AS/NZS 60335.1:2020

Australian/New Zealand Standard™

# Household and similar electrical appliances — Safety

## Part 1: General requirements (IEC 60335-1 Ed 5.2, MOD)

AS/NZS 60335.1:2020

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies. It was approved on behalf of the Council of Standards Australia on 13 November 2020 and by the New Zealand Standards Approval Board on 7 October 2020.

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The following are represented on Committee EL-002:

Association of Accredited Certification Bodies
Australian Industry Group
National Retailers Association (Australia)
Business New Zealand
Consumer Electronic Suppliers Association, Australia
Consumers' Federation of Australia
Electrical Regulatory Authorities, Australia
Electrical consultants
Engineers Australia
JAS-ANZ
Testing Interests New Zealand
WorkSafe, New Zealand
New Zealand Electric Fence Energizer Manufacturers' Standards Group

This Standard was issued in draft form for comment as DR 20008.

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Australian/New Zealand Standard™

# Household and similar electrical appliances — Safety

## Part 1: General requirements (IEC 60335-1 Ed 5.2, MOD)

Originated in Australia and New Zealand as AS/NZS 60335.1:2002.
Jointly revised and redesignated AS/NZS 60335.1:2011.
Jointly revised and redesignated AS/NZS 60335.1:2020.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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**AS/NZS 60335.1:2020**

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –**

**Part 1: General requirements**

## Foreword

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002 - Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 60335.1:2011 and its amendments from the date of publication.

NOTE: Regulatory authorities that reference this Standard in regulation may apply these requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the appliance and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand.

The text of IEC 60335-1 Ed 5.2, prepared by IEC Technical Committee 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption of the IEC standard as a Standards Australia/Standards New Zealand joint standard.

The principal changes in this edition as compared with the 2011 edition of AS/NZS 60335.1 and its amendments are as follows (minor changes are not listed):

– reference to AS/NZS 3112 has been made an undated reference;

– figures, subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letters AZ;

– reference to AS/NZS 3112 has been included as a variation to subclause 5.2;

– subclause 22.3 is made VOID because its contents are covered by AS/NZS 3112;

– the national variations for 22.201 are updated and renumbered as AZ.22.201;

– the New Zealand national variation for the first dashed item of 7.1 has been modified by deletion of “at least”.

This Standard is an adoption with national modifications of the fifth edition of IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements* including its

- corrigendum 1 (July 2010);
- amendment 1 (2013) including its corrigendum 1 (January 2014);
- corrigendum 1 (April 2014) to IEC 60335-1 edition 5.1;
- amendment 2 (2016) including its corrigendum 1 (September 2016) and its ISH1 (April 2020)

It has been varied as indicated to take account of Australian and New Zealand conditions.

This part is to be used in conjunction with the appropriate Part 2 of AS/NZS 60335. The Parts 2 contain clauses to supplement or modify the corresponding clauses in this part to provide the relevant requirements for each type of appliance.

The National Variations in the 2020 edition of AS/NZS 60335.1 apply to all of the AS/NZS 60335 series parts 2.

NOTE 1 The following annexes contain provisions suitably modified from other IEC standards:

– Annex E Needle-flame test IEC 60695-11-5
– Annex F Capacitors IEC 60384-14
– Annex G Safety isolating transformers IEC 61558-1 and IEC 61558-2-6
– Annex H Switches IEC 61058-1
– Annex J Coated printed circuit boards IEC 60664-3
– Annex N Proof tracking test IEC 60112
– Annex R Software evaluation IEC 60730-1

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.;
– figures, subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letters AZ.

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.

p NOTE 4 In this document, p is used in the margin to indicate instructions for preparing a consolidated version.

The essential safety requirements in AS/NZS 3820[1] that could be applicable to household and similar electrical appliances are covered by this standard taken in conjunction with any other relevant requirements affecting safety.

The national variations to IEC 60335-1 Ed 5.2 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).

[1] AS/NZS 3820 *Essential safety requirements for electrical equipment*

The text of the International Standard IEC 60335-1 Ed 5.2 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.

