BS 4491 : Part 1 : 1989
EN 60 320 : Part 1 : 1987

UDC 621.316.541 : 64.06-83-
181.1-777.001.2.001.4(083.71)
614.825.001.25.004.11

British Standard

Appliance couplers for household and similar general purposes

Part 1. Specification of general requirements

Connecteurs pour usages domestiques et usages généraux analogues
Partie 1. Spécification des prescriptions générales

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche Zwecke
Teil 1. Spezifikation für allgemeine Anforderungen

This European Standard EN 60 320-1 has the status of a British Standard

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British Standards

Full document details: BS 4491-1:1989

National foreword

This British Standard has been prepared under the direction of the Power Electrical Engineering Standards Policy Committee and is identical with the English language version of EN 60 320 'Appliance couplers for household and similar general purposes' Part 1 'General requirements' published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by that organization from IEC Publication 320 (1981) which has a similar title as that of the European Standard. This British Standard supersedes BS 4491 : 1969 'Specification for appliance couplers for household and similar general purposes', which is withdrawn. Further Parts giving specific requirements for appliance couplers are expected.

EN 60 320 Part 2.1 (1987) 'Sewing machine couplers' will be published as BS 4491 : Part 2 : Section 2.1.

EN 60 320 Part 2.2 'Interconnection couplers' is in preparation in CENELEC.

Cross-references. Details of other international publications quoted in this standard are given in appendix A. Where there are British Standards either identical or technically equivalent to these international standards the relationship is given in national appendix P.*

Additional information

Warning. A choice of degreasing agents is given in clause 27. Amongst these is carbon tetrachloride, the use of which is deprecated for reasons of toxicity.

On page 2 of the text of EN 60 320 under the title 'Technical text', abbreviations doa, dop and dow are given. These represent 'date of announcement at national level that the EN exists', 'date of latest publication of the corresponding harmonized national standard' and 'date of withdrawal of conflicting requirements in national standards'. These dates have been set by the CENELEC Technical Board.

The standard test finger shown in figure 10 is very similar, but not identical to that shown as test finger II in BS 3042 : 1971.

The requirements of **22.5** although similar to those of IEC Publication 817 (1984) are not identical.

In the set of drawings at the end of the standard it will be noticed that there are discontinuities in the 'Standard Sheet' and 'Figure' numbers assigned to it. These discontinuities are due to deletions by amendment to the original IEC Publication.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

* National appendices start from letter N to avoid confusion with appendices to the basic CENELEC text. There is no appendix O.

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BSI STANDARDS

Amendment No. 1
published and effective from 30 April 1991
to BS 4491 : Part 1 : 1989

Appliance couplers for household and similar general purposes
Part 1. Specification of general requirements

NOTE. This amendment has been issued to implement Amendment 1, published in September 1989, to the English version of EN 60 320 : Part 1 : 1987. A consequent change to the national foreword has also been made.

Revised text

AMD 6462
April 1991

National foreword

In paragraph 1, line 3, after 'Part 1 'General requirements'' insert 'including Amendment 1'.

AMD 6462
April 1991

EN title page, brief history and technical text

Insert the attached EN title page (brief history and technical text on reverse).

AMD 6462
April 1991

Text of EN 60 320-1

Amend the text of European Standard EN 60 320-1 in accordance with the details given on the attached pages.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60 320-1
Amendment 1
September 1989

UDC: 621.316.541 : 64.06-83-181.1.777.001.2.001.33.001.4 (083.71) 614.825.001.25.004.11

Key words: Appliance couplers for electric household appliances; connectors; appliance inlets; dimensions; requirements; testing; definitions; electrical safety

Amendment 1 to the English version of EN 60 320-1

Appliance couplers for household and similar general purposes

(Amdt 3 (1987) to IEC 320 (1981) ed 2)

Connecteurs pour usages domestiques et usages généraux analogues
(Amdt 3 (1987) à la CEI 320 (1981) ed 2)

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche allgemeine Zwecke
(Amdt 3 (1987) zu IEC 320 (1981) Ausg. 2)

Amendment 1 modifies the European Standard EN 60 320-1. It was ratified by CENELEC on 12th June 1989.

The text of this Amendment consists of the text of Amendment 3 (1987) to IEC 320 (1981) ed 2, excluding the text of Amendment 1 (1984) and Amendment 2 (1985).

CENELEC members are bound to comply with the requirements of the CENELEC Internal Regulations which specify under which conditions this Amendment should be incorporated without any alteration, in the corresponding national standard.

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

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue Bréderode 2, B-1000 Brussels

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Full document details: BS 4491-1:1989

Brief history

The CENELEC Questionnaire Procedure, performed for finding out whether or not Amendment 3 (1987) (excluding Amendments 1 (1984) and 2 (1985)) to IEC 320 (2nd edition – 1981) could be accepted without textual changes, has shown that no CENELEC common modifications were necessary.

The Reference Document was submitted to the CENELEC members for formal vote and acceptance by CENELEC.

Technical text

The text of the Amendment 3 (1987) (excluding Amendments 1 (1984) and 2 (1985)) to the International Standard IEC 320 (2nd edition – 1981) was approved and ratified by CENELEC on 12 June 1989 as Amendment 1 to the European Standard EN 60 320-1.

The following dates were fixed:

– date of announcement (doa)	: 1989-12-01
– date of latest publication (dop)	: 1990-06-01
– date of withdrawal of conflicting national standard (dow)	: 1990-06-01

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Full document details: BS 4491-1:1989

4. **General notes on tests**

Replace Sub-clause 4.5 by the following:

"For appliance inlets, three samples are subjected to the tests specified.

For connectors, nine samples are required:

- *three are subjected to the tests specified, with the exception of those of Clauses 13, 14, 15, 18, 19 and 20 and Sub-clause 23.2;*
- *three are subjected to the tests of Clauses 13, 14, 15, 18, 19 and 20 (including the repetition of the test of Sub-clause 15.2);*
- *three are subjected to the test of Sub-clause 21.4.*

For connectors of rubber, polyvinyl chloride (PVC) or similar material, two additional samples are required which are subjected to the test of Sub-clause 23.2.1 or 23.2.2, whichever is applicable."

Replace Sub-clause 4.6 by the following:

"Appliance inlets integrated in or incorporated in an appliance or equipment are tested under the conditions of use of the equipment, the number of samples then being the same as the number of samples of equipment required according to the relevant standard for the equipment."

Replace Sub-clause 4.7 by the following:

"Connectors and appliance inlets are considered not to comply with this standard if there are more failures than that of one sample in one of the tests. If one sample fails in a test, that test and those preceding which may have influenced the result of that test are repeated on another set of samples of the number specified in Sub-clause 4.5, all of which shall then comply with the repeated tests.

In general, it will be necessary to repeat only the test which caused the failure, unless the sample fails in one of the tests of Clauses 18 to 22 inclusive, in which case the tests are repeated from that of Clause 17 onwards.

