

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1 AMENDEMENT 1

Household and similar electrical appliances – Safety – Part 1: General requirements

Appareils électrodomestiques et analogues – Sécurité – Partie 1: Exigences générales



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Partie 1: Exigences générales**

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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
61/4639/FDIS	61/4675/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- withdrawn,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.

The contents of the corrigendum of January 2014 have been included in this copy.

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.

1 Scope

Add the following to Note 1:

Dual supply appliances, either mains-supplied or battery-operated, are regarded as **battery-operated appliances** when operated in the battery mode.

2 Normative references

Replace the reference to IEC 60252-1 by the following:

IEC 60252-1:2010, *AC motor capacitors – Part 1: General – Performance, testing and rating – Safety requirements – Guidance for installation and operation*

Add the following references:

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60730-2-9:2008¹, *Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls*

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

IEC 62477-1, *Safety requirements for power electronic converter systems and equipment – Part 1: General*

3 Terms and definitions

3.2.2 interconnection cord

Replace the existing definition and note by the following:

external flexible cord between two parts of an appliance, provided as part of a complete appliance for purposes other than connection to the supply mains

NOTE In **battery-operated appliances**, if the battery is placed in a separate box, the flexible lead or flexible cord connecting the box with the appliance is considered to be an **interconnection cord**.

3.3.10 class II appliance

Delete Note 3.

Add the following new definitions:

3.3.16

battery-operated appliance

appliance deriving its energy from batteries enabling the appliance to perform its intended function without a mains connection

3.6.7

battery box

separate compartment for containing the batteries that is detachable from the appliance

5 General conditions for the tests

5.17 *Replace the existing text by the following:*

Appliances powered by rechargeable batteries that are recharged in the appliance are tested in accordance with Annex B.

¹ There exists a consolidated edition 3.1 (2011) that includes edition 3:2008 and its Amendment 1:2011.

Battery-operated appliances powered by batteries that are non-rechargeable or not recharged in the appliance are tested in accordance with Annex S.

7 Marking and instructions

7.1 Add the following new paragraph after Note 4:

Class II appliances and **class III appliances** incorporating a functional earth shall be marked with the symbol IEC 60417-5018 (2011-07).

7.3 In Note 3, replace the text of the example by the following.

EXAMPLE: 230 V~/400 V 3N~: The appliance is only suitable for the voltage values indicated, 230 V~ being for single-phase, a.c. operation and 400 V 3N~ for three-phase, a.c. with neutral operation (an appliance with terminals for both supplies).

7.4 Replace the requirement by the following:

If the appliance can be adjusted for different **rated voltages** or **rated frequencies**, the voltage or the frequency to which the appliance is adjusted shall be clearly discernible. If frequent changes in voltage setting or frequency setting are not required, this requirement is considered to be met if the **rated voltage** or **rated frequency** to which the appliance is to be adjusted can be determined from a wiring diagram fixed to the appliance.

7.6 Replace [symbol ISO 7000-0434 (2004-01)] by [symbol ISO 7000-0434A (2004-01)].

7.8 Add the following to the first paragraph of the requirement:

- functional earthing terminals shall be indicated by symbol IEC 60417-5018 (2011-07).

7.12 Delete “for use” in the first paragraph and in the Note.

Add the following after the existing last paragraph of the requirement:

For appliances intended for use at altitudes exceeding 2 000 m, the maximum altitude of use shall be stated.

The instructions for appliances incorporating a functional earth shall state the substance of the following:

This appliance incorporates an earth connection for functional purposes only.

7.12.1 Add the following text:

For appliances marked with different **rated voltages** or different **rated frequencies** (separated by a /), instructions shall be included to indicate to the user or installer what action must be taken to adjust the appliance for operation at the required **rated voltage** or **rated frequency**.

7.15 Add the following:

The symbol IEC 60417-5018 (2011-07) shall be placed next to the symbol IEC 60417-5172 (2003-02) or the symbol IEC 60417-5180 (2003-02) as appropriate.

8 Protection against access to live parts

8.1.1 Delete the Note.

10 Power input and current

10.1 Replace the penultimate paragraph of the test specification by the following:

If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, then the power input is the maximum value that is exceeded for more than 10 % of the representative period. Otherwise the power input is taken as the arithmetic mean value.