**AUSTRALIAN NATIONAL VARIATIONS**

CLAUSE

p AZ.3.1.201 After Clause 3.1.12 *add* the following variation:

**AZ.3.1.201**

**outlet load**

maximum allowed load that may be connected to appliance outlets and socket outlets accessible to the user

Note to entry 1 A USB outlet is not considered to be an appliance outlet

p 5.2 *Add* the following variation:

*If the tests of AZ.22.201 need to be performed they are carried out on separate appliances, the number of appliances is that required by AS/NZS 3112.*

p 5.8.1 *Replace* with the following variation:

**5.8.1** *Appliances for a.c. only are tested with a.c. at 50 Hz, and those for a.c. and d.c. are tested at a.c. 50 Hz or d.c., whichever is the more unfavourable supply.*

p AZ.5.201 After Clause 5.19 *add* the following variation:

**AZ.5.201** *For appliances, other than **class III appliances**, that are intended for connection to the supply mains and that are not marked with*

– *a **rated voltage** of at least 240 V for single-phase appliances and at least 415 V for three-phase appliances, or*

– *a **rated voltage range** that includes 240 V for single-phase appliances and 415 V for three-phase appliances,*

*the **rated voltage** is equal to 240 V for single-phase appliances and 415 V for three-phase appliances, and the upper limit of the **rated voltage range** is equal to 240 V for single-phase appliances and 415 V for three-phase appliances. In addition, the **rated current** or **rated power input** is equal to the calculated value corresponding to 240 V for single-phase appliances and 415 V for three-phase appliances as appropriate.*

NOTE 1 Example of calculation

If the appliance is marked with a **rated voltage** of 230 V and a **rated current** "A" or a **rated power input** "P", it will be tested as if it is marked with a **rated voltage** of 240 V and a **rated current** of A x (240/230) or a **rated power input** of P x $(240/230)^2$.

p 6.1 *Replace* the requirement with the following variation:

Appliances shall be of one of the following classes with respect to protection against electric shock:

**class I**, **class II**, **class III**.

p 7.1 After the first paragraph of the requirement *insert* the following variation:

Appliances intended for connection to the supply mains, other than **class III appliances**, shall be marked with

– a **rated voltage** of at least:

- 230 V for single-phase appliances;
- 400 V for poly-phase appliances.

or

– a **rated voltage range** that includes:

- 230 V for single-phase appliances;
- 400 V for poly-phase appliances.

For appliance outlets and socket outlets accessible to the user

– that are incorporated in appliances connected to the supply mains; and

– that operate at **rated voltage;**

the appliance shall be marked with their maximum **outlet load** in watts.

p 7.13 *Replace* the requirement with the following variation:

Instructions and other text required by this standard shall be written in English.

p 7.15 After the last paragraph of the requirement *insert* the following variation:

The marking of the maximum **outlet load** shall be close to the appliance outlet or socket outlet.

p 10.1 After the last paragraph of the test specification *insert* the following variation:

*Appliance outlets and socket outlets accessible to the user*

– *that are incorporated in appliances connected to the supply mains; and*

– *that operate at **rated voltage;***

*are not loaded during the test, however their contribution to the power input is considered to be the marked **outlet load** per appliance outlet or socket-outlet.*

p 11.7 After the first paragraph of the test specification *insert* the following variation:

*Appliance outlets and socket outlets accessible to the user are loaded with a resistive load that gives the marked **outlet load** in watts.*

p 11.8 After the first paragraph of the test specification *insert* the following variation:

*The pins of plug connectors inserted into appliance outlets accessible to the user and plugs inserted into socket outlets accessible to the user shall have a temperature rise not exceeding 45 K.*

p 19.13 After the seventh paragraph of the test specification *insert* the following variation:

*During and after the tests the no-load output voltage of an accessible safety extra-low voltage outlet or connector or Universal Serial Bus (USB) outlet shall not have increased by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher.*

p 22.2 After the first paragraph of the requirement *insert* the following variation:

For stationary appliances permanently connected to the fixed wiring, compliance with this requirement is considered to be met if the instruction concerning disconnection incorporated in the fixed wiring is in accordance with AS/NZS 3000.

p 22.3 *Replace* the text with the following variation:

VOID

p 22.33 *Delete* the last sentence of the first paragraph of the requirement and introduce it as a new first paragraph of the requirement.

p AZ.22.201 After Clause 22.52 *add* the following variation:

**AZ.22.201** Appliances having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112.

*Compliance is checked as specified in Appendix J of AS/NZS 3112*

p AZ.22.202 After AZ.22.201 *add* the following variation:

**AZ.22.202** Appliance outlets and socket outlets accessible to the user

– that are incorporated in appliances connected to the supply mains; and

– that operate at **rated voltage;**

shall be single-phase and have a current rating not exceeding 16 A.