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

12. **Construction**

Add the following test specification at the end of Sub-clause 12.4:

"The security of the pin retention is checked by inspection and, in case of doubt, by the following test:

The sample is heated to its appropriate temperature class given in Sub-clause 6.1.1 for 1 h and maintained at this temperature for the duration of the test including the 5 min period after removal of the test load.

The appliance inlet is held firmly in such a manner that there will be no undue squeezing or distortion of the body, and the means of holding shall not assist in maintaining the pins in their original position.

[AMD 6462]
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Each pin is subjected to a force of 60 ± 0.6 N, applied without jerks, in a direction along the axis of the pin and maintained at this value for a period of 60 s.

For all pins the force is applied, first in the direction away from the base of the appliance inlet and then in the direction towards the base of the appliance inlet.

The attachment of the pins is deemed to be satisfactory if there is no movement exceeding 2.5 mm during the test on any pin, and provided that within 5 min after removal of the pushing-in test force or within 5 min after removal of the pulling-out test force, all pins remain within the tolerances specified in the relevant standard sheet."

15. **Forces necessary to insert and to withdraw the connector**

In the third paragraph of Sub-clause 15.2, delete "hard chromium-plated steel pins" and substitute "hardened steel pins, having a surface roughness not exceeding 0.8 μm".

21. **Flexible cables and cords and their connection**

Replace the table of Sub-clause 21.3 by the following:

Type of connector	Types of flexible cord	Nominal cross-sectional area (mm²)
10 A for cold conditions	H05VV-F H05VV-F	0.75 1
10 A for hot conditions	H05RR-F H05RR-F	0.75 1
10 A for very hot conditions	H05RR-F H05RR-F	0.75 1
16 A for cold conditions	H05VV-F H05VV-F	1 1.5
16 A for very hot conditions	H05RR-F H05RR-F	1 1.5

Replace the table of Sub-clause 21.4 by the following:

Type of connector	Type of flexible cord	Nominal cross-sectional area (mm²)
10 A for cold conditions	H05VV-F	1
10 A for hot conditions	H05RR-F	1
10 A for very hot conditions	H05RR-F	1
16 A for cold conditions	H05VV-F	1.5
16 A for very hot conditions	H05RR-F	1.5

[AMD 6482]
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23. **Resistance to heat and ageing**

Replace Sub-clause 23.1.2 by the following:

"Parts of insulating material, of appliance inlets not integrated in or incorporated in an appliance or equipment and of connectors, shall be subjected to a ball pressure test by means of the apparatus shown in Figure 23.

Parts of the cord anchorage, the cord guard, parts of connectors moulded together with the flexible cable or cord and parts of ceramic are not subjected to this test.

The test is made in a heating cabinet maintained at a temperature of:

155 ± 2 °C in the case of accessories for very hot conditions;

125 ± 2 °C in the case of accessories for hot conditions;

125 ± 2 °C for those parts of accessories for cold conditions which retain current-carrying parts and parts of the earthing circuit in position:

75 ± 2 °C for other parts of accessories for cold conditions.

The surface of the part to be tested is placed in the horizontal position and a steel ball of 5 mm diameter is pressed against this surface with a force of 20 N.

After 1 h the ball is removed from the sample, which is then cooled down, within 10 s, to approximately room temperature by immersion in cold water.

The diameter of the impression caused by the ball is measured and shall not exceed 2 mm."

Replace Sub-clause 23.2 by the following:

"Connectors of rubber, polyvinyl chloride or similar material shall be sufficiently resistant to ageing.

Compliance is checked:

- *for connectors of rubber, by the tests of Sub-clauses 23.2.1 and 23.2.3;*
- *for connectors of polyvinyl chloride or similar material, by the tests of Sub-clauses 23.2.2 and 23.2.3.*

For the tests of Sub-clauses 23.2.1 and 23.2.2, two new samples are used, which are first subjected to the test of Clause 15.

For the tests of Sub-clauses 23.2.1 and 23.2.2, the use of an electrically heated cabinet is recommended.
Natural air circulation may be provided by holes in the walls of the cabinet.
Temperatures may be measured by means of thermometers."

Delete Sub-clause 23.2.2.

Renumber Sub-clause 23.2.3 to become 23.2.2.

Renumber Sub-clause 23.2.4 to become 23.2.3.

In the first line of Sub-clause 23.2.4, replace "Sub-clauses 23.2.1 and 23.2.2 or 23.2.3" by "Sub-clauses 23.2.1 or 23.2.2".

[AMD 6462]
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Full document details: BS 4491-1:1989

Amendment No. 2
published and effective from 15 June 1994
to BS 4491 : Part 1 : 1989

Appliance couplers for household and similar general purposes
Part 1. Specification of general requirements

NOTE. This amendment has been issued to implement Corrigendum to EN 60320-1 : 1987 and Corrigendum to EN 60320-1 : 1987/A1 : 1989, published in November 1993, to the English version. A consequent change to the national foreword has also been made.

Corrections

National foreword

In paragraph 1, line 3, after 'Part 1 'General requirements' including Amendment 1' insert 'and Corrigendum : 1993'.

AMD 8133/June 1994

Clause 7.7

Add:

'The type reference may be marked in paint or ink, protected, if necessary, by varnish.

A revision of the test for checking durability of the marking is under consideration.'

AMD 8133/June 1994

Clause 14.2

In the table, delete in the first block, cord type H05VVH2-F. Delete type of cord H03RT-F and the corresponding entries in the second and third columns.

AMD 8133/June 1994

Clause 21.1

In the second column of the table, against 10 A connectors for cold conditions, replace the text by:

H05VVH2-F[4] or H05VV-F or H05RR-F

Add to the notes:

'[4] Only for connectors for Class II equipment.'

AMD 8133/June 1994

9406—0.5k

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Full document details: BS 4491-1:1989

Clause 21.4 (as amended by Amendment No. 1)

Delete from the second column of the table cord type H05VVH2-F (twice, against connector types 10 A and 16 A, both for cold conditions).

AMD 8133/June 1994

Figure 1

In the column, 'Lightest type (of cord) allowed':

– against 2,5 A I 65 °C, replace existing text by: 'H03VV-F'

– against 2,5 A II 65 °C, replace existing text by: 'H03VV-F or H03VVH2-F'

– against 10 A I 65 °C, 16 A I 65 °C and 16 A II 65 °C delete 'H05VVH2-F or'

Replace notes 3) and 4) by:

[3] For lengths exceeding 2 m, 1,0 mm^2 is required

[4] For lengths exceeding 2 m, 1,5 mm^2 is required

AMD 8133/June 1994

Appendix D — Special national conditions

Delete the Swedish special national condition for clauses 1, 11.1.3 and 21.1.

