STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Amendment No. 2 to AS/NZS 60335.1:2002 Household and similar electrical appliances - Safety – Part 1: General requirements

REVISED TEXT

The 2002 edition of AS/NZS 60335.1 is amended as follows; the amendments should be inserted in the appropriate places.

SUMMARY: This amendment applies to Title, Foreword and Clauses 1, 2, 3, 5, 7, 8, 10, 11, 14, 16, 19, 22, 24, 25, 26, 27, 28, 29, 30 and 32 and Figure 7 and Annexes D, E, J, O, Q and ZZ and the Bibliography.

Published on 25 May 2007

Approved for publication in Australia on behalf of the Council of Standards Australia on 3 May 2007

Approved for publication in New Zealand by the Standards Council of New Zealand on 30 March 2007

This amendment takes effect from the date of publication.

TITLE

Replace IEC 60335-1:2001 *by* IEC 60335-1: Ed 4.2

FOREWORD

Replace the second paragraph by the following:

This standard incorporates Amendment No. 1 (May 2004) and Amendment No. 2 (May 2007). The changes introduced by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) is indicated by the marginal bar against the part affected.

Replace the fourth paragraph by the following:

This Standard is an adoption with national modifications and contains the full text of the fourth edition of IEC 60335-1, *Household and similar electrical appliances – Safety - Part 1: General requirements*, including its corrigendum 1 (2002-01) and amendment 1 (2004-03) and amendment 2 (2006-05) including its corrigendum 1 (2006-08) along with corrigendum 1 to edition 4.1 (2005-12) and interpretation sheet IS1 to edition 4.1 (2007-02) and has been varied as indicated to take account of Australian and New Zealand conditions.

In the sixth, twelfth and thirteenth paragraphs replace IEC 60335-1:2001 *by* IEC 60335-1: Ed 4.2.

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1 Scope

Replace the two dashed items in the third paragraph by the following:

– persons (including children) whose
  - physical, sensory or mental capabilities; or
  - lack of experience and knowledge

  prevents them from using the appliance safely without supervision or instruction;
– children playing with the appliance.

2 Normative references

Delete from the existing list the following normative references:

IEC 60249-2-4
IEC 60249-2-5

Replace reference to IEC 60085 *by the following new reference:*

IEC 60085:	2004,	*Electrical insulation – Thermal classification*

Replace the year of publication of IEC 60384-14 *by* "2005".

Replace reference to IEC 60664-3 *by the following new reference:*

IEC 60664-3:	2003,	*Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

Replace reference to IEC 60695-2-2 *by the following new reference:*

IEC 60695-11-5:	2004,	*Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*	AS/NZS 60695.11.5	2005

Replace reference to IEC 60730-1:1999 *by the following reference:*

IEC 60730-1:	1999,	*Automatic electrical controls for household and similar use – Part 1: General requirements*
Amendment 1	2002	

Replace reference to IEC 60730-2-8:2000 *by the following reference:*

IEC 60730-2-8:	2000,	*Automatic electrical controls for household and similar use – Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements*
Amendment 1	2002	

Replace reference to IEC 61000-4-11 *by the following new reference:*

IEC 61000-4-11:	2004,	*Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

Replace reference to IEC 61558-1:1997 *by the following reference:*

IEC 61558-1:	1997,	*Safety of power transformers, power supply units and similar – Part 1: General requirements and tests*
Amendment 1	1998	

Replace reference to ISO 9772:2001 *by the following reference:*

ISO 9772:	2001,	*Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*
Amendment 1	2003	

Replace ISO 7000 *by* ISO 7000-DB:2004.

Add the following new references:

IEC 60691:	2002,	*Thermal-links – Requirements and application guide*
IEC 62151		*Safety of equipment electrically connected to a telecommunication network*

3 Definitions

Add the following new definition:

3.1.12

remote operation
control of an appliance by a command that can be initiated out of sight of the appliance using means such as telecommunications, sound controls or bus systems

NOTE An infra-red control by itself is not considered one used for **remote operation.** However, it may be incorporated as part of a system such as a telecommunication, sound control or bus system.

3.6.3 *Add the following:*

NOTE **Accessible non-metallic parts** with conductive coatings are considered to be **accessible metal parts**.

5 General conditions for the tests

5.3 *Add the following to the first paragraph:*

The test of 19.14 is carried out before the tests of 19.11.

7 Marking and instructions

7.5 *In the first paragraph of the requirement, replace (in two places)* "mean value" *by* "arithmetic mean value".

7.6 *Replace the third and fourth symbols by the following:*

3 ~	[symbol IEC 60417-5032-1 (DB:2002-10)]	three-phase alternating current
3N ~	[symbol IEC 60417-5032-2 (DB:2002-10)]	three-phase alternating current with neutral

Replace the symbol 1641 of ISO 7000 by the following:

	[symbol ISO 7000-1641 (DB:2004-01)]	operator's manual; operating instructions

Add

the following symbol:

	[symbol ISO 7000-0790 (DB:2004-01)]	read operator's manual

7.12 *Replace the shaded paragraphs by the following:*

The instructions shall state the substance of the following:

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

8 Protection against access to live parts

8.1 *Delete Note 201*

8.1.1 *Renumber the existing note as Note 1.*

Add the following note after the third paragraph of the test specification:

NOTE 2 ”Without appreciable force” is considered to be a force not exceeding 1 N.

8.1.2 *Renumber the existing note as Note 1.*

Add the following note after the first paragraph of the test specification:

NOTE 2 ”Without appreciable force” is considered to be a force not exceeding 1 N.

8.1.3 *Add the following note after the first paragraph of the test specification:*

NOTE 1 ”Without appreciable force” is considered to be a force not exceeding 1 N.

Renumber the existing note as Note 2.

8.1.4 *Add the following dashed item to the second paragraph of the requirement:*

– for voltages having a peak value over 15 kV, the energy in the discharge shall not exceed 350 mJ.

Replace the third sentence of the second paragraph of the test specification by the following:

The quantity of electricity and energy in the discharge is measured using a resistor having a nominal non-inductive resistance of 2 000 Ω.

8.2 *Replace the test specification by the following:*

Compliance is checked by inspection and by applying test probe B of IEC 61032 in accordance with the conditions specified in 8.1.1.

Delete Note 1 and renumber existing Note 2 as Note.

