BS EN IEC 60320-1:2021

BSI Standards Publication

# Appliance couplers for household and similar general purposes

Part 1: General requirements

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Full document details: BS EN IEC 60320-1:2021

# National foreword

This British Standard is the UK implementation of EN IEC 60320-1:2021. It is identical to IEC 60320-1:2021. It supersedes BS EN 60320-1:2015+A1:2021, which will be withdrawn on 31 August 2024.

The UK participation in its preparation was entrusted to Technical Committee PEL/23/3, Connectors for portable appliances.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication has been prepared under a mandate given to the European Standards Organizations by the European Commission and the European Free Trade Association. It is intended to support requirements of the EU legislation detailed in the European Foreword. A European Annex, usually Annex ZA or ZZ, describes how this publication relates to that EU legislation.

For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. If there is no National Annex of this kind, the relevant Annex ZA or ZZ in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

For the Northern Ireland market, UK law will continue to implement relevant EU law subject to periodic confirmation. Therefore Annex ZA/ZZ in the European text, and references to EU legislation, are still valid for this market.

UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of www.gov.uk.

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**Amendments/corrigenda issued since publication**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN IEC 60320-1

October 2021

ICS 29.120.30

Supersedes EN 60320-1:2015 and all of its amendments and corrigenda (if any)

English Version

# Appliance couplers for household and similar general purposes - Part 1: General requirements (IEC 60320-1:2021)

Connecteurs pour usages domestiques et usages généraux analogues - Partie 1: Exigences générales (IEC 60320-1:2021)

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche allgemeine Zwecke - Teil 1: Allgemeine Anforderungen (IEC 60320-1:2021)

This European Standard was approved by CENELEC on 2021-08-31. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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# European foreword

The text of document 23G/464/FDIS, future edition 4 of IEC 60320-1, prepared by SC 23G "Appliance couplers" of IEC/TC 23 "Electrical accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60320-1:2021.

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) 2022-05-31
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-08-31

This document supersedes EN 60320-1:2015 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

## Endorsement notice

The text of the International Standard IEC 60320-1:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---|---|---|
| IEC 60320-2-1 | NOTE | Harmonized as EN IEC 60320-2-1 |
| IEC 60320-2-3 | NOTE | Harmonized as EN IEC 60320-2-3 |
| IEC 60320-2-4 | NOTE | Harmonized as EN IEC 60320-2-4 |
| IEC 60364-4-44 | NOTE | Harmonized as HD 60364-4-444 |
| IEC 61140 | NOTE | Harmonized as EN 61140 |
| ISO 1456 | NOTE | Harmonized as EN ISO 1456 |
| ISO 2081 | NOTE | Harmonized as EN ISO 2081 |

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# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60068-2-31 | - | Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens | EN 60068-2-31 | 2008 |
| IEC 60068-2-60 | - | Environmental testing - Part 2-60: Tests - Test Ke: Flowing mixed gas corrosion test | EN 60068-2-60 | 2015 |
| IEC 60068-2-75 | - | Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests | EN 60068-2-75 | 2014 |
| IEC 60112 | 2020 | Method for the determination of the proof and the comparative tracking indices of solid insulating materials | EN IEC 60112 | 2020 |
| IEC 60227 | series | Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - | EN 50525 | series |
| IEC 60245 | series | Rubber insulated cables - Rated voltages up to and including 450/750 V | EN 50525 | series |
| IEC 60320-3<br>+A1 | 2014<br>2018 | Appliance couplers for household and similar general purposes - Part 3: Standard sheets and gauges | EN 60320-3<br>+ A1 | 2014<br>2021 |
| IEC 60417 | - | Graphical symbols for use on equipment. Index, survey and compilation of the single sheets. | - | - |
| IEC 60664-1 | 2020 | Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests | EN IEC 60664-1 | 2020 |
| IEC 60695-2-11 | 2014 | Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products | EN 60695-2-11 | 2014 |
| IEC 60695-10-2 | 2014 | Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test method | EN 60695-10-2 | 2014 |
| IEC 60730-2-11 | 2019 | Automatic electrical controls for household and similar use - Part 2-11: Particular requirements for energy regulators | EN IEC 60730-2-11 | 2020 |