Add:

8.3 Dimensions and compatibility

Replace the second and third paragraph of the requirement by:

Appliance inlets shall not allow improper connections with cord connectors complying with Section 107.

Connectors shall not allow improper connections with plugs complying with Section 107.

(DK, Section 107 of the Heavy Current Regulations).

Figure 1

In the heading of the last column, add a referencee to note 5 after IEC 83.

Under the table add:

[5] Groups A and B shall not be used in Denmark.

(DK, Section 107 of the Heavy Current Regulations).

AMD 8133/June 1994

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Full document details: BS 4491-1:1989

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Full document details: BS 4491-1:1989

Amendment No. 3
published and effective from 15 February 1995
to BS 4491 : Part 1 : 1989

Appliance couplers for household and similar general purposes
Part 1. Specification of general requirements

NOTE. This amendment has been issued to implement A11 : 1994, to the English version of EN 60320-1 : 1987. A consequent change to the national foreword has also been made.

This amendment together with the European Standard EN 60320-1 : 1987 including amendment A1 : 1989 has the status of a British Standard.

Revised text

National foreword (as amended by Amendment No. 2)

In paragraph 1, line 3, after 'and Corrigendum : 1993' insert 'and Amendment 11'.

AMD 8407/February 1995

EN amendment title page and foreword

Insert the attached EN amendment title page (foreword on reverse).

AMD 8407/February 1995

Text of EN 60320-1

Amend the text of European Standard EN 60320-1 in accordance with the details given on the attached page.

AMD 8407/February 1995

9502—2—0.65k— BIR

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60320-1/A11

June 1994

UDC 621.316.541::64.06.83-181.1-777.001.2.001.33.001.4(083.71)
614.825.001.25.004.11

Descriptors: Appliance couplers for electric household appliances, connectors, appliance inlets, dimensions, requirements, testing, definitions, electrical safety

Amendment A11 to the English version of EN 60320-1

Appliance couplers for household and similar general purposes

Connecteurs pour usages domestiques et usages généraux analogues

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche allgemeine Zwecke

This amendment A11 modifies the European Standard EN 60320-1 : 1987. It was approved by CENELEC on 1994-03-08. 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 Central Secretariat or to any CENELEC member.

This amendment 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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Full document details: BS 4491-1:1989

Foreword

A draft for an amendment to EN 60320-1, prepared by Reporting Secretariat SR 23G was submitted to the CENELEC members for formal vote and was approved by CENELEC as amendment A11 to EN 60320-1 on 8 March 1994.

The following dates were fixed:

– latest date of publication of an identical national standard	(dop)	1995-03-15
– latest date of withdrawal of conflicting national standards	(dow)	1995-03-15

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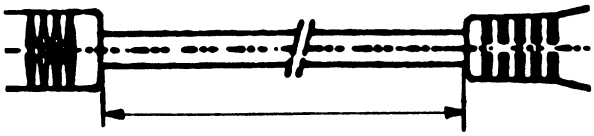
Full document details: BS 4491-1:1989

The following modification applies to the text of EN 60320-1 : 1987

21 Flexible cables and cords and their connection

21.1 *Add:*

The length of the flexible cable or cord not exceeding 2 m is the length as shown below:



Compliance is checked by measurement.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60 320
Part 1
June 1987

UDC : 621.316.541 : : 64.06-83-181.1-777.001.2.001.33.001.4(083.71)
614.825.001.25.004.11

Key words: Appliance couplers for electric household appliances; connectors; appliance inlets; dimensions; requirements; testing; definitions; electrical safety

English version

Appliance couplers for household and similar general purposes

Connecteurs pour usages domestiques et usages généraux analogues
(CEI 320 (1981) 2ème édition avec les modifications No 1 (1984) et No 2 (1985), modifiée)

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche Zwecke
(IEC 320 (1981) 2. Ausgabe, einschließlich Änderung Nr. 1 (1984) und Änderung Nr. 2 (1985), modifiziert)

(IEC 320 (1981) 2nd edition including Amendment No. 1 (1984) and Amendment No. 2 (1985), modified)

This European Standard was ratified by CENELEC on 10th September 1986. CENELEC members are bound to comply with the requirements of the 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 CENELEC General Secretariat 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 CENELEC General Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

General Secretariat: rue Bréderode 2, B-1000 Brussels

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Full document details: BS 4491-1:1989

Brief history

The CENELEC Questionnaire Procedure performed for finding out whether or not IEC 320 (second edition, 1981) including Amendment No. 1 (1984) and Amendment No. 2 (1985) could be accepted without textual changes, has shown that a number of CENELEC common modifications became necessary for the acceptance of IEC 320 including Amendment No. 1 and Amendment No. 2 as a European Standard (EN). These modifications prepared in two meetings of a Preparatory Working Group which was set up by the Technical Board, were submitted to the CENELEC members for vote and acceptance by CENELEC.

Technical text

The text of the International Standard IEC 320 (second edition, 1981) including Amendment No. 1 (1984) and Amendment No. 2 (1985) was approved by CENELEC on 10th September 1986 as a European Standard with agreed common modifications and is to be issued as EN 60 320 Part 1. For the sake of clarity these CENELEC common modifications have been incorporated at the appropriate places in the text of IEC 320 (1981) including Amendment No. 1 (1984) and Amendment No. 2 (1985); they are marked by a vertical line at the left-hand margin. The relevant parts of the original IEC text have been quoted as 'INFORMATION' directly after the text of the common modifications.

The following dates were fixed:

doa: 1987-09-01
dop: 1988-01-01
dow: 1988-09-15

Appendices designated 'normative' are part of the body of the standard. Appendices designated as 'informative' are given only for information.

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INFORMATION as to original IEC text
The Foreword of IEC Publication 320 (1981) is not part of this European Standard: Appendix A (normative), Appendix B (normative), Appendix C (informative) and Appendix D (informative) are not included in IEC 320 (1981)

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Full document details: BS 4491-1:1989

APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES

INFORMATION as to original IEC text
The Foreword of IEC Publication 320 (1981) is not part of the European Standard. It reads:

1) The formal decisions or agreements of the IEC on Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.
4) The IEC has not laid down any procedure concerning marking as an indication of approval and has no responsibility when an item of equipment is declared to comply with one of its recommendations.

PREFACES OF IEC PUBLICATION 320 (1981), AMENDMENT No. 1(1984) AND AMENDMENT No. 2 (1985)

This standard has been prepared by Sub-Committee 23G: Appliance Couplers, of IEC Technical Committee No. 23: Electrical Accessories.

The present second edition supersedes the first edition published in 1970.

Like the first edition, this second edition has been derived from CEE (International Commission for Conformity Certification of Electrical Equipment) Publication 22: Specification for Appliance Couplers for Domestic and Similar General Purposes, draft second edition.

A first draft was discussed at the meeting held in Milan in 1974, as a result of which a revised draft was prepared, and discussed at the meeting held in The Hague in 1975. As a result of this meeting, a draft, Document 23G(Central Office)3, was submitted to the National Committees for approval under the Six Months' Rule in December 1976.