10.2 Replace the penultimate paragraph of the test specification by the following:

If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, then the current is the maximum value that is exceeded for more than 10 % of the representative period. Otherwise the current is taken as the arithmetic mean value.

11 Heating

11.8 Delete the second sentence of the first paragraph.

Table 3 – Maximum normal temperature rises

After the entry for pins of appliance inlets, add the following new entry:

Pins of appliances for insertion into socket-outlets

45

Replace the second to last, third to last and fourth to last entries in Table 3 by the following:

External enclosure of motor-operated appliances except handles held in normal use: ^m	
– of bare metal	48
– of coated metal ⁿ	59
– of glass and ceramic	65
– of plastic having a thickness exceeding 0,4 mm ^l	74
Surfaces of handles, knobs, grips and similar parts which are continuously held in normal use (e.g. soldering irons): ^m	
– of bare metal	30
– of coated metal ⁿ	34
– of porcelain or vitreous material	40
– of rubber or of plastic having a thickness exceeding 0,4 mm ^l	50
– of wood	50
Surfaces of handles, knobs, grips and similar parts ^k which are held for short periods only in normal use (e.g. switches): ^m	
– of bare metal	35
– of coated metal ⁿ	39
– of porcelain or vitreous material	45
– of rubber or of plastic having a thickness exceeding 0,4 mm ^l	60
– of wood	65

Add the following footnotes to Table 3:

- ^k The temperature rise limits of controls actuated by contact or proximity of a finger, with no movement of the contact surface also includes all surfaces within 5 mm of such controls, regardless of their shape.
- ^l The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.
- ^m When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of the coated metal or of glass and ceramic material apply.
- ⁿ Metal is considered coated when a coating having a minimum thickness of 90 µm made by enamel, powder or non-substantially plastic coating is used.

13 Leakage current and electric strength at operating temperature

13.2 In the first paragraph, after “**class II appliances**” add “, **class II constructions**” and replace the second sentence by the following:

For **class 0I appliances** and **class I appliances**, C may be replaced by a low impedance ammeter responding to the **rated frequency** of the appliance.

Replace the second paragraph by the following:

The leakage current is measured between any pole of the supply and

- **accessible metal parts** intended to be connected to protective earth, for **class I appliances** and **class 0I appliances**;
- metal foil having an area not exceeding 20 cm × 10 cm which is in contact with **accessible surfaces** of insulating material and metal parts not intended to be connected to protective earth, for **class 0 appliances**, **class II appliances**, **class II constructions** and **class III appliances**.

Replace the fourth paragraph by the following:

For single-phase appliances, the measuring circuit is shown in the following figures:

- if they are **class II appliances** or parts of **class II construction**, Figure 1;
- if they are neither **class II appliances** nor parts of **class II construction**, Figure 2.

Replace the sixth paragraph by the following:

For three-phase with neutral (3N~) connected appliances, the measuring circuit is shown in the following figures:

- if they are **class II appliances** or parts of **class II construction**, Figure 3;
- if they are neither **class II appliances** nor parts of **class II construction**, Figure 4.

Delete “For three-phase appliances,” from the first sentence of the seventh paragraph.

Replace the third sentence of the seventh paragraph by the following:

For three-phase without neutral (3~) connected appliances, the measuring circuit in Figure 3 or Figure 4 shall be used as applicable, but the neutral is not connected to the appliance.

In the existing eighth paragraph, replace the first dashed item by the following:

- for **class II appliances** and for parts of **class II construction** 0,35 mA peak

15 Moisture resistance

15.2

Replace the first paragraph of the test specification by the following:

Compliance is checked by the following test using a spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent.

Replace the fifth paragraph of the test specification by the following:

The liquid container of the appliance is completely filled with the solution and a further quantity equal to 15 % of the capacity of the container or 0,25 l, whichever is the greater, is poured in steadily over a period of 1 min.

Add the following new text as a penultimate paragraph:

Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, the rinsing agent shall have the following properties:

- viscosity, 17 mPa·s;
- pH, 2,2 (1 % in water).

and its composition shall be

Substance	Parts by mass %
Plurafac ® LF 221 ²	15,0
Cumene sulfonate (40 % solution)	11,5
Citric acid (anhydrous)	3,0
Deionized water	70,5

16 Leakage current and electric strength

16.2 *Replace the first paragraph by the following:*

*An a.c. test voltage is applied between **live parts** and*

- **accessible metal parts** intended to be connected to protective earth, for **class I appliances** and **class 0I appliances**;
- metal foil having an area not exceeding 20 cm × 10 cm which is in contact with **accessible surfaces** of insulating material and metal parts not intended to be connected to protective earth, for **class 0 appliances**, **class II appliances**, **class II constructions** and **class III appliances**.

