

INTERNATIONAL STANDARD



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



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

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

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INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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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.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-27:2019. 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):

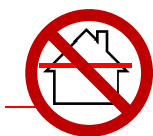
WARNING: Do not stare at the emitter. It is required to wear the provided eyewear due to intense optical radiation. Read instructions carefully.

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.

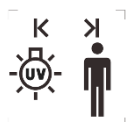
NOTE 404103 If these warnings are combined, the word "warning" need not be repeated.

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 erythema 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 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 ~~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 60598-1:20082020, 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: <ul style="list-style-type: none"> – 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 60598-1:20082020, 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 60598-1:20082020, 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 104~~ Figure 104) or of 150 mm in case of facial exposure (position 1 in ~~Figure 104~~ 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 %.*

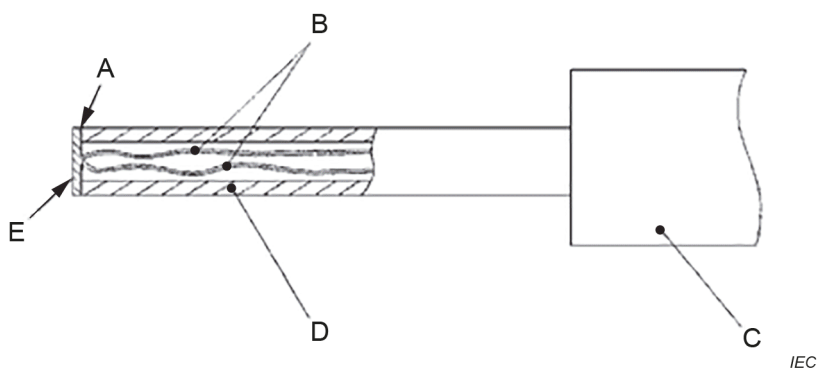
*For measurements of **luminous transmission**, a lamp with a continuous spectrum in the visible wavelength region shall be used.*

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

Wavelength λ	Maximum transmission %
$250 \text{ nm} < \lambda \leq 320 \text{ nm}$	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

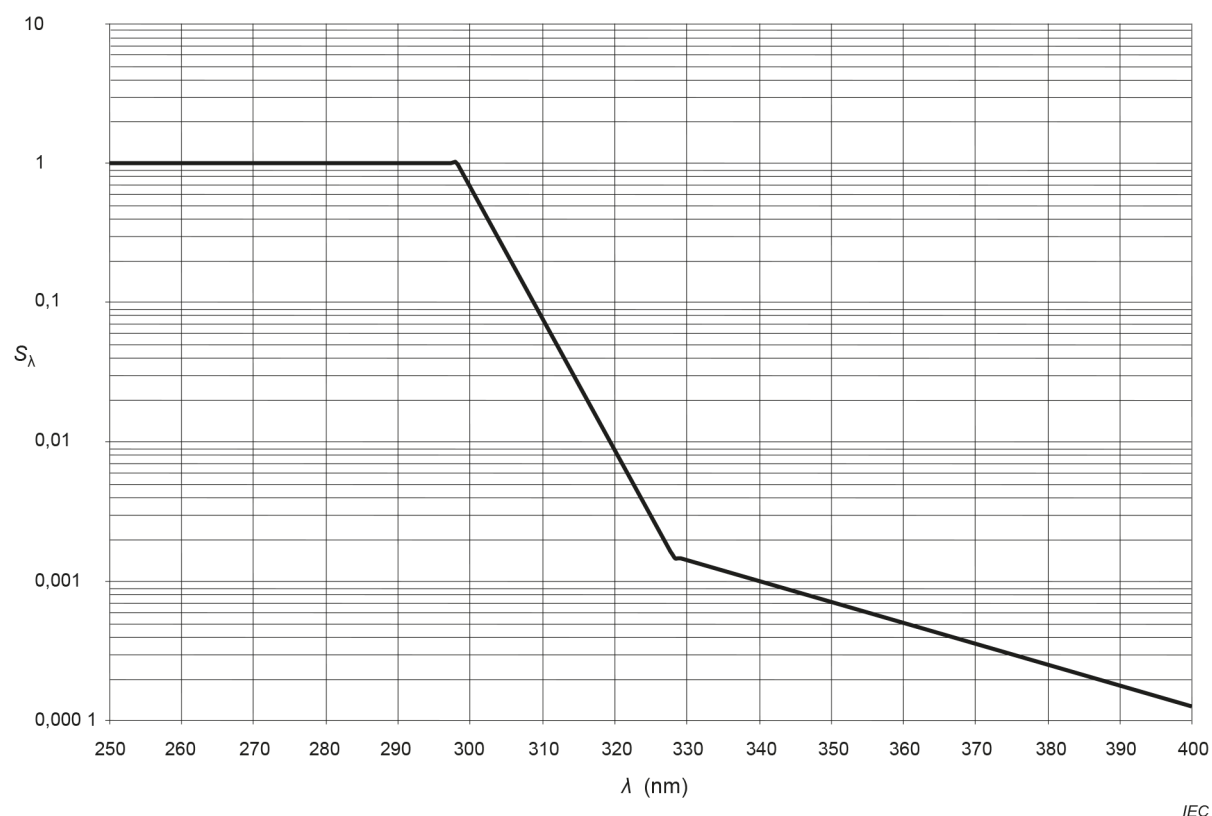


NOTE This pictogram incorporates symbol IEC 60417-5957 (2004-12) combined with the prohibition sign of ISO 3864-1.

