Coated metal ^b	42
Glass and ceramic	51
Plastic and plastic coating > 0,4 mm ^{c, d}	58
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Temperature rises are not measured on: – the underside of appliances intended to be used on a working surface or floor where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end; – the rear surface of appliances which, according to the instructions, shall be placed against a wall and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end. ^b Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used. ^c The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm. ^d When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.	

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.

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.

19.1 Modification:

Replace the first, second and third paragraph of the test specification with the following:

~~Instead of the tests specified, all~~ Appliances are subjected to the tests of 19.4 to 19.8, 19.10 to 19.12, 19.101 and 19.102, as applicable.

For appliances having a lid but without a warning in the instructions that the appliance must not be switched on with the lid closed, 19.2 and 19.3 are applicable.

19.2 Replacement:

Appliances having a lid that is opened in normal use are tested with the lid closed.

The test is carried out under the conditions specified in Clause 11. Appliances with **IR emitters** are operated at 0,85 times **rated power input**. All other appliances are supplied at 0,94 times **rated voltage**.

19.3 Replacement:

The test of 19.2 is repeated but appliances with **IR emitters** are operated at 1,24 times **rated power input**. All other appliances are supplied at 1,1 times **rated voltage**.

19.9 Not applicable.

19.101 Appliances, other than those for mounting at a height more than 1,8 m above the floor, are supplied at **rated voltage** and operated as specified in Clause 11. When steady conditions are established, a piece of dry bleached cotton flannelette having a specific mass of 130 g/m² to 165 g/m², a width of 100 mm and long enough to pass over the front of the appliance is stretched over the appliance in the most unfavourable position.

The flannelette shall not smoulder or ignite within 10 s.

NOTE If smouldering has started, a hole will have formed in the material with its edge glowing red. Blackening without smouldering is ignored.

19.102 Appliances having discharge lamps are operated under the fault conditions specified in IEC 60598-1:2008/2020, 12.5.1 a), d) and e) the appliance being supplied at rated voltage.

The temperatures of ballast or transformer windings shall not exceed the values specified in IEC 60598-1:2008/2020, 12.5.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Addition:

For emitters, including adjacent glass parts and any lens that protrude from the enclosure, the impact energy is reduced to 0,35 J.

NOTE 101 The test is carried out on emitters and on glass parts that do not hit the floor if the appliance is dropped.

For filters, the impact energy is increased to 1,0 J and compliance with 32.101 shall not be impaired.

21.101 Guards intended to prevent inadvertent ignition of flammable material shall have adequate mechanical strength.

Compliance is checked by the following test.

The appliance is placed so that the central part of the guard is horizontal. A flat disc having a diameter of 10 cm and a mass of 2,5 kg is placed on the centre of the guard for 1 min.

After the test, the guard shall show no ~~significant~~ permanent deformation.

21.102 Parts of the appliance that are intended to support a person shall have adequate mechanical strength.

Compliance is checked by the following test.

A mass equal to the maximum load indicated in the instruction, but at least 135 kg, evenly distributed over an area of 30 cm × 50 cm, is placed on the surface intended to support a person for 1 min.

After removal of the load, the appliance shall not be damaged to such an extent that compliance with this standard, in particular with Clause 29, is impaired.

NOTE In case of doubt, **supplementary insulation** and **reinforced insulation** are subjected to the electric strength test of 16.3.

22 Construction

This clause of Part 1 is applicable except as follows.

22.24 Replacement:

Bare heating elements shall be supported to prevent excessive displacement ~~occurring during normal use~~. The rupture of a heating element shall not give rise to a hazard.

Compliance is checked by inspection and by the following test.

*The heating element is cut in the most unfavourable place. The conductors shall not come into contact with **accessible metal parts** or fall out of the appliance.*

22.35 Addition:

The requirement does not apply to handles, levers and knobs which are only intended for short time use such as those touched during entering or leaving the appliance.

Modification:

~~The relaxation for stationary appliances is not applicable.~~

In the second paragraph, delete "**stationary appliances** and".

22.101 Appliances having a lid that has to be opened in normal use shall be constructed so that the lid does not close inadvertently.

Compliance is checked by the following test.

The appliance is placed in any normal position of use on a plane inclined at an angle of 15° to the horizontal.

The lid shall remain in the open position.

22.102 Appliances incorporating parts that are suspended or intended to be raised and lowered over a person shall incorporate a safety device to prevent injury if the suspension, raising or lowering means fails or there is excessive travel of the part.

Compliance is checked by inspection and by manual test.

22.103 Emitters intended for full body exposure or used over a person shall be protected against accidental damage.

Compliance is checked by inspection and by the following test.

A cylindrical rod, having a diameter of 100 mm ± 1 mm and a hemispherical end, is applied with a force of 5 N.

It shall not be possible to touch the emitter with the rod.

22.104 Fixed appliances intended to be used over a person shall have means for fixing that are protected against loosening.

Compliance is checked by inspection and by manual test.

22.105 UV appliances that are inclined at an angle of more than 35° to the vertical shall be constructed so that the emission of ultraviolet radiation is automatically stopped if the timer fails.

Compliance is checked by the following tests.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. A fault in the timer is simulated. The emission of ultraviolet radiation shall cease before the exposure time has exceeded 110 % of the set value.*

If compliance relies on the operation of an **electronic circuit**, the appliance is further tested as follows.

The appliance is supplied at **rated voltage** and operated under **normal operation**. A fault in the timer is simulated. The fault conditions in a) to g) of 19.11.2 are applied one at a time to the **electronic circuit**. The emission of ultraviolet radiation shall cease before the exposure time has exceeded 110 % of the set value and the appliance shall not be capable of further use without repair.

If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of *normative Annex R*.

22.106 UV appliances shall be provided with a timer that terminates the emission of ultraviolet radiation. The maximum timer setting shall not exceed the manufacturer's recommended maximum exposure time. The timer shall be incorporated in the appliance or, for appliances intended to be permanently connected to fixed wiring, be supplied for incorporation in the wiring system.

The settings marked on the timer shall be compatible with the times specified in the recommended schedule of exposure, the highest setting providing an exposure dose not exceeding 600 J/m².

Compliance is checked by inspection, by measurement and by calculating the exposure dose from the total **effective irradiance** determined during the test of 32.101, weighted according to the erythema action spectrum of Figure 103.

22.107 Metal parts in contact with the skin and which support the body in normal use shall not be earthed.

The requirement does not apply to hinges or other parts of the enclosure, such as handles, levers and knobs that could be touched when entering or leaving the appliance.

Compliance is checked by inspection and by the tests specified for **double insulation** or **reinforced insulation**.

22.108 Appliances intended to be fixed to a wall by screws or other permanent fixing devices shall be constructed so that the method of fixing is obvious or specified in the installation instructions.

Compliance is checked by inspection.

22.109 Guards intended to prevent inadvertent ignition of flammable material shall be securely attached to the appliance so that it is not possible to detach them completely without the aid of a tool.

Compliance is checked by inspection and by manual test.

22.110 UV appliances shall incorporate a control that terminates the emission of radiation. The control shall be easily accessible to the user during exposure and be readily identified by touch and sight.

Compliance is checked by inspection.

22.111 For appliances that are marked with a fluorescent UV lamp equivalency code range, the limits of the range shall be as follows:

- for the X component of the range,

- the upper limit of the range shall be equal to the total erythema effective UV irradiance of the originally supplied fluorescent UV lamp and that is used during type testing;
 - the lower limit of the range shall be equal to 0,75 times the upper limit of the range;
- for the Y component of the range,
- the lower limit of the range shall be equal to 0,75 times the arithmetic mean value of the range;
 - the upper limit of the range shall be equal to 1,25 times the arithmetic mean value of the range.

Compliance is checked by inspection.

NOTE An example of the equivalency code range calculation is as follows.

If the equivalency code of the lamp fitted in the appliance during type testing is

100–R–47/3,2

The equivalency code range that ~~must be~~ is marked on the appliance is calculated as follows:

lower value of X range: $0,75 \times 47 = 35,25$

lower value of Y range: $0,75 \times 3,2 = 2,40$

upper value of Y range: $1,25 \times 3,2 = 4,00$

X is rounded to the nearest integer, Y is rounded to the nearest first decimal.

The fluorescent UV lamp equivalency code range is then:

100–R–(35–47)/(2,4–4,0)

22.112 Appliances fitted with **UV filters** shall be constructed so that the emission of UV radiation ~~is does not increased~~ exceed the limits specified in 32.101 if the filter is removed.

*Compliance is checked by the test of 32.101 with the **UV filters** removed.*

*If compliance relies on the operation of an **electronic circuit**, the appliance is further tested as follows.*

*The appliance is supplied at **rated voltage** and the filter is removed. The fault conditions in a) to g) of 19.11.2 are then applied one at a time to the **electronic circuit**. The appliance shall comply with 32.101.*

*If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of **normative Annex R**.*

22.113 Appliances completely surrounding a person shall be capable of being opened from the inside without the use of any electrical means.

~~Appliances that the user may lock from the inside shall include provision to gain access from outside of the appliance when the appliance is locked.~~

Compliance is checked ~~by inspection~~ by the following test.

The appliance is disconnected from any electrical source of supply with doors and lids closed.

A force is then applied to a point, equivalent to an accessible inside point, of each appropriate door or lid of the appliance, at the midpoint of the edge farthest from the hinge axis in the direction perpendicular to the plane of the lid or door.

The force shall be applied at a rate not exceeding 15 N/s and the lid or door shall open before the force exceeds 150 N.

22.114 Appliances ~~for commercial use only~~ that completely surround a person and that can be locked from the inside shall include provision ~~for the operator~~ to gain access to the appliance from the outside ~~of the appliance~~ when the appliance is locked.

Compliance is checked by inspection and by manual test.

22.115 Glass parts of broken high-pressure metal halide lamps shall not be ejected from the appliance or contact a user or cause a fire hazard if they contact non-metallic parts of the appliance.

Compliance is checked by inspection and, if necessary, by the following test.

Non-metallic material that ~~may~~ ~~can~~ be contacted by parts of broken high-pressure metal halide lamps shall comply with IEC 60695-2-11 without ignition at a test severity of 750 °C. The glow-wire test need not be carried out on parts that have a glow-wire ignition temperature according to IEC 60695-2-13 of at least 775 °C.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 Addition:

The number of flexings for conductors that are only flexed when the appliance is stored is 5 000. The number of flexings for conductors flexed in normal use is increased to 50 000.

24 Components

This clause of Part 1 is applicable except as follows.

24.1 Addition:

*If the current flowing through the terminals of lampholders or ballasts exceeds the rated value, the terminal shall comply with IEC 60598-1: ~~2008~~ 2020, 15.6. The current for the test is 1,1 times the current measured when the appliance is operated at **rated voltage**.*

24.2 ~~Modification~~ Addition:

Switches controlling a motor for raising or lowering part of the appliance, and switches of **portable appliances** having a **rated current** not exceeding 2 A, may be fitted in flexible cords.

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 for appliances having a mass not exceeding 3 kg.

25.7 Addition:

Supply cords having a rubber sheath or a sheath of other material likely to be affected by ultraviolet radiation emitted from the appliance shall not be used in **UV appliances**.

~~NOTE 101 The emitter and the reflector are not considered to be parts that the supply cord is likely to touch in normal use.~~

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:

The requirement does not apply if the insulation is provided by the envelope of an **UV emitter** or by the glass envelope of an **IR emitter**.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

Subclause 30.2.2 is applicable except for electrical parts that operate when the appliance is unattended; for these parts, 30.2.3 is 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 except as follows.

32.2 Addition:

This requirement is not applicable to the UV radiation emitted for the tanning function of the appliance.

32.101 The radiation from **UV appliances** shall be limited.

NOTE 1 See *informative* Annex EE for limits set by some regional or national authorities.

Compliance is checked by the following test.

*The appliance is provided with **UV emitters** that have been aged by supplying them at **rated voltage** for a period of approximately*

- 5 h for fluorescent lamps;
- 1 h for high-intensity discharge lamps.

NOTE 2 A high-intensity discharge lamp is an electric discharge lamp in which the radiation-producing arc is stabilized by the wall temperature and the arc has a bulb wall loading in excess of 3 W/cm².

NOTE 3 For appliances containing both fluorescent lamps and high-intensity discharge lamps, the high-intensity discharge lamps can be aged for the same period as the fluorescent lamps.

*The appliance is supplied at **rated voltage** and operated for approximately half the maximum exposure time allowed by the timer. The irradiance is then measured according to 32.101.1.*

*Appliances suitable for household use shall have a total **effective irradiance** not exceeding*

- 0,15 W/m², for wavelengths up to 320 nm;
- 0,15 W/m², for wavelengths between 320 nm and 400 nm;

weighted according to the erythema action spectrum of Figure 103.

*Appliances for commercial use only shall have a total **effective irradiance** not exceeding 0,7 W/m², weighted according to the erythema action spectrum of Figure 103.*

*The exposure dose referred to in 22.106 and *normative* Annex DD (except for the maximum yearly dose) is calculated from the total **effective irradiance** weighted according to the erythema action spectrum of Figure 103.*

The exposure dose is given by:

$$H_{\text{er}} = E_{\text{er}} t$$

where

t is the exposure time in seconds, during which the effective erythema irradiance is applied;

H_{er} is the effective exposure dose applied in J/m²;

E_{er} is the effective erythema irradiance in W/m².

The total **effective irradiance** is given by:

$$E_{\text{eff}} = \sum_{250 \text{ nm}}^{400 \text{ nm}} S_{\lambda} E_{\lambda} \Delta \lambda$$

where

E_{eff} is the total effective irradiance;

S_λ is the relative spectral effectiveness (weighting factor) according to Figure 103;

E_λ is the spectral irradiance in W/(m²nm);

Δλ is the wavelength interval (nm).

The wavelength interval for the calculation shall not exceed 2,5 nm.

Appliances shall have a total irradiance not exceeding 0,003 W/m², for wavelengths between 200 nm and 280 nm.

The total irradiance is given by:

$$E = \sum_{200 \text{ nm}}^{280 \text{ nm}} E_{\lambda} \Delta \lambda$$

where

E is the total irradiance;

E_{λ} is the spectral irradiance in W/(m²nm);

$\Delta \lambda$ is the wavelength interval (nm).

32.101.1 The irradiance is measured with the measuring instrument being placed so that the highest **effective irradiance** is recorded at positions which model the human body as follows:

- for appliances which expose persons from below, the measuring instrument is placed on the surface the person lies on;
- for appliances that are arranged over a person, the measuring instrument is placed on the surface profile of a virtual half-cylinder with a radius of 300 mm in case of full body exposure (position 2 in ~~Figure 101~~ Figure 104) or of 150 mm in case of facial exposure (position 1 in ~~Figure 101~~ Figure 104). The virtual half-cylinder is placed directly on the surface the person lays on and is aligned along the centre line of this surface. The virtual half-cylinder for the facial measurement is placed on a 50 mm base that is itself placed directly on the surface the person lays on and is aligned along the centre line of this surface. In the transition area between head and body, measurements are conducted in position 1 and position 2 and the higher **effective irradiance** is recorded;
- for appliances having upper and lower radiating surfaces, each part is measured separately while the other part is covered. If the distance between two radiating surfaces is less than 300 mm or 200 mm for a facial measurement, the measurement is made at the surface of the upper panel;
- for appliances exposing an upright standing person from all sides, the measuring instrument is placed on the surface profile of a virtual cylinder with a radius of 300 mm. The virtual cylinder is formed from two virtual half cylinders. The virtual cylinder is positioned in the centre of the appliance. During the measurement, the virtual half cylinder opposite the measuring instrument shall be covered;
- for appliances where the exposure position is not defined by the construction, such as those placed on a table or some shoulder tanners, the measuring instrument is placed parallel to the emitting surface at the shortest recommended exposure distance or directly on the emitting surface;
- for appliances exposing a sitting person, the measuring instrument is placed on the surface of a virtual half-cylinder with a radius of 300 mm in case of full body exposure (positions 2, 3 and 4 of ~~Figure 102~~ Figure 105) or with a radius of 150 mm in case of facial exposure (position 1 of ~~Figure 102~~ Figure 105). The virtual half-cylinder is located in the position of the body part to be exposed. The virtual half-cylinder for the facial measurement is placed on a 50 mm base. In the transition area between head and body, measurements are conducted in position 1 and position 2 and the higher **effective irradiance** is recorded.