10 Power input and current

10.1 *Add the following to the requirement:*

The permissible deviations apply for both limits of the range for appliances marked with a **rated voltage range** having limits differing by more than 10 % of the arithmetic mean value of the range.

In the second paragraph of the test specification, replace “mean value” by “arithmetic mean value”.

Delete Notes 2 and 3 and renumber existing Note 1 as Note.

Add the following to the test specification:

*The test is carried out at both the upper and lower limits of the ranges for appliances marked with one or more **rated voltage ranges**, unless the marking of the **rated power input** is related to the arithmetic mean value of the relevant voltage range, in which case the test is carried out at a voltage equal to the arithmetic mean value of that range.*

10.2 *Add the following to the requirement:*

The permissible deviations apply for both limits of the range for appliances marked with a **rated voltage range** having limits differing by more than 10 % of the arithmetic mean value of the range.

In the second paragraph of the test specification, replace "mean value" by "arithmetic mean value".

Delete Notes 2 and 3 and renumber existing Note 1 as Note.

Add the following to the test specification:

*The test is carried out at both the upper and lower limits of the ranges for appliances marked with one or more **rated voltage ranges**, unless the marking of the **rated current** is related to the arithmetic mean value of the relevant voltage range, in which case the test is carried out at a voltage equal to the arithmetic mean value of that range.*

11 Heating

Table 3 – Maximum normal temperature rises

In the first entry, replace the terms "class A, class E, class B, class F and class H" by the terms "class 105, class 120, class 130, class 155 and class 180" respectively.

Replace the fifth entry by the following:

*Rubber, polychloroprene or polyvinyl chloride insulation of internal and external wiring, including **supply cords**:*	
– without temperature rating or with a temperature rating not exceeding 75 °C	*50*
– with temperature rating (T) [j] where T exceeds 75 °C	*T-25* [aa]

Add the following paragraph to footnote [a]:

The temperature rise limit of windings in transformers and inductors mounted on printed circuit boards is equal to the thermal class of the winding insulation reduced by 25 K provided the largest dimension of the winding does not exceed 5 mm in cross section or length.

Replace footnote [aa] by the following:

[aa] *For **portable appliances**, temperature rises not exceeding 75K are allowed on PVC insulation of **supply cords** which have a T rating of 90°C, provided that they are protected by an enclosure and are not subject to movement.*

Add the following footnote:

[j] *IEC 60245 Types 53, 57 and 87 **supply cords** have a T rating of 60 °C;*
*IEC 60227 Types 52 and 53 **supply cords** have a T rating of 70 °C;*
*IEC 60227 Types 56 and 57 **supply cords** have a T rating of 90 °C.*

14 Transient overvoltages

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

The impulse test voltage has a no-load waveshape corresponding to the 1,2/50 μs standard impulse specified in IEC 61180-1. It is supplied from a generator having a conventional impedance not exceeding 42 Ω. The impulse test voltage is applied three times for each polarity with intervals of at least 1 s.

Delete Note 3.

16 Leakage current and electric strength

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

Immediately after the test of 16.2, the insulation is subjected to a voltage having a frequency of 50 Hz or 60 Hz for 1 min in accordance with IEC 61180-1. The values of the test voltage for different types of insulation are given in Table 7.

Replace Note 2 by the following:

NOTE 2 The characteristics of the high-voltage source used for the test are described in Table 5.

Delete the penultimate paragraph of the test specification.

19 Abnormal operation

19.1 *Add the following new paragraph after the third paragraph of the test specification:*

Appliances incorporating contactors or relays are subjected to the test of 19.14.

19.7 *In the second paragraph, replace "IEC 60252" by "IEC 60252-1".*

19.11 *Replace the existing second paragraph by the following:*

*Appliances incorporating an **electronic circuit** that relies upon a programmable component to function correctly are subjected to the test of 19.11.4.8, unless restarting at any point in the operating cycle after interruption of operation due to a supply voltage dip will not result in a hazard. The test is carried out after removal of all batteries and other components intended to maintain the programmable component supply voltage during mains supply voltage dips, interruptions and variations.*

In the existing third paragraph, replace "switch" by "device" in two places.

In the sixth paragraph replace "all three" by "both" and delete the last dashed item.

19.11.2 *In the first paragraph of the test specification, add the following after Note 2:*

g) failure of an electronic power switching device in a partial turn-on mode with loss of gate (base) control. During this test, winding temperatures shall not exceed the values given in 19.7.

NOTE 3 This mode may be simulated by disconnecting the electronic power switching device gate (base) terminal and connecting an external adjustable power supply between the gate (base) terminal and the source (emitter) terminal of the electronic power switching device. The power supply is then varied so as to achieve a current that will not damage the electronic power switching device but give the most onerous conditions of test.

NOTE 4 Examples of electronic power switching devices are field effect transistors (FET's and MOSFET's) and bipolar transistors (including IGBT's).

19.11.4 *In the first paragraph, replace "switch" by "device" in three places.*

In the last paragraph, replace "arresters" by "protective devices".

19.11.4.6 *Replace the text by the following:*

The appliance is subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11. The values specified in Table 1 and Table 2 of IEC 61000-4-11 are applied at zero crossing of the supply voltage.

Add the following new subclause:

19.11.4.8 *The appliance is supplied at **rated voltage** and operated under **normal operation**. After approximately 60 s, the power supply voltage is reduced to a level such that the*

appliance ceases to respond to user inputs or parts controlled by the programmable component cease to operate, whichever occurs first. This value of supply voltage is recorded. The appliance is supplied at ***rated voltage*** *and operated under* ***normal operation****. The voltage is then reduced to a value of approximately 10 % less than the recorded voltage. It is held at this value for approximately 60 s and then increased to* ***rated voltage****. The rate of decrease and increase of the power supply voltage is to be approximately 10 V/s.*

The appliance shall continue to either operate normally from the same point in its operating cycle at which the voltage decrease occurred or a manual operation shall be required to restart it.

19.13 *Replace the second paragraph by the following:*

After the tests, and when the appliance has cooled to approximately room temperature, compliance with Clause 8 shall not be impaired and the appliance shall comply with 20.2 if it can still be operated.

