

**MAJAPIDAMIS- JA MUUD TAOLISED ELEKTRISEADMED.  
OHUTUS. OSA 1: ÜLDNÕUDED**

**Household and similar electrical appliances - Safety -  
Part 1: General requirements  
(IEC 60335-1:2010, modified  
+ IEC 60335-1:2010/A1:2013, modified, COR1:2014  
+ IEC 60335-1:2010/A2:2016, modified COR1:2016)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 60335-1:2012+A11+A13+A1+A14+A2:2019 sisaldab Euroopa standardi EN 60335-1:2012 ja selle muudatuste A11:2014, A13:2017, A1:2019, A14:2019 ja A2:2019 ning paranduste AC:2014 ja AC:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 60335-1:2012+A11+A13+A1+A14+A2:2019 consists of the English text of the European standard EN 60335-1:2012 and its amendments A11:2014, A13:2017, A1:2019, A14:2019 and A2:2019, and its corrigendums AC:2014 and AC:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.  Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.01.2012, muudatused A11 08.08.2014, A13 13.10.2017, A1 09.08.2019, A14 09.08.2019 ja A2 09.08.2019.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.  Date of Availability of the European standard is 13.01.2012, for A11 08.08.2014, A13 13.10.2017, A1 09.08.2019, A14 09.08.2019 and A2 09.08.2019.
Sellesse standardisse on muudatus A11 sisse viidud ja tehtud muudatused tähistatud püst-kriipsuga lehe välisveerisel.  Sellesse standardisse on muudatus A13 sisse viidud ja tehtud muudatused tähistatud topeltpüst-kriipsuga lehe välisveerisel.  Sellesse standardisse on muudatus A1 sisse viidud ja tehtud muudatused tähistatud kolmekordse püst-kriipsuga lehe välisveerisel.  Sellesse standardisse on muudatuse A1 ühismuudatused sisse viidud ja tehtud muudatused tähistatud punktiirjoonega lehe välisveerisel.  Sellesse standardisse on muudatus A14 sisse viidud ja tehtud muudatused tähistatud lainelise kriipsuga lehe välisveerisel.  Sellesse standardisse on muudatus A2 sisse viidud ja tehtud muudatused tähistatud topeltlainelise kriipsuga lehe välisveerisel.  Sellesse standardisse on muudatuse A2 ühismuudatused sisse viidud ja tehtud muudatused tähistatud katkendjoonega lehe välisveerisel.  Parandusega AC:2014 lisatud või muudetud teksti algus ja lõpp on tekstis ära märgitud märgenditega   .  Parandusega AC:2016 lisatud või muudetud teksti algus ja lõpp on tekstis ära märgitud märgenditega   .	The amendment A11 has been incorporated into this standard and changes have been marked by a vertical line on the outer row of the page.  The amendment A13 has been incorporated into this standard and changes have been marked by a double vertical line on the outer row of the page.  The amendment A1 has been incorporated into this standard and changes have been marked by a triple vertical line on the outer row of the page.  The amendment A1 common modifications have been incorporated into this international standard and changes have been marked by a dotted line on the outer row of the page.  The amendment A14 has been incorporated into this standard and changes have been marked by a wavy line on the outer row of the page.  The amendment A2 has been incorporated into this standard and changes have been marked by a double wavy line on the outer row of the page.  The amendment A2 common modifications have been incorporated into this international standard and changes have been marked by a dashed line on the outer row of the page.  The start and finish of text introduced or altered by amendment AC:2014 is indicated in the text by symbols   .  The start and finish of text introduced or altered by amendment AC:2016 is indicated in the text by symbols   .