The socket outlets shall

– comply with AS/NZS 3112;

– accept a 3-pin, flat-pin plug as described in Figure 2.1(a1) of AS/NZS 3112.

The appliance outlets and socket outlets shall be protected by one of the following protection devices that has a current rating not exceeding the current rating of the appliance outlet or socket-outlet:

– a circuit breaker for equipment complying with IEC 60934;

– a manually resettable trip-free or cycling trip-free overcurrent **protection device**;

– a non-user replaceable fuse-link.

The protection device shall be placed behind a **non-detachable cover**. The actuating member of the circuit breaker and the manually resettable **protection device** may be accessible.

The current rating of the appliance outlets and socket outlets is obtained from the marked **outlet load** in watts divided by the **rated voltage**.

*Compliance is checked by inspection and for a manually resettable trip-free or cycling trip-free overcurrent **protection device** by the following tests.*

*The device shall be operated at **rated voltage** at 136% of its current rating, in an ambient temperature of 23°C ± 2°C in a draught-free environment.*

*The device shall operate to interrupt the current within 2 h.*

*The device shall be operated at **rated voltage** at 600% of its current rating in an ambient temperature of 23°C ± 2°C in a draught-free environment.*

*The device shall operate to interrupt the current within 5 s.*

*Immediately following the overcurrent tests, the test of clause 16.3 shall be applied, and the device shall comply with the specified requirements of the test.*

*The device shall comply with the ball pressure test of 30.1 carried out at 160 °C.*

*The device shall comply with the glow-wire test of 30.2.3.1 with a test severity of 960 °C.*

p 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.

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

*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 Media and Communications Authority.

p 25.1 After the requirement *insert* the following variation.

**Supply cords** for single-phase **portable appliances** intended for direct connection to the supply mains, shall be fitted with an appropriate plug complying with AS/NZS 3112.

p Table 11 In footnote *a insert* the following variation:

However, they cannot be used in **class I appliances**.

## NEW ZEALAND NATIONAL VARIATIONS

p AZ.3.1.201 After Clause 3.1.12 *add* the following variation:

**AZ.3.1.201**

**outlet load**

maximum allowed load that may be connected to appliance outlets and socket outlets accessible to the user

Note to entry 1 A USB outlet is not considered to be an appliance outlet

p 5.2 *Add* the following variation:

*If the tests of AZ.22.201 need to be performed they are carried out on separate appliances, the number of appliances is that required by AS/NZS 3112.*

p 5.8.1 *Replace* with the following variation:

**5.8.1** *Appliances for a.c. only are tested with a.c. at 50 Hz, and those for a.c. and d.c. are tested at a.c. 50 Hz or d.c., whichever is the more unfavourable supply.*

p 6.1 *Replace* the requirement with the following variation:

Appliances shall be of one of the following classes with respect to protection against electric shock:

**class I**, **class II**, **class III**.

p 7.1 After the first paragraph of the requirement *insert* the following variation:

Appliances intended for connection to the supply mains, other than **class III appliances**, shall be marked with

– a **rated voltage** of:

- 230 V for single-phase appliances;
- 400 V for poly-phase appliances.

or

– a **rated voltage range** that includes:

- 230 V for single-phase appliances;
- 400 V for poly-phase appliances.

For appliance outlets and socket outlets accessible to the user

– that are incorporated in appliances connected to the supply mains; and

– that operate at **rated voltage;**

the appliance shall be marked with their maximum **outlet load** in watts.

p 7.13 *Replace* the requirement with the following variation:

Instructions and other text required by this standard shall be written in English.

p 7.15 After the last paragraph of the requirement *insert* the following variation:

The marking of the maximum **outlet load** shall be close to the appliance outlet or socket outlet.

p 10.1 After the last paragraph of the test specification *insert* the following variation:

*Appliance outlets and socket outlets accessible to the user*

– *that are incorporated in appliances connected to the supply mains; and*

– *that operate at **rated voltage;***

*are not loaded during the test, however their contribution to the power input is considered to be the marked **outlet load** per appliance outlet or socket-outlet.*

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*The pins of plug connectors inserted into appliance outlets accessible to the user and plugs inserted into socket outlets accessible to the user shall have a temperature rise not exceeding 45 K.*

p 19.13 After the seventh paragraph of the test specification *insert* the following variation:

*During and after the tests the no-load output voltage of an accessible safety extra-low voltage outlet or connector or Universal Serial Bus (USB) outlet shall not have increased by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher.*

p 22.2 After the first paragraph of the requirement *insert* the following variation:

For stationary appliances permanently connected to the fixed wiring, compliance with this requirement is considered to be met if the instruction concerning disconnection incorporated in the fixed wiring is in accordance with AS/NZS 3000.