Add the following immediately before the penultimate paragraph:

After the operation or interruption of a control, ***clearances*** *and* ***creepage distances*** *across the* ***functional insulation*** *shall withstand the electric strength test of 16.3, the test voltage, however, being twice the* ***working voltage****.*

Replace the last paragraph by the following:

Appliances tested with an electronic switch in the ***off position****, or in the stand-by mode, shall*

– *not become operational, or*
– *if they become operational, not result in a* ***dangerous malfunction*** *during or after the tests of 19.11.4.*

NOTE Unintended operation that may impair safety can result from careless use of appliances, such as:

– storage of small appliances while connected to the supply;
– placing flammable material on working surfaces of heating appliances; or
– placing objects in areas near motorized appliances that are not expected to start.

Add the following new subclause:

19.14 *Appliances are operated under the conditions of Clause 11. Any contactor or relay contact that operates under the conditions of Clause 11 is short-circuited.*

NOTE If a relay or contactor with more than one contact is used, all contacts are short-circuited at the same time.

22 Construction

22.2 *Replace the second paragraph of the requirement by the following:*

Single-pole switches and single-pole **protective devices** that disconnect heating elements from the supply mains in single-phase, permanently connected **class 0I appliances** and **class I appliances** shall be connected to the phase conductor.

22.5 *In the requirement, after "*charged capacitors*" add "*having a rated capacitance exceeding 0,1 µF*".*

Delete the note.

22.21 *Add the following to the requirement:*

This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements.

Delete Note 2.

22.32 *Add the following paragraph to the requirement:*

Insulating material in which heating conductors are embedded is considered to be **basic insulation** and not **reinforced insulation**.

Delete Note 1 and renumber existing Note 2 as Note.

22.35 *Replace the first paragraph of the requirement by the following:*

For constructions other than those of **class III**, handles, levers and knobs that are held or actuated in normal use shall not become live in the event of a failure of **basic insulation**. If these handles, levers and knobs are of metal and if their shafts or fixings are likely to become live in the event of a failure of **basic insulation**, they shall be adequately covered by insulating material or their **accessible parts** shall be separated from their shafts or fixings by **supplementary insulation.**

22.40 *Add the following new paragraph and note:*

Unless the appliance can operate continuously, automatically or remotely without giving rise to a hazard, appliances for **remote operation** shall be fitted with a switch for stopping the operation of the appliance. The actuating member of this switch shall be easily visible and accessible.

NOTE Examples of appliances that can operate continuously, automatically or remotely without giving rise to a hazard are fans, storage water heaters, air conditioners, refrigerators and drives for awnings, windows, doors, gates and rolling shutters.

22.44 *Replace the text by the following:*

Appliances shall not have an enclosure that is shaped or decorated like a toy.

NOTE Examples of such enclosures are those representing animals, characters, persons or scale models.

Compliance is checked by inspection.

22.46 *Replace the text by the following:*

Software used in **protective electronic circuits** shall be **software class B** or **software class C**.

If failure of the software in the presence of another fault in the appliance would result in a hazard, then **software class B** shall be used. If failure of software alone would result in a hazard, then **software class C** shall be used.

*Compliance is checked by evaluating the software in accordance with the relevant requirements of Annex R and, for checking if the correct software class is used, by assessing whether failure of the function controlled by the software can result in a **dangerous malfunction**, electric shock, fire, mechanical or other hazard.*

NOTE 1 Software class A denotes software used for functional purposes.

NOTE 2 In case the software is modified, the evaluation and relevant tests are repeated if the modification can influence the results of the tests involving **protective electronic circuits**.

Add the following new subclauses:

22.49 For **remote operation**, the duration of operation shall be set before the appliance can be started unless the appliance switches off automatically at the end of a cycle or it can operate continuously without giving rise to a hazard.

Compliance is checked by inspection.

NOTE For appliances such as ovens, the duration of operation has to be set before the appliance can be started. Washing machines and dishwashers are examples of appliances that switch off automatically at the end of a cycle. Fans, storage water heaters, air conditioners and refrigerators are examples of appliances that can operate continuously without giving rise to a hazard.

22.50 Controls incorporated in the appliance, if any, shall take priority over controls actuated by **remote operation.**

Compliance is checked by inspection and by appropriate tests if necessary.

22.51 A control on the appliance shall be manually adjusted to the setting for **remote operation** before the appliance can be operated in this mode. There shall be a visual indication on the appliance showing that the appliance is adjusted for **remote operation**. The manual setting and the visual indication of the remote mode are not necessary on appliances that can

- operate continuously, or
- operate automatically, or
- be operated remotely,

without giving rise to a hazard.

Compliance is checked by inspection.

NOTE Examples of appliances that can operate continuously, automatically or remotely without giving rise to a hazard are fans, storage water heaters, air conditioners, refrigerators and drives for awnings, windows, doors, gates and rolling shutters.

22.52 Socket-outlets on appliances accessible to the user shall be in accordance with the socket-outlet system used in the country in which the appliance is sold.

Compliance is checked by inspection.

24 Components

24.1 *Replace the shaded text and struck through text by the following*

24.1 Components shall comply with the safety requirements specified in the relevant IEC standard as far as they reasonably apply.

NOTE 201 The relevant IEC standard may be replaced with the relevant Australia/New Zealand standard where applicable.

NOTE 1 Compliance with the IEC standard for the relevant component does not necessarily ensure compliance with the requirements of this standard.

NOTE 2 Motors are not required to comply with IEC 60034-1.

NOTE 3 Unless otherwise specified, the requirements of Clause 29 of this standard apply between **live parts** of components and **accessible parts** of the appliance.

NOTE 4 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 been previously tested and shown to comply with the resistance to fire requirements in the IEC 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 preselection alternative is used, the test report for the component states whether it complied with the IEC standard for the relevant component with or without flame. Flames existing for a cumulative time not exceeding 2 s during the test are ignored.

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

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

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.

Unless components have been previously tested and found to comply with the relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9.

Components that have not been separately tested and found to comply with the relevant IEC standard, components that are not marked or not used in accordance with their marking, are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard.

NOTE 5 For automatic controls, marking includes documentation and declaration as specified in clause 7 of IEC 60730-1.

Lampholders and starterholders that have not been previously tested and found to comply with the relevant IEC standard are tested as a part of the appliance and shall additionally comply with the gauging and interchangeability requirements of the relevant IEC standard under the conditions occurring in the appliance.

NOTE 6 Where the relevant IEC standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used.

When an IEC standard does not exist for a component, there are no additional tests specified.

Add the following new subclauses:

24.1.7 *If the **remote operation** of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151.*

In Australia, telecommunication interface circuitry must comply with the Telecom Labelling Notice issued under the Telecommunications Act instead of IEC 62151.

