

INTERNATIONAL STANDARD



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

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INTERNATIONAL STANDARD



Household and similar electrical appliances – Safety –
Part 2-27: Particular requirements for appliances for skin exposure to **ultraviolet**
and infrared 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 ~~ultraviolet and infrared~~ 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. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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

This sixth edition cancels and replaces the fifth edition published in 2009, Amendment 1:2012 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- aligns the text with IEC 60335-1, Ed 5, and its Amendments 1 and 2;
- luminous transmission has been defined (3.1.102);
- requirements for testing parts of the appliance that are operated unattended are added (30.2).

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

FDIS	Report on voting
61/5796/FDIS	61/5837/RVD

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

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

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. It was established on the basis of the fifth edition (2010) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 7.1: The markings are different (USA).
- 10.1: The deviations are different (USA).
- 10.2: The deviations are different (USA).
- 19.101: The test is different (USA).
- 20.1: The test is carried out at an angle of 8° (USA).
- 22.107: The requirement is not applicable (USA).
- 22.108: The maximum timer setting is shorter (USA).
- 32.101: The irradiance limits and the tests are different (USA).
- 32.102: The requirements for protective goggles are different (USA).

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

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

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-27: Particular requirements for appliances for skin exposure to ~~ultraviolet and infrared~~ optical radiation

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electrical appliances incorporating emitters for exposing the skin to ~~ultraviolet or infrared~~ 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.

~~Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used in tanning salons, beauty parlours and similar premises, are also within the scope of this standard.~~

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 ~~UV~~ 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 ~~101~~102 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements ~~may~~ can be necessary;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities;
- IEC 60598-1 is applicable as far as is reasonable.

NOTE ~~102~~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 61228, *Fluorescent ultraviolet lamps used for tanning – Measurement and specification method*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

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 of 380 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 incorporating one or more **IR emitters**

3.5.103

VIS appliance

appliance incorporating one or more **VIS emitters**

3.6 Definitions relating to parts of an appliance

3.6.101

ultraviolet emitter

~~UV emitter~~

radiating source constructed to emit ~~non-ionizing~~ electromagnetic energy at wavelengths ~~of~~ between 200 nm and 400 nm ~~or less~~

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 emitters** are also referred to as **UV emitters**.

3.6.102

infrared emitter

~~IR emitter~~

radiating source constructed to emit electromagnetic energy at wavelengths ~~of 800 nm or longer~~ between 780 nm and 1 mm

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

3.6.103
visual emitter

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

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

3.6.104
UV filter

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

~~5.1 Addition:~~

~~Appliances with UV emitters are tested as motor-operated appliances.~~

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 ~~may~~ 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 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" ~~symbol shown in 7.6~~ 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 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.

~~Appliances having UV emitters~~ **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.

NOTE 102 For **UV appliances** ~~having UV emitters~~ 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".

~~Appliances having UV emitters~~ **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 103 The method of measuring luminance is given in Annex AA.

Appliances shall be marked with the substance of the following unless they are in the exempt group (see 6.1.1 in 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 centimeters (cm) included between the dimensional arrow heads.

Goggles shall be marked with name, trade mark or identification mark of the manufacturer and the following alpha-numeric characters IEC 60335-2-27.

NOTE 104 If these warnings are combined, the word "warning" need not be repeated.

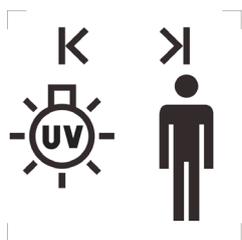
7.6 Addition:



Prohibition sign

not for household use

NOTE 101 This symbol incorporates the prohibition sign of ISO 3864-1.



[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** ~~having UV emitters~~ 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;
- ~~– 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;~~

- 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 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** ~~having UV emitters~~ 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 ~~having~~ 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.

7.14 Addition:

The ~~height~~ diameter of the Prohibition sign “not for household use” ~~symbol~~ 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.

~~NOTE 101—Compliance with the relevant requirements of Section 8 of IEC 60598-1 is to be maintained during the replacement of emitters, unless the instructions forbid replacement by the user and tools are needed.~~

8.1 Addition:

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

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 %.*

10.2 Modification:

The following deviations apply:

- *appliances having **UV emitters** only: + 10 %;*
- *other appliances: – 10 % to + 5 %.*

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Modification:

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.

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

Addition:

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

11.7 Replacement:

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 Addition:

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

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

12 Void

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:

Instead of the tests specified, all appliances are subjected the tests of 19.4 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 ~~having UV with IR emitters are supplied at 0,94 times rated voltage and other appliances~~ 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 ~~having UV with IR emitters are supplied at 1,1 times rated voltage and other appliances~~ 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 12.5.1 a), d) and e) of IEC 60598-1:2008, the appliance being supplied at rated voltage.*

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

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 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 ~~UV~~ 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 ~~of~~ 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.

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 means fails or there is excessive travel of the part.

Compliance is checked by inspection and by manual test.

22.103 ~~UV~~ 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 ~~Appliances having UV emitters intended to be used by a person lying down~~ **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.*

~~NOTE Appliances having UV emitters that are intended to be used when inclined at an angle more than 35° to the vertical are considered to be appliances for use by a person lying down.~~

*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 Annex R.*

22.106 **UV appliances** shall be provided with a timer that terminates the emission of ultraviolet radiation. 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.

~~NOTE For appliances intended for permanent connection to fixed wiring, the timer may be supplied for incorporation in the wiring system.~~

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 ~~0,85~~ 0,75 times the arithmetic mean value of the range;
 - the upper limit of the range shall be equal to ~~1,15~~ 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 marked on the appliance is calculated as follows:

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

lower value of Y range: ~~$0,85 \times 3,2 = 2,72$~~ $0,75 \times 3,2 = 2,40$

upper value of Y range: ~~$1,15 \times 3,2 = 3,68$~~ $1,25 \times 3,2 = 4,00$

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)/(2,7-3,7 2,4-4,0)

22.112 Appliances fitted with **UV filters** shall be constructed so that the emission of ~~non-melanoma skin cancer (NMSC) effective~~ UV radiation is not increased 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 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.

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 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 15.6 of IEC 60598-1:2008. The current for the test is 1,1 times the current measured when the appliance is operated at **rated voltage**.*

24.2 Modification:

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 shall not be used.

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.

~~30.2.3 Not applicable.~~

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows.

~~32.101 Appliances shall not present a toxic or similar hazard.~~ The radiation from **UV appliances** incorporating **UV emitters** shall be limited.

NOTE 1 See 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 ~~with the measuring instrument being placed so that the highest irradiance is recorded at positions which model the human body as follows~~ 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 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:

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

where

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

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

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

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

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

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);

$\Delta\lambda$ 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) or of 150 mm in case of facial exposure (position 1 in Figure 101). 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 being 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 ~~side of the cylinder should~~ the measuring instrument shall be covered;
- for appliances ~~without a defined~~ 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. ~~If no distance is indicated, the measuring instrument is placed~~ 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) or with a radius of 150 mm in case of facial exposure (position 1 of Figure 102). 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.

NOTE 3 Details of the instrument used for the measurements are given in IEC 61228.

The measuring instrument ~~used~~ 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 ~~spectroradiometer~~ double monochromator system. The ~~spectroradiometer~~ double monochromator shall have a bandwidth not exceeding 2,5 nm.

