IEC 60335-2-65

Edition 2.0 2015-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2
AMENDEMENT 2

Household and similar electrical appliances – Safety –
Part 2-65: Particular requirements for air-cleaning appliances

Appareils électrodomestiques et analogues – Sécurité –
Partie 2-65: Règles particulières pour les épurateurs d'air

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FOREWORD

This amendment has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

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

FDIS	Report on voting
61/4837/FDIS	61/4875/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

NOTE 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.

Contents

Replace the title of Clause 3 by the following:

Terms and definitions

2 Normative references

Replace the text by the following:

This clause of Part 1 is applicable except as follows.

Addition:

ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 4892-4:2013, *Plastics – Methods of exposure to laboratory light sources – Part 4: Open-flame carbon-arc lamps*

3 Definitions

Replace the title of Clause 3 but not the clause number, by the following:

Terms and definitions

Add the following definitions:

3.102
UV-C emitter
radiating source constructed to emit non-ionizing electromagnetic energy at wavelengths of 100 nm to 280 nm

3.103
UV radiation air-cleaning appliance
appliance that incorporates **UV-C emitters** to inactivate air-borne microbes

7 Marking and instructions

Add the following new subclause:

7.1 *Addition:*

UV radiation air-cleaning appliances containing replaceable **UV-C emitters** shall be marked with the type reference of the emitter and with the substance of the following warning:

> WARNING: UV radiation is dangerous for the eyes and skin. Do not operate the UV-C emitter outside the appliance.

If it is intended that replacement of the **UV-C emitter** can be carried out by the user, the appliance shall be marked with “Read the instructions” or with symbol ISO 7000-0790 (2004-01).

7.12

Add the following to the addition:

The instructions for **UV radiation air-cleaning appliances** shall give details concerning:

– the method, frequency of cleaning, and necessary precautions to be taken;
– precautions to be taken when replacing **UV-C emitters** and starters, if applicable.

The instructions of appliances containing **UV-C emitters** shall contain the substance of the following:

– This appliance contains a UV-C emitter.

– Unintended use of the appliance or damage to the housing may result in the escape of dangerous UV-C radiation. UV-C radiation may, even in little doses, cause harm to the eyes and skin.
– Appliances that are obviously damaged must not be operated.
– If the replacement of the **UV-C emitter** by the user is not allowed, this must be clearly stated.

The instructions of appliances containing replaceable **UV-C emitters** shall also contain the substance of the following:

– Read the maintenance instructions before opening the appliance;
– The appliance must be disconnected from the supply before replacing the UV-C emitter.

22 Construction

Add the following new subclauses:

22.103 UV radiation air-cleaning appliances shall not emit UV radiation in hazardous amounts:

– before, during or after installation;
– during operation;
– during maintenance;
– during cleaning;
– during replacement of the **UV-C emitter**.

*Compliance is checked by inspection and by the tests of Clause 32. If a switch is used to de-energize the **UV-C emitter** so as to meet the requirement, it shall not be possible to operate the switch with test probe B of IEC 61032.*

22.104 If the replacement of the **UV-C emitter** is allowed by the user, the appliance shall be constructed so that

– the replacement of the **UV-C emitter** is easily possible;
– if screws or components are omitted or incorrectly positioned or fastened, the appliance is rendered inoperable or manifestly incomplete;
– the **UV-C emitter** is deactivated by an interlock actuated by opening or removing of a part to gain access.

Compliance is checked by inspection and by manual test.

22.105 If the replacement of the **UV-C emitter** by the user is not intended, this shall be prevented by the construction of the appliance.

Compliance is checked by inspection and, if necessary, by manual test.

NOTE The requirement can be met if the emitter can only be replaced by the manufacturer or its service agent together with a part of the appliance.

22.106 Parts of organic material that are exposed to direct or reflected UV-C radiation shall be UV-C resistant.

Compliance is checked by inspection and, if necessary, by manual test.

23 Internal wiring

Replace the existing text by the following:

This clause of Part 1 is applicable except as follows.

23.101 Internal wiring that is exposed to direct or reflected UV-C radiation shall be UV-C resistant.

Compliance is checked by the following test.

Samples of the internal wiring are conditioned in accordance with Annex AA.

On completion of the conditioning, the cable is wrapped in metal foil and is wound around a conductive mandrel 15 mm in diameter for three turns. A voltage of 2 000 V is applied for 15 min between the conductor and the mandrel. There shall be no break down.

32 Radiation, toxicity and similar hazards

Replace the existing text by the following:

This clause of Part 1 is replaced by the following.

32.101 The ozone concentration produced by **air-cleaning appliances** shall not be excessive.

Compliance is checked by the following test, which is carried out in a room without openings having dimensions of 2,5 m × 3,5 m × 3,0 m, the walls being covered with polyethylene sheet. If the instructions state that the appliance is to be fixed in a room having a volume exceeding 30 m^3, the dimensions of the test room are increased accordingly.

The appliance is positioned in accordance with the instructions. Appliances used on a table are placed in the centre of the room approximately 750 mm above the floor.