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ICS 13.120; 97.030

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60335-1 + A11 + A13 + A1 +  
A14 + A2**

January 2012, August 2014, October 2017,  
August 2019, August 2019, August 2019

ICS 13.120; 97.030

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A2:2006 + A11:2004 + A12:2006 + A13:2008 + A14:2010 + A15:2011 + corr.  
Jan.2007 + corr. Feb.2007

English Version

**Household and similar electrical appliances - Safety - Part 1: General  
requirements**  
(IEC 60335-1:2010, modified + IEC 60335-1:2010/A1:2013 ,modified +  
COR1:2014 + IEC 60335-1:2010/A2:2016 , modified + COR1:2016))

Appareils électrodomestiques et analogues - Sécurité - Partie  
1: Exigences générales  
(CEI 60335-1:2010, modifiée  
+ IEC 60335-1:2010/A1:2013 , modifiée + COR1:2014  
+ IEC 60335-1:2010/A2:2016 , modifiée + COR1:2016)

Sicherheit elektrischer Geräte für den Hausgebrauch und  
ähnliche Zwecke - Teil 1: Allgemeine Anforderungen  
(IEC 60335-1:2010, modifiziert  
+ IEC 60335-1:2010/A1:2013 , modifiziert + COR1:2014  
+ IEC 60335-1:2010/A2:2016 , modifiziert + COR1:2016)

This European Standard was approved by CENELEC on 2011-11-21. Amendment A11 was approved by CENELEC on 2014-06-16. Amendment A13 was approved by CENELEC on 2017-09-26. Amendment A1 was approved by CENELEC on 2018-07-30. Amendment A14 was approved by CENELEC on 2019-07-10. Amendment A2 was approved by CENELEC on 2018-07-30. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard and its amendments the status of a national standard without any alteration.

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EN 60335-1:2012/A1:2019 E + EN 60335-1:2012/A14:2019 E + EN 60335-1:2012/A2:2019 E

## Foreword

This document (EN 60335-1:2012) consists of the text of IEC 60335-1:2010 prepared by IEC/TC 61 "Safety of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 61, "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-11-21
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2014-11-21

The dow stated in this EN 60335-1:2012 and its relevant amendments is applicable only when the Part 1 is used to test products for which no Part 2 exists. This means that when a Part 2 exists the dow is the one mentioned in the relevant Part 2.

This document supersedes EN 60335-1:2002 + corr. Jul.2009 + corr. May.2010 + A1:2004 + A2:2006 + A11:2004 + A12:2006 + A13:2008 + A14:2010 + A15:2011 + corr. Jan.2007 + corr. Feb.2007.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60335-1:2010 are prefixed "Z".

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

This part of EN 60335 is to be used in conjunction with the appropriate Part 2. The Parts 2 contain clauses to supplement or modify the corresponding clauses in Part 1 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	EN 60695-11-5
Annex F	Capacitors	EN 60384-14
Annex G	Safety isolating transformers	EN 61558-1 and EN 61558-2-6
Annex H	Switches	EN 61058-1
Annex J	Coated printed circuit boards	EN 60664-3
Annex N	Proof tracking test	EN 60112

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.

Special national conditions causing a deviation from this European Standard are listed in Annex ZA.

National deviations from this European Standard are listed in Annex ZB.

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### Endorsement notice

The text of the International Standard IEC 60335-1:2010 was approved by CENELEC as a European Standard with common modifications.

### EN 60335-1:2012/A11:2014 foreword

This document (EN 60335-1:2012/A11:2014) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-06-16
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### EN 60335-1:2012/A13:2017 foreword

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The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-05-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-05-03

This Amendment 13 to EN 60335-1:2012 cancels and replaces with immediate effect EN 60335-1:2012/A12:2017.

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## EN 60335-1:2012/A1:2019 foreword

This document (EN 60335-1:2012/A1:2019) consists of the text of IEC 60335-1:2010/A1:2013 + COR:2014, prepared by IEC/TC 61 "Safety of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-11-09
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-07-30

This amendment supplements or modifies the corresponding clauses of EN 60335-1:2012 and its amendments A11:2014 and A13:2017.

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The text of the International Standard IEC 60335-1:2010/A1:2013 + COR:2014 was approved by CENELEC as a European Standard with agreed common modifications.