NOTE 201 The Telecommunications Act is administered by the Australian Communications Authority.

24.1.8 *The relevant standard for **thermal links** is IEC 60691. **Thermal links** that do not comply with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19.*

24.1.9 *Relays, other than motor starting relays, are tested as part of the appliance. However, they are also tested in accordance with Clause 17 of IEC 60730-1 under the maximum load conditions occurring in the appliance for at least the number of operations in 24.1.4 selected according to the relay function in the appliance.*

25 Supply connections and external flexible cords

25.7 *Replace the text by the following:*

Supply cords shall be one of the following types:

– Rubber sheathed.

Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53);

NOTE 1 These cords are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.

– Polychloroprene sheathed.

Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57);

NOTE 2 These cords are suitable for appliances intended to be used in low temperature applications.

– Cross-linked polyvinyl chloride sheathed.

Their properties shall be at least those of cross-linked polyvinyl chloride sheathed cords (code designation 60245 IEC 87);

NOTE 3 These cords are suitable for appliances when they may come into contact with hot surfaces. Due to the composition of the conductors, the cords are suitable for applications where high flexibility is required.

– Polyvinyl chloride sheathed.

These cords shall not be used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of Clause 11. Their properties shall be at least those of

- light polyvinyl chloride sheathed cord (code designation 60227 IEC 52), for appliances having a mass not exceeding 3 kg;
- ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53), for other appliances;

– Heat resistant polyvinyl chloride sheathed.

These cords shall not be used for **type X attachment** other than specially prepared cords. Their properties shall be at least those of

- heat-resistant light polyvinyl chloride sheathed cord (code designation 60227 IEC 56), for appliances having a mass not exceeding 3 kg;
- heat-resistant polyvinyl chloride sheathed cord (code designation 60227 IEC 57), for other appliances.

Compliance is checked by measurement.

26 Terminals for external conductors

26.2 *Replace the note by the following:*

NOTE Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain it in position unless they are held in place near the terminals independently of the solder.

In Table 13, replace the last two rows by the following:

>32 and ≤50	6 and 10	6 to 16
>50 and ≤63	10 and 16	10 to 25

26.3 *In the test specification, replace "8.6" by "9.6".*

26.11 *Replace Notes 1 and 2 by the following:*

NOTE Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain it in position unless they are held in place near the terminals independently of the solder.

27 Provision for earthing

27.6 *Replace the text by the following:*

27.6 The printed conductors of printed circuit boards shall not be used to provide earthing continuity in **hand-held appliances**. They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit.

Compliance is checked by inspection and by the relevant tests.

28 Screws and connections

Table 14 – Torque for testing screws and nuts

Replace the penultimate row of Table 14 by the following:

>4,7 and ≤5,3	*0,8*	*2,0*	*1,0*	

28.3 *Replace the second and third paragraphs of the requirement by the following:*

Thread-cutting (self-tapping) screws and thread rolling screws shall only be used for electrical connections if they generate a full form standard machine screw thread. However, thread-cutting (self-tapping) screws shall not be used if they are likely to be operated by the user or installer.

Thread-cutting, thread rolling and space-threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection

– in normal use,
– during **user maintenance**,
– when replacing a **supply cord** having a **type X attachment**, or
– during installation.

At least two screws must be used for each connection providing earthing continuity unless the screw forms a thread having a length of at least half the diameter of the screw.

29 Clearances, creepage distances and solid insulation

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

*If coatings are used on printed circuit boards to protect the microenvironment (Type 1 coating) or to provide **basic insulation** (Type 2 coating), Annex J applies. The microenvironment is pollution degree 1 under Type 1 coating. There are no **clearance** or **creepage distance** requirements under Type 2 coating.*

29.1 *In Note 2, replace "*suppression*" by "*protective*".*

Add the following new note:

NOTE 6 For appliances intended for use at altitudes exceeding 2 000 m, the altitude correction factors for clearances specified in Table A.2 of IEC 60664-1 should be taken into account.

29.1.1 *Replace the second sentence of the requirement by the following:*

The values of Table 16, or the impulse voltage test of Clause 14, are applicable.

29.2 *Replace Note 1 by the following*:

NOTE 1 The **working voltage** for parts connected to the neutral is the same as for parts connected to the phase and this is the **working voltage** for **basic insulation**.

Add the following new note:

NOTE 6 In a **double insulation** system, the **working voltage** for both the **basic insulation** and **supplementary insulation** is taken as the **working voltage** across the complete **double insulation** system. It is not divided according to thickness and dielectric constant of the **basic insulation** and **supplementary insulation**.

30 Resistance to heat and fire

30.2 *Replace the text by the following:*

30.2 Parts of non-metallic material shall be resistant to ignition and spread of fire.

This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance.

Compliance is checked by the test of 30.2.1. In addition,

– *for attended appliances, 30.2.2 is applicable;*

– *for unattended appliances, 30.2.3 is applicable.*

*Appliances for **remote operation** are considered to be appliances that are operated while unattended and consequently they are subjected to the test of 30.2.3.*

For the base material of printed circuit boards, compliance is checked by the test of 30.2.4.

The tests are carried out on parts of non-metallic material that have been removed from the appliance. When the glow-wire test is carried out, the parts are placed in the same orientation as they would be in normal use.

NOTE 1 For parts that have been removed, it is the intention that IEC 60695-2-11 Clause 4 item c) applies, which states “remove the part under examination in its entirety and test it separately”.

These tests are not carried out on the insulation of wires.

NOTE 2 The selection and sequence of tests for resistance to fire are shown in Figure O.2.

30.2.1 *Parts of non-metallic material are subjected to the glow-wire test of IEC 60695-2-11, which is carried out at 550 °C.*

The glow-wire test is not carried out on parts of material classified at least HB40 according to IEC 60695-11-10 provided that the test sample used for the classification was no thicker than the relevant part of the appliance.

Parts for which the glow-wire test cannot be carried out, such as those made of soft or foamy material, shall meet the requirements specified in ISO 9772 for material classified HBF, the test sample used for the classification being no thicker than the relevant part of the appliance.