Amendments, Documents 23G(Central Office)9, 11, 18 and 22, were submitted to the National Committees for approval under the Two Months' Procedure in September 1978, October 1978, September 1979 and April 1980.

A first draft for a revision of Clause 11, based upon the work of Sub-Committee 23F, was discussed at the meeting held in Oslo in 1977. As a result of this meeting, a draft, Document 23G(Central Office)8, was submitted to the National Committees for approval under the Six Months' Rule in March 1978.

Amendments, Document 23G(Central Office)13, were submitted to the National Committees for approval under the Two Months' Procedure in January 1979.

A draft concerning the 2.5 A 250 V appliance coupler for Class II equipment was discussed at the meeting held in The Hague in 1975. As a result of this meeting, a draft, Document 23G(Central Office)4, was submitted to the National Committees for approval under the Six Months' Rule in January 1977.

Amendments, Document 23G(Central Office)10, were submitted to the National Committees for approval under the Two Months' Procedure in September 1978. (Document 23G(Central Office)22 mentioned above also contained amendments to Document 23G(Central Office)4.)

A draft concerning gauges for appliance couplers was discussed at the meeting held in Sofia in 1980. As a result of this meeting, a draft, Document 23G(Central Office)21 was submitted to the National Committees for approval under the Six Months' Rule in May 1980.

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The National Committees of the following countries voted explicitly in favour of these documents:

Documents / Countries	23G(CO)3	23G(CO)9	23G(CO)11	23G(CO)18	23G(CO)22	23G(CO)4	23G(CO)10	23G(CO)8	23G(CO)13	23G(CO)21
Australia	+	+	+	+	+	+	+	+	+	+
Austria	+	+	+	+	+	+	+		+	+
Belgium		+	+	+	+	+	+			+
Brazil	+					+				
Bulgaria	+			+				+		
Canada	+	+	+	+	+	+	+	+		+
Denmark	+	+	+				+	+	+	+
Egypt	+			+	+	+		+	+	
Finland		+	+	+	+		+	+	+	
Germany				+	+			+	+	+
Hungary	+	+	+		+	+	+		+	+
Israel	+		+			+				+
Italy	+	+	+	+	+		+	+	+	+
Japan	+	+	+	+		+	+	+	+	+
Netherlands		+ [1]	+ [1]	[1]	+	+	+	+		+
New Zealand					+					
Norway	+	+	+	+	+	+	+	+	+	
Poland		+	+	+	+	+	+	+	+	+
Romania		+	+		+		+			+
South Africa (Republic of)		+	+	+	+	+	+	+	+	+
Sweden	+	+	+	+	+	+	+		[3]	+
Switzerland		+	[2]	+	+	+	+	+	+	+
Turkey	+	+	+	+	+	+	+	+	+	+
United Kingdom		+		+	+	+	+		+	+
Yugoslavia				+	+					+

[1] The National Committee of the Netherlands reaffirms its negative vote on Document 23G(Central Office)3.
[2] The National Committee of Switzerland reaffirms its negative vote on Document 23G(Central Office)3.
[3] The National Committee of Sweden reaffirms its negative vote on Document 23G(Central Office)8.

Amendment No. 1 (1984)
The amendments contained in this document have been approved under the Six Months' Rule. The draft amendments were discussed by Sub-Committee 23G of Technical Committee No. 23, and were circulated for approval under the Six Months' Rule as documents 23G (Central Office) 26 in May 1982, 23G (Central Office) 29 in June 1982, 23G (Central Office) 36 in July 1983, 23G (Central Office) 38 in August 1983, 23G (Central Office) 41 in October 1983 and 23G (Central Office) 42 in March 1984.

Amendment No. 2 (1985)
The amendments contained in this document have been approved under the Six Months' Rule. The draft amendments were discussed by Sub-Committee 23G of Technical Committee No. 23, and were circulated for approval under the Six Months' Rule as Document 23G (Central Office) 43 in April 1984. Further details can be found in the following Report on Voting: Document 23G (Central Office) 49.

In this standard, the following print types are used:
— Requirements proper: in roman type.
— *Test specifications: in italic type.*
— Explanatory matter: in smaller roman type.

Note: — Other international publications quoted in this standard are given in Appendix A (normative). Where those publications have been implemented as Harmonization Documents (HD) reference to the relevant HDs has been included.

INFORMATION as to original IEC text
It reads: *Other IEC publications quoted in this Standard.*
(The list given under this IEC heading does not include the following publications:
IEC 112, IEC 695-2-1, IEC 730-1, IEC 799)

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APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES

1. Scope

This standard is applicable to two-pole appliance couplers for a.c. only, with and without earthing contact, with a rated voltage not exceeding 250 V and a rated current not exceeding 16 A, for household and similar general purposes and intended for the connection of a supply flexible cable or cord to electric appliances or other electric equipment for 50 Hz or 60 Hz supply.

Appliance inlets integrated in or incorporated in appliances or other equipment are within the scope of this standard. The dimensional and general requirements of this standard apply to such inlets, but certain tests may not be relevant.

The requirements for connectors are based on the assumption that the temperature of the pins of the corresponding appliance inlets does not exceed:
65 °C for connectors for cold conditions;
120 °C for connectors for hot conditions;
155 °C for connectors for very hot conditions.

Appliance couplers complying with this standard are suitable for use at ambient temperatures not normally exceeding 25 °C, but occasionally reaching 35 °C.

Appliance couplers complying with the standard sheets in this standard are intended for the connection of equipment having no special protection against moisture.

If appliance couplers are used with equipment which may be subject to spillage of liquid in normal use then protection against moisture shall be provided by the equipment.

INFORMATION as to original IEC text. It reads:
For the connection of other equipment which is subject to spillage of liquid in normal use. Additional requirements are necessary.

Special constructions may be required:
— in locations where special conditions prevail, for example, as in ships, vehicles and the like;
— in hazardous locations, for example, where explosions are liable to occur.

2. Definitions

2.1 Where the terms voltage and current are used, they imply the r.m.s. values, unless otherwise specified.

2.2 The following definitions apply for the purpose of this standard:

— An appliance coupler is a means enabling the connection and disconnection at will, of a flexible cable or cord to an appliance or other equipment. It consists of two parts:

  — a *connector,* which is the part integral with, or intended to be attached to, the flexible cable or cord connected to the supply;

  — An appliance inlet, which is the part integrated in or incorporated in the appliance or equipment, or intended to be fixed to it.

  An appliance inlet integrated in an appliance or equipment is an appliance inlet (the shroud and base of) which is formed by the housing of the appliance or equipment.

  An appliance inlet incorporated in an appliance or an equipment is a separate appliance inlet built in or fixed to an appliance or equipment.