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| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| 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 mm² up to 35 mm² (included) | EN 60999-1 | 2000 |
| IEC 61058 | series | Switches for appliances | EN 61058 | series |

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# Annex ZZ
(informative)

## Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

**Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]**

| Safety objectives of Directive 2014/35/EU | Clause(s) / sub-clause(s) of this EN | Remarks / Notes |
|---|---|---|
| (1)(a) | 8 | |
| (1)(b) | 4, 9, 12, 20 | |
| (1)(c) | See below detailed clauses | |
| (2)(a) | 4, 8.6, 10, 11, 12, 13, 14, 15, 20, 21, 22, 23, 26, 27<br>9 in combination with EN 60320-3 | |
| (2)(b) | 17, 19, 20, 21, 25, 27 | |
| (2)(c) | N.A. | |
| (2)(d) | 10, 14, 15, 20, 22, 26 | |
| (3)(a) | 22, 23 | |
| (3)(b) | 14, 22, 24, 28 | |
| (3)(c) | 21, 22 | |

**WARNING 1** — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2** — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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Full document details: BS EN IEC 60320-1:2021

CONTENTS

FOREWORD ..... 7
1 Scope ..... 9
2 Normative references ..... 9
3 Terms and definitions ..... 10
4 General requirements ..... 13
5 General notes on tests ..... 14
5.1 General ..... 14
5.2 Test samples ..... 14
5.3 Routine tests ..... 14
6 Standard ratings ..... 15
7 Classification of appliance couplers ..... 15
8 Marking ..... 15
8.1 General ..... 15
8.2 Additional markings ..... 15
8.3 Appliance couplers for class II equipment ..... 16
8.4 Symbols or alphanumeric notations ..... 16
8.5 Legibility of markings ..... 16
8.6 Terminal markings and wiring instructions ..... 16
8.7 Durability ..... 17
8.8 Test and inspection ..... 17
9 Dimensions and compatibility ..... 17
9.1 General ..... 17
9.2 Single-pole connections ..... 17
9.3 Compatibility ..... 17
9.4 Dimensions for standardized appliance couplers ..... 18
9.5 Dimensions for non-standardized appliance couplers ..... 18
10 Protection against electric shock ..... 19
10.1 Accessibility of live parts ..... 19
10.2 Protection against single pole connection ..... 19
10.3 Protection against access to live parts ..... 19
10.4 External parts ..... 19
10.5 Shrouds ..... 19
11 Provision for earthing ..... 19
12 Terminals and terminations ..... 20
12.1 General ..... 20
12.2 Rewirable appliance couplers ..... 20
12.3 Non-rewirable appliance couplers ..... 20
13 Construction ..... 20
13.1 Risk of accidental contact ..... 20
13.2 Contact positions ..... 20
13.3 Parts covering live parts ..... 21
13.4 Pin construction ..... 21
13.4.1 Prevention of rotation ..... 21
13.4.2 Pin retention ..... 21
13.4.3 Non-solid pins ..... 22