30.2.2 *For appliances that are operated while attended, parts of non-metallic material supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections, are subjected to the glow-wire test of IEC 60695-2-11. However, the glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least*

– *750 °C, for connections which carry a current exceeding 0,5 A during **normal operation**,*

– *650 °C, for other connections.*

If the glow-wire flammability index is not available for a sample with a thickness within ± 0,1 mm of the relevant part, then the test sample shall have a thickness equal to the nearest preferred value specified in IEC 60695-2-12 that is no thicker than the relevant part.

NOTE 1 The preferred values in IEC 60695-2-12 are 0,75 mm ± 0,1 mm, 1,5 mm ± 0,1 mm and 3,0 mm ± 0,2 mm.

Where a non-metallic material is within 3 mm of a current carrying connection, but is shielded from the connection by a different material, the glow-wire test of IEC 60695-2-11 is carried out at the relevant temperature with the tip of the glow-wire applied to the interposed shielding material with the shielded material in place and not directly to the shielded material.

When the glow-wire test of IEC 60695-2-11 is carried out, the temperatures are

– *750 °C, for connections that carry a current exceeding 0,5 A during **normal operation**,*
– *650 °C, for other connections.*

NOTE 2 Contacts in components such as switch contacts are considered to be connections.

NOTE 3 The tip of the glow-wire should be applied to the part in the vicinity of the connection.

This test is not applicable to:

– *parts supporting welded connections;*
– *parts supporting connections in low-power circuits described in 19.11.1;*
– *soldered connections on printed circuit boards;*
– *connections on small components on printed circuit boards;*

and parts within 3 mm of any of these connections.

NOTE 4 Examples of small components are diodes, transistors, resistors, inductors, integrated circuits and capacitors not directly connected to the supply mains.

It is also not applicable to

– ***hand-held appliances**;*
– *appliances that have to be kept switched on by hand or foot;*
– *appliances that are continuously loaded by hand.*

30.2.3 *Appliances that are operated while unattended are tested as specified in 30.2.3.1 and 30.2.3.2. However, the tests are not applicable to*

– *parts supporting welded connections,*
– *parts supporting connections in low-power circuits described in 19.11.1,*
– *soldered connections on printed circuit boards,*
– *connections on small components that are mounted on printed circuit boards*

and parts within 3 mm of any of these connections.

NOTE Examples of small components are diodes, transistors, resistors, inductors, integrated circuits and capacitors not directly connected to the supply mains.

30.2.3.1 *Parts of non-metallic material supporting connections that carry a current exceeding 0,2 A during **normal operation**, and parts of non-metallic material within a distance of 3 mm of such connections, are subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C. However, the glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index of at least 850 °C according to IEC 60695-2-12. If the glow-wire flammability index is not available for a sample with a thickness within ± 0,1 mm of the relevant part, then the test sample shall have a thickness equal to the nearest preferred value specified in IEC 60695-2-12 that is no thicker than the relevant part.*

NOTE 1 The preferred values in IEC 60695-2-12 are 0,75 mm ± 0,1 mm, 1,5 mm ± 0,1 mm and 3,0 mm ± 0,2 mm.

NOTE 2 Contacts in components such as switch contacts are considered to be connections.

NOTE 3 The tip of the glow-wire is applied to the part in the vicinity of the connection.

The glow-wire test is also not carried out on small parts that comply with the needle-flame test of Annex E or on small parts of material classified as V-0 or V-1 according to IEC 60695-11-10 provided that the test sample used for the classification was no thicker than the relevant part of the appliance.

NOTE 4 Small parts are as defined in IEC 60695-4.

Where a non-metallic material is within 3 mm of a current carrying connection, but is shielded from the connection by a different material, the glow-wire test of IEC 60695-2-11 is carried out at the relevant temperature with the tip of the glow-wire applied to the interposed shielding material with the shielded material in place and not directly to the shielded material.

30.2.3.2 *Parts of non-metallic material supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections, are subjected to the glow-wire test of IEC 60695-2-11. However, the glow-wire test is not carried out on parts of material classified as having a glow-wire ignition temperature according to IEC 60695-2-13 of at least*

– *775 °C, for connections that carry a current exceeding 0,2 A during **normal operation**,*
– *675 °C, for other connections.*

If the glow-wire ignition temperature is not available for a sample with a thickness within ± 0,1 mm of the relevant part, then the test sample shall have a thickness equal to the nearest preferred value specified in IEC 60695-2-13 that is no thicker than the relevant part.

NOTE 1 The preferred values in IEC 60695-2-13 are 0,75 mm ± 0,1 mm, 1,5 mm ± 0,1 mm and 3,0 mm ± 0,2 mm.

Where an non-metallic material is within 3 mm of a current carrying connection, but is shielded from the connection by a different material, the glow-wire test of IEC 60695-2-11 is carried out at the relevant temperature with the tip of the glow-wire applied to the interposed shielding material with the shielded material in place and not directly to the shielded material.

When the glow-wire test of IEC 60695-2-11 is carried out, the temperatures are

– *750 °C, for connections that carry a current exceeding 0,2 A during **normal operation**,*
– *650 °C, for other connections.*

NOTE 2 Contacts in components such as switch contacts are considered to be connections.

NOTE 3 The tip of the glow-wire is applied to the part in the vicinity of the connection.

If parts that withstand the glow-wire test of IEC 60695-2-11, but during the test produce a flame that persists for longer than 2 s, then these parts and adjacent parts are further tested as follows. Parts above the connection within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm are subjected to the needle-flame test of Annex E. However, parts shielded by a flame barrier that meets the needle-flame test of Annex E are not tested.

The needle-flame test is not carried out on parts of material classified as V-0 or V-1 according to IEC 60695-11-10 provided that the test sample used for the classification was no thicker than the relevant part of the appliance.

30.2.4 *The base material of printed circuit boards is subjected to the needle-flame test of Annex E. The flame is applied to the edge of the board where the heat sink effect is lowest when the board is positioned as in normal use.*

NOTE The test may be carried out on a printed circuit board on which components are mounted. However, ignition of a component is disregarded.