Details of the instrument used for the measurements are given in IEC 61228. The measuring instrument shall measure the mean irradiance over a circular area having a diameter not exceeding 20 mm. The response of the instrument shall be proportional to the cosine of the angle between incident radiation and the normal to the circular area. The spectral irradiance

shall be measured at intervals of 1 nm in an appropriate double monochromator system. The double monochromator shall have a bandwidth not exceeding 2,5 nm.

32.102 The radiation from **VIS appliances** ~~incorporating VIS emitters or~~ and **IR emitters appliances** shall be limited.

Compliance is checked by the following test.

The appliance is fitted with **VIS emitters** or **IR emitters**, as appropriate, that have been conditioned by supplying them at **rated voltage** for a period of approximately 5 h.

The appliance is supplied at **rated voltage** and the radiation from the appliance is measured as detailed in IEC 62471:2006, 5.1 at the exposure distance in IEC 62471:2006, Clause 6 or at the recommended exposure distance, whatever is more unfavourable.

Irradiances from **VIS appliances** and **IR appliances** shall not exceed the limits of risk group 1 as specified in IEC 62471:2006, 6.1.

32.103 Appliances that are not in the exempt group of IEC 62471 shall be supplied with at least two pairs of protective goggles that ensure ~~adequate~~ front and side protection for the eyes and that provide enough **luminous transmittance** to make it possible to see through them.

Compliance is checked by inspection and by the following test that is carried out on each pair of goggles.

The transmission is measured at the centre of each ocular by means of a spectrophotometer having a bandwidth not exceeding 2,5 nm. A beam of light having a diameter of approximately 5 mm is used. The transmission is measured at intervals of not more than 5 nm. The transmission shall not exceed the values specified in ~~Table 101~~ Table 102 and the **luminous transmission** shall not be less than 1 %.

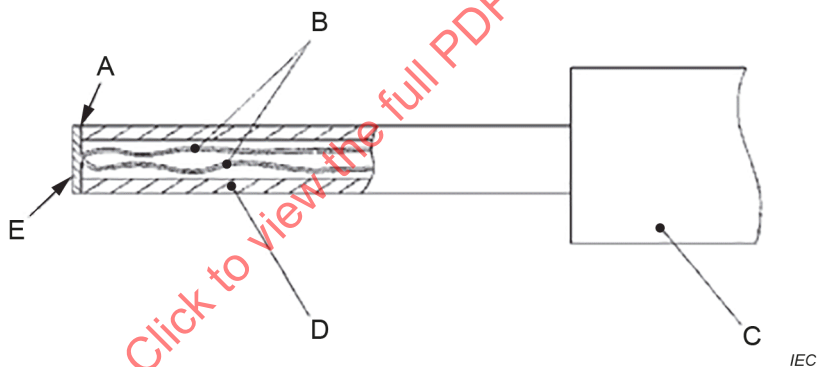
For measurements of **luminous transmission**, a lamp with a continuous spectrum in the visible wavelength region shall be used.

Table ~~101~~ 102 – Maximum transmission of goggles

Wavelength λ	Maximum transmission %
250 nm < λ ≤ 320 nm	0,1
320 nm < λ ≤ 400 nm	1
400 nm < λ ≤ 550 nm	5
550 nm < λ ≤ 3 000 nm	10

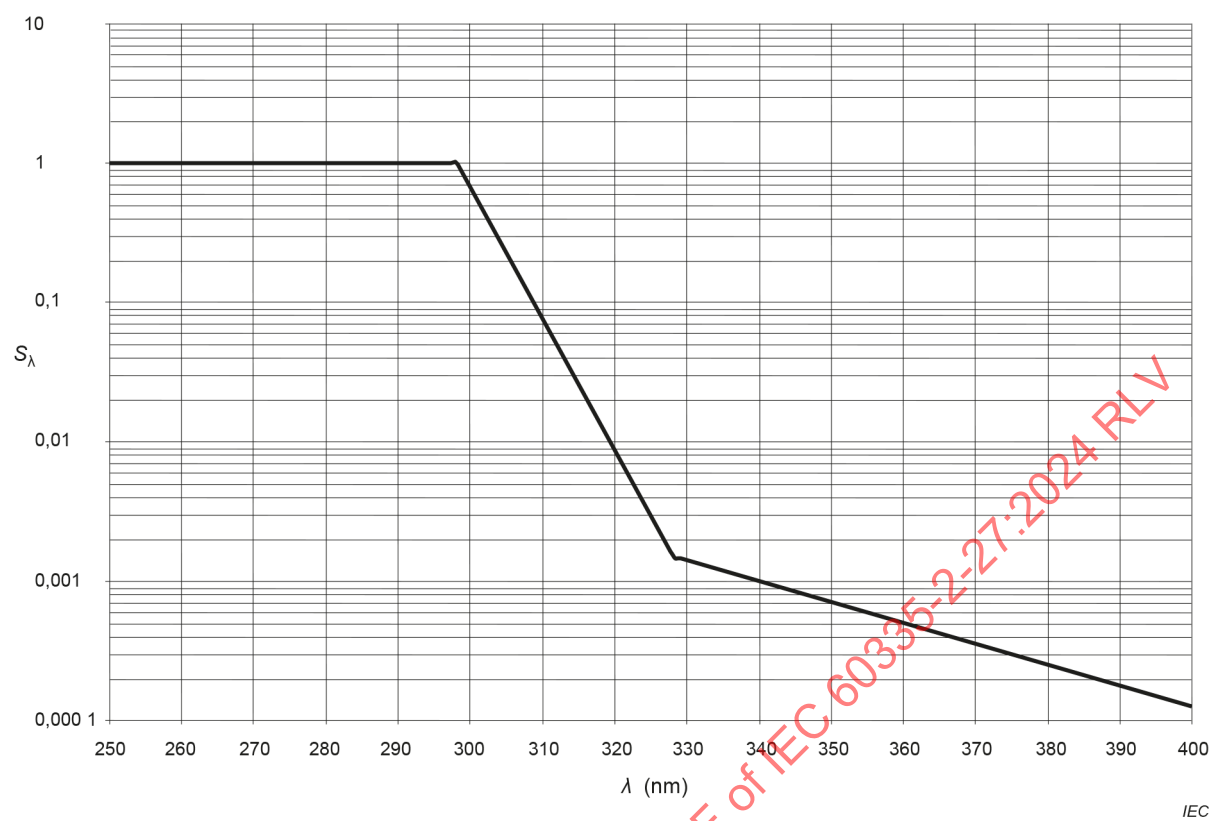


NOTE This pictogram incorporates symbol IEC 60417-5957 (2004-12) combined with the prohibition sign of ISO 3864-1.

Figure 101 – Not for household use**Key**

- A adhesive
- B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K
- C handle arrangement permitting a contact force of $4\text{ N} \pm 1\text{ N}$
- D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

Figure 102 – Probe for measuring surface temperatures



Key

— erythema action spectrum

NOTE The erythema action spectrum is defined from the following parameters:

Wavelength (λ) nm	Weighting factor (S_λ)
$\lambda \leq 298$	1
$298 < \lambda \leq 328$	$100,094^{(298-\lambda)}$
$328 < \lambda \leq 400$	$100,015^{(140-\lambda)}$

Figure 103 – Erythema action spectrum

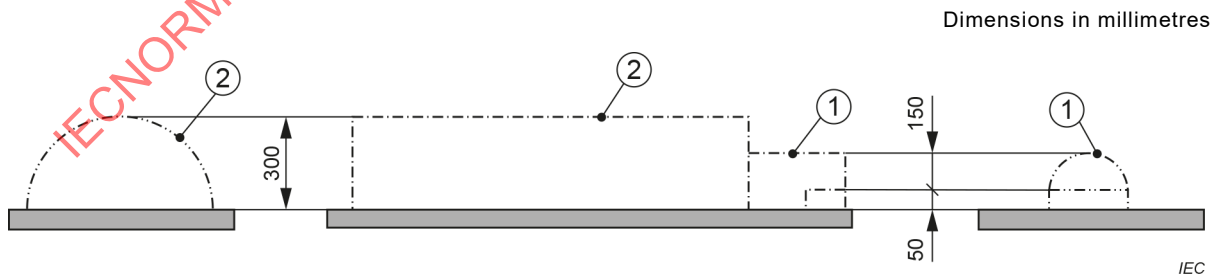
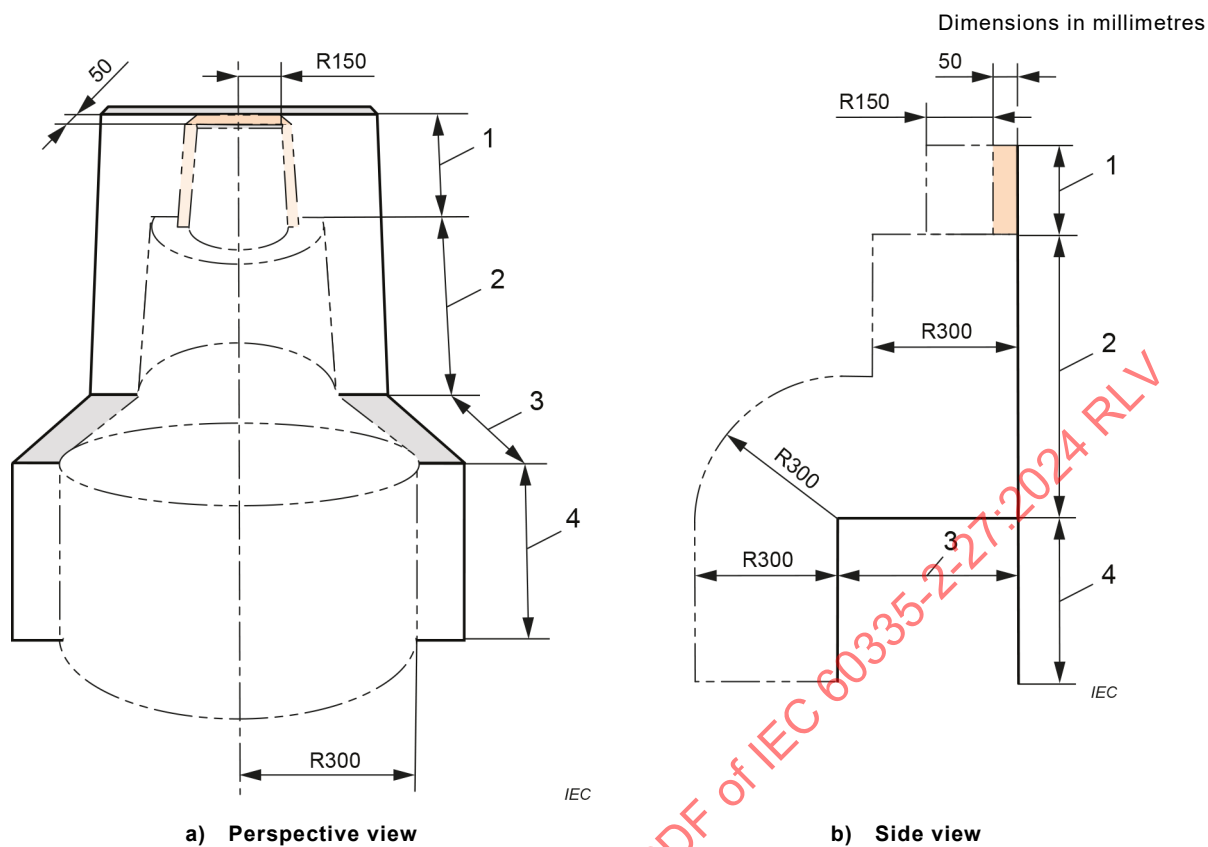


Figure 104 – Measuring points for appliances that are arranged over a person



Key

R radius

Figure 102 105 – Measuring points for appliances exposing a sitting person

Annexes

The annexes of Part 1 are applicable except as follows.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex B (normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

Annex B of Part 1 is applicable except as follows.

22 Construction

B.22.3 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

B.22.4 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex R (normative)

Software evaluation

R.2.2.5 Modification:

Replace the first paragraph with the following:

For **programmable electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur before compliance with Clause 19, 22.105 ~~and~~ or 22.112 is impaired.

R.2.2.9 Modification:

Replace the first sentence of the first paragraph with the following:

The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19, 22.105 ~~and~~ or 22.112 is impaired.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex AA (normative)

Measurement of luminance

Luminance is measured by means of collimating optics. The measurement is made at the shortest possible distance from the light source, but not less than 0,2 m. At the point of measurement, the optics shall collect all light passing through the entrance aperture within the solid angle of acceptance, the corresponding plane angle being 1°.

*During the measurement, the appliance is operated at **rated voltage**.*

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex BB (informative)

Detailed classification of UV appliances

BB.1 General

Annex BB provides details of a classification of **UV appliances** based on ~~amounts of radiation~~ **irradiance** in the ranges 250 nm to 320 nm and 320 nm to 400 nm.

~~BB.1 Terms and definitions~~

~~For the purposes of this annex, the following definitions apply.~~

~~BB.1.1~~

~~UV type 1 appliance~~

~~UV appliance such that the biological effect is caused by radiation having wavelengths longer than 320 nm and characterized by a relatively high irradiance in the range 320 nm to 400 nm~~

~~BB.1.2~~

~~UV type 2 appliance~~

~~UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance in the range of 320 nm to 400 nm~~

~~BB.1.3~~

~~UV type 3 appliance~~

~~UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a limited irradiance over the whole UV radiation band~~

~~BB.1.4~~

~~UV type 4 appliance~~

~~UV appliance such that the biological effect is mainly caused by radiation having wavelengths shorter than 320 nm~~

~~BB.1.5~~

~~UV type 5 appliance~~

~~UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance over the whole UV radiation band~~

BB.2 Classification

UV appliances can be classified as one of the following types:

- **UV type 1 appliance;**
- **UV type 2 appliance;**
- **UV type 3 appliance;**
- **UV type 4 appliance;**
- **UV type 5 appliance.**

NOTE **UV type 1 appliances, UV type 2 appliances, UV type 4 appliances and UV type 5 appliances** are intended to be used in tanning salons, beauty parlours and similar premises, under supervision of appropriately trained persons. They are not intended for household use.

UV type 3 appliances are suitable for household and similar use and can be used by unskilled persons. They are also suitable for use in tanning salons, beauty parlours and similar premises.

BB.3 Effective irradiance

The **effective irradiance** for each type of **UV appliance**, weighted according to the erythema action spectrum of Figure 103, is given in Table BB.1.

Table BB.1 – Limits of effective irradiance

UV type appliance	Effective irradiance W/m ²	
	250 nm < λ ≤ 320 nm	320 nm < λ ≤ 400 nm
UV type 1	< 0,001	≥ 0,15
UV type 2	0,001 to 0,15	≥ 0,15
UV type 3	< 0,15	< 0,15
UV type 4	≥ 0,15	< 0,15
UV type 5	≥ 0,15	≥ 0,15
λ is the wavelength of the radiation.		

Annex CC (informative)

Fluorescent UV lamp equivalency code

The equivalency code for fluorescent UV lamps for tanning, as detailed in IEC 61228, that is legibly and durably marked on the lamp is as follows.