AVA Documents
Document Sharing Hub

13.4.4 Pins for appliance couplers for higher ambient temperatures up to +90 °C ... 22
13.5 Contact pressure ... 22
13.6 Enclosure ... 23
13.6.1 General ... 23
13.6.2 Rewirable connectors and rewirable plug connectors ... 23
13.6.3 Non-rewirable connectors and non-rewirable plug connectors ... 23
13.7 Earth connection ... 24
13.8 Location of terminals and terminations ... 24
13.8.1 General ... 24
13.8.2 Free wire test for rewirable accessories ... 24
13.8.3 Free wire test for non-rewirable non-moulded-on accessories ... 24
13.8.4 Free wire verification for non-rewirable moulded-on accessories ... 25
13.9 Connectors/plug connectors without earthing contact ... 25
13.10 Fuses, relays, thermostats, thermal cut-outs and switches ... 25
14 Moisture resistance ... 25
15 Insulation resistance and electric strength ... 26
15.1 General ... 26
15.2 Insulation resistance ... 28
15.3 Dielectric strength ... 28
16 Forces necessary to insert and to withdraw the connector/appliance outlet ... 29
16.1 General ... 29
16.2 Verification of the maximum withdrawal force ... 30
16.3 Verification of the minimum withdrawal force ... 31
17 Operation of contacts ... 32
18 Resistance to heating of appliance couplers for hot conditions or very hot conditions ... 32
18.1 General ... 32
18.2 Heating test for connectors/plug connectors ... 33
18.3 Heating test for appliance inlets/appliance outlets ... 34
19 Breaking capacity ... 34
20 Normal operation ... 36
21 Temperature rise ... 36
22 Cords and their connection ... 37
22.1 Cords for non-rewirable connectors/plug connectors ... 37
22.2 Cord anchorage ... 38
22.2.1 General ... 38
22.2.2 Additional requirements for rewirable connectors and rewirable plug connectors ... 39
22.2.3 Pull test for cable anchorage ... 39
22.3 Flexing test ... 41
23 Mechanical strength ... 43
23.1 General ... 43
23.2 Free fall test ... 44
23.3 Lateral pull test for contacts ... 44
23.4 Impact test ... 46
23.5 Deformation test ... 46
23.6 Pull tests for connectors/plug connectors with a separate front part ... 47

AVA Documents
Document Sharing Hub
Full document details: BS EN IEC 60320-1:2021

23.6.1 General ... 47
23.6.2 Straight pull test ... 47
23.6.3 Lateral pull test ... 47
24 Resistance to heat and ageing ... 48
24.1 Resistance to heat ... 48
24.2 Resistance to ageing ... 48
24.2.1 General ... 48
24.2.2 Ageing test for elastomeric materials ... 49
24.2.3 Ageing test for thermoplastic materials ... 49
24.2.4 Ageing test assessment ... 49
25 Screws, current-carrying parts and connections ... 49
25.1 General ... 49
25.2 Electrical connections ... 50
25.3 Securement of connections ... 51
25.4 Metallic parts ... 51
26 Clearances, creepage distances and solid insulation ... 51
26.1 General ... 51
26.2 Clearances ... 52
26.2.1 Dimensioning ... 52
26.2.2 Minimum values for clearances ... 52
26.3 Creepage distances ... 53
26.3.1 Dimensioning ... 53
26.3.2 Minimum creepage distances ... 53
26.4 Solid insulation ... 54
27 Resistance of insulating material to heat, fire and tracking ... 55
27.1 Resistance to heat and fire ... 55
27.1.1 General ... 55
27.1.2 Objective of the test ... 55
27.1.3 General description of the test ... 55
27.1.4 Degree of severity ... 55
27.1.5 Evaluation of test results ... 55
27.2 Resistance to tracking ... 56
28 Resistance to rusting ... 56
29 Electromagnetic compatibility (EMC) requirements ... 56
29.1 Immunity – Accessories not incorporating electronic components ... 56
29.2 Emission – Accessories not incorporating electronic components ... 57
Annex A (normative) Proof tracking test ... 58
Annex B (normative) Routine tests for factory wired appliance couplers related to safety ... 59
B.1 General ... 59
B.2 Polarized systems: Line (L) and neutral (N) – Correct connection ... 59
B.3 Earth (PE) continuity ... 60
B.4 Short-circuit/wrong connection and reduction in creepage distance and clearance ... 60
B.4.1 Accessible surface safety check ... 60
B.4.2 Short-circuit/wrong connection ... 60
Annex C (normative) Test schedule ... 61
Annex D (informative) Comparison of typical conductor cross-sectional areas ... 63