The test is not carried out:

– *on printed circuit boards of low-power circuits described in 19.11.1;*
– *on the printed circuit boards in*
  - *a metal enclosure that confines flames or burning droplets,*
  - ***hand-held appliances**,*
  - *appliances that have to be kept switched on by hand or foot,*
  - *appliances that are continuously loaded by hand,*
– *on a base material classified as V-0 according to IEC 60695-11-10 provided that the test sample used for the classification was no thicker than the printed circuit board.*

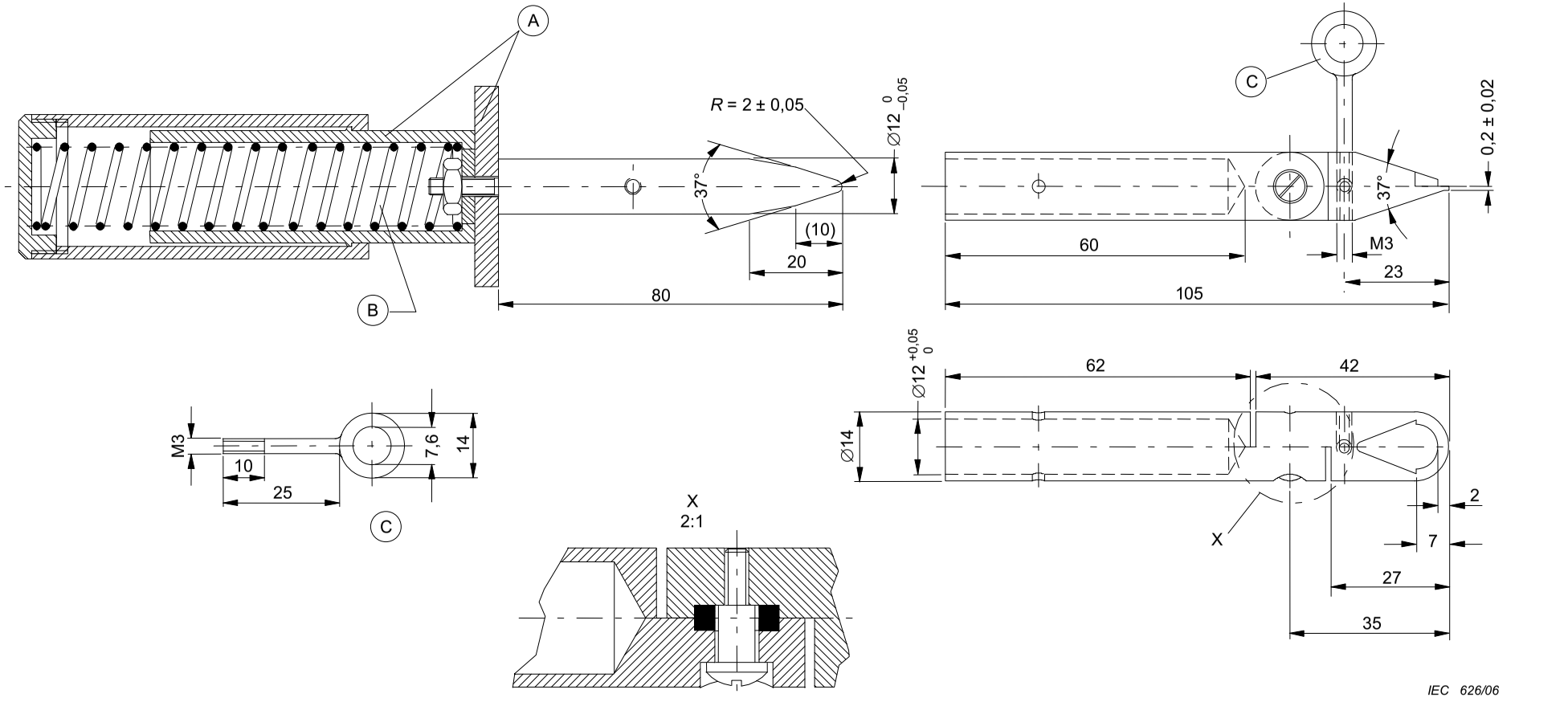
32 Radiation, toxicity and similar hazards

Replace the existing text by the following:

Appliances shall not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use.

Compliance is checked by the limits or tests specified in Part 2. However, if no limits or tests are specified in Part 2, then the appliance is deemed to comply with the requirement without testing.

Replace Figure 7 by the following.



Dimensions in millimeters

Key

A Insulating material

B Spring with a constant suitable for providing a push force as specified in 22.11 on the test finger nail

C Loop

Annexes

Annex D *Delete the note.*

Replace Annex E by the following:

Annex E
(normative)

Needle-flame test

The needle-flame test is carried out in accordance with IEC 60695-11-5 with the following modifications.

7 Severities

Replacement:

The duration of application of the test flame is 30 s ± 1 s.

9 Test procedure

9.1 Position of test specimen

Modification:

The specimen is arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1.

9.2 Application of needle-flame

Modification:

The first paragraph does not apply.

Addition:

If possible, the flame is applied at least 10 mm from a corner.

9.3 Number of test specimens

Replacement:

The test is carried out on one specimen. If the specimen does not withstand the test, the test may be repeated on two additional specimens, both of which shall then withstand the test.

11 Evaluation of test results

Addition:

The duration of burning (t_b) shall not exceed 30 s. However, for printed circuit boards, the duration of burning shall not exceed 15 s.

Replace Annex J by the following:

Annex J
(normative)

Coated printed circuit board

The testing of protective coatings of printed circuit boards is carried out in accordance with IEC 60664-3 with the following modifications.

5.7 Conditioning of the test specimens

When production samples are used, three samples of the printed circuit board are tested.

5.7.1 Cold

The test is carried out at –25 °C.