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

~~— 0,35 W/m², for wavelengths up to 320 nm,~~

~~— 0,15 W/m², for wavelengths between 320 nm and 400 nm,~~

~~weighted according to the non-melanoma skin cancer action spectrum of Figure 103.~~

~~Appliances for commercial use only shall have a total effective irradiance not exceeding 1 W/m², weighted according to the non-melanoma skin cancer action spectrum of Figure 103.~~

~~NOTE 4—The exposure dose referred to in 22.106 and Annex DD (except for the total yearly dose) is calculated from the total effective irradiance weighted according to the erythema action spectrum of Figure 103.~~

~~NOTE 4—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 $\text{W}/(\text{m}^2\text{nm})$;~~

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

~~The wavelength interval for the calculation should preferably be 1 nm but should not exceed 2,5 nm. It should ideally be equal to the bandwidth of the spectroradiometer used.~~

~~Appliances shall have a total irradiance not exceeding $0,003 \text{ W}/\text{m}^2$ for wavelengths between 200 nm and 280 nm.~~

~~NOTE 5—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 $\text{W}/(\text{m}^2\text{nm})$;~~

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

32.102 The radiation from appliances incorporating **VIS emitters** or **IR emitters** 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 5.1 of IEC 62471:2006 at the exposure distance in Clause 6 of IEC 62471:2006 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 6.1 of IEC 62471:2006.*

32.1023 **UV** 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 ~~between 250 nm and 550 nm at intervals of not more than 5 nm. The luminous transmission is measured between 380 nm and 780 nm at intervals of not more than 5 nm.~~

The transmission shall not exceed the values specified in Table 101 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 – 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

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Dimensions in millimetres

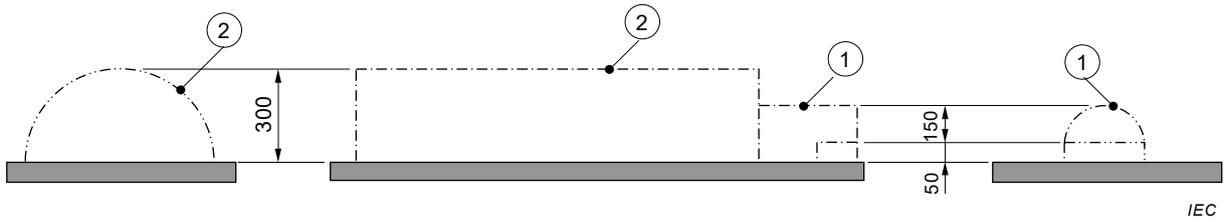
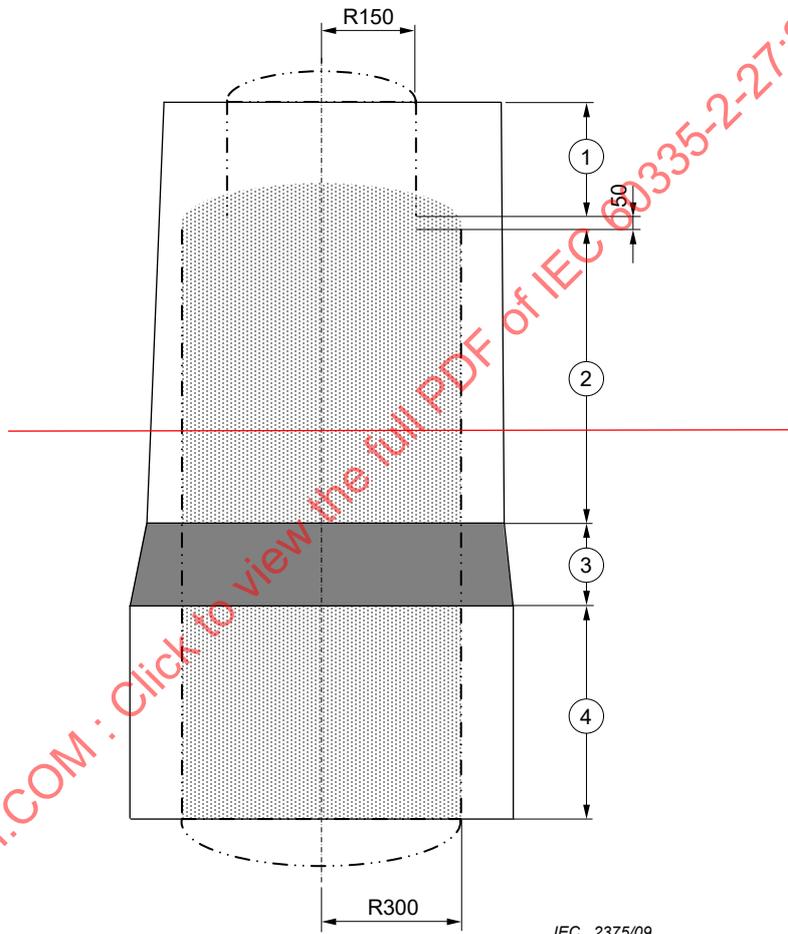
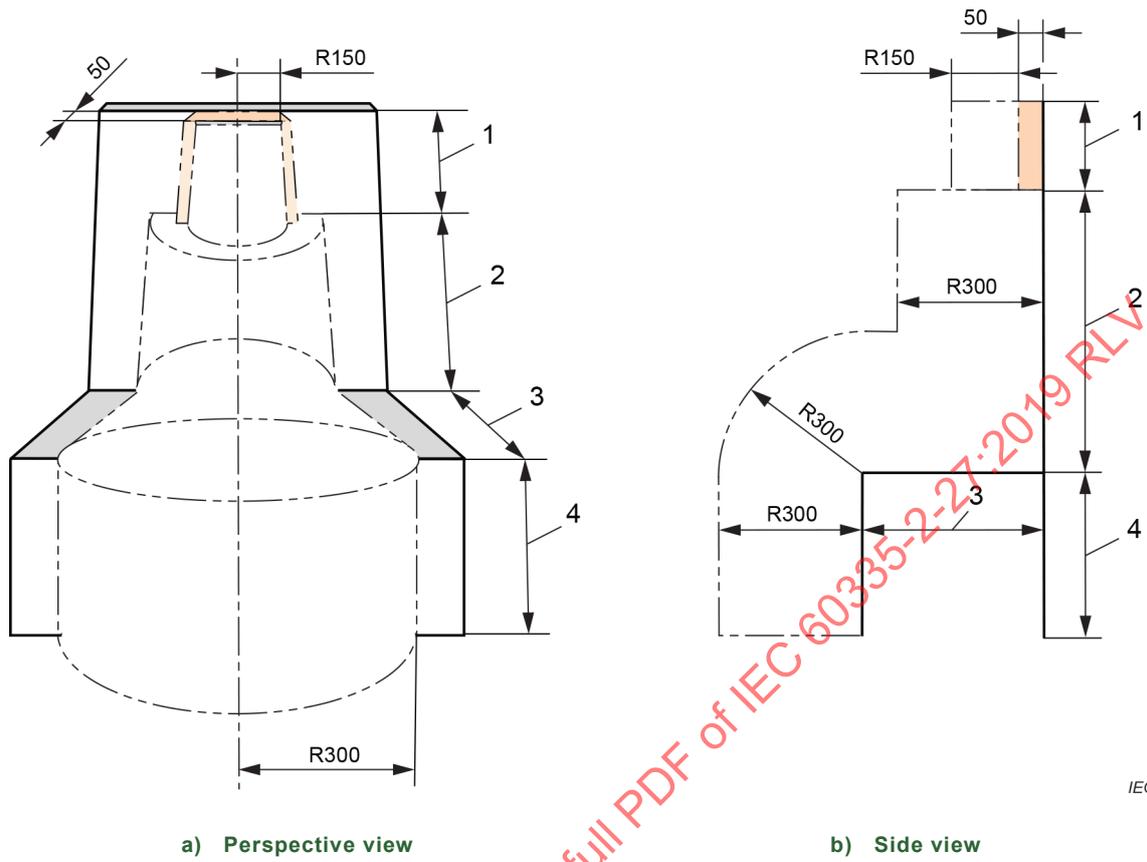