## EN 60335-1:2012/A14:2019 foreword

This document (EN 60335-1:2012/A14:2019) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-07-10
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-07-30

This amendment supplements or modifies the corresponding clauses of EN 60335-1:2012 and its amendments A11:2014, A13:2017 and A1:2019.

EN 60335-1:2012/A14:2019 is to be read in conjunction with EN 60335-1:2012 and its amendments, which are referred to in this text as "Part 1".

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For the relationship with EU Directive(s) see informative Annexes ZZ, which are part of EN 60335-1:2012 and its amendments.

## EN 60335-1:2012/A2:2019 foreword

This document (EN 60335-1:2012/A2:2019) consists of the text of IEC 60335-1:2010/A2:2016 + COR:2016 prepared by IEC/TC 61 "Safety of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

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with this document have to be withdrawn

This amendment supplements or modifies the corresponding clauses of EN 60335-1:2012 and its amendments A11:2014, A13:2017, A1:2018 and A14:2019.

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For the relationship with EU Directive(s) see informative Annexes ZZ.

## Endorsement notice

The text of the International Standard IEC 60335-1:2010/A2:2016 + COR:2016 was approved by CENELEC as a European Standard with agreed common modifications.

## CONTENTS

FOREWORD.....	6
IEC 60335-1:2010/A1:2013 FOREWORD.....	8
IEC 60335-1:2010/A2:2016 FOREWORD.....	9
INTRODUCTION.....	10
1 Scope.....	12
2 Normative references .....	13
3 Terms and definitions .....	17
4 General requirement.....	26
5 General conditions for the tests .....	26
6 Classification.....	30
7 Marking and instructions.....	30
8 Protection against access to live parts.....	38
9 Starting of motor-operated appliances .....	40
10 Power input and current .....	40
11 Heating .....	41
12 Void.....	46
13 Leakage current and electric strength at operating temperature.....	47
14 Transient overvoltages .....	49
15 Moisture resistance .....	50
16 Leakage current and electric strength.....	53
17 Overload protection of transformers and associated circuits .....	55
18 Endurance.....	55
19 Abnormal operation .....	55
20 Stability and mechanical hazards .....	64
21 Mechanical strength .....	65
22 Construction.....	66
23 Internal wiring.....	78
24 Components.....	80
25 Supply connection and external flexible cords .....	84
26 Terminals for external conductors.....	92
27 Provision for earthing .....	95
28 Screws and connections.....	97
29 Clearances, creepage distances and solid insulation .....	100
30 Resistance to heat and fire.....	108
31 Resistance to rusting.....	113
32 Radiation, toxicity and similar hazards.....	113
Annex A (informative) Routine tests.....	127
Annex B (normative) Appliances powered by rechargeable batteries that are recharged in the appliance .....	129
Annex C (normative) Ageing test on motors .....	134
Annex D (normative) Thermal motor protectors.....	135