The equivalency code is of the form: Wattage–Reflector type code–UV code.

The following reflector type code shall be used in the equivalency code:

- O for non-reflector lamps;
- B for lamps with a broad reflector angle $\alpha > 230^\circ$
- N for lamps with a narrow reflector angle $\alpha < 200^\circ$
- R for lamps with a regular reflector $200^\circ \leq \alpha \leq 230^\circ$

The following UV code shall be used in the equivalency code:

UV code = X/Y;

X = total erythema effective UV irradiance over the range 250 nm to 400 nm;

Y = ratio of the NMSC effective UV irradiances ≤ 320 nm and > 320 nm.

X given in mW/m^2 rounded to the nearest integer, Y is rounded to the nearest first decimal. The effective values are at 25 cm distance and under conditions of optimum UV irradiance.

NOTE An example of a lamp equivalency code is given below:

100 W reflector lamp with 220° reflector angle.

Erythema effective UV irradiance (250 nm to 400 nm) = 47 mW/m^2 .

Short wave NMSC effective UV irradiance (≤ 320 nm) = 61 mW/m^2 .

Long wave NMSC effective UV irradiance (> 320 nm) = 19 mW/m^2 .

The equivalency code of the lamp is:

100–R–47/3,2

Annex DD (~~informative~~ normative)

~~Guidelines for the development of an exposure time schedule for UV exposure~~ UV exposure schedule

~~Annex DD provides detailed information about the requirements for an exposure time schedule for UV exposure.~~

- ~~• The exposure time schedule need not depend on the skin type.~~
- ~~• The recommended exposure time for the first exposure for untanned skin should not exceed that required to provide an exposure dose of 100 J/m², weighted according to the erythema action spectrum shown in Figure 103, or as a result of a test on a small area of the skin. For calculation of the recommended exposure time for the first exposure, use the formula for the exposure dose in 32.101.~~
- ~~• Wait 48 h between first and second exposure, since delayed unexpected side effects can occur until 48 h after the first exposure.~~
- ~~• The reason for the small first exposure dose is to check for unexpected side effects following to any UV exposure. This reason should be explained to the user.~~
- ~~• The recommended exposure time for the second exposure for untanned skin should not exceed that required to provide an exposure dose of 250 J/m², weighted according to the erythema action spectrum shown in Figure 103.~~
- ~~• A single exposure dose should not exceed 600 J/m², weighted according to the erythema action spectrum shown in Figure 103.~~
- ~~• Waiting period between subsequent exposures should be approximately 48 h due to cumulative behaviour of the erythema reaction.~~
- ~~• A tanning course (a consecutive series of exposures used to develop a tan) should not exceed a total exposure dose of 3 kJ/m², weighted according to the erythema action spectrum shown in Figure 103.~~
- ~~• Increases in the exposure dose should be applied gradually over the period of the tanning course.~~
- ~~• The recommended number of exposures per year for each part of the body is to be based upon a maximum yearly dose of 15 kJ/m², weighted according to the erythema action spectrum shown in Figure 103 and taking into account the recommended schedule of exposure.~~

The recommended exposure time schedule for UV exposure shall provide the following information:

- The exposure time schedule need not depend on the skin type.
- The first exposure is a test exposure to identify unexpected side effects when exposed to UV. This reason shall be explained to the user.
- Therefore, a first recommended exposure shall not exceed an exposure dose of 100 J/m², weighted according to the erythema action spectrum shown in Figure 103. For calculation of the recommended exposure time for the first exposure, use the formula for the exposure dose in 32.101.
- Wait 48 h between first and second exposure, since delayed unexpected side effects can occur until 48 h after the first exposure.

NOTE Unexpected side effects can also be tested using a UV test on a small area of the skin and a 48 hours waiting period.

- The recommended exposure duration stated in the schedule for the second exposure shall not exceed that required to provide an exposure dose of 250 J/m², weighted according to the erythema action spectrum shown in Figure 103.

- A single exposure dose shall not exceed 600 J/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- Waiting period between subsequent exposures shall be approximately 48 h due to cumulative behaviour of the erythema reaction.
- A tanning course (a consecutive series of exposures used to develop a tan) shall not exceed a total exposure dose of 3 kJ/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- Increases in the exposure dose shall be applied gradually over the period of the tanning course.
- The recommended number of exposures per year for each part of the body shall be based upon a maximum yearly dose of 15 kJ/m^2 , weighted according to the erythema action spectrum shown in Figure 103 and taking into account the recommended schedule of exposure.

Compliance is checked by calculating the exposure times. These calculations are based on the measurement results from Subclause 32.101 and the maximum irradiation doses above.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex EE (informative)

Irradiance limits set by regional or national authorities

Many national or regional authorities have published regulations on the irradiance limits of **UV appliances** that are in some cases different to those listed in this standard. The limits as advised by National Committees that differ from the IEC limits are given in the following Table EE.1 to Table EE.3. These limits should also be taken into account during the type testing and classification of the appliance for these countries. Where no differing limit is given, the IEC limit is assumed to apply.

Table EE.1 – Europe: EN 60335-2-27 limits

Appliance	Total effective irradiance	(280 – 320) nm effective irradiance	(320 – 400) nm effective irradiance	(200 – 280) nm short wavelength irradiance	Maximum dose per exposure	Maximum dose per year ^a
	W/m ²	W/m ²	W/m ²	W/m ²	J/m ²	kJ/m ² (NMSC) ^b
UV type 1	0,3	< 0,001	≥ 0,15	0,003	600	25
UV type 2	0,3	< 0,15	≥ 0,15	0,003	600	25
UV type 3	0,3	< 0,15	< 0,15	0,003	600	25
UV type 4	0,3	≥ 0,15	< 0,15	0,003	600	25
UV type 5	Not allowed					

^a The maximum dose per year applicable in Finland is 5 kJ/m² weighted according to the erythema action spectrum.

^b (NMSC) means that the maximum dose per year is weighted according to the non-melanoma skin cancer spectrum.

Table EE.2 – Australia and New Zealand: AS/NZS 60335.2.27 limits

Appliance	Total effective irradiance W/m ²	(280 – 320) nm effective irradiance W/m ²	(320 – 400) nm effective irradiance W/m ²	(200 – 280) nm short wavelength irradiance W/m ²
UV type 1	Not allowed			
UV type 2 ^a	0,7	0,001 to 0,15 in addition 0,007 < UVB*/UVT** < 0,03	≥ 0,15	0,003 in addition the spectral irradiance limit is 1,0 × 10 ⁻⁵ W/m ² /nm
UV type 3		< 0,15 in addition 0,007 < UVB*/UVT** < 0,03	< 0,15	0,003 in addition the spectral irradiance limit is 1,0 × 10 ⁻⁵ W/m ² /nm
UV type 4	Not allowed			
UV type 5	Not allowed			
UVB* = Irradiance in the range 280 nm ≤ λ ≤ 320 nm				
UVT** = total irradiance				
^a UV Type 2 is not allowed in Australia.				

Table EE.3 – USA: 21 CFR 1040.20 limits

Appliance	Total effective irradiance W/m ²	(280 – 320) nm effective irradiance W/m ²	(320 – 400) nm effective irradiance W/m ²	(200 – 260)/(260 – 320) short wavelength irradiance ratio W/m ²
All types				0,003

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

AS/NZS 60335.2.23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

EN 60335-2-23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

IEC 60335-2-23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

IEC 60335-2-53, *Household and similar electrical appliances – Safety – Part 2-53: Particular requirements for sauna heating appliances and infrared cabins*

IEC 60335-2-113, *Household and similar electrical appliances – Safety – Part 2-113: Particular requirements for cosmetic and beauty care appliances incorporating lasers and intense light sources*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

21 CFR 1040.20, *Code of Federal Regulations, Title 21 – Food and Drugs, Chapter I – Food and Drug Administration Department of Health and Human Services, Subchapter J – Radiological Health, Part 1040 – Performance Standards for Light-Emitting Products*

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Household and similar electrical appliances – Safety –
Part 2-27: Particular requirements for appliances for skin exposure to optical
radiation**

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-27: Exigences particulières pour les appareils d'exposition de la peau
aux rayonnements optiques**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	9
4 General requirement.....	10
5 General conditions for the tests	10
6 Classification.....	10
7 Marking and instructions.....	11
8 Protection against access to live parts.....	14
9 Starting of motor-operated appliances	15
10 Power input and current.....	15
11 Heating.....	15
12 Charging of metal-ion batteries	17
13 Leakage current and electric strength at operating temperature.....	17
14 Transient overvoltages	17
15 Moisture resistance	17
16 Leakage current and electric strength.....	17
17 Overload protection of transformers and associated circuits	17
18 Endurance	18
19 Abnormal operation	18
20 Stability and mechanical hazards.....	18
21 Mechanical strength	19
22 Construction	19
23 Internal wiring.....	23
24 Components	23
25 Supply connection and external flexible cords	23
26 Terminals for external conductors.....	23
27 Provision for earthing	24
28 Screws and connections	24
29 Clearances, creepage distances and solid insulation	24
30 Resistance to heat and fire	24
31 Resistance to rusting	24
32 Radiation, toxicity and similar hazards.....	24
Annexes	31
Annex B (normative) Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances	32
Annex R (normative) Software evaluation	33
Annex AA (normative) Measurement of luminance	34
Annex BB (informative) Detailed classification of UV appliances	35
Annex CC (informative) Fluorescent UV lamp equivalency code	36
Annex DD (normative) UV exposure schedule.....	37

Annex EE (informative) Irradiance limits set by regional or national authorities	38
Bibliography	40
Figure 101 – Not for household use	28
Figure 102 – Probe for measuring surface temperatures	28
Figure 103 – Erythema action spectrum	29
Figure 104 – Measuring points for appliances that are arranged over a person	29
Figure 105 – Measuring points for appliances exposing a sitting person	30
Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions	17
Table 102 – Maximum transmission of goggles	28
Table BB.1 – Limits of effective irradiance	35
Table EE.1 – Europe: EN 60335-2-27 limits	38
Table EE.2 – Australia and New Zealand: AS/NZS 60335.2.27 limits	38
Table EE.3 – USA: 21 CFR 1040.20 limits	39

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-27: Particular requirements for appliances
for skin exposure to optical radiation**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60335-2-27 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This seventh edition cancels and replaces the sixth edition published in 2019. 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) modification or conversion of some notes to normative text (Clause 1, 7.1);
- c) clarification of product risk and liability (7.1);

- d) modification of Annex DD as a normative annex, and modification of relevant text (7.12, Annex DD);
- e) clarification of requirement for product use links provided (7.12.9);
- f) clarification of the application of test probe 18 for appliances for use in tanning salons, beauty parlours and similar premises (8.1.1, 20.2);
- g) introduction of accessible surface temperature limits (Clause 11);
- h) removal of redundancy between 22.113 and 22.114;
- i) clarification that 32.2 is not applicable for UV emitted for the tanning function of the appliance.

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

Draft	Report on voting
61/7071/FDIS	61/7094/RVD

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. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/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 appliances for skin exposure to optical radiation.

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 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.

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.

- 6.101: Commercial tanning sunbed services are illegal (Australia).
- Annex DD: Exposure doses are based on the Fitzpatrick Skin Phototype classification system (New Zealand).

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 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 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.

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 2-27: Particular requirements for appliances for skin exposure to optical radiation

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrical appliances incorporating emitters for exposing the skin to optical radiation (wavelength 100 nm to 1 mm), for household and similar use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances and **battery-operated appliances**.

As far as practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons using the appliances in tanning salons, beauty parlours and similar premises or at 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.

Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can 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.

This standard does not apply to

- appliances for skin or hair care (IEC 60335-2-23);
- sauna heating appliances and infrared cabins (IEC 60335-2-53);
- cosmetic and beauty care appliances incorporating lasers and intense light sources (IEC 60335-2-113);
- appliances for medical purposes (IEC 60601);
- appliances that use UV radiation for purposes other than tanning the skin;
- 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60598-1:2020, *Luminaires – Part 1: General requirements and tests*

IEC 61228, *Fluorescent ultraviolet lamps used for tanning – Measurement and specification method*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.101

effective irradiance

irradiance of electromagnetic radiation weighted according to a specified action spectrum

3.1.102

luminous transmission

percentage of incident light passing through a material weighted by the spectral sensitivity of the human eye and integrated over the wavelength range 380 nm and 780 nm

3.5 Definitions relating to types of appliances

3.5.101

UV appliance

appliance incorporating **UV emitters** for tanning purposes

3.5.102

IR appliance

appliance not for tanning purposes incorporating one or more **IR emitters**

3.5.103

VIS appliance

appliance not for tanning purposes incorporating one or more **VIS emitters**

3.5.104

UV type 1 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths longer than 320 nm and characterized by a relatively high irradiance in the range 320 nm to 400 nm

3.5.105

UV type 2 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance in the range 320 nm to 400 nm

3.5.106

UV type 3 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a limited irradiance over the whole UV radiation band

3.5.107

UV type 4 appliance

UV appliance such that the biological effect is mainly caused by radiation having wavelengths shorter than 320 nm

3.5.108

UV type 5 appliance

UV appliance such that the biological effect is caused by radiation having wavelengths both shorter and longer than 320 nm and characterized by a relatively high irradiance over the whole UV radiation band

3.6 Definitions relating to parts of an appliance

3.6.101

UV emitter

radiating source constructed to emit electromagnetic energy at wavelengths between 200 nm and 400 nm

Note 1 to entry: A fluorescent UV lamp for tanning is an example of a **UV emitter**.

Note 2 to entry: UV radiation with wavelengths below 200 nm is not easily transmitted through air and usually exists only in a vacuum.

Note 3 to entry: **UV emitters** are also referred to as **ultraviolet emitters**.

3.6.102

IR emitter

radiating source constructed to emit electromagnetic energy at wavelengths between 780 nm and 1 mm

Note 1 to entry: **IR emitters** are also referred to as **infrared emitters**.

3.6.103

VIS emitter

radiating source constructed to emit electromagnetic energy at wavelengths of 400 nm to 780 nm

Note 1 to entry: **VIS emitters** are also referred to as **visible emitters**.

3.6.104

UV filter

optical element for attenuation of UV radiation

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.

5.101 *Appliances with **IR emitters** only are tested as **heating appliances**. All other appliances are tested as **motor-operated appliances**.*

6 Classification

This clause of Part 1 is applicable except as follows.

6.101 UV appliances shall be one of the following types with respect to the emission of ultraviolet radiation:

- appliances suitable for household use;
- appliances for commercial use only.

NOTE 1 Appliances for household use can also be for commercial use, such as in tanning salons, beauty parlours and similar premises.

NOTE 2 Detailed classification of the appliances is described in informative Annex BB.

Compliance is checked by inspection and by the relevant tests.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

UV appliances intended for commercial use, such as in tanning salons, beauty parlours and similar premises shall be marked with the prohibition pictogram of Figure 101 or with the substance of the following:

Not for household use

Appliances having fluorescent UV lamps for tanning shall be marked with the fluorescent UV lamp equivalency code range. This equivalency code range identifies the fluorescent UV lamps for tanning that shall be used in the appliance.

NOTE 101 Details of the fluorescent UV lamp code that is marked on the lamp are given in IEC 61228 and are reproduced in informative Annex CC for information. An example of the fluorescent UV lamp equivalency code range to be marked on the appliance is given in 22.111.

For **UV emitters** other than fluorescent UV lamps for tanning, the appliance shall be marked with the type reference of the emitters that are recommended for use.

UV appliances shall be marked with the substance of the following:

DANGEROUS ULTRAVIOLET (UV) RADIATION! FOLLOW ALL INSTRUCTIONS! WEAR PROTECTIVE GOGGLES PROVIDED! Ultraviolet can cause injury to eyes and skin and can result in skin aging and skin cancers. Certain medicines can increase sensitivity. Do not use any sunscreens or cosmetics and follow the recommended exposure schedule.