Figure 101 – Measuring points for appliances that are arranged over a person

Dimensions in millimetres



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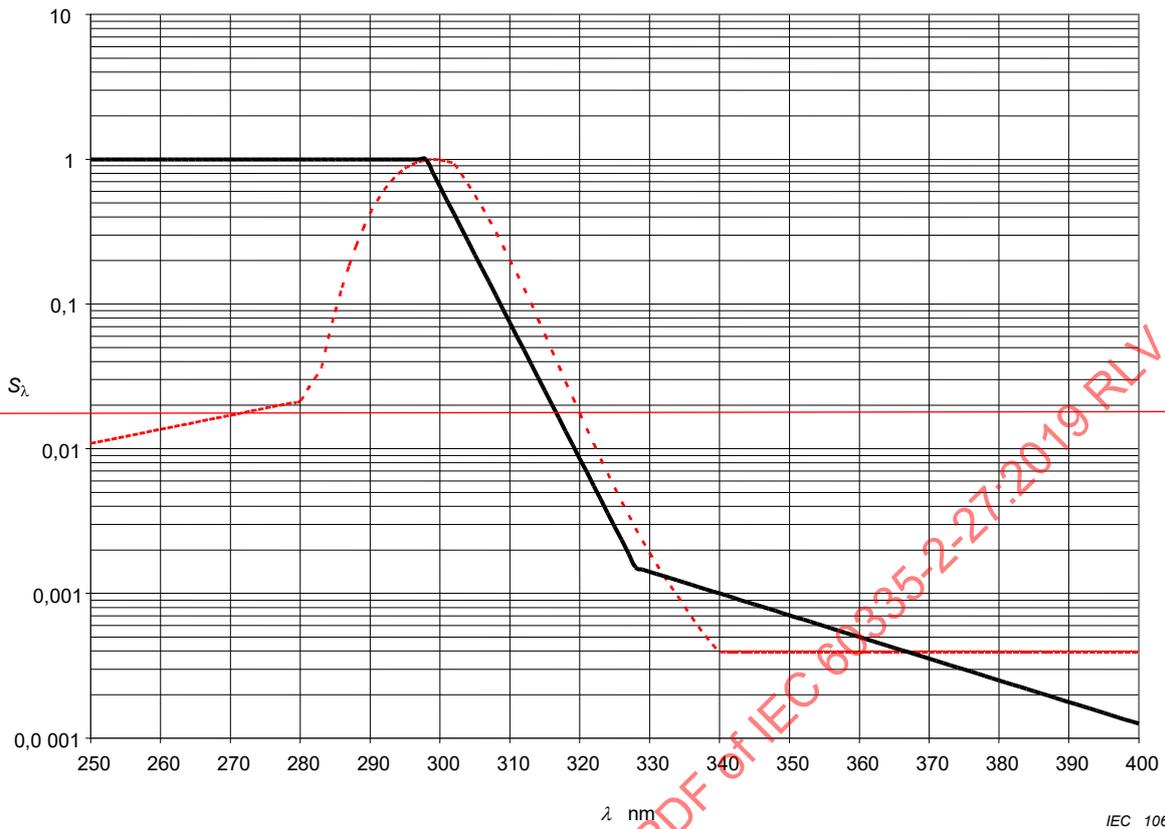
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Key

R radius

Figure 102 – Measuring points for appliances exposing a sitting person

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IEC 1063/04

Key

— Erythema action spectrum

NOTE 1— The erythema action spectrum is defined from the following parameters:

Wavelength (λ)	Weighting factor (S_λ)
$\lambda \leq 298$	1
$298 < \lambda \leq 328$	$10^{0,094(298-\lambda)}$
$328 < \lambda \leq 400$	$10^{0,015(140-\lambda)}$

Figure 103 – UV action spectra

NOTE 2 The weighting factor for each wavelength of the non-melanoma skin cancer action spectrum and erythema action spectrum is as follows.

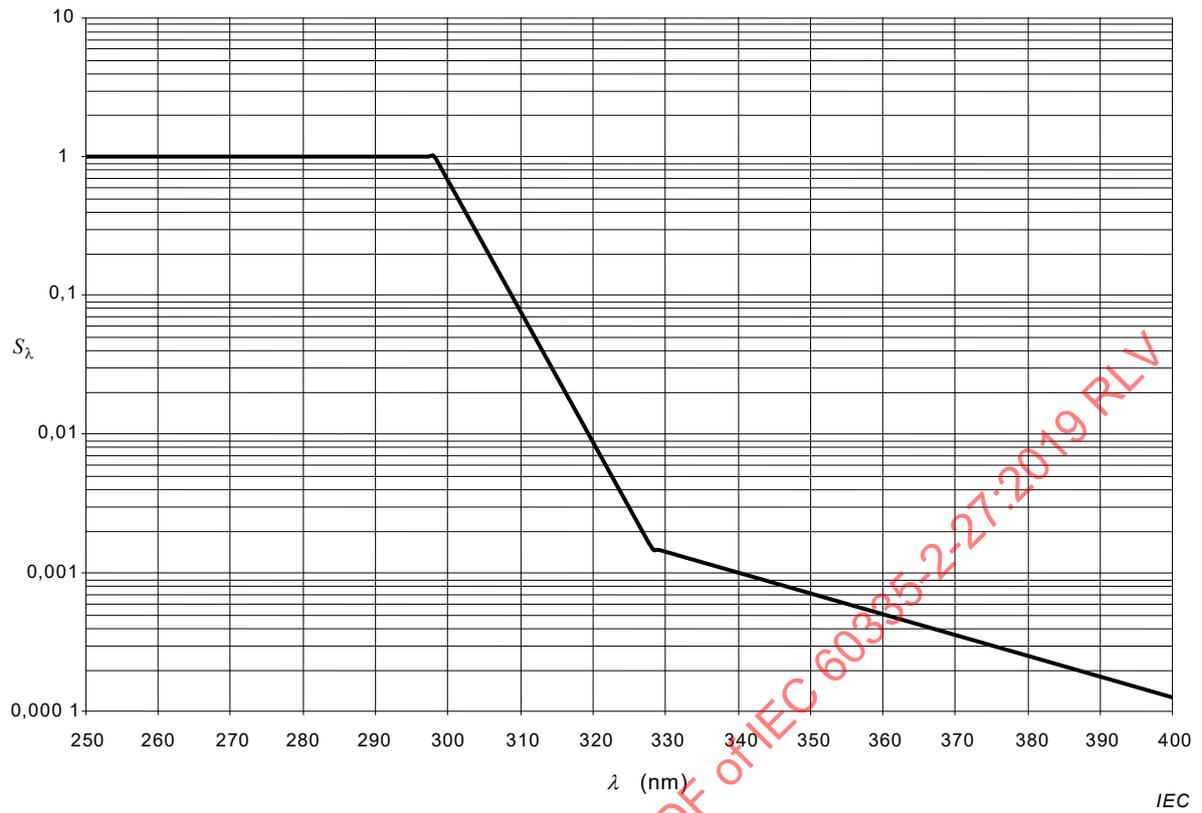
Wave-length (λ) nm	Weighting factor (S_{λ})	
	NMSC ^a	Erythema
250	0,010 900	1,000 000
251	0,011 139	1,000 000
252	0,011 383	1,000 000
253	0,011 633	1,000 000
254	0,011 888	1,000 000
255	0,012 158	1,000 000
256	0,012 435	1,000 000
257	0,012 718	1,000 000
258	0,013 007	1,000 000
259	0,013 303	1,000 000
260	0,013 605	1,000 000
261	0,013 915	1,000 000
262	0,014 231	1,000 000
263	0,014 555	1,000 000
264	0,014 886	1,000 000
265	0,015 225	1,000 000
266	0,015 571	1,000 000
267	0,015 925	1,000 000
268	0,016 287	1,000 000
269	0,016 658	1,000 000
270	0,017 037	1,000 000
271	0,017 424	1,000 000
272	0,017 821	1,000 000
273	0,018 226	1,000 000
274	0,018 641	1,000 000
275	0,019 065	1,000 000
276	0,019 498	1,000 000
277	0,019 942	1,000 000
278	0,020 395	1,000 000
279	0,020 859	1,000 000
280	0,021 334	1,000 000
281	0,025 368	1,000 000
282	0,030 166	1,000 000
283	0,035 871	1,000 000
284	0,057 388	1,000 000
285	0,088 044	1,000 000
286	0,129 670	1,000 000
287	0,183 618	1,000 000
288	0,250 586	1,000 000
289	0,330 048	1,000 000
290	0,420 338	1,000 000
291	0,514 138	1,000 000
292	0,609 954	1,000 000
293	0,703 140	1,000 000
294	0,788 659	1,000 000
295	0,861 948	1,000 000
296	0,919 650	1,000 000
297	0,958 965	1,000 000
298	0,988 917	1,000 000
299	1,000 000	0,805 378