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

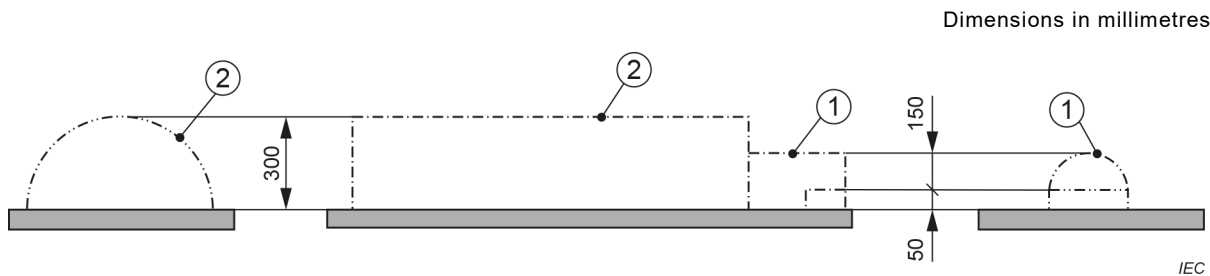
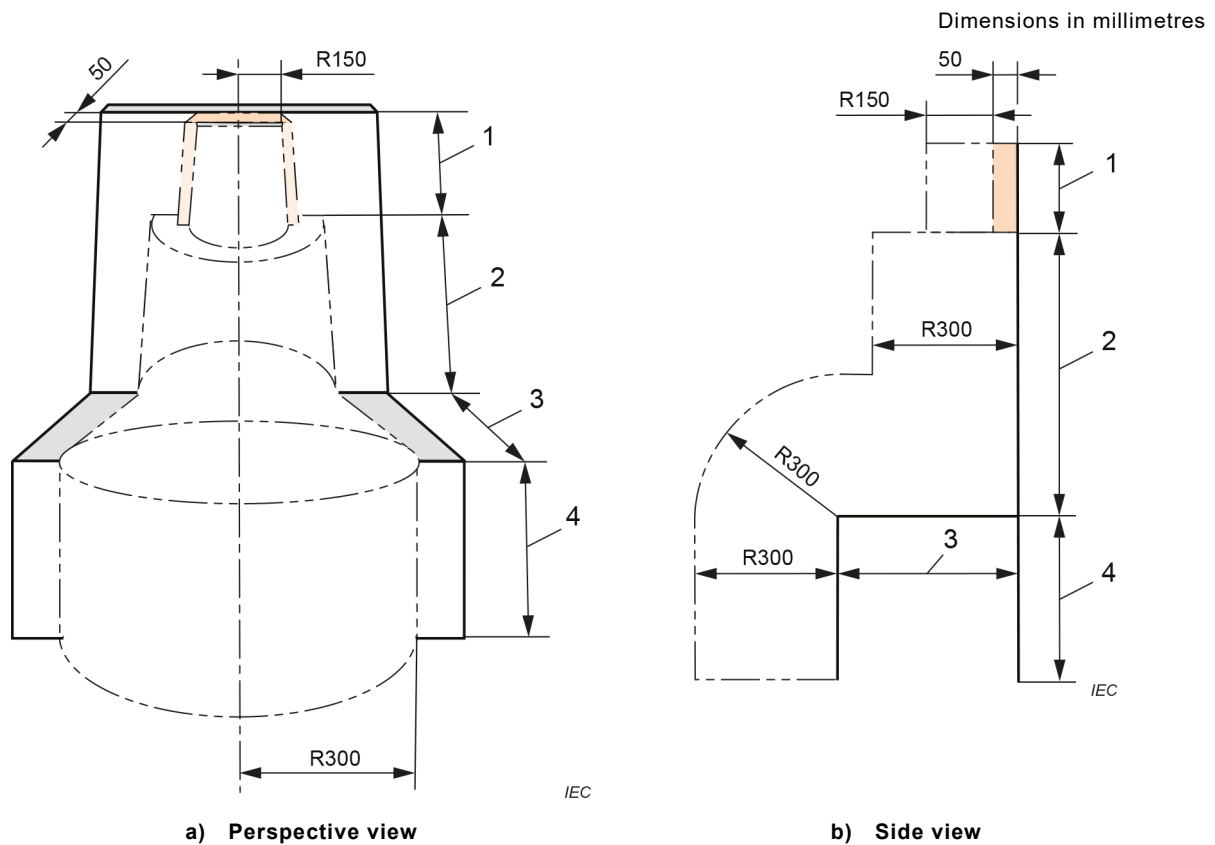


Figure ~~101~~ 104 – Measuring points for appliances that are arranged over a person

**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.

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.

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.

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**.*

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.