For **UV appliances** intended only for use in tanning salons, beauty parlours and similar premises, this warning may be given on a permanent label intended to be fixed on the wall adjacent to the UV appliance.

UV appliances with a luminance exceeding 100 000 cd/m² shall be marked with the substance of the following:

WARNING: Intense light. Do not stare at the emitter.

NOTE 102 The method for measuring luminance is given in normative Annex AA.

Appliances shall be marked with the substance of the following unless they are in the exempt group (see IEC 62471:2006):

WARNING: Do not stare at the emitter. It is required to wear the provided eyewear due to intense optical radiation. Read instructions carefully.

Appliances incorporating **VIS emitters** or **IR emitters** shall be marked with the manufacturer, model name and technical specification of appropriate replacement lamps.

Unless the intended exposure distance is controlled by their construction, **UV appliances** shall be marked with symbol IEC 60417-6301 (2015-03) with the recommended exposure distance and its unit in centimetres (cm) included between the dimensional arrow heads. Goggles shall be marked with name, trademark or identification mark of the manufacturer and the following alpha-numeric characters IEC 60335-2-27.

NOTE 103 If these warnings are combined, the word "warning" need not be repeated.

7.6 Addition:



[symbol IEC 60417-6301
(2015-03)]

ultra-violet light source, exposure
distance

7.12 Addition:

The instructions for **UV appliances** shall include the following information:

- identification of components that can influence the ultraviolet radiation, such as filters and reflectors;
- identification of replaceable **UV emitters**;
- information concerning the intended exposure distance (unless this is controlled by the construction of the **UV appliance**);
- schedule of exposure specifying duration and intervals according to normative Annex DD;
- recommended number of exposures that should not be exceeded in one year, see normative Annex DD;
- the type reference of the protective goggles to be used.

The instructions for **UV appliances** shall include the substance of the following statements:

- non-users, especially children, must not be present when the appliance is being operated;
- tanning appliances are not to be used by
 - persons under the age of 18 years;
 - persons who tend to freckle;
 - persons with a naturally red hair;
 - persons having abnormal discoloured patches on the skin;
 - persons having a large number of moles;
 - persons having asymmetrical irregularly shaped moles larger than 5 mm in diameter with variable pigmentation and irregular borders; in case of doubt, seek medical advice;
 - persons suffering from sunburn;
 - persons not able to tan at all or persons that burn easily when exposed to the sun;
 - persons having a history of frequent severe sunburn during childhood;
 - persons suffering from or previously suffering from skin cancer or predisposed to skin cancer;
 - persons under a doctor's care for diseases that involve photosensitivity;
 - persons receiving photosensitising medications;
- if unexpected side effects, such as itching, occur within 48 h of the first session of using a tanning appliance, medical advice should be sought prior to further UV exposure;
- exposures should not exceed the minimal amount of UV radiation exposure required to cause perceptible reddening of the skin (a person's minimal erythemal dose (MED));
- if skin reddening (erythema) is visible approximately 16 h to 24 h after any exposure, further exposure should cease. After one week, exposures may be restarted from the beginning of the schedule of exposure;
- the appliance must not be used if the timer is faulty or the filter is broken or removed;

- replaceable **UV emitters** are only to be replaced by types marked on the appliance
- ultraviolet radiation from the sun or from tanning appliances can cause skin or eye damage that can be irreversible. Avoid exposure to the internal tissues of the mouth as it can be more susceptible to UV damage than the skin. These biological effects depend upon the quality and quantity of the radiation as well as the skin sensitivity of the individual;
- the skin can develop sunburn after overexposure. Repeated exposures to ultraviolet radiation from the sun or from tanning appliances can lead to premature ageing of the skin as well as increased risk of development of skin tumours. These risks increase with increasing cumulative UV exposure. Exposure at an early age increases the risk of skin damage later in life;
- the unprotected eye can develop surface inflammation (photokeratitis) and in some cases damage can occur to the retina after exposure. Cataracts can develop after many repeated exposures;
- in cases of pronounced individual sensitivity or allergic reaction to ultraviolet radiation, medical advice is recommended before starting exposure;
- the first exposure, as indicated in the exposure schedule, is a necessary test exposure to identify unexpected side effects when exposed to UV. Therefore, the first recommended exposure in the exposure schedule is much shorter than later exposures and is not intended to provide a tan.
- the following precautions must be taken:
 - always use the protective goggles provided. Contact lenses and sun glasses are not a substitute for goggles;
 - remove cosmetics, fragrances, and skin care products well in advance of exposure and do not use any sunscreens or products that accelerate tanning;
 - certain medical conditions or side effects of certain medicines can be aggravated by ultraviolet exposure. In case of doubt, seek medical advice;
 - allow at least 48 h between the first two exposures;
 - do not sunbathe and use the appliance on the same day;
 - follow the recommendations concerning exposure durations, exposure intervals and distances from the lamp;
 - seek medical advice if persistent lumps or sores appear on the skin or if there are changes in pigmented moles;
 - protect sensitive skin parts such as scars, tattoos and genitals from exposure.

For fluorescent UV lamps for tanning, it shall be stated that they are only to be replaced by types marked with an equivalency code, the UV component of which falls within the UV component equivalency code range that is marked on the appliance. In this case, an example of the equivalency code shall be given and the UV component aspect of the fluorescent UV lamp for tanning equivalency code shall be explained.

For appliances, other than those complying with the tests of 19.2 and 19.3, having a lid that has to be opened in normal use, the instructions shall include a warning that the appliance must not be switched on with the lid in the closed position and that, before closing the lid for storage, the appliance must be disconnected from the supply and allowed to cool down.

For appliances having parts that are intended to support a person, the instructions shall include the substance of the following:

This appliance shall not be used by persons exceeding the maximum load of xxx kg. (The value of xxx shall be stated by the manufacturer).

The instructions for appliances incorporating **VIS emitters** or **IR emitters** shall include the following information:

- advice for the protection of the eyes against exposure to visible and infrared radiation and advise that precautions must be taken to safeguard the user against the dangers of overexposure;
- information concerning the intended exposure distance (unless this is controlled by the construction of the appliance);
- recommended schedule of exposure specifying duration and intervals (based on the emitter characteristics, distances);
- identification of alternative components that can influence the radiation, such as filters and reflectors;
- identification of replaceable emitters and a statement that they are only to be replaced by types marked on the appliance;
- instruction to use goggles and an information about the maximum exposure time.

The instructions for appliances incorporating **VIS emitters** or **IR emitters** shall include the substance of the following statements:

- VIS appliances and IR appliances are not to be used by
 - persons suffering from sunburn;
 - persons under medical care for diseases that involve photosensitivity;
 - persons receiving photosensitising medications;
- if unexpected side effects, such as itching, occur within 48 h of the first session of using an appliance, medical advice should be sought prior to further exposure;
- the appliance must not be used if the timer is faulty or the filter is broken or removed.

If the prohibition pictogram of Figure 101 or symbol IEC 60417-6301 (2015-03) is used, the meaning shall be explained.

7.12.9 Addition:

In addition, appliances having **UV emitters** shall be marked on the outside of the appliance with a QR-Code or similar system providing a direct link to all information on **UV appliance** use (manuals, tanning recommendations etc.), as required by this standard (see Clause 7).

7.14 Addition:

The diameter of the prohibition pictogram of Figure 101 shall be at least 10 mm.

The diameter of the UV lamp circle in symbol IEC 60417-6301 (2015-03) shall be at least 20 mm.

Compliance is checked by measurement.

7.15 Addition:

The additional warnings and markings specified in 7.1 shall be visible after the appliance has been installed and without removal of a cover.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 Addition:

During replacement of emitters, compliance is checked by the relevant requirements of IEC 60598-1:2020, Section 8, unless the instructions forbid replacement by the user and tools are needed to replace the emitters.

8.1.1 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

8.1.3 Not 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 except as follows.

10.1 Addition to Table 1:

Type of appliance	Rated power input W	Deviation
Appliances having UV emitters only	All	+10 %

10.2 Addition to Table 2:

Type of appliance	Rated current A	Deviation
Appliances having UV emitters only	All	+10 %

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Modification:

Replace the first dashed item in the fourth and fifth paragraphs with the following:

- *appliances normally placed on a floor or table are placed on the floor of the test corner with their back as near as possible to one of the walls and away from the other wall.*

Addition:

If the direction of the radiation is adjustable, the appliance is adjusted to the most unfavourable position of normal use.

Appliances having fluorescent lamps shall be fitted with a fluorescent lamp having either a short mount electrode or long mount electrode, whichever provides the more unfavourable results.

11.3 Addition:

Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external accessible surfaces specified in Table 101. The probe is applied with a force of $4\text{ N} \pm 1\text{ N}$ to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.

The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.

11.7 Modification:

Replace the first paragraph with the following:

The appliance is operated until steady conditions are established.

NOTE 101 If necessary, timers are reset immediately.

Parts operated by motors in appliances for wall mounting or ceiling mounting are fully raised and lowered five times without rest periods, or for 5 min, whichever is shorter.

11.8 Modification:

Replace the first paragraph with the following:

During the test, the temperature rises are monitored continuously and shall not exceed the values shown in Table 3 and Table 101.

Addition:

The temperatures of ballast windings and their associated wiring shall not exceed the values specified in IEC 60598-1:2020, 12.4 when measured under the conditions stated.

The temperature rises for surfaces in contact with the skin during normal use shall not exceed those specified for handles that are continuously held in the hand in normal use.

Table 3 – Maximum normal temperature rises

Modification:

Add the following to footnote "k": "Similar parts held for short periods include handles or grips of vents and air shutters."

Table 101 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface	Temperature rise of external accessible surfaces ^a K
Bare metal	38
Coated metal ^b	42
Glass and ceramic	51
Plastic and plastic coating > 0,4 mm ^{c, d}	58
NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.	
^a Temperature rises are not measured on: – the underside of appliances intended to be used on a working surface or floor where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end; – the rear surface of appliances which, according to the instructions, shall be placed against a wall and where these surfaces are inaccessible to a 75 mm diameter probe having a hemispherical end. ^b Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used. ^c The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm. ^d When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.	

12 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.

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.

19.1 Modification:

Replace the first, second and third paragraph of the test specification with the following:

Appliances are subjected to the tests of 19.4 to 19.8, 19.10 to 19.12, 19.101 and 19.102, as applicable.

For appliances having a lid but without a warning in the instructions that the appliance must not be switched on with the lid closed, 19.2 and 19.3 are applicable.

19.2 Replacement:

Appliances having a lid that is opened in normal use are tested with the lid closed.

*The test is carried out under the conditions specified in Clause 11. Appliances with **IR emitters** are operated at 0,85 times **rated power input**. All other appliances are supplied at 0,94 times **rated voltage**.*

19.3 Replacement:

*The test of 19.2 is repeated but appliances with **IR emitters** are operated at 1,24 times **rated power input**. All other appliances are supplied at 1,1 times **rated voltage**.*

19.9 Not applicable.

***19.101** Appliances, other than those for mounting at a height more than 1,8 m above the floor, are supplied at **rated voltage** and operated as specified in Clause 11. When steady conditions are established, a piece of dry bleached cotton flannelette having a specific mass of 130 g/m² to 165 g/m², a width of 100 mm and long enough to pass over the front of the appliance is stretched over the appliance in the most unfavourable position.*

The flannelette shall not smoulder or ignite within 10 s.

NOTE If smouldering has started, a hole will have formed in the material with its edge glowing red. Blackening without smouldering is ignored.

***19.102** Appliances having discharge lamps are operated under the fault conditions specified in IEC 60598-1:2020, 12.5.1 a), d) and e) the appliance being supplied at rated voltage.*

The temperatures of ballast or transformer windings shall not exceed the values specified in IEC 60598-1:2020, 12.5.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 Addition:

For emitters, including adjacent glass parts and any lens that protrude from the enclosure, the impact energy is reduced to 0,35 J.

NOTE 101 The test is carried out on emitters and on glass parts that do not hit the floor if the appliance is dropped.

For filters, the impact energy is increased to 1,0 J and compliance with 32.101 shall not be impaired.

21.101 Guards intended to prevent inadvertent ignition of flammable material shall have adequate mechanical strength.

Compliance is checked by the following test.

The appliance is placed so that the central part of the guard is horizontal. A flat disc having a diameter of 10 cm and a mass of 2,5 kg is placed on the centre of the guard for 1 min.

After the test, the guard shall show no permanent deformation.

21.102 Parts of the appliance that are intended to support a person shall have adequate mechanical strength.

Compliance is checked by the following test.

A mass equal to the maximum load indicated in the instruction, but at least 135 kg, evenly distributed over an area of 30 cm × 50 cm, is placed on the surface intended to support a person for 1 min.

After removal of the load, the appliance shall not be damaged to such an extent that compliance with this standard, in particular with Clause 29, is impaired.

NOTE In case of doubt, **supplementary insulation** and **reinforced insulation** are subjected to the electric strength test of 16.3.

22 Construction

This clause of Part 1 is applicable except as follows.

22.24 Replacement:

Bare heating elements shall be supported to prevent excessive displacement. The rupture of a heating element shall not give rise to a hazard.

Compliance is checked by inspection and by the following test.

*The heating element is cut in the most unfavourable place. The conductors shall not come into contact with **accessible metal parts** or fall out of the appliance.*

22.35 Addition:

The requirement does not apply to handles, levers and knobs which are only intended for short time use such as those touched during entering or leaving the appliance.

Modification:

In the second paragraph, delete "**stationary appliances** and".

22.101 Appliances having a lid that has to be opened in normal use shall be constructed so that the lid does not close inadvertently.

Compliance is checked by the following test.

The appliance is placed in any normal position of use on a plane inclined at an angle of 15° to the horizontal.

The lid shall remain in the open position.

22.102 Appliances incorporating parts that are suspended or intended to be raised and lowered over a person shall incorporate a safety device to prevent injury if the suspension, raising or lowering means fails or there is excessive travel of the part.

Compliance is checked by inspection and by manual test.

22.103 Emitters intended for full body exposure or used over a person shall be protected against accidental damage.

Compliance is checked by inspection and by the following test.

A cylindrical rod, having a diameter of 100 mm ± 1 mm and a hemispherical end, is applied with a force of 5 N.

It shall not be possible to touch the emitter with the rod.

22.104 Fixed appliances intended to be used over a person shall have means for fixing that are protected against loosening.

Compliance is checked by inspection and by manual test.

22.105 UV appliances that are inclined at an angle of more than 35° to the vertical shall be constructed so that the emission of ultraviolet radiation is automatically stopped if the timer fails.

Compliance is checked by the following tests.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. A fault in the timer is simulated. The emission of ultraviolet radiation shall cease before the exposure time has exceeded 110 % of the set value.*

*If compliance relies on the operation of an **electronic circuit**, the appliance is further tested as follows.*

*The appliance is supplied at **rated voltage** and operated under **normal operation**. A fault in the timer is simulated. The fault conditions in a) to g) of 19.11.2 are applied one at a time to the **electronic circuit**. The emission of ultraviolet radiation shall cease before the exposure time has exceeded 110 % of the set value and the appliance shall not be capable of further use without repair.*

*If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of normative Annex R.*

22.106 UV appliances shall be provided with a timer that terminates the emission of ultraviolet radiation. The maximum timer setting shall not exceed the manufacturer's recommended maximum exposure time. The timer shall be incorporated in the appliance or, for appliances intended to be permanently connected to fixed wiring, be supplied for incorporation in the wiring system.

The settings marked on the timer shall be compatible with the times specified in the recommended schedule of exposure, the highest setting providing an exposure dose not exceeding 600 J/m².