— A rewirable connector is an accessory so constructed that the flexible cable or cord can be replaced.

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— A *non-rewirable* connector or a non-rewirable plug is an accessory so constructed that it forms a constructional unit with the flexible cable or cord which is assembled by the manufacturer of the accessory. This unit shall be such that:

  — the flexible cable or cord cannot be separated from the accessory without making this permanently useless, and

  — the accessory cannot be opened by hand or by using a general purpose tool, for example a screwdriver.

  An accessory is considered to be permanently useless when for re-assembling the accessory, parts or materials other than the original are to be used.

– A *cord set* is an assembly consisting of a flexible cable or cord fitted with a non-rewirable plug and a non-rewirable connector, intended for the connection of an electrical appliance or equipment to the electrical supply.

– A *retaining device* is a mechanical arrangement which holds a connector in proper engagement with a corresponding appliance inlet and prevents its unintentional withdrawal.

— *Rated voltage* is the voltage assigned to the connector or the appliance inlet by the manufacturer.

— *Rated current* is the current assigned to the connector or the appliance inlet by the manufacturer.

— A *terminal* is the part to which a conductor is attached, providing a re-usable connection.

— A *termination* is the part to which a conductor is permanently attached.

— A *screw-type terminal* is a terminal for the connection and subsequent disconnection of a conductor, the connection being made, directly or indirectly by means of screws or nuts of any kind.

— A *pillar terminal* is a screw-type terminal in which the conductor is inserted into a hole or cavity, where it is clamped under the shank of a screw. The clamping pressure may be applied directly by the shank of the screw or through an intermediate clamping plate to which pressure is applied by the shank of the screw.

— A *screw terminal* is a screw-type terminal in which the conductor is clamped under the head of a screw. The clamping pressure may be applied directly by the head of the screw or through an intermediate part, such as a washer, clamping plate or anti-spread device.

— A *stud terminal* is a screw-type terminal in which the conductor is clamped under a nut. The clamping pressure may be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, clamping plate or anti-spread device.

— A *mantle terminal* is a screw-type terminal in which the conductor is clamped against the base of a slot in a threaded stud by means of a nut. The conductor is clamped against the base of the slot by a suitably shaped washer under the nut, by a central peg if the nut is a cap nut, or by equally effective means for transmitting the pressure from the nut to the conductor within the slot.

— A *screwless terminal* is a connecting terminal for the connection and subsequent disconnection of a conductor, the connection being made, directly or indirectly, by means of springs, wedges, eccentrics or cones, etc.

2.3 The term "accessory" is used as a general term covering connectors and/or appliance inlets (and, in some cases, plugs as well).

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3. 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 surroundings.

In general, compliance is checked by carrying out all the tests specified.

Note: It is to be understood that appliance couplers according to this standard are to be capable of meeting all the relevant requirements and tests specified herein.

INFORMATION as to original IEC text
Note not included.

4. General notes on tests

4.1 *Tests according to this standard are type tests.*

4.2 *Unless otherwise specified, the samples are tested as delivered and under normal conditions of use, at an ambient temperature of 20 ± 5 °C; they are tested with a.c. at 50 Hz or 60 Hz.*

Non-rewirable connectors, other than those forming part of a cord set, must be submitted with a flexible cable or cord at least 1 m long.

4.3 *Unless otherwise specified, the tests are carried out in the order of the clauses.*

4.4 *Unless otherwise specified, connectors and appliance inlets are tested in conjunction with an appropriate appliance inlet or connector, complying with this standard.*

4.5 *For appliance inlets, three samples are subjected to the tests specified.*

For all connectors, nine samples are required:

- *three are subjected to the tests specified, with the exception of those of Clauses 13, 14, 15, 18, 19 and 20 and Sub-clause 23.2:*
- *three are subjected to the tests of Clauses 13, 14, 15, 18, 19 and 20 (including the repetition of the test of Sub-clause 15.2);*
- *three are subjected to the test of Sub-clause 21.4, using the H05RR-F type cords.*

INFORMATION as to original IEC text
IEC cord type replaced by HD type.

For 10 A rewirable connectors for Class I equipment and hot or very hot conditions, three additional samples are required for the test of Sub-clause 21.4, using the H03RT-F type cord.

INFORMATION as to original IEC text
IEC cord type replaced by HD type.

For connectors of rubber or similar material, four additional samples are required, two of which are subjected to the test of Sub-clause 23.2.1 and the other two to the test of Sub-clause 23.2.2.

For connectors of polyvinylchloride (PVC) or similar material, two additional samples are subjected to the test of Sub-clause 23.2.3.

Accordingly, for connectors the total number of samples is:

Connector made of	Connector type
Rigid insulating material	9 (12)
Rubber or similar material	13 (16)
PVC or similar material	11 (14)

The numbers in brackets apply to 10 A connectors for Class I equipment and hot or very hot conditions.

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4.6 Appliance inlets integrated in or incorporated in an appliance or equipment are tested under the conditions of use of the equipment, the number of samples then being the same as the number of samples of equipment required according to the relevant standard for the equipment.

4.7 Connectors and appliance inlets are considered not to comply with this standard if there are more failures than that of one sample in one of the tests. If one sample fails in a test, that test and those preceding which may have influenced the result of that test are repeated on another set of samples of the number specified in Sub-clause 4.5, all of which shall then comply with the repeated tests.

In general, it will be necessary to repeat only the test which caused the failure, unless the sample fails in one of the tests of Clauses 18 to 22 inclusive, in which case the tests are repeated from that of Clause 17 onwards.

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

5. Standard ratings

5.1 The standard rated voltage is 250 V.

5.2 Standard rated currents are 0.2 A, 2.5 A, 6 A, 10 A and 16 A, as specified in Sub-clause 8.1.

Compliance with the requirements of Sub-clauses 5.1 and 5.2 is checked by visual inspection of the marking.

6. Classification

6.1 Appliance couplers are classified:

6.1.1 According to maximum pin temperature of the corresponding appliance inlet:

- appliance couplers for cold conditions (pin temperature not exceeding 65 °C);
- appliance couplers for hot conditions (pin temperature not exceeding 120 °C);
- appliance couplers for very hot conditions (pin temperature not exceeding 155 °C).

6.1.2 According to type of equipment to be connected:

- appliance couplers for Class I equipment;
- appliance couplers for Class II equipment.

For a description of the classes, see IEC Publication 536: Classification of Electrical and Electronic Equipment with Regard to Protection against Electric Shock.

6.2 Connectors are, moreover, classified according to the method of connecting the flexible cable or cord:

- rewirable connectors;
- non-rewirable connectors.

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Figure 1, shows the various types of appliance couplers standardized and their application.

0.2 A appliance couplers are intended only for the connection of small hand-held Class II equipment, if allowed by the relevant standard for the equipment.