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p 22.33 *Delete* the last sentence of the first paragraph of the requirement and introduce it as a new first paragraph of the requirement.

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**AZ.22.201** Appliances having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112.

*Compliance is checked as specified in Appendix J of AS/NZS 3112*

p. AZ.22.202 After AZ.22.201 *add* the following variation:

**AZ.22.202** Appliance outlets and socket outlets accessible to the user

– that are incorporated in appliances connected to the supply mains; and

– that operate at **rated voltage;**

shall be single-phase and have a current rating not exceeding 16 A.

The socket outlets shall

– comply with AS/NZS 3112;

– accept a 3-pin, flat-pin plug as described in figure 2.1(a1) of AS/NZS 3112.

The appliance outlets and socket outlets shall be protected by one of the following protection devices that has a current rating not exceeding the current rating of the appliance outlet or socket-outlet:

– a circuit breaker for equipment complying with IEC 60934;

– a manually resettable trip-free or cycling trip-free overcurrent **protection device**;

– a non-user replaceable fuse-link.

The protection device shall be placed behind a **non-detachable cover**. The actuating member of the circuit breaker and the manually resettable **protection device** may be accessible.

The current rating of the appliance outlets and socket outlets is obtained from the marked **outlet load** in watts divided by the **rated voltage**.

*Compliance is checked by inspection and for a manually resettable trip-free or cycling trip-free overcurrent **protection device** by the following tests.*

*The device shall be operated at **rated voltage** at 136% of its current rating, in an ambient temperature of 23°C ± 2°C in a draught-free environment.*

*The device shall operate to interrupt the current within 2 h.*

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*Immediately following the overcurrent tests, the test of clause 16.3 shall be applied, and the device shall comply with the specified requirements of the test.*

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

p 25.1 After the requirement *insert* the following variation.

**Supply cords** for single-phase **portable appliances** intended for direct connection to the supply mains, shall be fitted with an appropriate plug complying with AS/NZS 3112.

p Table 11 In footnote *a insert* the following variation:

However, they cannot be used in **class I appliances**.

## Annex ANZ
## (normative)
## Normative references to international publications with their corresponding joint Australia/New Zealand publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If the international publications are not so indicated, then either it or the listed Australia/New Zealand publication may be used.

| Publication | Year | Title | AS/NZS | Year |
|---|---|---|---|---|
| | | *Approval and test specification – Plugs and socket-outlets* | 3112 | |
| IEC 60034-1 | | *Rotating electrical machines – Part 1: Rating and performance* | | |
| IEC 60061-1 | | *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps* | | |
| IEC 60065<br>AMD 1 | 2001<br>(2005)[2)] | *Audio, video and similar electronic apparatus – Safety requirements* | 60065<br>Amendment 1 | 2003<br>2008 |
| IEC 60068-2-2 | | *Environmental testing – Part 2-2 Tests. Test B: Dry heat* | | |
| IEC 60068-2-31 | | *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens* | | |
| IEC 60068-2-75 | | *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests* | | |
| IEC 60068-2-78 | | *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state* | | |
| IEC/TR 60083 | | *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC* | | |
| IEC 60085 | 2007 | *Electrical insulation – Thermal evaluation and designation* | | |
| IEC 60112<br>AMD 1 | 2003<br>(2009)[3)] | *Method for the determination of the proof and the comparative tracking indices of solid insulating materials* | | |
| IEC 60127 (all parts) | | *Miniature fuses* | | |

2) There exists a consolidated edition 7.1 (2005) that includes edition 7 and its Amendment 1.

