

This document is a preview generated by EVS

Appliance couplers for household and similar general purposes - Part 1: General requirements

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60320-1:2015 sisaldb Euroopa standardi EN 60320-1:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 60320-1:2015 consists of the English text of the European standard EN 60320-1:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.09.2015.	Date of Availability of the European standard is 18.09.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.30

Standardite reproduutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60320-1

September 2015

ICS 29.120.30

Supersedes EN 60320-1:2001

English Version

Appliance couplers for household and similar general purposes -
Part 1: General requirements
(IEC 60320-1:2015)

Connecteurs pour usages domestiques et usages généraux
analogues - Partie 1: Exigences générales
(IEC 60320-1:2015)

Gerätesteckvorrichtungen für den Hausgebrauch und
ähnliche allgemeine Zwecke - Teil 1: Allgemeine
Anforderungen
(IEC 60320-1:2015)

This European Standard was approved by CENELEC on 2015-07-29. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 23G/345/FDIS, future edition 3 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 60320-1:2015.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2016-04-29 national level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2018-07-29 the document have to be withdrawn

This document supersedes EN 60320-1:2001.

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

Endorsement notice

The text of the International Standard IEC 60320-1:2015 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 60364-4-44	NOTE	Harmonized as HD 60364-4-44.
IEC 61140	NOTE	Harmonized as EN 61140.
ISO 1466	NOTE	Harmonized as EN ISO 1456.
ISO 2081	NOTE	Harmonized as EN ISO 2081.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-31	-	Environmental testing -- Part 2-31: Tests -EN 60068-2-31 Test Ec: Rough handling shocks, primarily for equipment-type specimens	-EN 60068-2-31	-
IEC 60068-2-60	-	Environmental testing -- Part 2-60: Tests -EN 60068-2-60 ¹⁾ Test Ke: Flowing mixed gas corrosion test	-EN 60068-2-60 ¹⁾	-
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests -EN 60068-2-75 Test Eh: Hammer tests	-EN 60068-2-75	-
IEC 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	-EN 60112	-
IEC 60227	series	Polyvinyl chloride insulated cables of rated-voltages up to and including 450/750 V --		series
IEC 60245	series	Rubber insulated cables - Rated voltages-up to and including 450/750 V		series
IEC 60320	series	Appliance couplers for household and similar general purposes	-EN 60320	series
IEC 60320-3	2014	Appliance couplers for household and similar general purposes - Part 3: Standard sheets and gauges	-EN 60320-3	2014
IEC 60417	-	Graphical symbols for use on equipment.- Index, survey and compilation of the single sheets.		-
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems -- Part 1: Principles, requirements and tests	-EN 60664-1	2007
IEC 60695-2-10	2000	Fire hazard testing -- Part 2-10:EN 60695-2-10 Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	-EN 60695-2-10	2001
IEC 60695-2-11	2000	Fire hazard testing -- Part 2-11:EN 60695-2-11 Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	-EN 60695-2-11	2001

1) To be published

IEC 60695-2-12	2000	Fire hazard testing -- Part 2-12:EN 60695-2-12 Glowing/hot-wire based test methods - Glow-wire flammability test method for materials	2001
IEC 60695-2-13	2000	Fire hazard testing -- Part 2-13:EN 60695-2-13 Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials	2001
IEC 60695-10-2	-	Fire hazard testing -- Part 10-2: Abnormal heat - Ball pressure test method	-
IEC 60730-2-11	-	Automatic electrical controls for household and similar use -- Part 2-11: Particular requirements for energy regulators	-
IEC 60999-1	-	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)	EN 60999-1
IEC 61058	series	Switches for appliances	EN 61058

CONTENTS

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

13.4.3	Non-solid pins	20
13.5	Contact pressure.....	21
13.6	Enclosure.....	21
13.6.1	General	21
13.6.2	Rewirable connectors/plug connectors.....	21
13.6.3	Non-rewirable connectors/plug connectors.....	22
13.7	Earth connection	22
13.8	Location of terminals and terminations.....	23
13.8.1	General	23
13.8.2	Free wire test for rewirable accessories	23
13.8.3	Free wire test for non-rewirable non-moulded-on accessories	23
13.8.4	Free wire verification for non-rewirable moulded-on accessories	24
13.9	Connectors/plug connectors without earthing contact	24
13.10	Fuses, relays, thermostats, thermal cut-outs and switches	24
14	Moisture resistance	24
15	Insulation resistance and electric strength.....	25
15.1	General.....	25
15.2	Insulation resistance	26
15.3	Dielectric strength	27
16	Forces necessary to insert and to withdraw the connector/appliance outlet	28
16.1	General.....	28
16.2	Verification of the maximum withdrawal force.....	28
16.3	Verification of the minimum withdrawal force.....	30
17	Operation of contacts.....	31
18	Resistance to heating of appliance couplers for hot conditions or very hot conditions.....	31
18.1	General.....	31
18.2	Heating test for connectors/plug connectors.....	31
18.3	Heating test for appliance inlets/appliance outlets	32
19	Breaking capacity	32
20	Normal operation	34
21	Temperature rise	34
22	Cords and their connection	35
22.1	Cords for non-rewirable connectors/plug connectors	35
22.2	Cord anchorage	36
22.2.1	General	36
22.2.2	Additional requirements for rewirable connectors/plug connectors	36
22.2.3	Pull test for cable anchorage	37
22.3	Flexing test	39
23	Mechanical strength.....	41
23.1	General.....	41
23.2	Free fall test.....	42
23.3	Lateral pull test	42
23.4	Impact test.....	44
23.5	Deformation test.....	44
23.6	Torque and pull test	45
24	Resistance to heat and ageing	45