Appliance inlets for cold conditions must not be used with heating appliances having external metal parts the temperature rise of which may, under normal operating conditions, exceed 75 K and which might be touched in normal use by the flexible cable or cord.

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

7. Marking

7.1 Connectors shall be marked with:

- rated current in amperes, except for 0.2 A connectors;
- rated voltage in volts;
- symbol for nature of supply;
- name, trade mark or identification mark of the maker or of the responsible vendor;
- type reference

The type reference may be a catalogue number.

7.2 Appliance inlets other than those integrated in or incorporated in an appliance or equipment shall be marked with the name, trade mark or identification mark of the maker or of the responsible vendor and a type reference, the latter being not visible after the appliance inlet is correctly mounted or a connector is in engagement. The marking of 0.2 A and 2.5 A appliance inlets may be visible, provided that there can be no doubt with regard to the marking of the appliance itself.

The type reference may be a catalogue number.

7.3 Connectors and appliance inlets for Class II equipment shall not be marked with the symbol for Class II construction.

7.4 When symbols are used, they shall be as follows:

amperes . . . . . A;
volts . . . . . V;
alternating current . . . . . ~;
earth . . . . . ⏚ or ⏚.

NOTE: Preferably the earthing symbol in a circle should be used.

INFORMATION as to original IEC text
The earth symbol in a circle and note not included.

For the marking of rated current and rated voltage, figures may be used alone, the figure for rated current being placed before or above that for rated voltage and separated from the latter by a line. The symbol for nature of supply shall be placed next to the marking for rated current and rated voltage.

The marking for current, voltage and nature of supply may accordingly be as follows:

10 A 250 V ~ or 10/250 ~ or $\frac{10}{250}$ ~ or $\frac{10}{250}$ ~

Lines formed by the construction of the tool are not considered as part of the marking.

7.5 The marking specified in Sub-clause 7.1 shall be easily discernible when the connector is wired ready for use.

The term "ready for use" does not imply that the connector is in engagement with an appliance inlet.

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7.6 In non-reversible connectors, the contact positions shall be established by looking at the engagement face of the connectors as shown in Figure 1 and their disposition shall be as follows:

earthing contact: upper central position;
line contact: lower right-hand position;
neutral contact: lower left-hand position.

In rewirable, non-reversible connectors, terminals shall be indicated as follows:

earthing terminal: the symbol ⏚;
neutral terminal: the letter N.

In non-rewirable, non-reversible connectors, no marking of contacts is necessary, but cores shall be connected as specified in Sub-clause 21.1.

Appliance inlets other than those integrated in or incorporated in an appliance or equipment, for use with connectors according to this sub-clause, shall have terminal markings to correspond with this sub-clause.

The marking symbol or letters shall not be placed on screws, removable washers or other removable parts.

The requirement concerning the marking of terminals and the connection of conductors has been introduced to take account of those countries who already require a polarized supply system and with regard to a possible future introduction of a unified plug and socket-outlet system, which will be to a great extent a polarized system. It is recommended to take this requirement into account already now in countries which at present have no polarized plug and socket-outlet system.

7.7 Marking shall be durable and easily legible.

Compliance with the requirements of Sub-clauses 7.1 to 7.7 is checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit.

The petroleum spirit used should consist of a solvent hexane with a content of aromatics of maximum 0.1 volume percentage, a kauri-butanol value of 29, and initial boiling point of approximately 65 °C, a dry-point of approximately 69 °C and a specific gravity of approximately 0.68 g/cm^3.

8. Dimensions and compatibility

8.1 Appliance couplers shall comply with the appropriate Standard sheets as specified below, except as permitted by Sub-clause 8.6:

0.2 A 250 V appliance coupler for Class II equipment and cold conditions:
— connector . . . . . Sheet C 1
— appliance inlet . . . . . Sheet C 2

2.5 A 250 V appliance coupler for Class I equipment and cold conditions:
— connector . . . . . Sheet C 5
— appliance inlet . . . . . Sheet C 6

2.5 A 250 V appliance coupler for Class II equipment and cold conditions:
— connector . . . . . Sheet C 7
— appliance inlet, standard type . . . . . Sheets C 8 and C 8A
— appliance inlet, for alternative connection of the equipment to two different mains voltages . . . . . Sheet C 8B

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6 A 250 V appliance coupler for Class II equipment and cold conditions:

— connector . . . . . Sheet C 9
— appliance inlet . . . . . Sheet C 10

10 A 250 V appliance coupler for Class I equipment and cold conditions:

— connector . . . . . Sheet C 13
— appliance inlet . . . . . Sheet C 14

10 A 250 V appliance coupler for Class I equipment and hot conditions:

— connector . . . . . Sheet C 15
— appliance inlet . . . . . Sheet C 16

10 A 250 V appliance coupler for Class I equipment and very hot conditions:

— connector . . . . . Sheet C 15A
— appliance inlet . . . . . Sheet C 16A

10 A 250 V appliance coupler for Class II equipment and cold conditions:

— connector . . . . . Sheet C 17
— appliance inlet . . . . . Sheet C 18

16 A 250 V appliance coupler for Class I equipment and cold conditions:

— connector . . . . . Sheet C 19
— appliance inlet . . . . . Sheet C 20

16 A 250 V appliance coupler for Class I equipment and very hot conditions:

— connector . . . . . Sheet C 21
— appliance inlet . . . . . Sheet C 22

16 A 250 V appliance coupler for Class II equipment and cold conditions:

— connector . . . . . Sheet C 23
appliance inlet . . . . . Sheet C 24

Dimensions are checked by means of gauges or by measurement. In case of doubt, gauges shall be used.

The test is carried out at an ambient temperature of 35 ± 2 °C, both the accessories and the gauges being at this temperature.

The gauges to be used are shown in:
Figure 2, for 0.2 A connectors;
Figures 4, 5 and 5 bis for 2.5 A connectors;
Figures 9A to 9T, for other connectors and appliance inlets.

The distance from the engagement face of connectors to the point of first contact of socket contacts is checked by means of the relevant gauge shown in Fig 27.

Dimensions for the fixing of appliance inlets are under consideration.

8.2 Provision, if any, for retaining the connector in the appliance inlet shall comply with Standard sheet C 25.

Compliance is checked by measurement.

8.3 It shall not be possible to make single-pole connections between connectors and appliance inlets.

Appliance inlets shall not allow improper connections with portable socket-outlets complying with IEC Publication 83: Plugs and Socket-outlets for Domestic and Similar General Use. Standards.

Connectors shall not allow improper connections with plugs complying with the same IEC Publication 83.

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Compliance is checked by manual test.

"Improper connections" include single-pole connection and other connections which do not comply with the requirements concerning protection against electric shock.

Conformity to the Standard sheets ensures compliance with these requirements.

8.4 It shall not be possible to engage:

— connectors for Class II equipment with appliance inlets for other equipment;

— connectors for cold conditions with appliance inlets for hot conditions or very hot conditions;

— connectors for hot conditions with appliance inlets for very hot conditions;

— connectors with appliance inlets having a higher rated current than the connector.