Wave-length (λ) nm	Weighting factor (S_{λ})	
	NMSC ^a	Erythema
300	0,991 996	0,648 634
301	0,967 660	0,522 396
302	0,929 095	0,420 727
303	0,798 410	0,338 844
304	0,677 339	0,272 898
305	0,567 466	0,219 786
306	0,470 257	0,177 011
307	0,385 911	0,142 561
308	0,313 889	0,114 815
309	0,253 391	0,092 469
310	0,203 182	0,074 473
311	0,162 032	0,059 979
312	0,128 671	0,048 306
313	0,101 794	0,038 905
314	0,079 247	0,031 333
315	0,061 659	0,025 235
316	0,047 902	0,020 324
317	0,037 223	0,016 368
318	0,028 934	0,013 183
319	0,022 529	0,010 617
320	0,017 584	0,008 551
321	0,013 758	0,006 887
322	0,010 804	0,005 546
323	0,008 525	0,004 467
324	0,006 756	0,003 597
325	0,005 385	0,002 897
326	0,004 316	0,002 333
327	0,003 483	0,001 879
328	0,002 830	0,001 514
329	0,002 316	0,001 462
330	0,001 911	0,001 413
331	0,001 590	0,001 365
332	0,001 333	0,001 318
333	0,001 129	0,001 274
334	0,000 964	0,001 230
335	0,000 810	0,001 189
336	0,000 688	0,001 148
337	0,000 589	0,001 109
338	0,000 510	0,001 072
339	0,000 446	0,001 035
340	0,000 394	0,001 000
341	0,000 394	0,000 966
342	0,000 394	0,000 933
343	0,000 394	0,000 902
344	0,000 394	0,000 871
345	0,000 394	0,000 841
346	0,000 394	0,000 813
347	0,000 394	0,000 785
348	0,000 394	0,000 759
349	0,000 394	0,000 733

Wave-length (λ) nm	Weighting factor (S_{λ})	
	NMSC ^a	Erythema
350	0,000 394	0,000 708
351	0,000 394	0,000 684
352	0,000 394	0,000 661
353	0,000 394	0,000 638
354	0,000 394	0,000 617
355	0,000 394	0,000 596
356	0,000 394	0,000 575
357	0,000 394	0,000 556
358	0,000 394	0,000 537
359	0,000 394	0,000 519
360	0,000 394	0,000 501
361	0,000 394	0,000 484
362	0,000 394	0,000 468
363	0,000 394	0,000 452
364	0,000 394	0,000 437
365	0,000 394	0,000 422
366	0,000 394	0,000 407
367	0,000 394	0,000 394
368	0,000 394	0,000 380
369	0,000 394	0,000 367
370	0,000 394	0,000 355
371	0,000 394	0,000 343
372	0,000 394	0,000 331
373	0,000 394	0,000 320
374	0,000 394	0,000 309
375	0,000 394	0,000 299
376	0,000 394	0,000 288
377	0,000 394	0,000 279
378	0,000 394	0,000 269
379	0,000 394	0,000 260
380	0,000 394	0,000 251
381	0,000 394	0,000 243
382	0,000 394	0,000 234
383	0,000 394	0,000 226
384	0,000 394	0,000 219
385	0,000 394	0,000 211
386	0,000 394	0,000 204
387	0,000 394	0,000 197
388	0,000 394	0,000 191
389	0,000 394	0,000 184
390	0,000 394	0,000 178
391	0,000 394	0,000 172
392	0,000 394	0,000 166
393	0,000 394	0,000 160
394	0,000 394	0,000 155
395	0,000 394	0,000 150
396	0,000 394	0,000 145
397	0,000 394	0,000 140
398	0,000 394	0,000 135
399	0,000 394	0,000 130
400	0,000 394	0,000 126

^a— NMSC — non-melanoma skin cancer

Figure 103 — UV action spectra (continued)



Key

— erythema action spectrum

NOTE 1 The erythema action spectrum is defined from the following parameters:

Wavelength nm (λ) nm	Weighting factor (S_λ)
$\lambda \leq 298$	1
$298 < \lambda \leq 328$	$10^{0,094(298-\lambda)}$
$328 < \lambda \leq 400$	$10^{0,015(140-\lambda)}$

Figure 103 – Erythema action spectrum

Annexes

The annexes of Part 1 are applicable except as follows.

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Annex R (normative)

Software evaluation

R.2.2.5 *Modification:*

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 22.112 is impaired.

R.2.2.9 *Modification:*

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

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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**.*

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Annex BB (informative)

Detailed classification of UV appliances

Annex BB provides details of a classification of **UV appliances** based on amounts of radiation 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 ~~having a UV emitter~~ 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 ~~having a UV emitter~~ 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 ~~having a UV emitter~~ 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 ~~having a UV emitter~~ 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 ~~having a UV emitter~~ 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 ~~may~~ 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 ~~non-melanoma skin cancer~~ 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		Maximum total effective irradiance W/m ²
	250 nm < λ ≤ 320 nm	320 nm < λ ≤ 400 nm	
1	< 0,001	≥ 0,15	1,0
2	0,001 to 0,35 0,15	≥ 0,15	1,0
3	< 0,35 0,15	< 0,15	-
4	≥ 0,35 0,15	< 0,15	1,0
5	≥ 0,35 0,15	≥ 0,15	1,0

λ is the wavelength of the radiation.

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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 is to be given in mW/m^2 rounded to the nearest integer, Y is to be 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 – 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)

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

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.
- **NOTE** 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 ~~25~~ 15 kJ/m², weighted according to the ~~non-melanoma skin-cancer~~ erythema action spectrum shown in Figure 103 and taking into account the recommended schedule of exposure.

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 Tables EE.1 to 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 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	Maximum dose per exposure J/m ²	Maximum dose per year ^a 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	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				

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
All types				0,003

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Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

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*

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

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

~~ISO 13732-1, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*~~

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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**

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

This sixth edition cancels and replaces the fifth edition published in 2009, Amendment 1:2012 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- aligns the text with IEC 60335-1, Ed 5, and its Amendments 1 and 2;
- luminous transmission has been defined (3.1.102);
- requirements for testing parts of the appliance that are operated unattended are added (30.2).

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

FDIS	Report on voting
61/5796/FDIS	61/5837/RVD

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

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

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. It was established on the basis of the fifth edition (2010) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 7.1: The markings are different (USA).
- 10.1: The deviations are different (USA).
- 10.2: The deviations are different (USA).
- 19.101: The test is different (USA).
- 20.1: The test is carried out at an angle of 8° (USA).
- 22.107: The requirement is not applicable (USA).
- 22.108: The maximum timer setting is shorter (USA).
- 32.101: The irradiance limits and the tests are different (USA).
- 32.102: The requirements for protective goggles are different (USA).

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.

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INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

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

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

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

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard 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.

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 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 of 380 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 incorporating one or more **IR emitters**

3.5.103

VIS appliance

appliance incorporating one or more **VIS emitters**

3.6 Definitions relating to parts of an appliance

3.6.101

ultraviolet 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 emitters** are also referred to as **UV emitters**.

3.6.102

infrared emitter

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

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

3.6.103

visual emitter

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

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

3.6.104

UV filter

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

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 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” 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 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.

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 103 The method of measuring luminance is given in Annex AA.

Appliances shall be marked with the substance of the following unless they are in the exempt group (see 6.1.1 in 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 centimeters (cm) included between the dimensional arrow heads.

Goggles shall be marked with name, trade mark or identification mark of the manufacturer and the following alpha-numeric characters IEC 60335-2-27.