In the fourth paragraph, replace the first dashed item by the following:

- for **class II appliances** and for parts of **class II construction** 0,25 mA

² Plurafac ® LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of this product.

19 Abnormal operation

19.7 Add the following to the fourth paragraph.

*If the timer or programmer is an electronic type that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, it is considered to be a **protective electronic circuit** as well as a control that operates under the conditions of Clause 11.*

19.11.4.4 Replace the first paragraph by the following:

The power supply terminals of the appliance are subjected to voltage surges in accordance with IEC 61000-4-5, five positive impulses and five negative impulses being applied at the selected points. An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode, a generator having a source impedance of 2 Ω being used. An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling mode, a generator having a source impedance of 12 Ω being used.

22 Construction

22.5 In the requirement, replace “exceeding” by “equal to or greater than”.

Add the following text after the existing last paragraph of the test specification.

*If compliance relies on the operation of an **electronic circuit**, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied one at a time to the appliance. The discharge test is then repeated three times and for each test, the voltage shall not exceed 34 V.*

22.32 Replace the words ‘Insulating material’ at the beginning of the 4th paragraph of the requirement by ‘Ceramic and similar porous material’ and combine this paragraph with the third paragraph of the requirement.

22.33 Add the following to the first sentence of the first paragraph of the requirement:

“or unearthed metal parts that are separated from **live parts** by **basic insulation** only.”

22.35 In the second paragraph of the requirement add ‘and cordless appliances’ after ‘stationary appliances’.

Add the following note after the requirement:

NOTE A cordless appliance is an appliance that is connected to the supply only when placed on its associated stand.

Add the following new subclauses:

22.53 Class II appliances and class III appliances that incorporate functionally earthed parts shall have at least **double insulation** or **reinforced insulation** between **live parts** and the functionally earthed parts.

Compliance is checked by inspection and test.

22.54 Button cells and batteries designated R1 shall not be accessible without the aid of a **tool** unless the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously.

Compliance is checked by inspection and by manual test.

NOTE Batteries are specified in IEC 60086-2.

23 Internal wiring

23.5 *Replace Note 2 by the following text.*

For **class II construction**, the requirements for **supplementary insulation** and **reinforced insulation** apply except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide **supplementary insulation**.

A single layer of internal wiring insulation does not provide **reinforced insulation**.

24 Components

24.1 *Replace Notes 1, 2, 3 and 4 by the following, and renumber Note 5 to Note 2.*

Compliance with the IEC standard for the relevant component does not necessarily ensure compliance with the requirements of this standard.

Motors are not required to comply with IEC 60034-1. They are tested as part of the appliance according to this standard.

Relays shall be tested as part of the appliance according to this standard. They may be alternatively tested to IEC 60730-1, in which case they must also meet the additional requirements in IEC 60335-1.

Unless otherwise specified, the requirements of Clause 29 of this standard apply between **live parts** of components and **accessible parts** of the appliance. Unless otherwise specified, components may comply with the requirements for **clearances** and **creepage distances** for **functional insulation** as specified in the relevant component standard.

Unless otherwise specified, the requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components.

Components that have not been previously tested and shown to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2 of this standard.

Components that have been previously tested and shown to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided that

- the severity specified in the component standard is not less than the severity specified in 30.2 of this standard, and
- unless the pre-selection alternatives in 30.2 are used, the test report for the component states the values of t_e and t_i as required by IEC 60695-2-11.

If the above two conditions are not satisfied, the component shall be tested as part of the appliance.

NOTE 1 There are two levels of severity specified for appliances for which 30.2.3 is applicable.

Power electronic converter circuits are not required to comply with IEC 62477-1. They are tested as part of the appliance according to this standard.

24.1.2 Add the following text as a new first paragraph.

The relevant standard for transformers in associated switch mode power supplies is Annex BB of IEC 61558-2-16. Clause 26 of IEC 61558-1 and Annex H of IEC 61558-1 are not applicable.