3) There exists a consolidated edition 4.1 (2009) that includes edition 4 and its Amendment 1.

| | | | | |
|---|---|---|---|---|
| IEC 60227 (all parts) | | *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V* | | |
| IEC 60238 | | *Edison screw lampholders* | 60238 | |
| IEC 60245 (all parts) | | *Rubber insulated cables – Rated voltages up to and including 450/750 V* | | |
| IEC 60252-1 | | *A.C. motor capacitors - Part 1: General - Performance, testing and rating - Safety requirements - Guide for installation and operation* | | |
| IEC 60309 (all parts) | | *Plugs, socket-outlets and couplers for industrial purposes* | | |
| IEC 60320-1 | | *Appliance couplers for household and similar general purposes – Part 1: General requirements* | 60320.1 | |
| IEC 60320-2-2 | | *Appliance couplers for household and similar general purposes – Part 2-2: Interconnection couplers for household and similar equipment* | 60320.2.2 | |
| IEC 60320-2-3 | | *Appliance couplers for household and similar general purposes – Part 2-3: Appliance coupler with a degree of protection higher than IPX0* | | |
| IEC 60384-14 | 2005 | *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains* | | |
| IEC 60417 | | *Graphical symbols for use on equipment* | | |
| IEC 60445 | 2010 | *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors* | | |
| IEC 60529<br>AMD 1 | 1989<br>1999 | *Degrees of protection provided by enclosures (IP Code)* | | |
| IEC 60598-1 | 2008 | *Luminaires – Part 1: General requirements and tests* | 60598.1 | 2013 |
| IEC 60664-1 | 2007 | *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests* | | |

| | | | | |
|---|---|---|---|---|
| IEC 60664-3 | 2003, | *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution* | | |
| IEC 60664-4 | 2005, | *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress* | | |
| IEC 60691 | | *Thermal-links – Requirements and application guide* | | |
| IEC 60695-2-11 | 2000 | *Fire Hazard testing – Part 2-11: Glowing/hot wire based test methods – Glow-wire flammability test method for end-products* | 60695.2.11<br>Amendment 1 | 2001<br>2001 |
| IEC 60695-2-12 | | *Fire Hazard testing – Part 2-12: Glowing/hot wire based test methods – Glow-wire flammability test method for materials* | 60695.2.12 | |
| IEC 60695-2-13 | | *Fire Hazard testing – Part 2-13: Glowing/hot wire based test methods – Glow-wire ignitability test method for materials* | 60695.2.13 | |
| IEC 60695-10-2 | | *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test* | | |
| IEC 60695-11-5: | 2004, | *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance* | | |
| IEC 60695-11-10 | | *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods* | | |
| IEC 60730-1:<br>AMD 1<br>AMD2 | 1999,<br>2002<br>2007[4)] | *Automatic electrical controls for household and similar use – Part 1: General requirements* | | |
| IEC 60730-2-8:<br>AMD 1 | 2000,<br>2002[5)] | *Automatic electrical controls for household and similar use – Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements* | | |
| IEC 60730-2-9:<br>AMD 1 | 2008<br>2011[6)] | *Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls* | | |

4) There exists a consolidated edition 3.2 (2007) that includes edition 3 and its Amendment 1 and Amendment 2.

5) There exists a consolidated edition 2.1 (2003) that includes edition 2 and its Amendment 1.

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

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|---|---|---|---|---|
| IEC 60730-2-10 | | *Automatic electrical controls for household and similar use – Part 2-10: Particular requirements for motor-starting relays* | | |
| IEC 60738-1 | | *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification* | | |
| IEC 60906-1 | | *IEC system of plugs and socket-outlets for household and similar purposes – Part 1: Plugs and socket-outlets 16 A 250 V a.c.* | | |
| IEC 60934 | | *Circuit-breakers for equipment (CBE)* | | |
| IEC 60990 | 1999 | *Methods of measurement of touch-current and protective conductor current* | 60990 | 2002 |
| IEC 60999-1 | 1999 | *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 $mm^2$ up to 35 $mm^2$ (included)* | | |
| IEC 61000-4-2 | | *Electromagnetic compatibility (EMC) – Part 4.2: Testing and measurement techniques –: Electrostatic discharge immunity test* | 61000.4.2 | |
| IEC 61000-4-3 | | *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test* | 61000.4.3 | |
| IEC 61000-4-4 | | *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test* | 61000.4.4 | |
| IEC 61000-4-5 | | *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques –Surge immunity test* | 61000.4.5 | |
| IEC 61000-4-6 | | *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields* | 61000.4.6 | |