AVA Documents
Document Sharing Hub
Full document details: BS EN IEC 60320-1:2021

Annex E (normative) Additional tests and requirements for appliance couplers intended to be used in ambient temperatures above +35 °C up to and including +90 °C ..... 64
E.1 General ..... 64
E.2 General requirements on tests ..... 64
E.2.1 General ..... 64
E.2.2 Test setup ..... 64
E.2.3 Conditions of temperature measurement ..... 64
E.2.4 Method of measurement ..... 65
E.3 Markings ..... 65
E.4 Determination of $t_a$ and the rated and derated current in relation to the ambient temperature ..... 65
E.4.1 Determination of the maximum ambient temperature ($t_a$) for operation of the accessory at the rated current ..... 65
E.4.2 Determination of the derated operating currents for ambient temperatures above $t_a$ ..... 66
E.5 Test to evaluate the long-term behaviour of the appliance couplers in ambient temperatures above +35 °C up to and including +90 °C ..... 66
E.5.1 Resistance to heat ..... 66
E.5.2 Resistance to ageing ..... 67
E.5.3 Resistance to tracking ..... 68
E.6 Cords and their connections ..... 68
Bibliography ..... 69

Figure 1 – Intended use of appliance couplers ..... 11
Figure 2 – Device for testing non-solid pins ..... 22
Figure 3 – Apparatus for checking the withdrawal force ..... 30
Figure 4 – Gauge for verification of the minimum withdrawal force ..... 31
Figure 5 – Example of an apparatus for heating test (see 18.2) ..... 33
Figure 6 – Circuit diagram for breaking capacity and normal operation tests ..... 35
Figure 7 – Apparatus for testing the cord anchorage ..... 39
Figure 8 – Apparatus for the flexing test ..... 42
Figure 9 – Example of apparatus for pulling test ..... 45
Figure E.1 – Schematic drawing of a derating curve with an example of a derated current $I_d$ at the operating ambient temperature $t_d$ ..... 66

Table 1 – Position of contacts ..... 20
Table 2 – Maximum diameters of the cords ..... 27
Table 3 – Minimum insulation resistance ..... 28
Table 4 – Dielectric strength ..... 29
Table 5 – Maximum and minimum withdrawal forces ..... 30
Table 6 – Ratings for the tests of Clause 19 ..... 35
Table 7 – Ratings for the tests of Clause 20 ..... 36
Table 8 – Cords and conductors for the tests of Clause 21 ..... 37
Table 9 – Type and nominal cross-sectional area of cords ..... 38
Table 10 – Types of cord for the rewirable connector/plug connector test ..... 40
Table 11 – Applicable tests ..... 44
Table 12 – Values for the lateral pulls applied ..... 46

AVA Documents
Document Sharing Hub
Full document details: BS EN IEC 60320-1:2021

Table 13 – Values for pull forces ..... 47
Table 14 – Torque applied for the tightening and loosening test ..... 50
Table 15 – Rated impulse withstand voltage for appliance couplers energized directly from the low voltage mains ..... 52
Table 16 – Minimum clearances for basic insulation ..... 53
Table 17 – Minimum creepage distances for basic and functional insulation ..... 54
Table B.1 – Test overview ..... 59
Table C.1 – Test schedule ..... 61
Table D.1 – Comparison of conductor sizes ..... 63

Documents
Document Sharing Hub

Full document details: BS EN IEC 60320-1:2021

INTERNATIONAL ELECTROTECHNICAL COMMISSION

# APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES –

## 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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60320-1 has been prepared by subcommittee 23G: Appliance couplers, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2015 and Amendment 1:2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) introduction of necessary tolerances throughout this document;
b) the heating test from edition 2 is reintroduced in 18.2;
c) temperature rise added for plug connectors in Clause 21;
d) change for better readability in 23.3;
e) updated lateral pull test in 23.6 for connectors/plug connectors with separate front parts;

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f) revision of 24.1 for ball pressure test;

g) Clause 27 for glow wire test is updated;

h) revision of Annex C for test sequences;

i) additional Annex E for additional tests and requirements for appliance couplers intended to be used in ambient temperatures above +35 °C.