Annex E (normative) Needle-flame test .....	136
Annex F (normative) Capacitors .....	137
Annex G (normative) Safety isolating transformers .....	139
Annex H (normative) Switches .....	140
Annex I (normative) Motors having basic insulation that is inadequate for the rated voltage of the appliance .....	142
Annex J (normative) Coated printed circuit boards .....	144
Annex K (normative) Overvoltage categories .....	145
Annex L (informative) Guidance for the measurement of clearances and creepage distances .....	146
Annex M (normative) Pollution degree .....	149
Annex N (normative) Proof tracking test .....	150
Annex O (informative) Selection and sequence of the tests of Clause 30 .....	151
Annex P (informative) Guidance for the application of this standard to appliances used in tropical climates .....	157
Annex Q (informative) Sequence of tests for the evaluation of electronic circuits .....	159
Annex R (normative) Software evaluation .....	161
Annex S (normative) Battery-operated appliances powered by batteries that are non-rechargeable or not recharged in the appliance .....	174
Annex T (normative) UV-C radiation effect on non-metallic materials .....	177
Annex ZA (normative) Special national conditions .....	180
Annex ZB (informative) A-deviations .....	181
Annex ZC (normative) Normative references to international publications with their corresponding European publications .....	182
Annex ZD (informative) IEC and CENELEC code designations for flexible cords .....	193
Annex ZE (informative) Specific additional requirements for appliances and machines intended for commercial use .....	194
Annex ZF (informative) Criteria applied for the allocation of products covered by standards in the EN 60335 series under LVD or MD .....	200
Annex ZG (normative) UV appliances .....	206
Annex ZH (informative) Common plug and socket-outlet types in CENELEC countries .....	207
Annex ZI (informative) Information on the application of A11:2014 to EN 60335-1:2012 CENELEC CLC/TC 61(SEC)2096A .....	218
Annex ZZA (informative) Relationship between this European Standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered .....	220
Annex ZZB (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC aimed to be covered .....	221
Bibliography .....	222
Figure 1 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of class II appliances and for parts of class II construction .....	114
Figure 2 – Circuit diagram for leakage current measurement at operating temperature for single-phase connection of other than class II appliances or parts of class II construction .....	115
Figure 3 – Circuit diagram for leakage current measurement at operating temperature for three-phase with neutral class II appliances and for parts of class II construction .....	116

Figure 4 – Circuit diagram for leakage current measurement at operating temperature for three-phase with neutral appliances other than those of class II or parts of class II construction .....	117
Figure 5 – Small part .....	118
Figure 6 – Example of an electronic circuit with low-power points .....	119
Figure 7 – Test finger nail .....	120
Figure 8 – Flexing test apparatus.....	121
Figure 9 – Constructions of cord anchorages .....	122
Figure 10 – An example of parts of an earthing terminal .....	123
Figure 11 – Examples of clearances .....	124
Figure 12 – Example of the placement of the cylinder .....	125
Figure 13 – Small parts cylinder.....	126
Figure B.1 – Examples of forms of constructions for appliances covered by Annex B.....	132
Figure I.1 – Simulation of faults .....	143
Figure L.1 – Sequence for the determination of clearances.....	147
Figure L.2 – Sequence for the determination of creepage distances .....	148
Figure O.1 – Tests for resistance to heat .....	151
Figure O.2 – Selection and sequence of tests for resistance to fire in hand-held appliances .....	152
Figure O.3 – Selection and sequence of tests for resistance to fire in attended appliances .....	153
Figure O.4 – Selection and sequence of tests for resistance to fire in unattended appliances .....	154
Figure O.5 – Some applications of the term "within a distance of 3 mm" .....	156
Figure S.1 – Examples of battery marking representing three batteries .....	176
Table 1 – Power input deviation.....	40
Table 2 – Current deviation.....	41
Table 3 – Maximum normal temperature rises.....	44
Table 4 – Voltage for electric strength test.....	49
Table 5 – Characteristics of high-voltage sources .....	49
Table 6 – Impulse test voltage .....	50
Table 7 – Test voltages.....	54
Table 8 – Maximum winding temperature .....	57
Table 9 – Maximum abnormal temperature rise.....	63
Table 10 – Dimensions of cables and conduits.....	85
Table 11 – Minimum cross-sectional area of conductors .....	87
Table 12 – Pull force and torque .....	90
Table 13 – Nominal cross-sectional area of conductors .....	94
Table 14 – Torque for testing screws and nuts.....	98
Table 15 – Rated impulse voltage .....	100
Table 16 – Minimum clearances.....	101
Table 17 – Minimum creepage distances for basic insulation .....	105