Compliance is checked by inspection, by manual test and by means of the gauges shown in Figures 6 to 9.

For 6 A, 10 A and 16 A connectors and appliance inlets, compliance is checked by means of the gauges shown in Figures 9A to 9T as applicable.

The test is carried out an ambient temperature of 35 ± 2 °C, both the accessories and the gauges being at this temperature.

Conformity to the Standard sheets ensures compliance with the requirements, other than those verified by means of the gauges shown in Figures 6 to 9.

8.5 If appliance inlets are arranged countersunk in the outer surface of equipment, and if this surface is curved or inclined with respect to the axis of the appliance inlet, the arrangement shall be such that, under any circumstances, the pin ends do not protrude beyond the limiting surface of the shroud.

Compliance is checked by connecting all pins, including the earthing pin, if any, together with one pole of a contact indicator, the other pole being connected to a metal straight-edge ruler, having a width wider than the largest inside dimension of the appliance inlet, which is placed in all possible directions over the opening of the shroud. The ruler shall not come into contact with the pin ends.

For 10 A or 16 A appliance inlets for Class II equipment, the test shall be carried out with a simulated earthing pin.

An electrical indicator with a voltage between 40 V and 50 V is used to show contact with the relevant part.

8.6 Appliance couplers of design other than those shown on standard sheets may be made, provided that their dimensions do not affect interchangeability. Such non-standard appliance couplers shall, however, comply with all other requirements of this standard as far as they apply.

INFORMATION as to original IEC text
See Appendix C.

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9. Protection against electric shock

9.1 Appliance couplers shall be so designed that live parts of appliance inlets are not accessible when the connector is in partial or complete engagement.

Connectors shall be so designed that live parts, and the earthing contact and parts connected thereto, are not accessible when the connector is properly assembled and wired as in normal use.

Compliance is checked by inspection and, if necessary, by a test with the standard test finger shown in Figure 10. This finger is applied in every possible position, an electrical indicator being used to show contact with the relevant parts. For connectors with enclosures or bodies of rubber or thermoplastic material, the standard test finger is applied for 30 s with a force of 20 N at all points where yielding of the insulating material could impair the safety of the connector; this test is made at an ambient temperature of 35 ± 2 °C.

The standard test finger must be so designed that each of the jointed sections can be turned through an angle of 90 with respect to the axis of the finger in the same direction only.

An electrical indicator with a voltage between 40 V and 50 V is used to show contact with the relevant part.

Conformity to the Standard sheets ensures compliance with the requirements so far as the inaccessibility of contact members during insertion of a connector into an appliance inlet is concerned.

9.2 It shall not be possible to make connection between a pin of an appliance inlet and a contact of a connector as long as any of the pins is accessible.

Compliance is checked by manual test and by the test of Sub-clause 9.1.

Conformity to the Standard sheets ensures compliance with this requirement.

9.3 It shall not be possible to remove parts preventing access to live parts without the aid of a tool.

The means for fixing these parts shall be insulated from live parts.

Bushes, if any, in the entry holes for the pins shall be adequately fixed and it shall not be possible to remove them without dismantling the connector.

Compliance is checked by inspection and by manual test.

9.4 External parts of connectors, with the exception of assembly screws and the like, shall be of insulating material. The shroud and the base of appliance inlets without earthing contact and those of 2.5 A appliance inlets with earthing contact, shall be of insulating material.

Compliance is checked by inspection.

The suitability of the insulating material is checked during the insulation tests of Clause 14.

Lacquer or enamel is not considered to be insulating material for the purpose of Sub-clauses 9.1 to 9.4.

10. Provision for earthing

10.1 Earthing terminals shall comply with the requirements of Clause 11.

Compliance is checked by inspection and by the tests of Clause 11.

10.2 Appliance couplers with earthing contact shall be so constructed that, when inserting the connector, the earth connection is made before the current-carrying contacts of the appliance inlet are energized.

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When withdrawing a connector, the current-carrying contacts shall separate before the earth connection is broken.

For appliance couplers not complying with the Standard sheets, compliance is checked by inspection of drawings, taking into account the effect of tolerances, and by checking the samples against these drawings.

Conformity to the Standard sheets ensures compliance with this requirement.

11. **Terminals and terminations**

The requirements of this clause apply only to connectors.

For appliance inlets submitted as individual accessories not integrated in or incorporated in an appliance or equipment, particular requirements are under consideration.

For appliance inlets integrated in or incorporated in an appliance or equipment, the requirements in the appropriate IEC standard for that equipment shall apply.

11.1 *General*

11.1.1 Rewirable connectors shall be provided with terminals with screw clamping.

Screw-type terminals shall be of the pillar, screw, stud or mantle type or of an equally effective type.

Non-rewirable connectors shall be provided with soldered, welded, crimped or equally effective screwless connections, which need not have the possibility to disconnect the conductor; screwed connections shall not be used.

The end of a stranded conductor shall not be consolidated by soft soldering at places where the conductor is subject to contact pressure unless the clamping means is designed so as to obviate the risk of a bad contact due to cold flow of the solder.

11.1.2 Clamping means of terminals shall not serve to fix any other component, although they may hold the terminals in place or prevent them from turning.

11.1.3 Rewirable connectors with a rated current not exceeding 16 A shall have terminals of size 1, which can accept conductors having a nominal cross-sectional area not less than 0.75 mm^2 and not more than 1.5 mm^2.

The largest diameter of a flexible 1.5 mm^2 conductor is 1.73 mm.

The terminal size number relates to the terminal dimensions, see Standard Sheets C 26, C 27 and C 28.

Compliance is checked by inspection, by measurement and by fitting conductors having cross-sectional areas of 0.75 mm^2 and 1.5 mm^2.

11.2 *Screw-type terminals*

11.2.1 Screw-type terminals shall allow the conductor to be connected without special preparation.

Compliance is checked by inspection.

The term "special preparation" covers soldering of the wires of the conductor, use of cable lugs, formation of eyelets, etc., but not the reshaping of the conductor before its introduction into the terminal or the twisting of a flexible conductor to consolidate the end.

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11.2.2 Screw-type terminals shall have adequate mechanical strength.

Screws and nuts for clamping the conductors shall have a metric ISO thread.

Screws shall not be of metal which is soft or liable to creep, such as zinc or aluminium.

Compliance is checked by inspection and by the tests of Sub-clauses 11.2.4 and 11.2.8.

11.2.3 Screw-type terminals shall be resistant to corrosion.

Terminals, the body of which is made of copper or a copper alloy as specified in Sub-clause 24.6 are considered as complying with this requirement.

Terminals made of other materials are subjected to a corrosion test which is under consideration.