The text of this International Standard is based on the following documents:

| FDIS | Report on voting |
|---|---|
| 23G/464/FDIS | 23G/467/RVD |

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

The language used for the development of this International Standard is English.

A list of all the parts in the IEC 60320 series, under the general title *Appliance couplers for household and similar general purposes*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

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# APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES –

## Part 1: General requirements

## 1 Scope

This part of IEC 60320 sets the general requirements for appliance couplers for two poles and two poles with earth contact and for the connection of electrical devices for household and similar onto the mains supply.

This document is also valid for appliance inlets/appliance outlets integrated or incorporated in appliances.

The rated voltage does not exceed 250 V (AC) and the rated current does not exceed 16 A.

Appliance couplers complying with this document are suitable for normal use at ambient temperatures not normally exceeding +40 °C, but their average over a period of 24 h does not exceed +35 °C, with a lower limit of the ambient air temperature of −5 °C.

Annex E provides test requirements for derating the operating current of an accessory when used in ambient temperatures above +35 °C up to and including +90 °C.

Appliance couplers are not suitable for:

– use in place of plug and socket-outlet systems according to IEC 60884-1;
– use in place of devices for connecting luminaires (DCLs) according to IEC 61995 or luminaire supporting couplers (LSCs);
– use in place of installation couplers according to IEC 61535.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-60, *Environmental testing – Part 2-60: Tests – Test Ke: Flowing mixed gas corrosion test*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60112:2020, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

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

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

IEC 60320-3:2014, *Appliance couplers for household and similar general purposes – Part 3: Standard sheets and gauges*
IEC 60320-3:2014/AMD1:2018

IEC 60417, *Graphical symbols for use on equipment* (available from: http://www.graphical-symbols.info/equipment)

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60730-2-11:2019, *Automatic electrical controls – Part 2-11: Particular requirements for energy regulators*

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

IEC 61058 (all parts), *Switches for appliances*

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

**3.1**
**appliance coupler**
means enabling the connection and disconnection of an appliance or equipment to the supply

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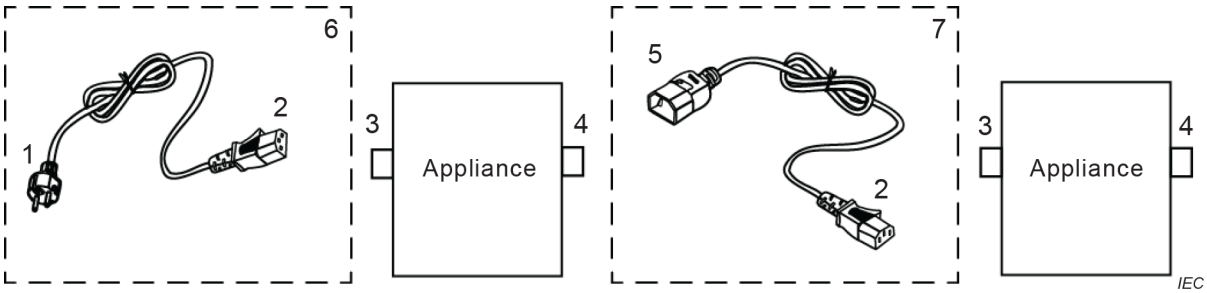


1 Plug
2 Connector (see 3.1.1)
3 Appliance inlet (see 3.1.2)
4 Appliance outlet (see 3.2.2)
5 Plug connector (see 3.2.1)
6 Cord set (see 3.5)
7 Interconnection cord set (see 3.6)

**Figure 1 – Intended use of appliance couplers**

**3.1.1**
**connector** (of an appliance coupler)
part of the appliance coupler integral with, or intended to be attached to, one cord connected to the supply

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-02, modified – "the cord" has been replaced with "one cord" and a reference to Figure 1 has been added.]