*The room is maintained at approximately 25 °C and 50 % relative humidity. The appliance is supplied at **rated voltage** for 24 h, removable filters being removed if this is more unfavourable.*

The ozone sampling tube is to be located in the air stream 50 mm from the air outlet of the appliance. The background ozone concentration measured prior to the test is subtracted from the maximum concentration measured during the test.

The percentage of ozone in the room shall not exceed 5×10^{-6}.

32.102 Appliances shall not emit radiation in hazardous amount.

Compliance is checked by the followings test.

*The appliance is supplied at **rated voltage** and operated under **normal operation**. The irradiance is measured at a distance of 300 mm, the measuring instrument being positioned so that the highest radiation is recorded. If the appliance has an inspection window, the measuring distance is reduced to 0 mm.*

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 not exceeding 2,5 nm in an appropriate spectro-radiometric system. The spectro-radiometer shall have a bandwidth not exceeding 2,5 nm.

NOTE 1 A bandwidth of 1 nm is advisable for greater measurement accuracy in cases where a rapid change of the spectral energy occurs within a small bandwidth area.

*The irradiance is measured when the radiation from the **UV-C emitter** has stabilized. Appliances shall have a total irradiance not exceeding 0,003 W/m^2, for wavelengths between 200 nm and 280 nm. The spectral irradiance shall not exceed 10^{-5} Wm^{-2}nm^{-1}.*

NOTE 2 The total irradiance is given by

$$I = \sum_{200\,\mathrm{mm}}^{280\,\mathrm{mm}} E_\lambda \Delta\lambda$$

where

I is the total irradiance;

E_λ is the spectral irradiance in Wm^{-2}nm^{-1};

$\Delta\lambda$ is the wavelength interval in nm.

The total irradiance shall not exceed 1 mW/m^2 for wavelengths between 250 nm and 400 nm.

NOTE 3 The total irradiance is given by

$$E = \sum_{250\,\mathrm{mm}}^{400\,\mathrm{mm}} S_\lambda E_\lambda \Delta\lambda$$

where

E is the total effective irradiance;

E_λ is the spectral irradiance in Wm^{-2}nm^{-1};

S_λ is the weighting factor specified in Table 1;

$\Delta\lambda$ is the wavelength interval in nm.

Table 1 – Weighting factors for different wavelengths

Wavelength nm	Weighting factor (S_λ)		Wavelength nm	Weighting factor (S_λ)		Wavelength nm	Weighting factor (S_λ)
250	0,430		308	0,026		335	0,000 34
254	0,500		310	0,015		340	0,000 28
255	0,520		313	0,006		345	0,000 24
260	0,650		315	0,003		350	0,000 20
265	0,810		316	0,002 4		355	0,000 16
270	1,000		317	0,002 0		360	0,000 13
275	0,960		318	0,001 6		365	0,000 11
280	0,880		319	0,001 2		370	0,000 093
285	0,770		320	0,001 0		375	0,000 077
290	0,640		322	0,000 67		380	0,000 064
295	0,540		323	0,000 54		385	0,000 053
297	0,460		325	0,000 50		390	0,000 044
300	0,300		328	0,000 44		395	0,000 036
303	0,120		330	0,000 41		400	0,000 030
305	0,060		333	0,000 37			

NOTE The weighting factors for intermediate wavelengths are determined by interpolation.

Annexes

Replace the existing text by the following:

The annexes of Part 1 are applicable except as follows:

Annex AA
(normative)

UV radiation conditioning

AA.1 Ten samples of the internal wiring are subjected to ultraviolet light conditioning according to Clause AA.2 or AA.3. When the internal wiring is provided in more than one colour, ten samples of each colour are subjected to this conditioning.

The test samples are mounted on the inside of the cylinder in the ultraviolet light apparatus perpendicular to the light source and in such a way that the samples do not touch each other.

AA.2 The samples are to be exposed for 1 000 h to xenon-arc, method A, in accordance with ISO 4892-2. There shall be continuous exposure to light and intermittent exposure to water spray. The cycle shall consist of 102 min without water spray and 18 min with water spray. The apparatus shall operate with a water-cooled xenon-arc lamp, borosilicate glass inner and outer optical filters, a spectral irradiance of 0,35 W/m^2/nm at 340 nm and a black panel temperature of (65 ± 3) °C. The temperature of the chamber shall be (45 ± 3) °C. The relative humidity in the chamber shall be (50 ± 5) %.

AA.3 The samples are to be exposed for 720 h to open-flame sunshine carbon-arc, in accordance with ISO 4892-4. There shall be continuous exposure to light and intermittent exposure to water spray. The cycle shall consist of 102 min without water spray and 18 min with water spray. The apparatus shall operate with an open-flame sunshine carbon-arc lamp, borosilicate glass Type 1 inner and outer optical filters, a spectral irradiance of 0,35 W/m^2/nm at 340 nm and a black panel temperature of (63 ± 3) °C. The temperature of the chamber shall be (45 ± 3) °C. The relative humidity in the chamber shall be (50 ± 5) %.

Bibliography

Replace the text by the following.

The bibliography of Part 1 is applicable.