| | | | | |
|---|---|---|---|---|
| IEC 61000-4-11: | 2004, | *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests* | 61000.4.11 | 2005 |
| IEC 61000-4-13 | 2002, | *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests* | 61000.4.13 | 2006 |
| IEC 61000-4-34<br>AMD 1 | 2005<br>2009 | *Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase* | 61000.4.34 | |
| IEC 61032 | 1997 | *Protection of persons and equipment by enclosures – Probes for verification* | | |
| IEC 61058-1<br>AMD1<br>AMD 2 | 2000<br>2001<br>2007[7)] | *Switches for appliances – Part 1: General requirements* | 61058.1 | 2008 |
| IEC 61180-1 | | *High-voltage test techniques for low-voltage equipment. Part 1: Definitions, test and procedure requirements* | | |
| IEC 61180-2 | | *High-voltage techniques for low-voltage equipment – Part 2: Test equipment* | | |
| IEC 61558-1:<br>(mod)<br>AMD 1 | 2005,<br>2009[8)] | *Safety of power transformers, power supply units and similar – Part 1: General requirements and tests* | 61558.1<br>Amendment 1 | 2008<br>2009 |
| IEC 61558-2-6 | 2009 | *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers* | 61558.2.6<br>Amendment 1 | 2009<br>2012 |
| 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* | 61558.2.16 | |

7) There exists a consolidated edition 3.2 (2008) that includes edition 3 and its Amendment 1 and Amendment 2.

8) There exists a consolidated edition 2.1 (2009) that includes edition 2 and its Amendment 1.

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|---|---|---|
| IEC 61770 | | *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets* |
| IEC 62151 | | *Safety of equipment electrically connected to a telecommunication network* |
| IEC 62477-1 | | *Safety requirements for power electronic converter systems and equipment – Part 1: General* |
| IEC 62821-1 | | *Electric cables – Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltages up to and including 450/750 V – Part 1: General requirements* |
| ISO 178<br>/AMD 1 | 2010<br>2013 | *Plastics – Determination of flexural properties* |
| ISO 179-1 | 2010 | *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test* |
| ISO 180<br>/AMD 1<br>/AMD 2 | 2000<br>2006<br>2013 | *Plastics – Determination of Izod impact strength* |
| ISO 527 (all parts) | | *Plastics – Determination of tensile properties* |
| ISO 2768-1 | | *General tolerances – Part 1: Tolerances for linear and angular dimensions without individual tolerance indications* |
| ISO 4892-1 | 1999 | *Plastics – Methods of exposure to laboratory light sources – Part 1: General guidance* |
| ISO 4892-2 | 2013 | *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc amps* |
| ISO 7000 | 2004 | *Graphical symbols for use on equipment – Index and synopsis* |
| ISO 8256 | 2004 | *Plastics – Determination of tensile-impact strength* |
| ISO 9772<br>AMD 1 | 2001<br>2003 | *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame* |

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| ISO 9773 | *Plastics – Determination of burning behaviour of thin flexible vertical specimens in contact with a small-flame ignition source* |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 1: General requirements

## 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 Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.**

**This Consolidated version of IEC 60335-1 bears the edition number 5.2. It consists of the fifth edition (2010-05) [documents 61/3974/FDIS and 61/4014/RVD], its corrigenda 1 (2010-07) and 2 (2011-04), its amendment 1 (2013-12) [documents 61/4639/FDIS and 61/4675/RVD] and its corrigendum 1 (2014-01), and its amendment 2 (2016-05) [documents 61/5116A/FDIS and 61/5166/RVD] and its corrigendum 1 (2016-09) and the interpretation sheet (2020-04). The technical content is identical to the base edition and its amendments.**

**This Final version does not show where the technical content is modified by amendments 1 and 2. A separate Redline version with all changes highlighted is available in this publication.**

International Standard IEC 60335-1 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

The principal changes in this edition as compared with the fourth edition of IEC 60335-1 are as follows (minor changes are not listed):

– updated the text of the standard to align with the most recent editions of the dated normative references;
– modified the functional safety requirements using programmable electronic circuits including software validation requirements;
– updated Clause 29 to cover insulation requirements subjected to high frequency voltages as in switch mode power supply circuits;
– updated Subclause 30.2 to further align the pre-selection option with the end-product test option;
– deleted some notes and converted many other notes to normative text;
– clarified requirements for class III appliances and class III constructions.

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

This part is to be used in conjunction with the appropriate part 2 of IEC 60335. The parts 2 contain clauses to supplement or modify the corresponding clauses in this part to provide the relevant requirements for each type of appliance.