**3.1.2**
**appliance inlet**
part of the appliance coupler integrated as a part of an appliance or incorporated as a separate part in the appliance or equipment or intended to be fixed to it

SEE: Figure 1.

**3.2**
**interconnection coupler**
appliance coupler enabling the connection and disconnection of an appliance or equipment to a cord leading to another appliance or equipment

SEE: Figure 1.

Note 1 to entry: An interconnection coupler is a type of appliance coupler.

**3.2.1**
**plug connector**
part of the interconnection coupler integral with or intended to be attached to one cord

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-09, modified – "the flexible cable" has been replaced with "one cord" and a reference to Figure 1 has been added.]

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**3.2.2**
**appliance outlet**
part of the interconnection coupler integrated in or incorporated in the appliance or equipment or intended to be fixed to it, and from which the supply is obtained

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-08, modified – A reference to Figure 1 has been added.]

**3.3**
**rewirable appliance coupler**
accessory so constructed that a cable or cord can be replaced

**3.4**
**non-rewirable appliance coupler**
accessory so constructed that it forms a complete unit with flexible supply cable or cord after connection and assembly by the manufacturer of the accessory

**3.5**
**cord set**
assembly consisting of one cable or cord fitted with one non-rewirable plug and one non-rewirable connector, intended for the connection of an electrical appliance or equipment to the electrical supply

SEE: Figure 1.

**3.6**
**interconnection cord set**
assembly consisting of one cable or cord fitted with one non-rewirable plug connector and one non-rewirable connector, intended for the interconnection between two electrical appliances

SEE: Figure 1

Note 1 to entry: The definition is based on that of IEC 60050-442:1998, 442-07-06.

**3.7**
**integrated appliance coupler**
appliance coupler which is formed by the housing or enclosure of the appliance or equipment and that cannot be tested separately

**3.8**
**standardized appliance coupler**
appliance coupler with dimensions in accordance with the standard sheets of IEC 60320-3

**3.9**
**non-standardized appliance coupler**
appliance coupler with dimensions not in accordance with the standard sheets of IEC 60320-3

**3.10**
**base of a pin**
part of the pin where it protrudes from the engagement face

**3.11**
**retaining device**
mechanical provision or arrangement which holds a connector in proper engagement with a corresponding appliance inlet and prevents its unintentional withdrawal

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**3.12**
**rated voltage** (for accessories)
voltage assigned by the manufacturer for a specified operating condition of an accessory

[SOURCE: IEC 60050-442:1998, 442-01-03]

**3.13**
**rated current** (for accessories)
current assigned by the manufacturer for a specified operating condition of an accessory

[SOURCE: IEC 60050-442:1998, 442-01-02]

**3.14**
**terminal** (for accessories)
part of an accessory to which a conductor is attached, providing a re-usable connection

[SOURCE: IEC 60050-442:1998, 442-06-05]

**3.15**
**termination**
part of an accessory to which a conductor is permanently attached

[SOURCE: IEC 60050-442:1998, 442-06-06]

**3.16**
**thread-cutting screw**
screw having an interrupted thread which, by screwing in, makes a thread by removing material from the cavity

[SOURCE: IEC 60050-442:1998, 442-06-03]

**3.17**
**type test**
test of one or more devices made to a certain design to show that the design meets certain requirements

**3.18**
**routine test**
conformity test made on each individual item during or after manufacture

[SOURCE: IEC 60050-151:2001, 151-16-17]

## 4 General requirements

Appliance couplers shall be so designed and constructed that in normal use their performance is reliable and without danger to the user or to the surroundings.

A non-standardized appliance coupler shall comply with all safety requirements of this document and shall be tested together with its counterpart.

Compliance is checked by carrying out all the tests specified.

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# 5 General notes on tests

## 5.1 General

Tests shall be made to prove compliance with the requirements set out in this document, where applicable.