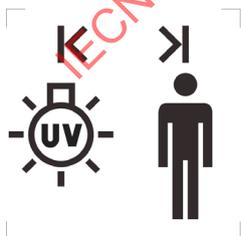
NOTE 104 If these warnings are combined, the word "warning" need not be repeated.

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.

7.14 Addition:

The diameter of the Prohibition sign “not for household use” 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 Section 8 of IEC 60598-1:2008, unless the instructions forbid replacement by the user and tools are needed to replace the emitters.

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 %.*

10.2 Modification:

The following deviations apply:

- *appliances having **UV emitters** only: + 10 %;*
- *other appliances: – 10 % to + 5 %.*

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 Modification:

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.

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.

11.7 Replacement:

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 Addition:

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

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

12 Void

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:

Instead of the tests specified, all appliances are subjected the tests of 19.4 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 12.5.1 a), d) and e) of IEC 60598-1:2008, the appliance being supplied at rated voltage.

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

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 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.

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 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 Annex R.*

22.106 UV appliances shall be provided with a timer that terminates the emission of ultraviolet radiation. 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 marked on the appliance is calculated as follows:

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

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

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

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 not increased 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 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.

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 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 15.6 of IEC 60598-1:2008. The current for the test is 1,1 times the current measured when the appliance is operated at **rated voltage**.*

24.2 Modification:

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 shall not be used.

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.

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

NOTE 1 See 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 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 erythemal irradiance is applied;

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

E_{er} is the effective erythemal 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 $\text{W}/(\text{m}^2\text{nm})$;

$\Delta\lambda$ 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/m^2 , 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 $\text{W}/(\text{m}^2\text{nm})$;

$\Delta\lambda$ 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) or of 150 mm in case of facial exposure (position 1 in Figure 101). 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 being 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) or with a radius of 150 mm in case of facial exposure (position 1 of Figure 102). 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 appliances incorporating **VIS emitters** or **IR emitters** 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 5.1 of IEC 62471:2006 at the exposure distance in Clause 6 of IEC 62471:2006 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 6.1 of IEC 62471:2006.

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 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 – 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

Dimensions in millimetres

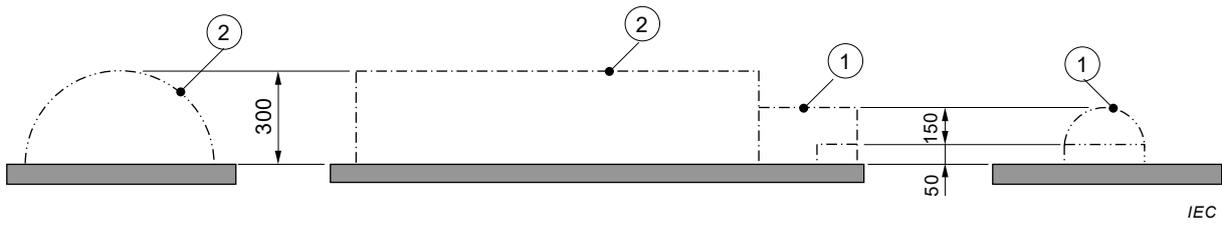
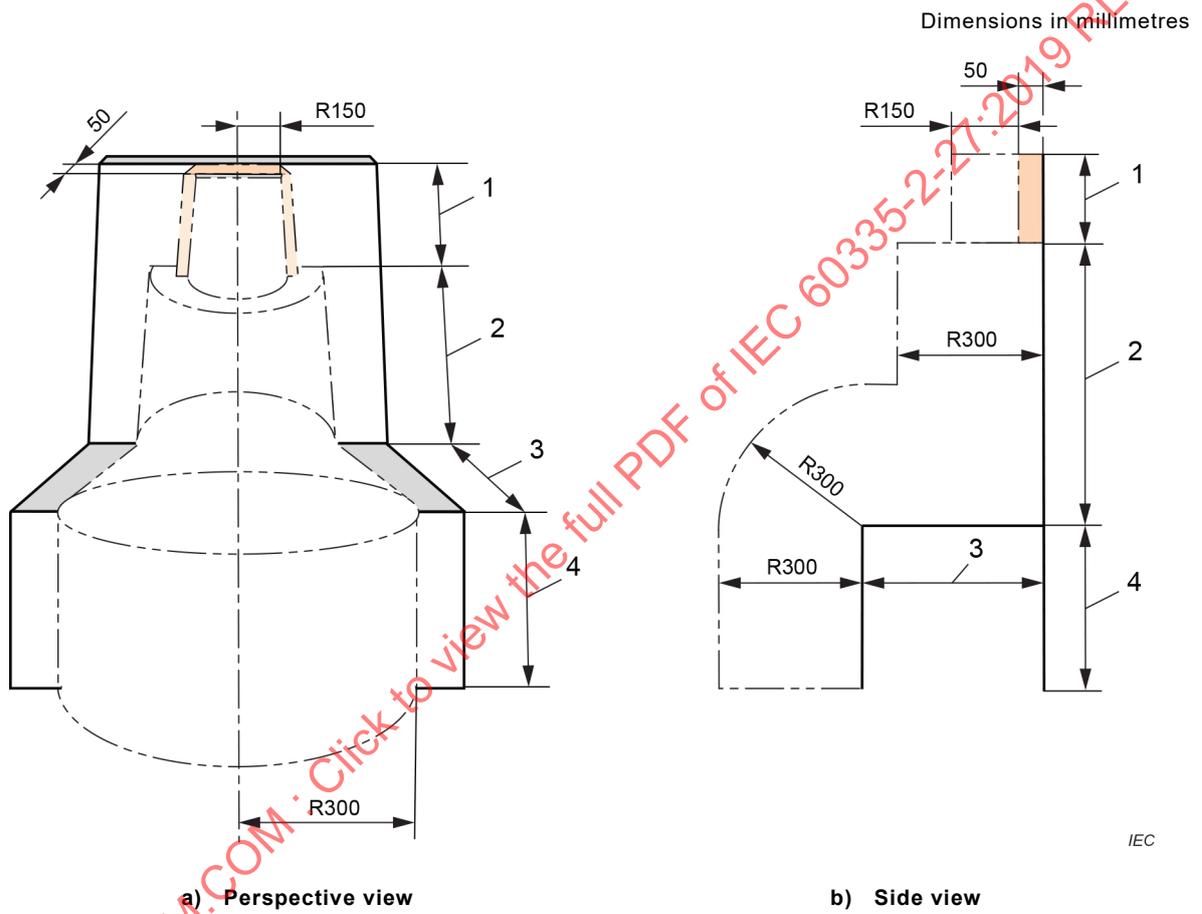