24.1.4 Add the following new paragraph:

Thermal cut-outs of the capillary type shall comply with the requirements for type 2.K controls in IEC 60730-2-9.

24.1.5 In the second sentence of the first paragraph, add “**class II**” before “appliances”.

25 Supply connection and external flexible cords

25.1 Replace the first dashed item of the requirement by the following:

- **supply cord** fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance;

25.7 Delete the third dashed item in the first paragraph of the requirement.

25.10 Add the following as a new paragraph to the requirement.

In multi-phase appliances, the colour of the neutral conductor of the **supply cord**, if any, shall be blue.

25.13 In the requirement, replace the second sentence by the following:

If it is not evident from the construction of the appliance that the **supply cord** can be introduced without risk of damage, a **non-detachable lining** or **non-detachable bushing** shall be provided that complies with 29.3 for **supplementary insulation**.

25.15 Replace the second paragraph of the test specification by the following:

A mark is made on the cord at a distance of approximately 20 mm from the cord anchorage or other suitable point. The mark is made while the cord is subjected to a pull force of

- 100 N, for **fixed appliances** regardless of the mass of the appliance;
- the value as shown in Table 12, for other appliances.

25.20 Delete, in the first sentence, the word “insulated” in the phrase “insulated conductors of the **supply cord**” and the word “additionally” in the phrase “shall be additionally insulated”.

27 Provision for earthing

27.1 In the first paragraph of the requirement replace “an insulation fault” by “a failure of **basic insulation**”.

Delete Note 1 and replace “Note 2” by “Note”.

Replace the third paragraph by the following:

Class 0 appliances, **class II appliances** and **class III appliances** shall have no provision for protective earthing. **Class II appliances** and **class III appliances** may incorporate an earth for functional purposes.

27.2 *Add the following paragraph to the requirement:*

These requirements are not applicable to **class II appliances** and **class III appliances** that incorporate an earth for functional purposes.

27.3 *Add the following paragraph to the requirement:*

These requirements are not applicable to **class II appliances** and **class III appliances** that incorporate an earth for functional purposes.

27.4 *Add the following paragraph to the requirement:*

These requirements are not applicable to **class II appliances** and **class III appliances** that incorporate an earth for functional purposes.

27.5 *Add the following paragraph to the requirement:*

These requirements are not applicable to **class II appliances** and **class III appliances** that incorporate an earth for functional purposes.

Replace existing Note 1 by the following as an addition to the existing second paragraph of the test specification.

The test is carried out until steady conditions have been established.

Replace existing Note 2 by the following as an addition to the last paragraph of the test specification.

*The resistance of the **supply cord** is not included in the resistance calculation.*

Renumber existing Note 3 as Note.

27.6 *Add the following sentence to the requirement:*

This requirement is not applicable to **class II appliances** and **class III appliances** that incorporate an earth for functional purposes.

28 Screws and connections

28.2 *In the second paragraph of the requirement, replace bullets with dashes in the two bulleted items.*

29 Clearances, creepage distances and solid insulation

29.1 *Add the following as a new second paragraph of the requirement:*

For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 shall be increased according to the relevant multiplier values in Table A.2 of IEC 60664-1.

Add the following to the existing second paragraph of the requirement:

or to appliances intended for use at altitudes exceeding 2 000 m.

Delete Note 5.

Table 17 – Minimum creepage distances for basic insulation

Replace Note 1 by the following:

Lacquered conductors of windings are considered to be bare conductors but **creepage distances** for **basic insulation** in other than a **double insulation** construction need not be greater than the associated **clearance** specified in Table 16 taking into account 29.1.1.

29.3 *Replace the third dashed item by the following:*

- *for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3 and for **accessible parts of reinforced insulation** consisting of a single layer, by measurement in accordance with 29.3.4, or*

Add the following as the fourth dashed item of the test specification:

- *by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or*

Figures

Figure 1 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of class II appliances

Replace the title of Figure 1 by the following:

Figure 1 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of class II appliances and for parts of class II construction

Figure 2 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of appliances, other than those of class II

Replace the note of Figure 2 by the following:

NOTE For **class 0I appliances** and **class I appliances**, C can be replaced by a low impedance ammeter responding to the **rated frequency** of the appliance.

Replace the title of Figure 2 by the following:

Figure 2 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of other than class II appliances or parts of class II construction