NOTE 1 The following annexes contain provisions suitably modified from other IEC standards:

| | | | |
|---|---|---|---|
| – | Annex E | Needle-flame test | IEC 60695-11-5 |
| – | Annex F | Capacitors | IEC 60384-14 |
| – | Annex G | Safety isolating transformers | IEC 61558-1 and IEC 61558-2-6 |
| – | Annex H | Switches | IEC 61058-1 |
| – | Annex J | Coated printed circuit boards | IEC 60664-3 |
| – | Annex N | Proof tracking test | IEC 60112 |
| – | Annex R | Software evaluation | IEC 60730-1 |

NOTE 2 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 associated noun are also in bold.

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.

The committee has decided that the contents of the base publication and its amendments 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 3 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.

– Introduction: The Part 1 standard (UL60335-1) is only used in combination with a part 2 (UL60335-2-x). National differences are specified in these standards (USA).

– 5.7: The ambient temperature is 25 °C ± 10 °C (Japan).

– 5.7: The ambient temperature is 27 °C ± 5 °C (India).

– 6.1: Class 0 appliances and class 0I appliances are not allowed (Australia, Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Hungary, India, Israel, Ireland, Italy, Netherlands, New Zealand, Norway, Poland, Singapore, Slovakia, Sweden, Switzerland, United Kingdom).

– 7.12.2: The requirements for full disconnection do not apply (Japan).

– 7.12.8: The maximum inlet water pressure shall be at least 1,0 MPa (Denmark, Norway, Sweden).

– 13.2: The test circuit and some leakage current limits are different (India).

– 22.2: The second paragraph of this subclause dealing with single-phase class I appliances with heating elements cannot be complied with because of the supply system (France and Norway).

– 22.2: Double-pole switches or protective devices are required (Norway).

– 22.35 Accessible metal parts separated from live parts by earthed metal parts are not regarded as likely to become live in the event of an insulation fault (USA).

– 24.1: IEC component standard requirements are replaced by the relevant requirements of component standards specified in UL60335-1 and parts 2 (UL60335-2-x) (USA).

– 25.3: A set of supply leads is not permitted (Norway, Denmark, Finland, Netherlands).

– 25.8: 0,5 $mm^2$ supply cords are not allowed for class I appliances (Australia and New Zealand).

– 26.6: Conductor cross-sectional areas are different (USA).

– 29.1: Different rated impulse voltages are used between 50 V and 150 V (Japan).

**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 publication 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 the functions of an appliance are covered by different parts 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.

NOTE 1 Throughout this publication, when “Part 2” is mentioned, it refers to the relevant part of IEC 60335.

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

NOTE 2 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 3 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.

Individual countries may wish to consider the application of the standard, as far as is reasonable, to appliances not mentioned in a part 2, and to appliances designed on new principles. In this case consideration should be given to defining normal operation, specifying the classification of the appliance according to Clause 6 and specifying whether the appliance is operated attended or unattended. Consideration should also be given to particular categories of likely users and to related specific risks such as access to live parts, hot surfaces or hazardous moving parts.

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 which impair the level of safety covered by these requirements.

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

NOTE 4 Standards dealing with non-safety aspects of household appliances are

– IEC standards published by TC 59 concerning methods of measuring performance;
– CISPR 11, CISPR 14-1, IEC 61000-3-2 and IEC 61000-3-3 concerning electromagnetic emissions;
– CISPR 14-2 concerning electromagnetic immunity;
– IEC standards published by TC 111 concerning environmental matters.

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 1: General requirements

## 1 Scope

This International Standard deals with the safety of electrical appliances for household and similar purposes, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

NOTE 1 Battery-operated appliances and other d.c. 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.

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 by laymen in shops, in light industry and on farms, are within the scope of this standard.

NOTE 2 Examples of such appliances are catering equipment, cleaning appliances for commercial use, and appliances for hairdressers.

This standard deals with the reasonably foreseeable hazards presented by appliances that are encountered by all persons. However, in general, it does not take into account

– 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.

NOTE 3 Attention is drawn to the fact that

– for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
– in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 4 This standard does not apply to

– appliances intended exclusively for industrial purposes;
– 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);
– audio, video and similar electronic apparatus (IEC 60065);
– appliances for medical purposes (IEC 60601);
– hand-held motor-operated electric tools (IEC 60745);
– personal computers and similar equipment (IEC 60950-1);
– transportable motor-operated electric tools (IEC 61029).

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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