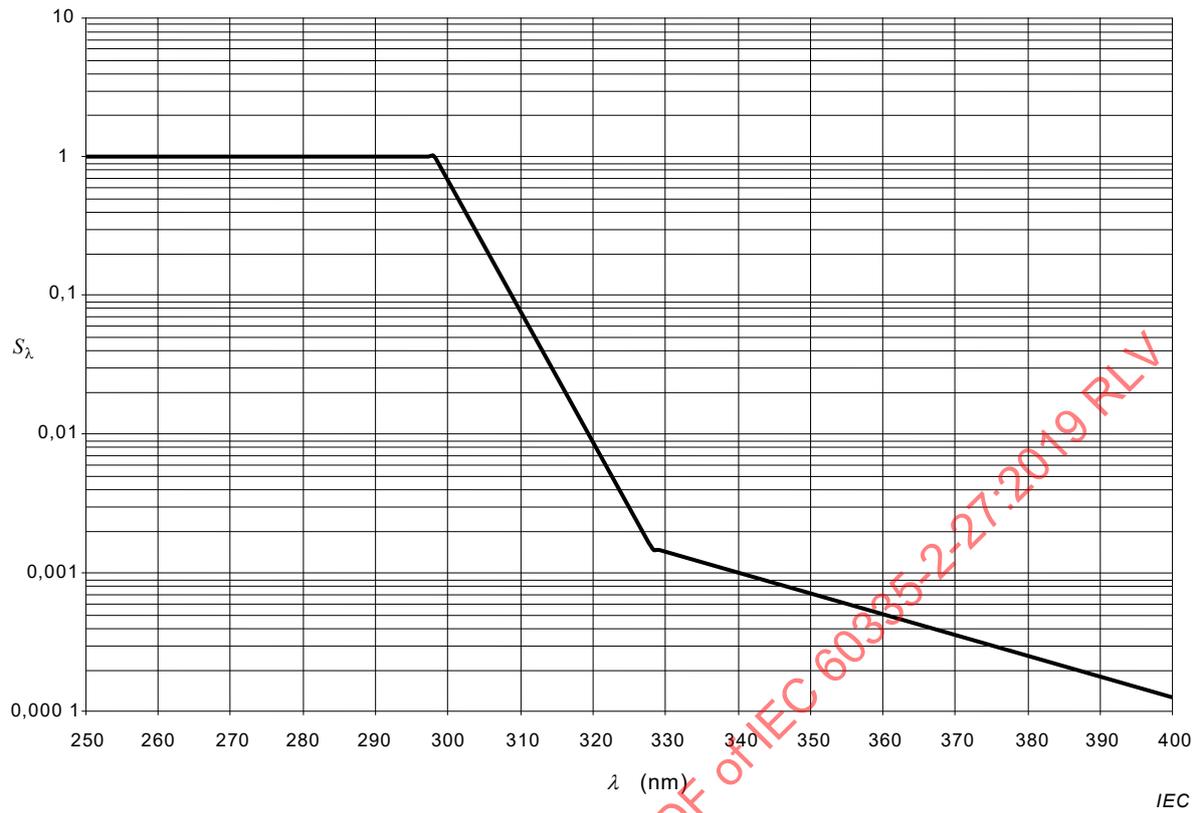
Figure 101 – Measuring points for appliances that are arranged over a person



Key

R radius

Figure 102 – Measuring points for appliances exposing a sitting person

**Key**

— erythema action spectrum

NOTE 1 The erythema action spectrum is defined from the following parameters:

Wavelength nm (λ) nm	Weighting factor (S_λ)
$\lambda \leq 298$	1
$298 < \lambda \leq 328$	$10^{0,094(298-\lambda)}$
$328 < \lambda \leq 400$	$10^{0,015(140-\lambda)}$

Figure 103 – Erythema action spectrum

Annexes

The annexes of Part 1 are applicable except as follows.

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Annex R (normative)

Software evaluation

R.2.2.5 *Modification:*

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 22.112 is impaired.

R.2.2.9 *Modification:*

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

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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**.*

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Annex BB (informative)

Detailed classification of UV appliances

Annex BB provides details of a classification of **UV appliances** based on amounts of radiation 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
1	< 0,001	≥ 0,15
2	0,001 to 0,15	≥ 0,15
3	< 0,15	< 0,15
4	≥ 0,15	< 0,15
5	≥ 0,15	≥ 0,15

λ is the wavelength of the radiation.

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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 is to be given in mW/m^2 rounded to the nearest integer, Y is to be 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 – 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)

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

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/m^2 , 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/m^2 , weighted according to the erythema action spectrum shown in Figure 103.
- A single exposure dose should not exceed 600 J/m^2 , 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/m^2 , 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/m^2 , weighted according to the erythema action spectrum shown in Figure 103 and taking into account the recommended schedule of exposure.

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 Tables EE.1 to 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 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	Maximum dose per exposure J/m ²	Maximum dose per year ^a 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	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				

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
All types				0,003

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Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

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*

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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

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

Cette sixième édition annule et remplace la cinquième édition parue en 2009, l'Amendement 1:2012 et l'Amendement 2:2015. Cette édition constitue une révision technique.

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

- mise en correspondance du texte avec l'IEC 60335-1, Ed 5, et ses Amendements 1 et 2;

- définition de la transmission lumineuse (3.1.102);
- ajout des exigences relatives aux parties de l'appareil soumises aux essais et fonctionnant de manière autonome (30.2).

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

FDIS	Rapport de vote
61/5796/FDIS	61/5837/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60335, publiées sous le titre général: *Appareils électrodomestiques et analogues – Sécurité*, peut être consultée 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. Elle a été établie sur la base de la cinquième édition (2010) 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 de sécurité applicables aux 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:

- paragraphes, tableaux et figures: ceux qui sont numérotés à partir de 101 sont complémentaires à ceux de la Partie 1;
- notes: 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 supplémentaires sont appelées 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.

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- amendé.

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.

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

- 7.1: Les marquages sont différents (Etats-Unis).
- 10.1: Les tolérances sont différentes (Etats-Unis).
- 10.2: Les tolérances sont différentes (Etats-Unis).
- 19.101: L'essai est différent (Etats-Unis).
- 20.1: L'essai est effectué avec un angle de 8° (Etats-Unis).
- 22.107: L'exigence n'est pas applicable (Etats-Unis).
- 22.108: Le réglage maximal de la minuterie est une valeur plus faible (Etats-Unis).
- 32.101: Les limites d'éclairement et les essais sont différents (Etats-Unis).
- 32.102: Les exigences applicables aux lunettes de protection sont différentes (Etats-Unis).

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INTRODUCTION

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

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 prend en considération les phénomènes électromagnétiques qui peuvent affecter le fonctionnement en toute sécurité 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 cette norme comporte également des fonctions qui sont 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, l'influence d'une fonction sur les autres fonctions est prise en compte.

Lorsqu'une partie 2 ne comporte pas d'exigences complémentaires pour couvrir les dangers 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 normes horizontales et génériques couvrant un danger ne sont pas applicables parce qu'elles ont été prises en considération lorsque les exigences générales et particulières ont été étudiées pour la série de normes IEC 60335. Par exemple, dans le cas des exigences de température de surface pour de nombreux appareils, des normes génériques, comme l'ISO 13732-1 pour les surfaces chaudes, ne sont pas applicables en plus de la Partie 1 ou des parties 2.

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.

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 l'article ci-après.

La présente Norme internationale traite de la sécurité des appareils électriques comportant des émetteurs pour l'exposition de la peau aux rayonnements optiques (longueur d'onde de 100 nm à 1 mm), destinés à des usages domestiques et analogues, dont la **tension assignée** n'est pas supérieure à 250 V pour les appareils monophasés et à 480 V pour les autres appareils.

NOTE 101 Les appareils alimentés par batteries et autres appareils alimentés en courant continu relèvent du domaine d'application de la présente norme. Les appareils à double alimentation, fonctionnant sur secteur ou sur batterie, sont vus comme des **appareils alimentés par batteries** lorsqu'ils fonctionnent sur batterie.

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, la présente norme ne tient pas compte en général:

- des personnes (y compris des enfants) dont:
 - les capacités physiques, sensorielles ou mentales; ou
 - le manque d'expérience et de connaissancesles empêchent d'utiliser l'appareil en toute sécurité sans surveillance ou instruction;
- de l'utilisation de l'appareil comme jouet par des enfants.

NOTE 102 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 autorités sanitaires nationales, les organismes nationaux en charge de la protection des travailleurs et les organismes analogues;
- l'IEC 60598-1 s'applique dans la limite du raisonnable.

NOTE 103 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 sauna chauffants et aux cabines infrarouges (IEC 60335-2-53);
- aux appareils cosmétiques et aux appareils de soins de beauté, y compris les lasers et les sources de lumière de forte intensité (IEC 60335-2-113);
- aux appareils à but médical (IEC 60601);
- aux appareils utilisant un rayonnement UV pour d'autres besoins que le bronzage de la peau;
- aux appareils destinés à être utilisés dans des locaux présentant 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 est applicable avec l'exception suivante.

Addition:

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

IEC 62471:2006, *Sécurité photobiologique des lampes et des appareils utilisant des lampes*

3 Termes et définitions

L'article de la Partie 1 est applicable avec les exceptions suivantes.