Tests are as follows:

1) type tests shall be made on representative samples of each accessory.
2) routine tests shall be conducted by the manufacturer and made on each accessory.
3) unless otherwise specified, the tests are carried out in the order of the clauses in this document.
4) unless otherwise specified, appliance couplers are tested together with their counterparts that are in compliance with this document.
5) integrated appliance couplers and incorporated appliances couplers are tested under the conditions of use of the equipment, the number of test samples then being the same as the number of test samples of equipment required according to the relevant standard for the equipment.
6) appliance couplers are considered to comply with this document if not more than one test sample of a given set fails in a test due to an assembly or manufacturing fault. That test and those preceding which may have influenced the result of that test are repeated on another set of test samples, all of which shall then comply with the repeated tests.
7) in general, only the test which caused the failure needs to be repeated unless:
   a) a failure occurs in one of the three test samples when tested in accordance with Clause 19, Clause 20, or Clause 21, in which case the tests are repeated from Clause 16 onwards; or
   b) a failure occurs in one of the three test samples when tested in accordance with Clause 22 (with the exception of 22.3) or Clause 23, in which case the tests are repeated from Clause 18 onwards.

Subclause 5.2 is applicable to type tests. For the number of samples and test sequences, see Annex C.

## 5.2 Test samples

Unless otherwise specified, the test samples are tested as delivered and under normal conditions, assembled and installed as in normal use according to the manufacturer's instructions at an ambient temperature of 20 °C ± 5 °C; they are tested with a.c. at 50 Hz or 60 Hz. Tests shall not commence earlier than 168 h after manufacture.

Non-rewirable connectors and non-rewirable plug connectors, other than those forming part of a cord set, shall be submitted with a cord at least 1 m long.

The applicant may submit, together with the first set of test samples, the additional set which may be necessary if one test sample should fail. The testing station will then, without further request, test the additional test samples and will only reject if a further failure occurs. If the additional set of test samples is not submitted at the same time, a failure of one test sample will entail a rejection.

## 5.3 Routine tests

Routine tests are specified in Annex B.

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## 6 Standard ratings

**6.1** The maximum permitted rated voltage is 250 V.

**6.2** The maximum permitted rated current is 16 A.

Preferred rated currents for appliance couplers are 0,2 A, 2,5 A, 6 A, 10 A and 16 A.

NOTE For details of standard type ratings refer to IEC 60320-3.

## 7 Classification of appliance couplers

**7.1** According to the maximum pin temperature at the base of the pins of the corresponding appliance inlet or the socket contacts of the corresponding appliance outlet:

a) appliance couplers for cold conditions, pin temperature not exceeding 70 °C;

b) appliance couplers for hot conditions, pin temperature not exceeding 120 °C;

c) appliance couplers for very hot conditions, pin temperature not exceeding 155 °C.

NOTE Appliance couplers for hot conditions can also be used under cold conditions; appliance couplers for very hot conditions can also be used under cold or hot conditions.

**7.2** According to the type of equipment to be connected:

a) appliance couplers for class I equipment;

b) appliance couplers for class II equipment.

NOTE 1 For a description of the classes, see IEC 61140.

NOTE 2 Appliance couplers for 0,2 A are intended only for the connection of small hand-held class II equipment, if allowed by the relevant standard for the equipment.

**7.3** Connectors / plug connectors according to the method of connecting the cord:

a) rewirable;

b) non-rewirable.

**7.4** According to the ambient temperature:

a) appliance couplers for ambient temperatures up to and including +35 °C;

b) appliance couplers for ambient temperatures up to and including +90 °C. This classification also requires a classification according to 7.1 b) or 7.1 c).

## 8 Marking

### 8.1 General

Appliance couplers shall be marked with:

– name, trademark or identification mark of the manufacturer or responsible vendor;

– type reference.

NOTE The type reference can be a catalogue number.

### 8.2 Additional markings

Standardized connectors and plug connectors in accordance with IEC 60320-3 and all non-standardized appliance couplers shall be additionally marked with:

– rated current in amperes, except for 0,2 A connectors;

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