5.7.3 Rapid change of temperature

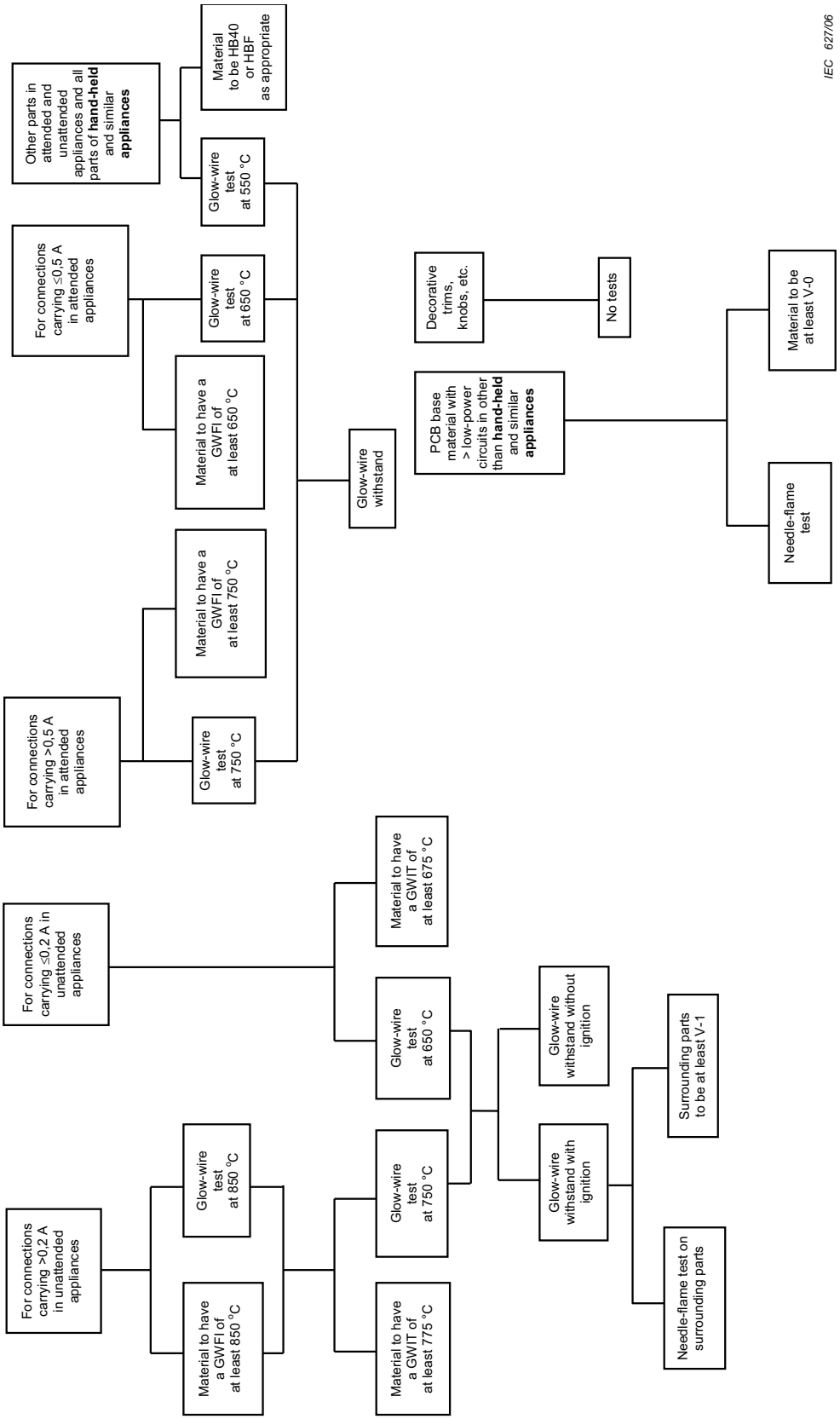
Severity 1 is specified.

5.9 Additional tests

This subclause is not applicable.