*Compliance is checked by inspection, by measurement and by calculating the exposure dose from the total **effective irradiance** determined during the test of 32.101, weighted according to the erythema action spectrum of Figure 103.*

22.107 Metal parts in contact with the skin and which support the body in normal use shall not be earthed.

The requirement does not apply to hinges or other parts of the enclosure, such as handles, levers and knobs that could be touched when entering or leaving the appliance.

*Compliance is checked by inspection and by the tests specified for **double insulation** or **reinforced insulation**.*

22.108 Appliances intended to be fixed to a wall by screws or other permanent fixing devices shall be constructed so that the method of fixing is obvious or specified in the installation instructions.

Compliance is checked by inspection.

22.109 Guards intended to prevent inadvertent ignition of flammable material shall be securely attached to the appliance so that it is not possible to detach them completely without the aid of a tool.

Compliance is checked by inspection and by manual test.

22.110 UV appliances shall incorporate a control that terminates the emission of radiation. The control shall be easily accessible to the user during exposure and be readily identified by touch and sight.

Compliance is checked by inspection.

22.111 For appliances that are marked with a fluorescent UV lamp equivalency code range, the limits of the range shall be as follows:

- for the X component of the range,
 - the upper limit of the range shall be equal to the total erythema effective UV irradiance of the originally supplied fluorescent UV lamp and that is used during type testing;
 - the lower limit of the range shall be equal to 0,75 times the upper limit of the range;

- for the Y component of the range,
 - the lower limit of the range shall be equal to 0,75 times the arithmetic mean value of the range;
 - the upper limit of the range shall be equal to 1,25 times the arithmetic mean value of the range.

Compliance is checked by inspection.

NOTE An example of the equivalency code range calculation is as follows.

If the equivalency code of the lamp fitted in the appliance during type testing is

100–R–47/3,2

The equivalency code range that is marked on the appliance is calculated as follows:

lower value of X range: $0,75 \times 47 = 35,25$

lower value of Y range: $0,75 \times 3,2 = 2,40$

upper value of Y range: $1,25 \times 3,2 = 4,00$

X is rounded to the nearest integer, Y is rounded to the nearest first decimal.

The fluorescent UV lamp equivalency code range is then:

100–R–(35-47)/(2,4-4,0)

22.112 Appliances fitted with **UV filters** shall be constructed so that the emission of UV radiation does not exceed the limits specified in 32.101 if the filter is removed.

*Compliance is checked by the test of 32.101 with the **UV filters** removed.*

*If compliance relies on the operation of an **electronic circuit**, the appliance is further tested as follows.*

*The appliance is supplied at **rated voltage** and the filter is removed. The fault conditions in a) to g) of 19.11.2 are then applied one at a time to the **electronic circuit**. The appliance shall comply with 32.101.*

*If the **electronic circuit** is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of normative Annex R.*

22.113 Appliances completely surrounding a person shall be capable of being opened from the inside without the use of any electrical means.

Compliance is checked by the following test.

The appliance is disconnected from any electrical source of supply with doors and lids closed.

A force is then applied to a point, equivalent to an accessible inside point, of each appropriate door or lid of the appliance, at the midpoint of the edge farthest from the hinge axis in the direction perpendicular to the plane of the lid or door.

The force shall be applied at a rate not exceeding 15 N/s and the lid or door shall open before the force exceeds 150 N.

22.114 Appliances that completely surround a person and that can be locked from the inside shall include provision to gain access to the appliance from the outside of the appliance when the appliance is locked.

Compliance is checked by inspection and by manual test.

22.115 Glass parts of broken high-pressure metal halide lamps shall not be ejected from the appliance or contact a user or cause a fire hazard if they contact non-metallic parts of the appliance.

Compliance is checked by inspection and, if necessary, by the following test.

Non-metallic material that can be contacted by parts of broken high-pressure metal halide lamps shall comply with IEC 60695-2-11 without ignition at a test severity of 750 °C. The glow-wire test need not be carried out on parts that have a glow-wire ignition temperature according to IEC 60695-2-13 of at least 775 °C.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.3 Addition:

The number of flexings for conductors that are only flexed when the appliance is stored is 5 000. The number of flexings for conductors flexed in normal use is increased to 50 000.

24 Components

This clause of Part 1 is applicable except as follows.

24.1 Addition:

*If the current flowing through the terminals of lampholders or ballasts exceeds the rated value, the terminal shall comply with IEC 60598-1:2020, 15.6. The current for the test is 1,1 times the current measured when the appliance is operated at **rated voltage**.*

24.2 Addition:

Switches controlling a motor for raising or lowering part of the appliance, and switches of **portable appliances** having a **rated current** not exceeding 2 A, may be fitted in flexible cords.

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 for appliances having a mass not exceeding 3 kg.

25.7 Addition:

Supply cords having a rubber sheath or a sheath of other material likely to be affected by ultraviolet radiation emitted from the appliance shall not be used in **UV appliances**.

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:

The requirement does not apply if the insulation is provided by the envelope of an **UV emitter** or by the glass envelope of an **IR emitter**.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

Subclause 30.2.2 is applicable except for electrical parts that operate when the appliance is unattended; for these parts, 30.2.3 is 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 except as follows.

32.2 Addition:

This requirement is not applicable to the UV radiation emitted for the tanning function of the appliance.

32.101 The radiation from **UV appliances** shall be limited.

NOTE 1 See informative Annex EE for limits set by some regional or national authorities.

Compliance is checked by the following test.

*The appliance is provided with **UV emitters** that have been aged by supplying them at **rated voltage** for a period of approximately*

- 5 h for fluorescent lamps;*
- 1 h for high-intensity discharge lamps.*

NOTE 2 A high-intensity discharge lamp is an electric discharge lamp in which the radiation-producing arc is stabilized by the wall temperature and the arc has a bulb wall loading in excess of 3 W/cm².

NOTE 3 For appliances containing both fluorescent lamps and high-intensity discharge lamps, the high-intensity discharge lamps can be aged for the same period as the fluorescent lamps.

*The appliance is supplied at **rated voltage** and operated for approximately half the maximum exposure time allowed by the timer. The irradiance is then measured according to 32.101.1.*

*Appliances suitable for household use shall have a total **effective irradiance** not exceeding*

- 0,15 W/m², for wavelengths up to 320 nm;
- 0,15 W/m², for wavelengths between 320 nm and 400 nm;

weighted according to the erythema action spectrum of Figure 103.

*Appliances for commercial use only shall have a total **effective irradiance** not exceeding 0,7 W/m², weighted according to the erythema action spectrum of Figure 103.*

*The exposure dose referred to in 22.106 and normative Annex DD (except for the maximum yearly dose) is calculated from the total **effective irradiance** weighted according to the erythema action spectrum of Figure 103.*

The exposure dose is given by:

$$H_{\text{er}} = E_{\text{er}} t$$

where

t is the exposure time in seconds, during which the effective erythema irradiance is applied;

H_{er} is the effective exposure dose applied in J/m²;

E_{er} is the effective erythema irradiance in W/m².

The total **effective irradiance** is given by:

$$E_{\text{eff}} = \sum_{250 \text{ nm}}^{400 \text{ nm}} S_{\lambda} E_{\lambda} \Delta \lambda$$

where

E_{eff} is the total effective irradiance;

S_λ is the relative spectral effectiveness (weighting factor) according to Figure 103;

E_λ is the spectral irradiance in W/(m²nm);

Δλ is the wavelength interval (nm).

The wavelength interval for the calculation shall not exceed 2,5 nm.

Appliances shall have a total irradiance not exceeding 0,003 W/m², for wavelengths between 200 nm and 280 nm.

The total irradiance is given by:

$$E = \sum_{200 \text{ nm}}^{280 \text{ nm}} E_{\lambda} \Delta \lambda$$

where

E is the total irradiance;

E_{λ} is the spectral irradiance in $W/(m^2nm)$;

$\Delta\lambda$ is the wavelength interval (nm).

32.101.1 The irradiance is measured with the measuring instrument being placed so that the highest **effective irradiance** is recorded at positions which model the human body as follows:

- for appliances which expose persons from below, the measuring instrument is placed on the surface the person lies on;
- for appliances that are arranged over a person, the measuring instrument is placed on the surface profile of a virtual half-cylinder with a radius of 300 mm in case of full body exposure (position 2 in Figure 104) or of 150 mm in case of facial exposure (position 1 in Figure 104). The virtual half-cylinder is placed directly on the surface the person lays on and is aligned along the centre line of this surface. The virtual half-cylinder for the facial measurement is placed on a 50 mm base that is itself placed directly on the surface the person lays on and is aligned along the centre line of this surface. In the transition area between head and body, measurements are conducted in position 1 and position 2 and the higher **effective irradiance** is recorded;
- for appliances having upper and lower radiating surfaces, each part is measured separately while the other part is covered. If the distance between two radiating surfaces is less than 300 mm or 200 mm for a facial measurement, the measurement is made at the surface of the upper panel;
- for appliances exposing an upright standing person from all sides, the measuring instrument is placed on the surface profile of a virtual cylinder with a radius of 300 mm. The virtual cylinder is formed from two virtual half cylinders. The virtual cylinder is positioned in the centre of the appliance. During the measurement, the virtual half cylinder opposite the measuring instrument shall be covered;
- for appliances where the exposure position is not defined by the construction, such as those placed on a table or some shoulder tanners, the measuring instrument is placed parallel to the emitting surface at the shortest recommended exposure distance or directly on the emitting surface;
- for appliances exposing a sitting person, the measuring instrument is placed on the surface of a virtual half-cylinder with a radius of 300 mm in case of full body exposure (positions 2, 3 and 4 of Figure 105) or with a radius of 150 mm in case of facial exposure (position 1 of Figure 105). The virtual half-cylinder is located in the position of the body part to be exposed. The virtual half-cylinder for the facial measurement is placed on a 50 mm base. In the transition area between head and body, measurements are conducted in position 1 and position 2 and the higher **effective irradiance** is recorded.

Details of the instrument used for the measurements are given in IEC 61228. The measuring instrument shall measure the mean irradiance over a circular area having a diameter not exceeding 20 mm. The response of the instrument shall be proportional to the cosine of the angle between incident radiation and the normal to the circular area. The spectral irradiance shall be measured at intervals of 1 nm in an appropriate double monochromator system. The double monochromator shall have a bandwidth not exceeding 2,5 nm.

32.102 The radiation from **VIS appliances** and **IR appliances** shall be limited.

Compliance is checked by the following test.

The appliance is fitted with **VIS emitters** or **IR emitters**, as appropriate, that have been conditioned by supplying them at **rated voltage** for a period of approximately 5 h.

The appliance is supplied at **rated voltage** and the radiation from the appliance is measured as detailed in IEC 62471:2006, 5.1 at the exposure distance in IEC 62471:2006, Clause 6 or at the recommended exposure distance, whatever is more unfavourable.

*Irradiances from **VIS appliances** and **IR appliances** shall not exceed the limits of risk group 1 as specified in IEC 62471:2006, 6.1.*

32.103 Appliances that are not in the exempt group of IEC 62471 shall be supplied with at least two pairs of protective goggles that ensure front and side protection for the eyes and that provide enough **luminous transmittance** to make it possible to see through them.

Compliance is checked by inspection and by the following test that is carried out on each pair of goggles.

*The transmission is measured at the centre of each ocular by means of a spectrophotometer having a bandwidth not exceeding 2,5 nm. A beam of light having a diameter of approximately 5 mm is used. The transmission is measured at intervals of not more than 5 nm. The transmission shall not exceed the values specified in Table 102 and the **luminous transmission** shall not be less than 1 %.*

*For measurements of **luminous transmission**, a lamp with a continuous spectrum in the visible wavelength region shall be used.*

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024

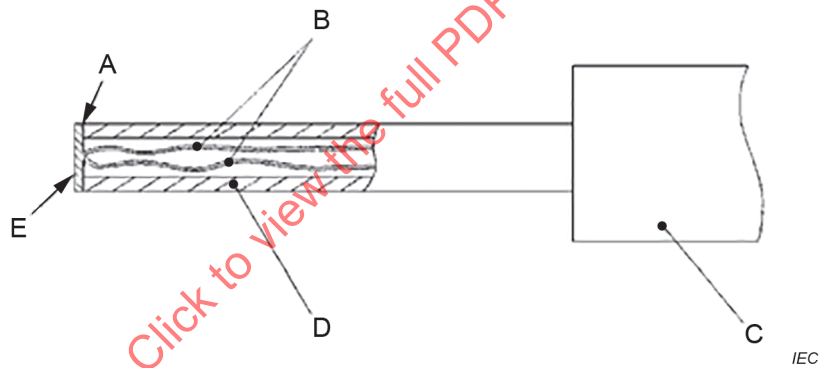
Table 102 – Maximum transmission of goggles

Wavelength λ	Maximum transmission %
$250 \text{ nm} < \lambda \leq 320 \text{ nm}$	0,1
$320 \text{ nm} < \lambda \leq 400 \text{ nm}$	1
$400 \text{ nm} < \lambda \leq 550 \text{ nm}$	5
$550 \text{ nm} < \lambda \leq 3\,000 \text{ nm}$	10



NOTE This pictogram incorporates symbol IEC 60417-5957 (2004-12) combined with the prohibition sign of ISO 3864-1.

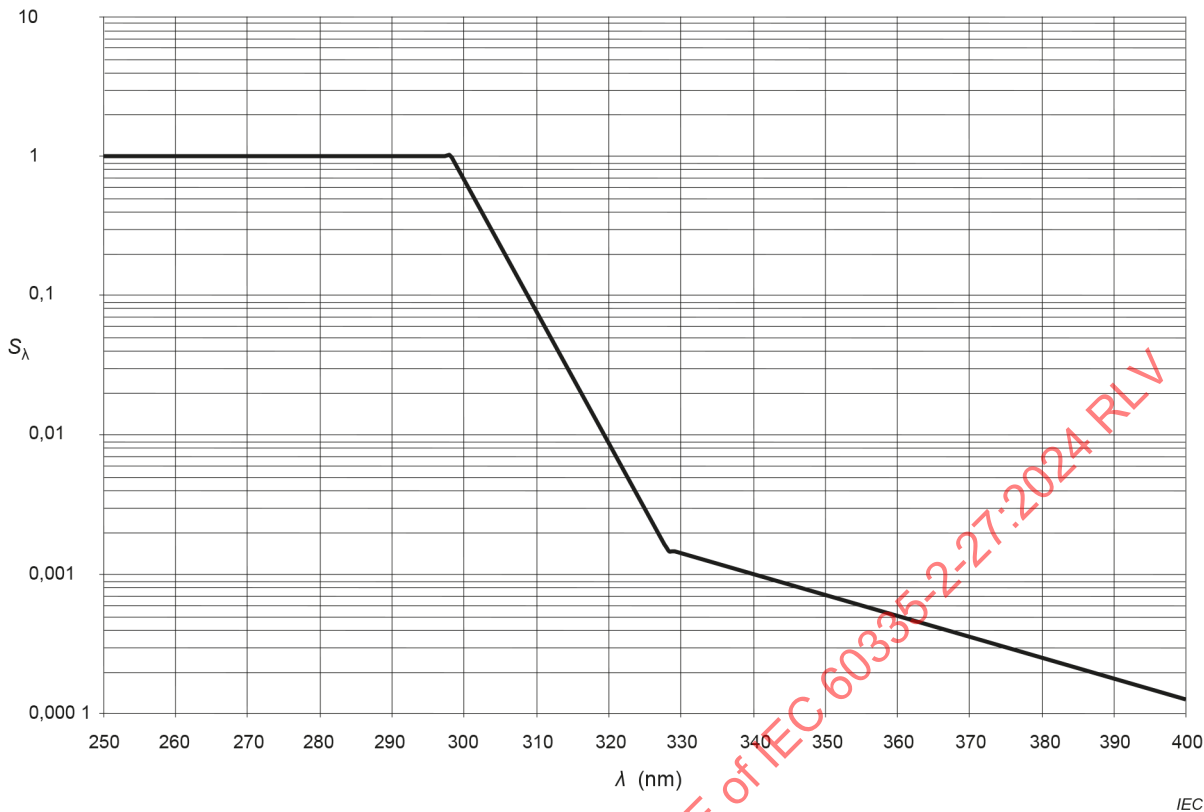
Figure 101 – Not for household use



Key

- A adhesive
- B thermocouple wires 0,3 mm diameter to IEC 60584-1 Type K
- C handle arrangement permitting a contact force of $4 \text{ N} \pm 1 \text{ N}$
- D polycarbonate tube: inside diameter 3 mm, outside diameter 5 mm
- E tinned copper disc: 5 mm diameter, 0,5 mm thick with a flat contact face