Table 18 – Minimum creepage distances for functional insulation .....	106
Table 19 – Minimum thickness for accessible parts of reinforced insulation consisting of a single layer .....	107
Table A.1 – Test voltages .....	128
Table C.1 – Test conditions .....	134
Table R.1 ° – General fault/error conditions .....	162
Table R.2 ° – Specific fault/error conditions .....	165
Table R.3 – Semi-formal methods .....	171
Table R.4 – Software architecture specification .....	171
Table R.5 – Module design specification .....	172
Table R.6 – Design and coding standards .....	172
Table R.7 – Software safety validation .....	173
Table S.101 – Battery source impedance .....	175
Table T.1 – Minimum property retention limits after UV-C exposure .....	178
Table T.2 – Minimum electric strength for internal wiring after UV-C exposure .....	179
Table ZD.1 — IEC and CENELEC code designations for flexible cords .....	193
Table ZF.1 – List of standards under CLC/TC 61 .....	201
Table ZZA.1 – Correspondence between this European Standard and Annex I of Directive 2014/35/EU [2014 OJ L96] .....	220
Table ZZB.1 – Correspondence between this European Standard and Annex I of Directive 2006/42/EC [OJ No L 157] .....	221

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

This fifth edition cancels and replaces the fourth edition published in 2001 including its Amendment 1 (2004) and amendment 2 (2006). It constitutes a technical revision.

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.

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

FDIS	Report on voting
61/3974/FDIS	61/4014/RVD

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

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 this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

NOTE 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<sup>2</sup> 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).

The contents of the corrigenda of July 2010 and April 2011 have been included in this copy.

## IEC 60335-1:2010/A1:2013 FOREWORD

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

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

FDIS	Report on voting
61/4639/FDIS	61/4675/RVD

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

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

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

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



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

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

## IEC 60335-1:2010/A2:2016 FOREWORD

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

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

FDIS	Report on voting
61/5116A/FDIS	61/5166/RVD

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

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

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

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

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

The contents of the corrigendum of September 2016 have been included in this copy.

## 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.

For appliances not covered by a particular Part 2 of EN 60335 additional consideration may need to be given to particular categories of likely users, including vulnerable people and children and to related specific risks (e.g. access to live parts, or to hot surfaces or to moving parts) that may be covered by a particular Part 2 considered to be closest to the product under examination.

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.

The principal objectives of the Low Voltage Directive, 2006/95/EC, are covered by this standard. The essential safety requirements of the following directives, which can be applicable to some household and similar appliances, have also been taken into account:

- 2006/42/EC – Machinery directive;
- 89/106/EEC – Construction products directive;
- 97/23/EC – Pressure equipment directive.

The Essential Health and Safety Requirements (EHSR) of the Directive 2006/42/EC are covered by Annex ZE. The application of EN 60335-1 alone does not give presumption of conformity for a product. This is achieved by complying with the requirements of EN 60335-1 and the relevant Part 2, when this Part 2 is also listed in the OJ under the Directive.

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 1: General requirements

#### 1 Scope

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

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.

NOTE Z1 Examples of appliance for household environment are appliances for typical housekeeping functions used in the household environment that may also be used by non expert users for typical housekeeping functions:

- in shops, offices and other similar working environments;
- in farm houses;
- by clients in hotels, motels and other residential type environments;
- in bed and breakfast type environments.

NOTE Z2 Household environment includes the dwelling and its associated buildings, the garden, etc.

Appliances and machines intended to be used by expert or trained users in shops, in light industry and on farms, and appliances and machines which are declared to be for commercial use by lay persons are within the scope of this standard.

Additional requirements for such appliances are given in Annex ZE.

NOTE 2 Void.

NOTE Z3 Examples of such appliances and machines are catering equipment, cleaning machines for commercial use, and appliances for hairdressers.

NOTE Z4 Criteria applied for the allocation of products covered by standards in the EN 60335 series under either the Low Voltage Directive (LVD) or the Machinery Directive (MD) are given for information in Annex ZF.

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:

- **children** playing with the appliance;
- the use of the appliance by **very young children**;
- the use of the appliance by **young children** without supervision.

It is recognized that **very vulnerable people** may have needs beyond the level addressed in this standard.

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.