24.1	Resistance to heat	45
24.2	Resistance to ageing.....	46
24.2.1	General	46
24.2.2	Ageing test for elastomeric materials	46
24.2.3	Ageing test for thermoplastic materials	46
24.2.4	Ageing test assessment	46
25	Screws, current-carrying parts and connections.....	47
25.1	General.....	47
25.2	Electrical connections	48
25.3	Securement of connections	48
25.4	Metallic parts	48
26	Clearances, creepage distances and solid insulation	49
26.1	General.....	49
26.2	Clearances	49
26.2.1	Dimensioning	49
26.2.2	Minimum values for clearances	50
26.3	Creepage distances	51
26.3.1	Dimensioning	51
26.3.2	Minimum creepage distances	51
26.4	Solid insulation	52
27	Resistance of insulating material to heat, fire and tracking.....	53
27.1	Resistance to heat and fire	53
27.1.1	General	53
27.1.2	Object of the test	53
27.1.3	General description of the test.....	53
27.1.4	Description of test apparatus.....	53
27.1.5	Degree of severity.....	53
27.1.6	Verification of the thermocouple	54
27.1.7	Preconditioning	54
27.1.8	Initial measurements	54
27.1.9	Test procedure.....	54
27.1.10	Observations and measurements.....	54
27.1.11	Evaluation of test results	54
27.2	Resistance to tracking	54
28	Resistance to rusting	54
29	Electromagnetic compatibility (EMC) requirements	55
29.1	Immunity – Accessories not incorporating electronic components	55
29.2	Emission – Accessories not incorporating electronic components	55
Annex A (normative)	Proof tracking test	56
Annex B (normative)	Routine tests for factory wired appliance couplers related to safety	57
B.1	General.....	57
B.2	Polarized systems: Phase (L) and neutral (N) – Correct connection.....	57
B.3	Earth (PE) continuity	58
B.4	Short-circuit/wrong connection and reduction in creepage distance and clearance	58
B.4.1	Accessible surface safety check	58
B.4.2	Short-circuit/wrong connection	58

Annex C (normative) Test schedule	59
Annex D (informative) Comparison of typical conductor cross-sectional areas	61
Bibliography	62
Figure 1 – Intended use of appliance couplers	10
Figure 2 – Device for testing non-solid pins	21
Figure 3 – Apparatus for checking the withdrawal force	29
Figure 4 – Gauge for verification of the minimum withdrawal force	30
Figure 5 – Circuit diagram for breaking capacity and normal operation tests	33
Figure 6 – Apparatus for testing the cord anchorage	37
Figure 7 – Apparatus for the flexing test	40
Figure 8 – Example of apparatus for pulling test	43
Table 1 – Position of contacts	19
Table 2 – Maximum diameters of the cords	26
Table 3 – Minimum insulation resistance	27
Table 4 – Dielectric strength	27
Table 5 – Maximum and minimum withdrawal forces	28
Table 6 – Ratings for the tests of Clause 19	33
Table 7 – Ratings for the tests of Clause 20	34
Table 8 – Cords and conductors for the tests of Clause 21	35
Table 9 – Type and nominal cross-sectional area of cords	36
Table 10 – Types of cord for the rewirable connector/plug connector test	38
Table 11 – Values for the lateral pulls applied	44
Table 12 – Values for torque and pull forces	45
Table 13 – Torque applied for the tightening and loosening test	48
Table 14 – Rated impulse withstand voltage for appliance couplers energized directly from the low voltage mains	50
Table 15 – Minimum clearances for basic insulation	51
Table 16 – Minimum creepage distances for basic and functional insulation	52
Table B.1 – Test overview	57
Table C.1 – Test schedule	59
Table D.1 – Comparison of conductor sizes	61