3.1 Définitions relatives aux caractéristiques physiques

3.1.101

éclairage effectif

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

3.1.102

transmission lumineuse

pourcentage de lumière incidente passant par un matériau, pondéré par la sensibilité spectrale de l'œil humain et intégré sur la plage de longueurs d'onde allant de 380 nm à 780 nm

3.5 Définitions relatives aux types d'appareils

3.5.101

appareil UV

appareil comprenant des **émetteurs UV** et utilisé pour le bronzage

3.5.102

appareil IR

appareil comprenant un ou plusieurs **émetteurs IR**

3.5.103

appareil VIS

appareil comprenant un ou plusieurs **émetteurs VIS**

3.6 Définitions relatives aux parties d'un appareil

3.6.101

émetteur ultraviolet

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 ultraviolets** sont également appelés, en abrégé, **émetteurs UV**.

3.6.102

émetteur infrarouge

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 infrarouges** sont également appelés, en abrégé, **émetteurs IR**.

3.6.103

émetteur visible

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 visibles** sont également appelés, en abrégé, **émetteurs VIS**.

3.6.104

filtre UV

dispositif utilisé pour modifier le rayonnement ultraviolet qui le traverse, généralement en altérant la distribution spectrale

4 Exigences générales

L'article de la Partie 1 est applicable.

5 Conditions générales d'essais

L'article de la Partie 1 est applicable avec l'exception suivante.

5.101 *Les appareils ne comportant que des **émetteurs IR** sont soumis aux essais des **appareils chauffants**. Tous les autres appareils sont soumis aux essais des **appareils à moteur**.*

6 Classification

L'article de la Partie 1 est applicable avec l'exception suivante.

6.101 Les **appareils UV** doivent être de l'un des types suivants en ce qui concerne l'émission de rayonnement ultraviolet:

- 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.

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

7 Marquage et instructions

L'article de la Partie 1 est applicable 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 le signal d'interdiction "Non destiné à un usage domestique" ou doivent porter en substance l'avertissement suivant:

Non destiné à un usage domestique

Les appareils comportant des lampes fluorescentes UV à bronzer doivent être marqués de la gamme de code d'équivalence pour lampe fluorescente UV. Cette gamme de code 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, pour information. Un exemple de gamme de code d'équivalence pour lampe fluorescente UV devant être marquée sur l'appareil est donné en 22.111.

Pour les **émetteurs UV** autres que les lampes fluorescentes UV à bronzer, l'appareil doit porter l'indication de la référence de type des émetteurs préconisés pour l'utilisation.

Les **appareils UV** doivent porter en substance la mise en garde suivante:

AVERTISSEMENT: Le rayonnement ultraviolet peut affecter les yeux, la peau et les tissus internes de la bouche, et provoquer par exemple le vieillissement de la peau et jusqu'au cancer de la peau. Lire attentivement les instructions. Porter les lunettes de protection fournies. Certains médicaments et cosmétiques peuvent augmenter la sensibilité.

NOTE 102 Pour les **appareils UV** destinés à n'être utilisés que dans des solariums, des salons de beauté et locaux analogues, cet avertissement peut figurer sur une plaque permanente destinée à être fixée sur le mur à proximité de l'appareil UV. La phrase "Lire attentivement la notice" peut être remplacée par "Consulter le surveillant responsable pour information supplémentaire".

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

AVERTISSEMENT: Lumière intense. Ne pas regarder l'émetteur.

NOTE 103 La méthode de mesure de la luminance est décrite à l'Annexe AA.

Les appareils doivent porter en substance l'avertissement suivant, sauf s'ils font partie du groupe sans risque (voir 6.1.1 de l'IEC 62471:2006):

AVERTISSEMENT: Ne pas regarder l'émetteur. Il est demandé de porter les lunettes de protection prévues en raison de l'intensité des rayonnements optiques. Lire attentivement les instructions.

Les appareils comportant des **émetteurs VIS** ou des **émetteurs IR** doivent être marqués du nom du fabricant, du nom du modèle et de la spécification technique des lampes de remplacement adéquates.

Sauf si la distance d'exposition prévue est contrôlée par construction, les **appareils UV** doivent être marqués du symbole IEC 60417-6301 (2015-03) avec la distance d'exposition recommandée et son unité en centimètres (cm) doit figurer 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 suivants.

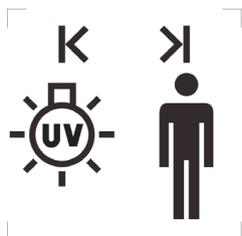
NOTE 104 Si ces mises en garde sont combinées, le mot "avertissement" peut ne pas être répété.

7.6 Addition:



Signal d'interdiction

non destiné à un usage domestique



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

source lumineuse ultraviolette, distance d'exposition

7.12 Addition:

Les instructions doivent donner des informations claires sur une utilisation appropriée de l'appareil.

Les **appareils UV** doivent comporter une indication selon laquelle les personnes non utilisatrices, en particulier les enfants, ne doivent pas être présentes lorsque l'appareil est mis en fonctionnement.

Les instructions applicables aux **appareils UV** doivent comporter, en substance, les informations suivantes:

- une indication que les **appareils UV** 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 présentant des taches décolorées anormales sur la peau;
 - des personnes présentant un nombre important de grains de beauté;
 - des personnes ayant des grains de beauté asymétriques, de forme irrégulière, d'un diamètre supérieur à 5 mm avec une pigmentation variable et un contour irrégulier; en cas de doute, demander un avis médical;
 - des personnes souffrant de coups de soleil;
 - des personnes ne pouvant pas du tout bronzer ou des personnes qui brûlent facilement lorsqu'elles sont exposées au soleil;
 - des personnes ayant des antécédents de graves coups de soleil durant leur enfance;
 - des personnes présentant ou ayant présenté un cancer de la peau ou une condition prédisposant au cancer de la peau;
 - des personnes traitées médicalement pour des maladies impliquant la photosensibilité;
 - des personnes sous traitement photosensibilisant;
- une indication selon laquelle, 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 UV, il convient de demander un avis médical avant de poursuivre l'exposition aux UV;

- une indication qu'il convient que les expositions ne dépassent pas la quantité minimale d'exposition à un rayonnement UV exigé pour produire un rougissement perceptible de la peau (dose érythémale minimale (DEM) pour une personne);
- une indication selon laquelle, si un rougissement de la peau (érythème) apparaît approximativement entre 16 h et 24 h après une quelconque exposition, il convient d'interrompre toute exposition supplémentaire. Les expositions peuvent reprendre une semaine après le début du programme d'exposition;
- une indication selon laquelle l'appareil ne doit pas être utilisé si la minuterie est défectueuse ou si le filtre est brisé ou enlevé;
- 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, et une indication selon laquelle ils ne doivent être remplacés que par les types marqués sur l'appareil. 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 entre dans la gamme de code d'équivalence du composant UV qui est marqué sur l'appareil. Dans ce cas, un exemple du code d'équivalence doit être donné et l'aspect du composant UV du code d'équivalence de la lampe fluorescente UV à bronzer doit être expliqué.

Les instructions applicables aux **appareils UV** doivent comporter, en substance, les informations et précautions suivantes:

- le rayonnement ultraviolet du soleil ou d'un appareil UV peut affecter la peau et les yeux de manière irréversible. Eviter 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. Les expositions trop répétées aux rayonnements ultraviolets du soleil ou d'un appareil UV peuvent provoquer un vieillissement prématuré de la peau, ainsi qu'une augmentation du risque de développement des 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 dans la vie;
- des inflammations superficielles peuvent se produire au niveau des yeux non protégés et, dans certains cas, la rétine peut être endommagée après une exposition excessive. La cataracte peut se développer après des expositions répétées;
- dans le cas de sensibilité individuelle prononcée ou de réaction allergique aux rayonnements ultraviolets, un avis médical est recommandé avant de commencer l'exposition;
- une information sur la distance d'exposition prévue (à moins que cette distance ne soit contrôlée par la construction de l'appareil UV);
- le programme d'exposition recommandé spécifiant les durées et les intervalles (reposant sur les caractéristiques d'émetteur UV, les distances et la sensibilité de la peau) (voir Annexe DD);
- le nombre d'expositions recommandé qu'il convient de ne pas dépasser en une année (voir Annexe DD);
- la référence du type de lunettes de protection à utiliser;
- les précautions suivantes doivent être prises:
 - toujours utiliser 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 bien 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 un minimum de 48 h entre les deux premières expositions;

- ne pas s'exposer au soleil et à l'appareil le même jour;
- suivre les recommandations concernant la durée, les intervalles des expositions et les distances par rapport à la lampe;
- demander un avis médical si des cloques persistantes ou des plaies apparaissent sur la peau, ou bien s'il se produit des modifications cutanées se traduisant par des mélanomes bénins;
- protéger de l'exposition les parties sensibles de la peau, telles que les cicatrices, les tatouages et les parties génitales.