Figure 102 – Probe for measuring surface temperatures



Key

— erythema action spectrum

NOTE The erythema action spectrum is defined from the following parameters:

Wavelength (λ) nm	Weighting factor (S_λ)
$\lambda \leq 298$	1
$298 < \lambda \leq 328$	$100,094^{(298-\lambda)}$
$328 < \lambda \leq 400$	$100,015^{(140-\lambda)}$

Figure 103 – Erythema action spectrum

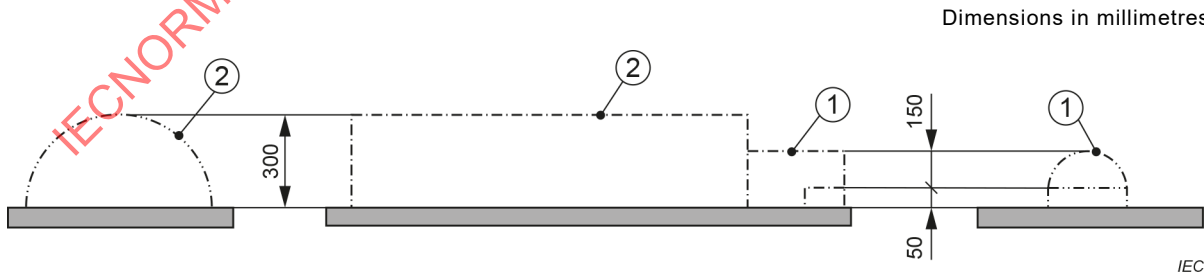
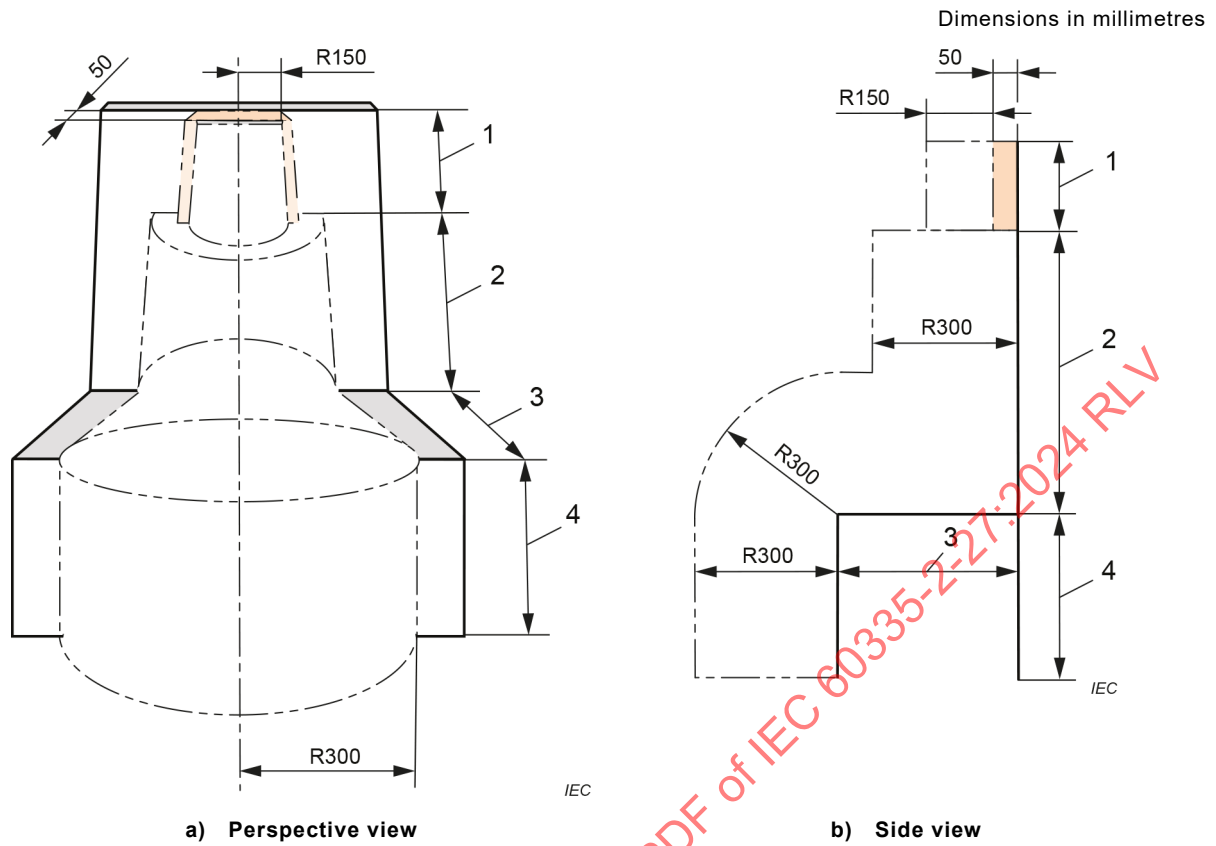


Figure 104 – Measuring points for appliances that are arranged over a person



Key

R radius

Figure 105 – Measuring points for appliances exposing a sitting person

Annexes

The annexes of Part 1 are applicable except as follows.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex B (normative)

Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances

Annex B of Part 1 is applicable except as follows.

22 Construction

B.22.3 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

B.22.4 Addition:

Test probe 18 is not applied to appliances intended exclusively for use in tanning salons, beauty parlours and similar premises.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex R (normative)

Software evaluation

R.2.2.5 Modification:

Replace the first paragraph with the following:

*For **programmable electronic circuits** with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur before compliance with Clause 19, 22.105 or 22.112 is impaired.*

R.2.2.9 Modification:

Replace the first sentence of the first paragraph with the following:

The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19, 22.105 or 22.112 is impaired.

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex AA (normative)

Measurement of luminance

Luminance is measured by means of collimating optics. The measurement is made at the shortest possible distance from the light source, but not less than 0,2 m. At the point of measurement, the optics shall collect all light passing through the entrance aperture within the solid angle of acceptance, the corresponding plane angle being 1°.

*During the measurement, the appliance is operated at **rated voltage**.*

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Annex BB (informative)

Detailed classification of UV appliances

BB.1 General

Annex BB provides details of a classification of **UV appliances** based on irradiance in the ranges 250 nm to 320 nm and 320 nm to 400 nm.

BB.2 Classification

UV appliances can be classified as one of the following types:

- **UV type 1 appliance;**
- **UV type 2 appliance;**
- **UV type 3 appliance;**
- **UV type 4 appliance;**
- **UV type 5 appliance.**

NOTE **UV type 1 appliances**, **UV type 2 appliances**, **UV type 4 appliances** and **UV type 5 appliances** are intended to be used in tanning salons, beauty parlours and similar premises, under supervision of appropriately trained persons. They are not intended for household use.

UV type 3 appliances are suitable for household and similar use and can be used by unskilled persons. They are also suitable for use in tanning salons, beauty parlours and similar premises.

BB.3 Effective irradiance

The **effective irradiance** for each type of **UV appliance**, weighted according to the erythema action spectrum of Figure 103, is given in Table BB.1.

Table BB.1 – Limits of effective irradiance

UV type appliance	Effective irradiance	
	W/m ²	
	250 nm < λ ≤ 320 nm	320 nm < λ ≤ 400 nm
UV type 1	< 0,001	≥ 0,15
UV type 2	0,001 to 0,15	≥ 0,15
UV type 3	< 0,15	< 0,15
UV type 4	≥ 0,15	< 0,15
UV type 5	≥ 0,15	≥ 0,15
λ is the wavelength of the radiation.		

Annex CC (informative)

Fluorescent UV lamp equivalency code

The equivalency code for fluorescent UV lamps for tanning, as detailed in IEC 61228, that is legibly and durably marked on the lamp is as follows.

The equivalency code is of the form: Wattage–Reflector type code–UV code.

The following reflector type code shall be used in the equivalency code:

- O for non-reflector lamps;
- B for lamps with a broad reflector angle $\alpha > 230^\circ$
- N for lamps with a narrow reflector angle $\alpha < 200^\circ$
- R for lamps with a regular reflector $200^\circ \leq \alpha \leq 230^\circ$

The following UV code shall be used in the equivalency code:

UV code = X/Y;

X = total erythema effective UV irradiance over the range 250 nm to 400 nm;

Y = ratio of the NMSC effective UV irradiances ≤ 320 nm and > 320 nm.

X given in mW/m^2 rounded to the nearest integer, Y is rounded to the nearest first decimal. The effective values are at 25 cm distance and under conditions of optimum UV irradiance.

NOTE An example of a lamp equivalency code is given below:

100 W reflector lamp with 220° reflector angle:

Erythema effective UV irradiance (250 nm to 400 nm) = 47 mW/m^2 .

Short wave NMSC effective UV irradiance (≤ 320 nm) = 61 mW/m^2 .

Long wave NMSC effective UV irradiance (> 320 nm) = 19 mW/m^2 .

The equivalency code of the lamp is:

100–R–47/3,2

Annex DD (normative)

UV exposure schedule

The recommended exposure time schedule for UV exposure shall provide the following information:

- The exposure time schedule need not depend on the skin type.
- The first exposure is a test exposure to identify unexpected side effects when exposed to UV. This reason shall be explained to the user.
- Therefore, a first recommended exposure shall not exceed an exposure dose of 100 J/m^2 , weighted according to the erythema action spectrum shown in Figure 103. For calculation of the recommended exposure time for the first exposure, use the formula for the exposure dose in 32.101.
- Wait 48 h between first and second exposure, since delayed unexpected side effects can occur until 48 h after the first exposure.

NOTE Unexpected side effects can also be tested using a UV test on a small area of the skin and a 48 hours waiting period.

- The recommended exposure duration stated in the schedule for the second exposure shall not exceed that required to provide an exposure dose of 250 J/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- A single exposure dose shall not exceed 600 J/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- Waiting period between subsequent exposures shall be approximately 48 h due to cumulative behaviour of the erythema reaction.
- A tanning course (a consecutive series of exposures used to develop a tan) shall not exceed a total exposure dose of 3 kJ/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- Increases in the exposure dose shall be applied gradually over the period of the tanning course.
- The recommended number of exposures per year for each part of the body shall be based upon a maximum yearly dose of 15 kJ/m^2 , weighted according to the erythema action spectrum shown in Figure 103 and taking into account the recommended schedule of exposure.

Compliance is checked by calculating the exposure times. These calculations are based on the measurement results from Subclause 32.101 and the maximum irradiation doses above.

Annex EE (informative)

Irradiance limits set by regional or national authorities

Many national or regional authorities have published regulations on the irradiance limits of **UV appliances** that are in some cases different to those listed in this standard. The limits as advised by National Committees that differ from the IEC limits are given in the following Table EE.1 to Table EE.3. These limits should also be taken into account during the type testing and classification of the appliance for these countries. Where no differing limit is given, the IEC limit is assumed to apply.

Table EE.1 – Europe: EN 60335-2-27 limits

Appliance	Total effective irradiance	(280 – 320) nm effective irradiance	(320 – 400) nm effective irradiance	(200 – 280) nm short wavelength irradiance	Maximum dose per exposure	Maximum dose per year ^a
	W/m ²	W/m ²	W/m ²	W/m ²	J/m ²	kJ/m ² (NMSC) ^b
UV type 1	0,3	< 0,001	≥ 0,15	0,003	600	25
UV type 2	0,3	< 0,15	≥ 0,15	0,003	600	25
UV type 3	0,3	< 0,15	< 0,15	0,003	600	25
UV type 4	0,3	≥ 0,15	< 0,15	0,003	600	25
UV type 5	Not allowed					
^a The maximum dose per year applicable in Finland is 5 kJ/m ² weighted according to the erythema action spectrum.						
^b (NMSC) means that the maximum dose per year is weighted according to the non-melanoma skin cancer spectrum.						

Table EE.2 – Australia and New Zealand: AS/NZS 60335.2.27 limits

Appliance	Total effective irradiance W/m ²	(280 – 320) nm effective irradiance W/m ²	(320 – 400) nm effective irradiance W/m ²	(200 – 280) nm short wavelength irradiance W/m ²
UV type 1	Not allowed			
UV type 2 ^a	0,7	0,001 to 0,15 in addition 0,007 < UVB*/UVT** < 0,03	≥ 0,15	0,003 in addition the spectral irradiance limit is 1,0 × 10 ⁻⁵ W/m ² /nm
UV type 3		< 0,15 in addition 0,007 < UVB*/UVT** < 0,03	< 0,15	0,003 in addition the spectral irradiance limit is 1,0 × 10 ⁻⁵ W/m ² /nm
UV type 4	Not allowed			
UV type 5	Not allowed			
UVB* = Irradiance in the range 280 nm ≤ λ ≤ 320 nm				
UVT** = total irradiance				
^a UV Type 2 is not allowed in Australia.				

Table EE.3 – USA: 21 CFR 1040.20 limits

Appliance	Total effective irradiance W/m ²	(280 – 320) nm effective irradiance W/m ²	(320 – 400) nm effective irradiance W/m ²	(200 – 280)/(260 – 320) short wavelength irradiance W/m ²
All types				0,003

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

AS/NZS 60335.2.23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

EN 60335-2-23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

IEC 60335-2-23, *Household and similar electrical appliances – Safety – Part 2-23: Particular requirements for appliances for skin or hair care*

IEC 60335-2-53, *Household and similar electrical appliances – Safety – Part 2-53: Particular requirements for sauna heating appliances and infrared cabins*

IEC 60335-2-113, *Household and similar electrical appliances – Safety – Part 2-113: Particular requirements for cosmetic and beauty care appliances incorporating lasers and intense light sources*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

21 CFR 1040.20, *Code of Federal Regulations, Title 21 – Food and Drugs, Chapter I – Food and Drug Administration Department of Health and Human Services, Subchapter J – Radiological Health, Part 1040 – Performance Standards for Light-Emitting Products*

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

SOMMAIRE

AVANT-PROPOS	44
INTRODUCTION.....	47
1 Domaine d'application	48
2 Références normatives	49
3 Termes et définitions	49
4 Exigences générales	50
5 Conditions générales d'essais	50
6 Classification	51
7 Marquage et instructions	51
8 Protection contre l'accès aux parties actives.....	55
9 Démarrage des appareils à moteur	56
10 Puissance et courant	56
11 Échauffements.....	56
12 Charge des batteries à ions métalliques	58
13 Courant de fuite et rigidité diélectrique à la température de régime	58
14 Surtensions transitoires	58
15 Résistance à l'humidité.....	58
16 Courant de fuite et rigidité diélectrique	58
17 Protection contre la surcharge des transformateurs et des circuits associés	58
18 Endurance	59
19 Fonctionnement anormal	59
20 Stabilité et dangers mécaniques	60
21 Résistance mécanique.....	60
22 Construction	61
23 Conducteurs internes.....	64
24 Composants	64
25 Raccordement au réseau et câbles souples extérieurs	65
26 Bornes pour conducteurs externes	65
27 Dispositions en vue de la mise à la terre	65
28 Vis et connexions	65
29 Distances dans l'air, lignes de fuite et isolation solide.....	65
30 Résistance à la chaleur et au feu.....	65
31 Protection contre la rouille	66
32 Rayonnement, toxicité et dangers analogues	66
Annexes	73
Annexe B (normative) Appareils alimentés par batteries, batteries séparables et batteries amovibles pour les appareils alimentés par batteries	74
Annexe R (normative) Évaluation des logiciels.....	75
Annexe AA (normative) Mesurage de la luminance	76
Annexe BB (informative) Classification détaillée des appareils UV	77
Annexe CC (informative) Code d'équivalence des lampes fluorescentes UV	78
Annexe DD (normative) Programme d'exposition aux UV	79

Annexe EE (informative) Limites d'éclairement énergétique définies par les autorités régionales ou nationales	80
Bibliographie.....	82
Figure 101 – Non destiné à un usage domestique.....	69
Figure 102 – Calibre pour le mesurage des températures de surface	70
Figure 103 – Spectre d'action de l'érythème.....	71
Figure 104 – Points de mesure pour les appareils placés au-dessus d'une personne.....	71
Figure 105 – Points de mesure pour les appareils qui produisent l'exposition d'une personne assise.....	72
Tableau 101 – Échauffements maximaux pour les surfaces accessibles extérieures spécifiées en conditions de fonctionnement normal.....	58
Tableau 102 – Transmission maximale des lunettes de protection	69
Tableau BB.1 – Limites de l'éclairement énergétique effectif.....	77
Tableau EE.1 – Europe: limites de l'EN 60335-2-27	80
Tableau EE.2 – Australie et Nouvelle-Zélande: limites de l'AS/NZS 60335.2.27	80
Tableau EE.3 – États-Unis: limites du règlement 21 CFR 1040.20	81

IECNORM.COM : Click to view the full PDF of IEC 60335-2-27:2024 RLV

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES –
SÉCURITÉ –****Partie 2-27: Exigences particulières pour les appareils
d'exposition de la peau aux rayonnements optiques****AVANT-PROPOS**

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse <https://patents.iec.ch>. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 60335-2-27 a été établie par le comité d'études 61 de l'IEC: Sécurité des appareils électrodomestiques et analogues. Il s'agit d'une Norme internationale.