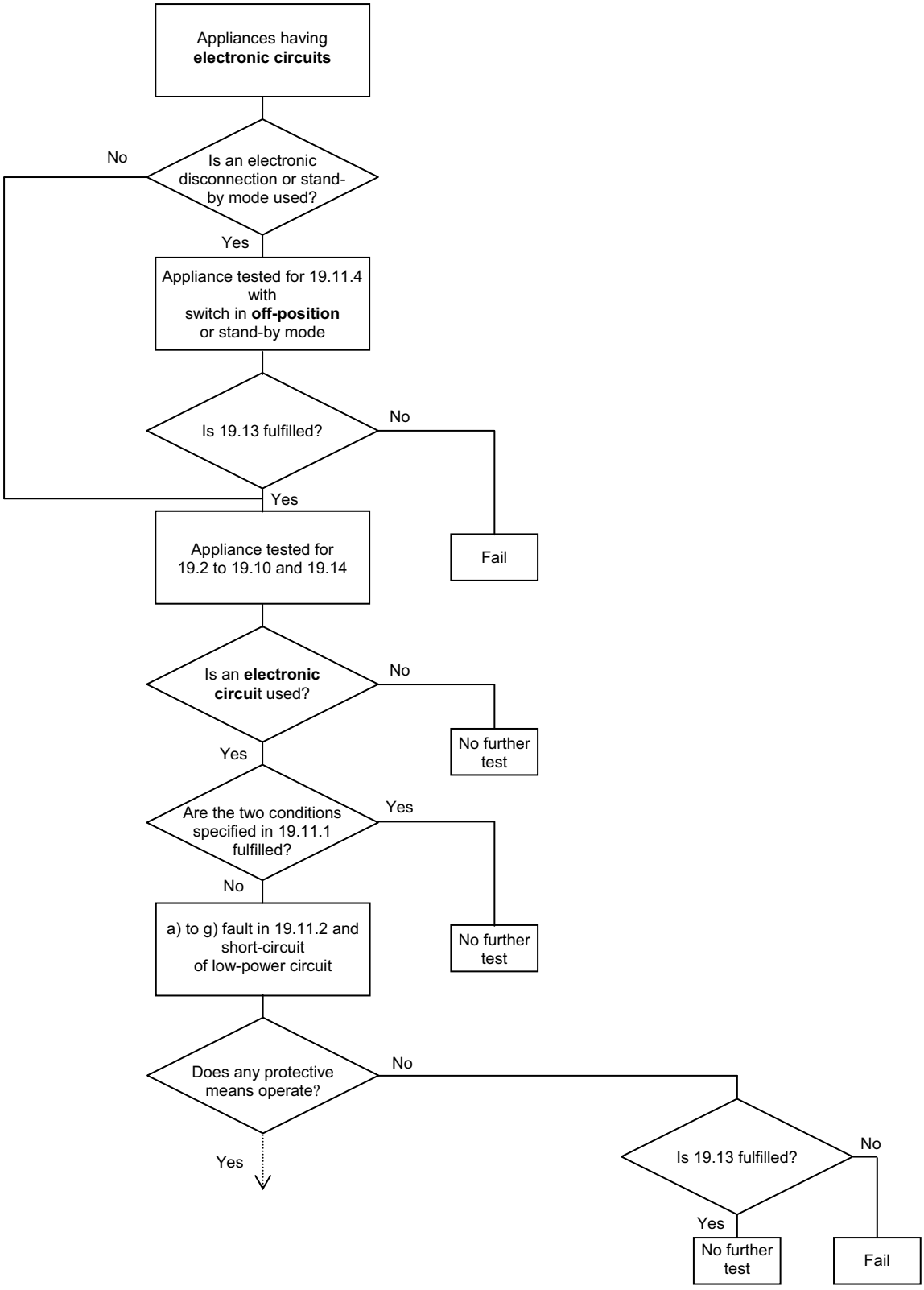
Annex O

Replace Figure O.2 by the following



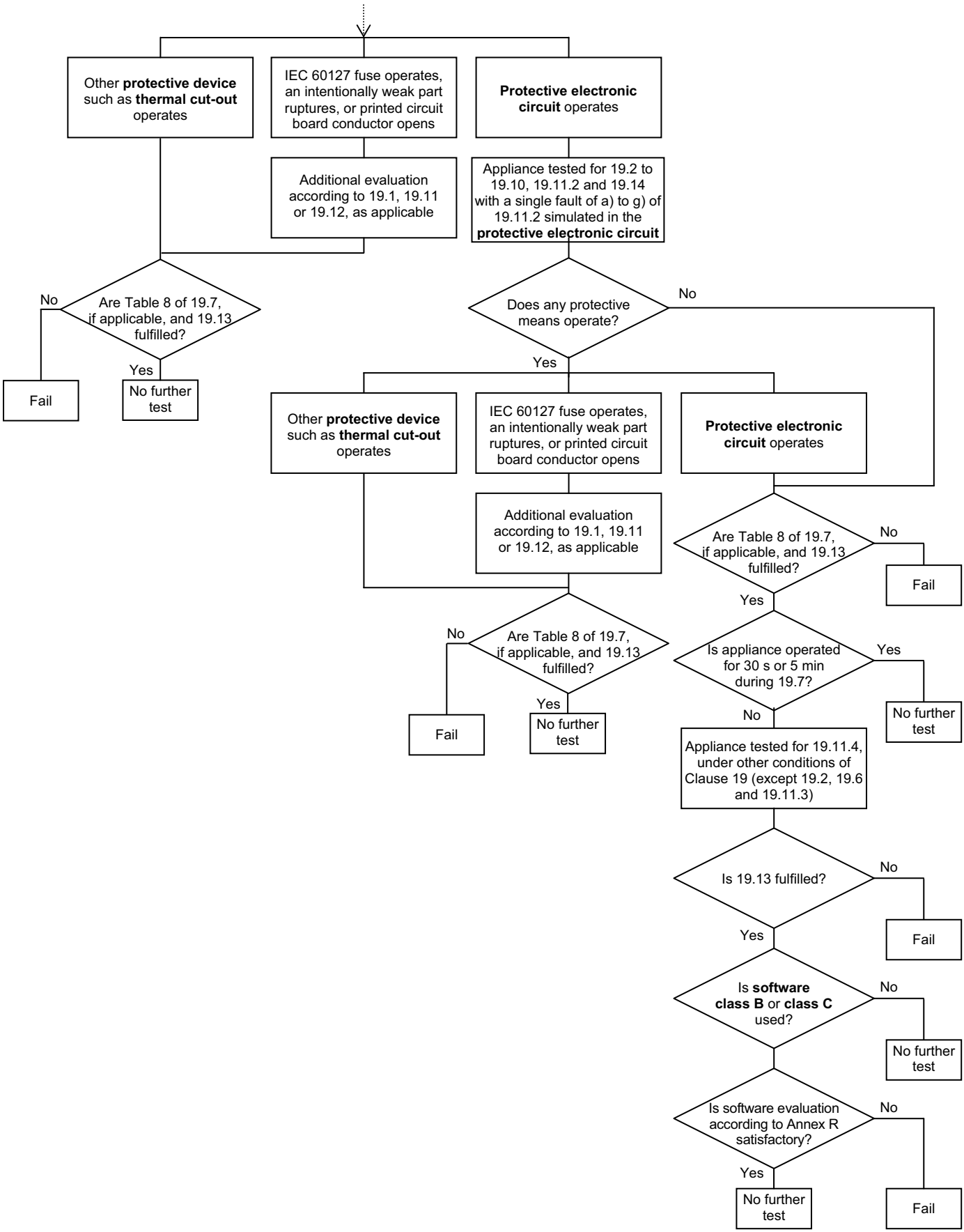
Annex Q

Replace the flow chart in Annex Q by the following:



Continued on next page

Sequence of tests for the evaluation of electronic circuits – (continuation)



Annex R

H.7 *Replace the first paragraph by the following:*

Only footnotes 12) to 16) inclusive and 18) of Table 7.2 are applicable.

H.11.12 *In the second paragraph, replace* "required in items 66 to 72 inclusive" *by* "referred to in footnotes 12) to 16) inclusive and 18)"

Bibliography

Add the following reference to the bibliography:

IEC 60695-4,	*Fire hazard testing − Part 4: Terminology concerning fire tests for electrotechnical products*

Index of defined words

Add the following

remote operation 3.1.12

Annex ZZ

Replace the title by the following:

Variations to IEC 60335-1 Ed 4.2 for application in Australia and New Zealand

Replace the text by the following:

This annex sets out the variations between this standard and IEC 60335-1 Ed 4.2. For Australia, these variations indicate national variations for purposes of the IECEE CB scheme and will be published in the IECEE CB Bulletin.

Delete the variation to 8.1

Delete the variation to 7.12

Table 3 *Delete the variation to the first dash item in the fifth row*

Table 3 *Replace the entry in the second column of the second dash item in the fifth row with the following variation:*

T-25 [aa]

Table 3 *Replace the text of footnote* [aa] *by the following:*

[aa] *For **portable appliances**, temperature rises not exceeding 75K are allowed on PVC insulation of **supply cords** which have a T rating of 90°C, provided that they are protected by an enclosure and are not subject to movement.*

24.1 *Replace the variation by the following:*

24.1 Before Note 1, *insert* the following variation.

NOTE 201 The relevant IEC standard may be replaced with the relevant Australia/New Zealand standard where applicable.

25.1 *Before the variation for 25.1, insert the following variation:*

24.1.7 *Add the following variation to the test specification:*

In Australia, telecommunication interface circuitry must comply with the Telecom Labelling Notice issued under the Telecommunications Act instead of IEC 62151.

NOTE 201 The Telecommunications Act is administered by the Australian Communications Authority.

Delete the variation to 30.2.3.1.

Delete the variation to Annex O

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