Pour les appareils comportant un couvercle qui doit être ouvert en utilisation normale, les instructions doivent comporter un avertissement indiquant que l'appareil ne doit pas être mis sous tension avec le couvercle en position fermée et, qu'avant de fermer le couvercle pour ranger l'appareil, l'appareil doit être déconnecté de l'alimentation et être laissé refroidir.

NOTE 101 Cet avertissement n'est pas exigé si l'appareil satisfait aux essais de 19.2 et de 19.3.

Pour les appareils ayant des parties destinées à supporter une personne, les instructions doivent comporter, en substance, les informations suivantes:

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

Les instructions applicables aux appareils pourvus d'**émetteurs VIS** ou d'**émetteurs IR** doivent comporter, en substance, les informations suivantes:

- des conseils pour la protection des yeux contre l'exposition aux rayonnements visibles et infrarouges, ainsi que des conseils recommandant que des précautions soient prises en vue de protéger l'utilisateur contre les dangers d'une exposition excessive;
- une indication que les appareils VIS et les appareils UV ne doivent pas être utilisés par
 - des personnes souffrant de coups de soleil;
 - des personnes traitées médicalement pour des maladies impliquant la photosensibilité;
 - des personnes sous traitement photosensibilisant;
- une indication selon laquelle, 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;
- une information sur la distance d'exposition prévue (à moins que cette distance ne soit contrôlée par la construction de l'appareil);
- le programme d'exposition recommandé spécifiant les durées et les intervalles (reposant sur les caractéristiques de l'**émetteur** et les distances);
- une indication selon laquelle l'appareil ne doit pas être utilisé si la minuterie est défectueuse ou si le filtre est brisé ou enlevé;
- l'identification des composants de rechange qui peuvent avoir une influence sur le rayonnement, tels que les filtres et les réflecteurs;
- l'identification des **émetteurs** remplaçables et une indication selon laquelle 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 (inutile si l'appareil est conforme aux limites applicables au groupe sans risque défini en 6.1.1 de l'IEC 62471:2006, s'il est soumis aux essais exigés en 32.103).

Si le signal d'interdiction "Non destiné à un usage domestique" ou le symbole IEC 60417-6301 (2015-03) est utilisé, sa signification doit être expliquée.

7.14 Addition:

Le diamètre du signal d'interdiction "Non destiné à un usage domestique" 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 des mesures.

7.15 Addition:

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

8 Protection contre l'accès aux parties actives

L'article de la Partie 1 est applicable avec les exceptions suivantes.

8.1 Addition:

La conformité aux exigences applicables de la Section 8 de l'IEC 60598-1:2008 est vérifiée lors du remplacement des émetteurs, à moins que les instructions n'interdisent le remplacement par l'utilisateur et que des outils soient nécessaires.

8.1.3 Non applicable.

9 Démarrage des appareils à moteur

L'article de la Partie 1 n'est pas applicable.

10 Puissance et courant

L'article de la Partie 1 est applicable avec les exceptions suivantes.

10.1 Modification:

Les tolérances suivantes s'appliquent:

- pour les appareils munis uniquement d'émetteurs UV: + 10 %;
- pour les autres appareils: – 10 % à + 5 %.

10.2 Modification:

Les tolérances suivantes s'appliquent:

- pour les appareils munis uniquement d'émetteurs UV: + 10 %;
- pour les autres appareils: – 10 % à + 5 %.

11 Echauffements

L'article de la Partie 1 est applicable avec les exceptions suivantes.

11.2 Modification:

Les appareils normalement placés sur le sol ou une table sont placés sur le plancher du local d'essai avec leur face arrière aussi proche que possible de l'une des parois et loin de l'autre paroi.

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

Addition:

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

11.7 Remplacement:

L'appareil est mis en fonctionnement jusqu'à établissement de 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, selon la durée la plus courte.

11.8 Addition:

Les températures des enroulements de ballasts et du câblage associé ne doivent pas dépasser les valeurs spécifiées en 12.4 de l'IEC 60598-1:2008, lorsqu'elles sont mesurées dans les conditions spécifiées.

Les échauffements de surfaces en contact avec la peau ne doivent pas dépasser ceux qui sont spécifiés pour les poignées qui sont continuellement tenues dans la main.

12 Vacant

13 Courant de fuite et rigidité diélectrique à la température de régime

L'article de la Partie 1 est applicable.

14 Surtensions transitoires

L'article de la Partie 1 est applicable.

15 Résistance à l'humidité

L'article de la Partie 1 est applicable.

16 Courant de fuite et rigidité diélectrique

L'article de la Partie 1 est applicable.

17 Protection contre la surcharge des transformateurs et des circuits associés

L'article de la Partie 1 est applicable.

18 Endurance

L'article de la Partie 1 n'est pas applicable.

19 Fonctionnement anormal

L'article de la Partie 1 est applicable avec les exceptions suivantes.

19.1 Modification:

A la place des essais spécifiés, tous les appareils sont soumis aux essais de 19.4 à 19.12, de 19.101 et de 19.102, s'ils sont applicables.

Pour des appareils munis d'un couvercle, mais sans avertissement dans les instructions que l'appareil ne doit pas être mis sous tension avec le couvercle fermé, le Paragraphe 19.2 et le Paragraphe 19.3 sont applicables.

19.2 Remplacement:

Les appareils munis d'un couvercle qui est ouvert en utilisation normale sont soumis aux essais avec le couvercle fermé.

*Les essais sont effectués dans les conditions spécifiées à l'Article 11. Les appareils comportant des **émetteurs IR** sont mis en fonctionnement à 0,85 fois leur **puissance assignée**. Tous les autres appareils sont alimentés à 0,94 fois leur **tension assignée**.*

19.3 Remplacement:

*Les essais de 19.2 sont répétés, mais les appareils **avec des émetteurs IR** sont mis en fonctionnement à 1,24 fois leur **puissance assignée**. Tous les autres appareils sont alimentés à 1,1 fois leur **tension assignée**.*

19.9 Non applicable.

***19.101** Les appareils autres que ceux qui sont destinés à être montés à une hauteur supérieure à 1,8 m au-dessus du sol sont alimentés à leur **tension assignée** et mis en fonctionnement comme spécifié à l'Article 11. Lorsque les conditions de régime sont établies, une pièce de flanelle de coton blanchi sèche ayant une masse spécifique comprise entre 130 g/m² et 165 g/m², une largeur de 100 mm et une longueur suffisante pour recouvrir la face avant de l'appareil est tendue sur l'appareil dans la position la plus défavorable.*

La flanelle ne doit pas se consumer ni s'enflammer avant 10 s.

NOTE Si la combustion lente a commencé, un trou aux bords rougeoyants se sera formé dans le tissu. Un noircissement sans combustion lente n'est pas pris en considération.

***19.102** Les appareils munis de lampes à décharge sont mis en fonctionnement dans les conditions de défaut spécifiées en 12.5.1 a), d) et e) de l'IEC 60598-1:2008, l'appareil étant alimenté à la tension assignée.*

Les températures des ballasts ou des enroulements des transformateurs ne doivent pas dépasser les valeurs spécifiées en 12.5 de l'IEC 60598-1:2008.