Cette septième édition annule et remplace la sixième édition parue en 2019. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) le texte a été aligné sur l'IEC 60335-1:2020;
- b) certaines notes ont été modifiées ou converties en texte normatif (Article 1, 7.1);
- c) les informations relatives au risque et à la responsabilité liés au produit ont été clarifiées (7.1);
- d) l'Annexe DD a été convertie en annexe normative, et le texte associé a été modifié (7.12, Annexe DD);
- e) l'exigence concernant les liens fournis pour l'utilisation du produit a été clarifiée (7.12.9);
- f) l'application du calibre d'essai 18 a été modifiée pour les appareils destinés à être utilisés dans les solariums, salons de beauté et locaux analogues (8.1.1, 20.2);
- g) des limites de température ont été introduites pour les surfaces accessibles (Article 11);
- h) la redondance entre le 22.113 et le 22.114 a été supprimée;
- i) l'exigence selon laquelle le 32.2 ne s'applique pas aux UV émis pour la fonction de bronzage de l'appareil a été clarifiée.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
61/7071/FDIS	61/7094/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général *Appareils électrodomestiques et analogues – Sécurité*, se trouve sur le site web de l'IEC.

La présente partie 2 doit être utilisée conjointement avec la dernière édition de l'IEC 60335-1 et ses amendements, sauf si cette édition l'exclut. Dans ce cas, la dernière édition qui n'exclut pas la présente partie 2 est utilisée. Elle a été établie sur la base de la sixième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans la présente norme fait référence à l'IEC 60335-1.

La présente partie 2 complète ou modifie les articles correspondants de l'IEC 60335-1, de façon à transformer cette publication en norme IEC: Exigences particulières pour les appareils d'exposition de la peau aux rayonnements optiques.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette partie 2, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente norme mentionne "addition", "modification" ou "remplacement", le texte correspondant de la Partie 1 doit être adapté en conséquence.

NOTE 2 Le système de numérotation suivant est utilisé:

- les paragraphes, tableaux et figures qui s'ajoutent à ceux de la Partie 1 sont numérotés à partir de 101;
- à l'exception de celles qui sont dans un nouveau paragraphe ou de celles qui concernent des notes de la Partie 1, les notes sont numérotées à partir de 101, y compris celles des articles ou paragraphes qui sont remplacés;
- les annexes qui sont ajoutées sont désignées AA, BB, etc.

NOTE 3 Les caractères d'imprimerie suivants sont utilisés:

- exigences: caractères romains;
- *modalités d'essais: caractères italiques;*
- notes: petits caractères romains.

Les termes en **gras** dans le texte sont définis à l'Article 3. Lorsqu'une définition concerne un adjectif, l'adjectif et le nom associé figurent également en gras.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

NOTE 4 L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'une nouvelle publication IEC, ou d'une publication amendée ou révisée, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu de cette publication soit adopté pour application nationale (obligatoire) au plus tôt 12 mois et au plus tard 36 mois après la date de publication.

Les différences suivantes existent dans les pays indiqués ci-après.

- 6.101: Les services commerciaux de lits de bronzage sont illégaux (Australie);
- Annexe DD: Les doses d'expositions sont fondées sur le système de classification de phototype de Fitzpatrick (Nouvelle-Zélande).

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture de ce document indique qu'il contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer ce document en utilisant une imprimante couleur.

INTRODUCTION

Il a été considéré en établissant cette Norme internationale que l'exécution de ses dispositions était confiée à des personnes expérimentées et ayant une qualification appropriée.

Les documents de recommandations concernant l'application des exigences de sécurité pour les appareils peuvent être consultés dans les documents de support du CE 61, accessibles sur le site web de l'IEC à l'adresse:

<https://www.iec.ch/tc61/supportingdocuments>

Cette information est donnée à l'intention des utilisateurs de la présente Norme internationale et n'a pas pour objet de remplacer le texte normatif de la présente norme.

La présente norme reconnaît le niveau de protection internationalement accepté contre les dangers électriques, mécaniques, thermiques, liés au feu et au rayonnement des appareils, lorsqu'ils fonctionnent comme en usage normal en tenant compte des instructions du fabricant. Elle couvre également les situations anormales auxquelles on peut s'attendre dans la pratique et elle tient compte de la façon dont les phénomènes électromagnétiques peuvent affecter le fonctionnement sûr des appareils.

Cette norme tient compte autant que possible des exigences de l'IEC 60364, de façon à rester compatible avec les règles d'installation quand l'appareil est raccordé au réseau d'alimentation. Cependant, des règles nationales d'installation peuvent être différentes.

Si un appareil relevant du domaine d'application de la présente norme comporte également des fonctions couvertes par une autre partie 2 de l'IEC 60335, la partie 2 correspondante est appliquée à chaque fonction séparément, dans la limite du raisonnable. Si cela est applicable, on tient compte de l'influence d'une fonction sur les autres fonctions.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les risques traités dans la Partie 1, la Partie 1 s'applique.

NOTE 1 Cela signifie que les comités d'études responsables pour les Parties 2 ont déterminé qu'il n'était pas nécessaire de spécifier des exigences particulières pour l'appareil en question en plus des exigences générales.

Cette norme est une norme de famille de produits traitant de la sécurité d'appareils et a préséance sur les normes horizontales et génériques couvrant le même sujet.

NOTE 2 Les publications horizontales, les publications fondamentales de sécurité et les publications groupées de sécurité couvrant un danger ne s'appliquent pas, parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335.

Un appareil conforme au texte de la présente norme ne sera pas nécessairement jugé conforme aux principes de sécurité de la norme si, lorsqu'il est examiné et soumis aux essais, il apparaît qu'il présente d'autres caractéristiques qui compromettent le niveau de sécurité visé par ces exigences.

Un appareil utilisant des matériaux ou présentant des modes de construction différents de ceux décrits dans les exigences de cette norme peut être examiné et essayé en fonction de l'objectif poursuivi par ces exigences et, s'il est jugé pratiquement équivalent, il peut être estimé conforme aux principes de sécurité de la norme.

NOTE 3 Les normes traitant des aspects non relatifs à la sécurité des appareils électrodomestiques sont:

- les normes IEC publiées par le comité d'études 59 concernant les méthodes de mesure d'aptitude à la fonction;
- les normes CISPR 11 et CISPR 14-1, ainsi que les normes applicables de la série IEC 61000-3 concernant les émissions électromagnétiques;
- la norme CISPR 14-2 concernant l'immunité électromagnétique;
- les normes IEC publiées par le comité d'études 111 concernant l'environnement.

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-27: Exigences particulières pour les appareils d'exposition de la peau aux rayonnements optiques

1 Domaine d'application

L'article de la Partie 1 est remplacé par le texte suivant.

La présente partie de l'IEC 60335 traite de la sécurité des appareils électriques qui comportent des émetteurs pour l'exposition de la peau aux rayonnements optiques (longueur d'onde de 100 nm à 1 mm), destinés à un usage domestique et analogue, dont la **tension assignée** est inférieure ou égale à 250 V pour les appareils monophasés et à 480 V pour les autres appareils, y compris les appareils alimentés en courant continu et les **appareils alimentés par batteries**.

Dans la mesure du possible, la présente norme traite des dangers ordinaires présentés par les appareils, encourus par toutes les personnes qui utilisent les appareils dans les solariums, salons de beauté et locaux analogues ou à domicile. Cependant, elle ne tient en général pas compte:

- des personnes (y compris des enfants) dont
 - les capacités physiques, sensorielles ou mentales; ou
 - le manque d'expérience et de connaissanceles empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
- des enfants qui jouent avec l'appareil.

L'attention est attirée sur le fait que

- pour les appareils destinés à être utilisés dans des véhicules ou à bord de navires ou d'avions, des exigences supplémentaires peuvent être nécessaires;
- dans de nombreux pays, des exigences supplémentaires sont spécifiées par les organismes nationaux de la santé, par les organismes nationaux responsables de la protection des travailleurs et par des organismes similaires.

La présente norme ne s'applique pas

- aux appareils destinés aux soins de la peau ou des cheveux (IEC 60335-2-23);
- aux appareils de chauffage de saunas et aux cabines infrarouges (IEC 60335-2-53);
- aux appareils destinés aux soins cosmétiques et esthétiques qui comportent des lasers et des sources de lumière de forte intensité (IEC 60335-2-113);
- aux appareils destinés à des usages médicaux (IEC 60601);
- aux appareils qui utilisent un rayonnement UV pour d'autres besoins que le bronzage de la peau;
- aux appareils destinés à être utilisés dans des locaux qui présentent des conditions particulières, telles que la présence d'une atmosphère corrosive ou explosive (poussière, vapeur ou gaz).

2 Références normatives

L'article de la Partie 1 s'applique, avec l'exception suivante.

Addition:

IEC 60584-1, *Couples thermoélectriques – Partie 1: Spécifications et tolérances en matière de FEM*

IEC 60598-1:2020, *Luminaires – Partie 1: Exigences générales et essais*

IEC 61228, *Lampes fluorescentes à ultraviolet utilisées pour le bronzage – Méthode de mesure et de spécification*

3 Termes et définitions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.101

éclairage énergétique effectif

éclairage énergétique de rayonnement électromagnétique pondéré en fonction d'un spectre d'action spécifié

3.1.102

transmission lumineuse

pourcentage de lumière incidente qui traverse un matériau, pondéré par la sensibilité spectrale de l'œil humain et intégré sur la plage de longueurs d'onde comprises entre 380 nm et 780 nm

3.5 Définitions relatives aux types d'appareils

3.5.101

appareil UV

appareil qui comporte des **émetteurs UV** pour le bronzage

3.5.102

appareil IR

appareil non destiné au bronzage qui comporte un ou plusieurs **émetteurs IR**

3.5.103

appareil VIS

appareil non destiné au bronzage qui comporte un ou plusieurs **émetteurs VIS**

3.5.104

appareil de type UV 1

appareil UV tel que l'effet biologique est causé par des rayonnements de longueurs d'onde supérieures à 320 nm et caractérisé par un éclairage énergétique relativement élevé dans la plage comprise entre 320 nm et 400 nm

3.5.105

appareil de type UV 2

appareil UV tel que l'effet biologique est causé par des rayonnements de longueurs d'onde inférieures ou supérieures à 320 nm et caractérisé par un éclairage énergétique relativement élevé dans la plage comprise entre 320 nm et 400 nm

3.5.106

appareil de type UV 3

appareil UV tel que l'effet biologique est causé par des rayonnements de longueurs d'onde inférieures ou supérieures à 320 nm et caractérisé par un éclairage énergétique limité sur toute la bande de rayonnement UV

3.5.107

appareil de type UV 4

appareil UV tel que l'effet biologique est essentiellement causé par des rayonnements de longueurs d'onde inférieures à 320 nm

3.5.108

appareil de type UV 5

appareil UV tel que l'effet biologique est causé par des rayonnements de longueurs d'onde inférieures ou supérieures à 320 nm et caractérisé par un éclairage énergétique relativement élevé sur toute la bande de rayonnement UV

3.6 Définitions relatives aux parties d'un appareil

3.6.101

émetteur UV

source de rayonnement conçue pour émettre de l'énergie électromagnétique à des longueurs d'onde comprises entre 200 nm et 400 nm

Note 1 à l'article: Une lampe fluorescente UV à bronzer est un exemple d'**émetteur UV**.

Note 2 à l'article: Les rayonnements UV aux longueurs d'onde inférieures à 200 nm ne sont pas faciles à transmettre dans l'air et n'existent généralement que dans le vide.

Note 3 à l'article: Les **émetteurs UV** sont également appelés **émetteurs ultraviolets**.

3.6.102

émetteur IR

source de rayonnement conçue pour émettre de l'énergie électromagnétique à des longueurs d'onde comprises entre 780 nm et 1 mm

Note 1 à l'article: Les **émetteurs IR** sont également appelés **émetteurs infrarouges**.

3.6.103

émetteur VIS

source de rayonnement conçue pour émettre de l'énergie électromagnétique à des longueurs d'onde comprises entre 400 nm et 780 nm

Note 1 à l'article: Les **émetteurs VIS** sont également appelés **émetteurs visibles**.

3.6.104

filtre UV

élément optique destiné à atténuer le rayonnement UV

4 Exigences générales

L'article de la Partie 1 s'applique.

5 Conditions générales d'essais

L'article de la Partie 1 s'applique, avec l'exception suivante.

5.101 Les appareils qui ne comportent que des **émetteurs IR** sont soumis à l'essai comme des **appareils chauffants**. Tous les autres appareils sont soumis à l'essai comme des **appareils à moteur**.

6 Classification

L'article de la Partie 1 s'applique, avec l'exception suivante.

6.101 Les **appareils UV** doivent appartenir à l'un des types suivants en ce qui concerne l'émission de rayonnements ultraviolets:

- appareils adaptés à un usage domestique;
- appareils à usage commercial uniquement.

NOTE 1 Les appareils à usage domestique peuvent également être utilisés dans des locaux à usage commercial tels que des solariums, salons de beauté et locaux analogues.

NOTE 2 Une classification précise des appareils est donnée à l'Annexe BB informative.

La vérification est effectuée par examen et par les essais applicables.

7 Marquage et instructions

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

7.1 Addition:

Les **appareils UV** destinés à un usage commercial, par exemple dans des solariums, salons de beauté et locaux analogues doivent porter un marquage sur lequel est apposé le pictogramme d'interdiction de la Figure 101 ou qui comporte en substance l'indication suivante:

Non destiné à un usage domestique

Les appareils qui comportent des lampes fluorescentes UV à bronzer doivent être marqués de la gamme de codes d'équivalence pour lampe fluorescente UV. Cette gamme de codes d'équivalence identifie les lampes fluorescentes UV à bronzer qui doivent être utilisées dans l'appareil.