CLC/TR 50417, *Safety of household and similar electrical appliances - Interpretations related to European Standards in the EN 60335 series*

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 60065:2001, *Audio, video and similar electronic apparatus – Safety requirements*  
Amendment 1 (2005)<sup>1)</sup>

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 60083:2015, *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*

<sup>1)</sup> There exists a consolidated edition 7.1 (2005) that includes edition 7 and its Amendment 1.

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*  
Amendment 1 (2009)<sup>2)</sup>

IEC 60127 (all parts), *Miniature fuses*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60238, *Edison screw lampholders*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60252-1, *AC 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*

IEC 60320-2-2, *Appliance couplers for household and similar general purposes – Part 2-2: Interconnection couplers for household and similar equipment*

IEC 60320-2-3, *Appliance coupler 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 60529:1989, *Degrees of protection provided by enclosures (IP Code)*  
Amendment 1 (1999)<sup>3)</sup>

IEC 60598-1:2008, *Luminaires – Part 1: General requirements and tests*

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*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot wire based test methods – Glow-wire flammability test method for materials*

<sup>2)</sup> There exists a consolidated edition 4.1 (2009) that includes edition 4 and its Amendment 1.

<sup>3)</sup> There exists a consolidated edition 2.1 (2001) that includes edition 2 and its Amendment 1.

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot wire based test methods – Glow-wire ignitability test method for materials*

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 60730-1:1999, *Automatic electrical controls for household and similar use – Part 1: General requirements*  
Amendment 1 (2003)  
Amendment 2 (2007)<sup>4)</sup>

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)<sup>5)</sup>

IEC 60730-2-9:2008<sup>6)</sup>, *Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls*

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 60990:1999, *Methods of measurement of touch current and protective conductor current*

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<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

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

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

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

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



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*  
Amendment 1 (2009)<sup>7)</sup>

IEC 61000-4-34:2005, *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*  
Amendment 1 (2009)

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1:2000, *Switches for appliances – Part 1: General requirements*  
Amendment 1 (2001)  
Amendment 2 (2007)<sup>8)</sup>

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 61558-1:2005, *Safety of power transformers, power supply units and similar products – Part 1: General requirements and tests*  
Amendment 1(2009)<sup>9)</sup>

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*

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

IEC 61770, *Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets*

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

*deleted text*

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 178:2010, *Plastics – Determination of flexural properties*  
ISO 178:2010/AMD 1:2013

ISO 179-1:2010, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

ISO 180:2000, *Plastics – Determination of Izod impact strength*  
ISO 180:2000/AMD 1:2006  
ISO 180:2000/AMD 2:2013

<sup>7)</sup> There exists a consolidated edition 1.1 (2009) that includes edition 1 and its Amendment 1.

<sup>8)</sup> There exists a consolidated edition 3.2 (2008) that includes edition 3 and its Amendment 1 and Amendment 2.

<sup>9)</sup> There exists a consolidated edition 2.1 (2009) that includes edition 2 and its Amendment 1.



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 lamps*

ISO 7000:2004, *Graphical symbols for use on equipment – Index and synopsis*

ISO 8256:2004, *Plastics – Determination of tensile-impact strength*

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

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

EN 41003, *Particular safety requirements for equipment to be connected to telecommunication networks and/or a cable distribution system*

*deleted text*

EN 62233, *Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure* (IEC 62233)

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 An Index of the defined terms is provided at the end of this publication.

NOTE 2 When the terms “voltage” and “current” are used, they are r.m.s. values, unless otherwise specified.

#### Definitions relating to physical characteristics

When the term “appliance” is used, it is intended to cover appliances and/or machines for household use and appliances and/or machines for commercial use.

##### 3.1.1

##### **rated voltage**

voltage assigned to the appliance by the manufacturer

##### 3.1.2

##### **rated voltage range**

voltage range assigned to the appliance by the manufacturer, expressed by its lower and upper limits

##### 3.1.3

##### **working voltage**

maximum voltage to which the part under consideration is subjected when the appliance is supplied at its **rated voltage** and operating under **normal operation**, with controls and switching devices positioned so as to maximize the value