NOTE 101 Des détails concernant le code pour lampe fluorescente UV marqué sur la lampe sont donnés dans l'IEC 61228 et sont reproduits à l'Annexe CC informative, pour information. Le 22.111 fournit un exemple de gamme de codes d'équivalence pour lampes fluorescentes UV qui doit être marquée sur l'appareil.

Pour les **émetteurs UV** autres que les lampes fluorescentes UV à bronzer, l'appareil doit porter un marquage sur lequel est apposée la référence de type des émetteurs dont l'utilisation est recommandée.

Les **appareils UV** doivent porter un marquage qui comporte en substance l'indication suivante:

RAYONNEMENT ULTRAVIOLET (UV) DANGEREUX! SUIVRE TOUTES LES INSTRUCTIONS! PORTER LES LUNETTES DE PROTECTION FOURNIES! Les ultraviolets peuvent occasionner des blessures oculaires ou cutanées, et peuvent favoriser le vieillissement de la peau et les cancers de la peau. Certains médicaments peuvent augmenter la sensibilité. Ne pas utiliser d'écrans solaires ou de cosmétiques, et respecter le programme d'exposition recommandé.

Pour les **appareils UV** destinés à être utilisés uniquement dans des solariums, des salons de beauté et locaux analogues, cette mise en garde peut être apposée sur une plaque permanente destinée à être fixée sur le mur à proximité de l'appareil UV.

Les **appareils UV** dont la luminance est supérieure à 100 000 cd/m² doivent porter en substance l'indication suivante:

MISE EN GARDE: Lumière intense. Ne pas regarder l'émetteur.

NOTE 102 La méthode de mesure de la luminance est décrite à l'Annexe AA normative.

Les appareils doivent porter en substance la mise en garde suivante, sauf s'ils sont classés dans le groupe sans risque (voir l'IEC 62471:2006):

MISE EN GARDE: Ne pas regarder l'émetteur. L'utilisateur doit porter les lunettes de protection fournies en raison de l'intensité des rayonnements optiques. Lire attentivement les instructions.

Les appareils qui comportent des **émetteurs VIS** ou des **émetteurs IR** doivent comporter un marquage sur lequel sont apposés le nom du fabricant, le nom du modèle, ainsi que la spécification technique des lampes de rechange appropriées.

Sauf si la distance d'exposition prévue est assurée par leur construction, les **appareils UV** doivent porter un marquage sur lequel est apposé le symbole IEC 60417-6301 (2015-03) en indiquant la distance d'exposition recommandée et son unité en centimètres (cm) entre les flèches des cotes dimensionnelles. Les lunettes de protection doivent être marquées du nom, de la marque commerciale ou de la marque d'identification du fabricant, ainsi que des caractères alphanumériques IEC 60335-2-27.

NOTE 103 Si ces mises en garde sont combinées, il n'est pas nécessaire de répéter l'expression "mise en garde".

7.6 Addition:



[symbole IEC 60417-6301
(2015-03)]

source de rayonnements ultraviolets,
distance d'exposition

7.12 Addition:

Les instructions pour les **appareils UV** doivent comporter les informations suivantes:

- l'identification des composants qui peuvent avoir une influence sur le rayonnement ultraviolet, tels que les filtres et les réflecteurs;
- l'identification des **émetteurs UV** remplaçables;
- une information concernant la distance d'exposition prévue (sauf si cette distance est assurée par la construction de l'**appareil UV**);
- le programme d'exposition précisant la durée et les intervalles, conformément à l'Annexe DD normative;
- le nombre d'expositions recommandé qu'il convient de ne pas dépasser en une année (voir Annexe DD normative);
- la référence du type des lunettes de protection à utiliser.

Les instructions pour les **appareils UV** doivent comporter en substance les énoncés suivants:

- les personnes non utilisatrices, en particulier les enfants, ne doivent pas être présentes lorsque l'appareil est mis en fonctionnement;
- les appareils de bronzage ne doivent pas être utilisés par:
 - des personnes âgées de moins de 18 ans;
 - des personnes sujettes aux taches de rousseur;
 - des personnes naturellement rousses;
 - des personnes qui présentent des taches décolorées anormales sur la peau;
 - des personnes qui possèdent un nombre important de grains de beauté;
 - des personnes qui possèdent des grains de beauté asymétriques de forme irrégulière d'un diamètre supérieur à 5 mm avec une pigmentation variable et des contours irréguliers; en cas de doute, demander un avis médical;
 - des personnes qui souffrent de coups de soleil;
 - des personnes qui ne peuvent pas du tout bronzer ou des personnes qui brûlent facilement lorsqu'elles sont exposées au soleil;
 - des personnes qui ont subi de graves coups de soleil durant leur enfance;
 - des personnes qui sont ou ont été atteintes d'un cancer de la peau ou qui sont prédisposées au cancer de la peau;
 - des personnes traitées médicalement pour des maladies impliquant la photosensibilité;
 - des personnes sous traitement photosensibilisant;
- si des effets secondaires inattendus, tels que des démangeaisons, se produisent dans les 48 h qui suivent la première séance d'utilisation d'un appareil de bronzage, il convient de demander un avis médical avant de poursuivre l'exposition aux UV;
- il convient que les expositions ne dépassent pas la quantité minimale d'exposition aux rayonnements UV nécessaire pour produire un rougissement perceptible de la peau (dose érythémale minimale (DEM) pour une personne);
- si un rougissement de la peau (érythème) apparaît entre 16 h et 24 h environ après une exposition, il convient d'interrompre toute exposition ultérieure. Les expositions peuvent reprendre une semaine après le début du programme d'exposition;
- l'appareil ne doit pas être utilisé si la minuterie est défectueuse ou si le filtre est cassé ou enlevé;
- les **émetteurs UV** remplaçables ne doivent être remplacés que par les types marqués sur l'appareil;
- les rayonnements ultraviolets émis par le soleil ou les appareils de bronzage peuvent occasionner des blessures oculaires ou cutanées qui peuvent être irréversibles. Éviter toute exposition des tissus internes de la bouche, ceux-ci pouvant être plus sensibles aux UV que la peau. Ces effets biologiques dépendent de la qualité et de la quantité du rayonnement, ainsi que de la sensibilité cutanée des individus;
- la peau peut développer un coup de soleil après une surexposition. Des expositions répétées aux rayonnements ultraviolets du soleil ou d'un appareil de bronzage peuvent entraîner un vieillissement prématuré de la peau, ainsi qu'une augmentation du risque de développement de tumeurs de la peau. Ces risques augmentent avec l'accroissement de l'exposition cumulée aux UV. Une exposition à un âge précoce augmente le risque de dommages cutanés plus tard;
- des inflammations superficielles (photokératite) peuvent se produire au niveau des yeux non protégés et, dans certains cas, la rétine peut être endommagée après une exposition. Une cataracte peut se développer après plusieurs expositions répétées;
- en cas de sensibilité prononcée ou de réaction allergique aux rayonnements ultraviolets, il est recommandé de demander un avis médical avant de démarrer l'exposition;

- comme cela est indiqué dans le programme d'exposition, la première exposition est une exposition d'essai nécessaire pour identifier les effets secondaires inattendus faisant suite à une exposition aux UV. La première exposition recommandée par le programme d'exposition est donc significativement plus courte que les expositions suivantes et n'est pas destinée à procurer un bronzage;
- les précautions suivantes doivent être prises:
 - toujours porter les lunettes de protection fournies. Des lentilles de contact et des lunettes de soleil ne se substituent pas aux lunettes de protection;
 - enlever les cosmétiques, parfums et produits dermatologiques longtemps avant l'exposition et ne pas utiliser d'écran solaire ou de produits accélérateurs de bronzage;
 - certains états de santé ou les effets secondaires de certains médicaments peuvent être aggravés par une exposition aux UV. En cas de doute, demander un avis médical;
 - respecter une durée minimale de 48 h entre les deux premières expositions;
 - ne pas s'exposer au soleil et ne pas utiliser l'appareil le même jour;
 - suivre les recommandations concernant la durée, les intervalles d'exposition et les distances d'exposition par rapport à la lampe;
 - demander un avis médical si des cloques persistantes ou des plaies apparaissent sur la peau, ou en cas de modifications de grains de beauté;
 - protéger les parties sensibles de la peau, comme les cicatrices, les tatouages et les parties génitales.

Pour les lampes fluorescentes UV à bronzer, il doit être indiqué qu'elles ne doivent être remplacées que par les types marqués d'un code d'équivalence dont le composant UV relève de la gamme de codes d'équivalence qui est marquée sur l'appareil. Dans ce cas, un exemple du code d'équivalence doit être fourni et l'aspect du composant UV du code d'équivalence de la lampe fluorescente UV à bronzer doit être expliqué.

Pour les appareils, autres que les appareils conformes aux essais des 19.2 et 19.3, équipés d'un couvercle qui doit être ouvert en usage normal, les instructions doivent comporter une mise en garde indiquant que l'appareil ne doit pas être mis sous tension avec le couvercle fermé et, qu'avant de fermer le couvercle pour ranger l'appareil, l'appareil doit être déconnecté de l'alimentation et doit refroidir.

Pour les appareils dont certaines parties sont destinées à supporter une personne, les instructions doivent inclure en substance les informations suivantes:

Cet appareil ne doit pas être utilisé par des personnes dont le poids dépasse la charge maximale de xxx kg. (La valeur de xxx doit être indiquée par le fabricant).

Les instructions pour les appareils équipés d'émetteurs VIS ou d'émetteurs IR doivent comporter les informations suivantes:

- des conseils pour la protection des yeux contre l'exposition aux rayonnements visibles et infrarouges, ainsi que des conseils indiquant que des précautions doivent être prises afin de protéger l'utilisateur contre les dangers d'une surexposition;
- une information concernant la distance d'exposition prévue (sauf si cette distance est assurée par la construction de l'appareil);
- le programme d'exposition recommandé spécifiant les durées et les intervalles (à partir des caractéristiques de l'émetteur et des distances);
- l'identification des composants de rechange qui peuvent avoir une incidence sur les rayonnements, comme les filtres et les réflecteurs;

- l'identification des émetteurs remplaçables et un énoncé indiquant qu'ils ne doivent être remplacés que par les types marqués sur l'appareil;
- une instruction sur l'utilisation des lunettes de protection et une information sur la durée maximale d'exposition.

Les instructions pour les appareils équipés d'**émetteurs VIS** ou d'**émetteurs IR** doivent comporter en substance les énoncés suivants:

- les appareils VIS et les appareils IR ne doivent pas être utilisés par:
 - des personnes qui souffrent de coups de soleil;
 - des personnes traitées médicalement pour des maladies impliquant la photosensibilité;
 - des personnes sous traitement photosensibilisant;
- si des effets secondaires inattendus, tels que des démangeaisons, se produisent dans les 48 h qui suivent la première séance d'utilisation d'un appareil, il convient de demander un avis médical avant de poursuivre l'exposition;
- l'appareil ne doit pas être utilisé si la minuterie est défectueuse ou si le filtre est cassé ou enlevé.

Si le pictogramme d'interdiction de la Figure 101 ou le symbole IEC 60417-6301 (2015-03) est utilisé, sa signification doit être explicitée.

7.12.9 Addition:

En outre, les appareils équipés d'**émetteurs UV** doivent comporter, à l'extérieur de l'appareil, un code QR ou système analogue qui fournit un lien direct vers l'ensemble des informations relatives à l'utilisation de l'**appareil UV** (manuels, recommandations concernant le bronzage, etc.), comme cela est exigé par la présente norme (voir Article 7).

7.14 Addition:

Le diamètre du pictogramme d'interdiction de la Figure 101 doit être d'au moins 10 mm.

Le diamètre du cercle de la lampe UV du symbole IEC 60417-6301 (2015-03) doit être d'au moins 20 mm.

La vérification est effectuée par mesurage.

7.15 Addition:

Les mises en garde et marquages supplémentaires spécifiés en 7.1 doivent être visibles après l'installation de l'appareil, sans retirer un couvercle.

8 Protection contre l'accès aux parties actives

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

8.1 Addition:

Lors du remplacement des émetteurs, la vérification est effectuée par les exigences applicables de l'IEC 60598-1:2020, Article 8, sauf si les instructions interdisent le remplacement par l'utilisateur et si des outils sont nécessaires pour remplacer les émetteurs.

8.1.1 Addition:

Le calibre d'essai 18 n'est pas appliqué aux appareils destinés exclusivement à être utilisés dans des solariums, salons de beauté et locaux analogues.

8.1.3 Ne s'applique pas.

9 Démarrage des appareils à moteur

L'article de la Partie 1 ne s'applique pas.

10 Puissance et courant

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

10.1 Ajout au Tableau 1:

Type d'appareil	Puissance assignée W	Divergence
Appareils équipés d'émetteurs UV uniquement	Tous	+10 %

10.2 Ajout au Tableau 2:

Type d'appareil	Courant assigné A	Divergence
Appareils équipés d'émetteurs UV uniquement	Tous	+10 %

11 Échauffements

L'article de la Partie 1 s'applique, avec les exceptions suivantes.

11.2 Modification:

Remplacer le premier tiret des quatrième et cinquième alinéas par ce qui suit:

- *les appareils normalement placés sur le sol ou une table sont posés sur le sol du coin d'essai en positionnant leur face arrière le plus près possible de l'une des parois et loin de l'autre paroi.*

Addition:

Si le sens du rayonnement est réglable, l'appareil est réglé dans la position la plus défavorable en usage normal.

Les appareils comportant des lampes fluorescentes doivent être équipés d'une lampe fluorescente avec une électrode à montage court ou à montage long, si ce montage donne les résultats les plus défavorables.

11.3 Addition:

Lorsque les **surfaces accessibles** extérieures sont suffisamment planes et que l'accès le permet, le calibre d'essai de la Figure 102 est utilisé pour mesurer les échauffements des surfaces accessibles extérieures spécifiées dans le Tableau 101. Le calibre est appliqué sur la surface avec une force de $4\text{ N} \pm 1\text{ N}$ de manière à établir le meilleur contact possible entre le calibre et la surface. Le mesurage est effectué après une durée de contact de 30 s.

Le calibre peut être maintenu en place à l'aide d'une pince de laboratoire sur statif ou d'un dispositif analogue. Tout instrument de mesure qui produit les mêmes résultats que le calibre peut être utilisé.

11.7 Modification:

Remplacer le premier alinéa par ce qui suit:

L'appareil est mis en fonctionnement jusqu'à l'établissement des conditions de régime.

NOTE 101 Si nécessaire, les minuteries sont immédiatement réinitialisées.

Pour les appareils installés au mur ou au plafond, les parties entraînées par des moteurs sont complètement levées et abaissées cinq fois sans périodes de repos, ou pendant 5 min, si cette durée est plus courte.

11.8 Modification:

Remplacer le premier alinéa par ce qui suit:

Pendant l'essai, les échauffements sont relevés en permanence et ne doivent pas dépasser les valeurs indiquées dans le Tableau 3 et le Tableau 101.

Addition:

Les températures des enroulements de ballasts et des conducteurs associés ne doivent pas dépasser les valeurs spécifiées dans l'IEC 60598-1:2020, 12.4, lorsque celles-ci sont mesurées dans les conditions indiquées.

Les échauffements de surfaces en contact avec la peau en usage normal ne doivent pas dépasser les valeurs spécifiées pour les poignées qui sont continuellement tenues dans la main en usage normal.

Tableau 3 – Échauffements normaux maximaux

Modification:

Ajouter le texte suivant dans la note de bas de tableau "k": "Les parties analogues touchées pendant de courtes périodes incluent les poignées ou les manettes des événements et des obturateurs d'air."