11.2.4 Screw-type terminals shall be so designed that they clamp the conductor reliably and between metal surfaces.

Compliance is checked by inspection and by the following test:

The terminals are fitted with conductors of the smallest and largest cross-sectional areas as specified in Sub-clause 11.1.3, the terminal screws being tightened with a torque equal to two-thirds of the torque specified in the appropriate column of the table in Sub-clause 24.1.

Each conductor is then subjected to a pull of:

40 N in the case of terminals of size 1,
50 N in the case of terminals of size 2,

applied without jerks, for 1 min, in the direction of the axis of the conductor space.

During the test, the conductor shall not move noticeably in the terminal.

11.2.5 Screw-type terminals shall be so designed that they clamp the conductor without undue damage to the conductor.

Compliance is checked by inspection of the conductors, after conductors of the smallest and of the largest cross-sectional areas specified in Sub-clause 11.1.3 have been clamped once and loosened, the torque applied to clamp the conductor being equal to two-thirds of the torque specified in the appropriate column of the table of Sub-clause 24.1.

Considered as unduly damaged are stranded flexible conductors where more than 10% of the strands are cut.
(The value of 10% is provisional.)

11.2.6 Screw-type terminals shall be so designed or placed that a wire of a flexible conductor cannot slip out while the clamping screws or nuts are tightened.

Compliance is checked by the following test:

Terminals are fitted with conductors having the composition as shown in the following table:

Terminal size	Nominal conductor cross-section (mm^2)	Number of wires and nominal diameter of wires, in millimetres, of the flexible conductor
1	1.5	30 × 0.25
2	2.5	50 × 0.25

Before insertion into the terminal, flexible conductors are twisted in one direction, so that there is a uniform twist of one complete turn in a length of approximately 1 cm.

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The conductor is inserted into the clamping means over the minimum distance prescribed or, where no distance is prescribed, until the conductor just projects from the far side of the terminal and in the position most likely to assist the wire to escape. The clamping screw is then tightened with a torque equal to two-thirds of the torque specified in the appropriate column of the table in Sub-clause 24.1.

The test is repeated with a new conductor which is twisted as before, but in the opposite direction.

After the test, no wire of the conductor shall have escaped from the clamping means.

11.2.7 Screw-type terminals shall be so designed or placed that, in normal use, the temperature occurring at the point where the conductor is clamped, is not excessive; in addition, the terminals shall not attain temperatures such that the insulating properties of adjacent parts or the insulation of the conductors are impaired.

Compliance is checked by the temperature-rise test of Clause 20.

11.2.8 Screw-type terminals shall be so fixed or located within the connector that when the clamping screws or nuts are tightened or loosened, the terminals shall not work loose and creepage distances and clearances shall not be reduced below the values specified.

These requirements do not imply that the terminals must be so designed that their rotation or displacement is prevented, but any movement must be sufficiently limited so as to prevent non-compliance with this standard.

The use of sealing compound or resin is considered to be sufficient for preventing a terminal from working loose, provided that:

— the sealing compound or resin is not subject to stress during normal use, and
— the effectiveness of the sealing compound or resin is not impaired by temperatures attained by the terminal under the most unfavourable conditions as specified in this standard.

Compliance is checked by inspection, by measurement and by the following test:

A solid rigid copper conductor of 1.5 mm^2 cross-sectional area (diameter 1.45 mm) is placed in the terminal.

Screws and nuts are tightened and loosened five times by means of a suitable test screwdriver or spanner, the torque applied when tightening being equal to the torque specified in the appropriate column of the table in Sub-clause 24.1.

The conductor is moved each time the screw or nut is loosened.

During the test, terminals shall not work loose and there shall be no damage, such as breakage of screws or damage to the head slots, threads, washers or stirrups, that will impair the further use of the terminals.

For mantle terminals, the specific nominal diameter is that of the slotted stud.

The shape of the blade of the test screwdriver must suit the head of the screw to be tested. The screws and nuts must not be tightened in jerks.

11.2.9 Screw-type earthing terminals shall be of the same size as the corresponding terminals for the current-carrying conductors.

Compliance is checked by inspection.

11.2.10 Clamping screws or nuts of screw-type earthing terminals shall be adequately locked against accidental loosening and it shall not be possible to loosen them without the aid of a tool.

Compliance is checked by inspection and by manual test.

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In general, the designs commonly used for current-carrying terminals, other than certain designs of terminals of the pillar type, provide sufficient resiliency to comply with this requirement; for other designs, special provisions, such as the use of an adequately resilient part, which is not likely to be removed inadvertently, may be necessary.

11.2.11 Screw-type earthing terminals shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor or any other metal that is in contact with these parts.

The body of earthing terminals shall be of brass or other metal no less resistant to corrosion.

Compliance is checked by inspection.

Screws or nuts of plated steel withstanding the relevant corrosion test are considered to be of a metal not less resistant to corrosion than brass.

A test for checking the resistance to corrosion is under consideration.

11.2.12 For pillar terminals, the distance between the clamping screw and the end of the conductor when fully inserted, shall be not less than the distance specified in Standard sheet C 26.

The minimum distance between the clamping screw and the end of the conductor applies only to pillar terminals in which the conductor cannot pass right through.

For mantle terminals, the distance between the fixed part and the end of the conductor when fully inserted, shall be not less than the distance specified in Standard sheet C 28.

Compliance is checked by measurement, after a solid conductor of 1.5 mm^2 cross-sectional area (diameter 1.45 mm) has been fully inserted and fully clamped.

12. **Construction**

12.1 Appliance couplers shall be so designed that there is no risk of accidental contact between the earthing contact of the appliance inlet and the current-carrying contacts of the connector.

Compliance is checked by inspection.

Conformity to the Standard sheets ensures compliance with this requirement.

12.2 Screws which fix a part providing protection against electric shock, for example the part covering the contacts of a connector, shall be adequately locked against loosening.

Compliance is checked by inspection and by the tests of Clauses 17, 19 and 22.

12.3 Pins of appliance inlets and contacts of connectors shall be locked against rotation.

Compliance is checked by inspection and by manual test.

Clamping screws may serve to prevent contacts from rotating.

12.4 Pins of appliance inlets shall be securely retained and shall have adequate mechanical strength. It shall not be possible to remove them without the aid of a tool and they shall be surrounded by a shroud.

This requirement does not exclude pins which are to some extent floating.

The extent of permissible floating is not checked by measurement, but by using a gauge.

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Compliance is checked by inspection, by manual test and, for non-solid pins, by the following test which is made after all other tests have been completed:

The shroud is removed from the appliance inlet and the pin supported as shown in Figure 11.

A force of 100 N is exerted on the pin for 1 min in a direction perpendicular to the axis of the pin, by means of a steel rod having a diameter of 4.8 mm, the axis of which is also at right angles to the axis of the pin.

After the test, there shall be no significant alteration in the shape of the pin.

12.5 Contacts of connectors shall be self-adjusting so as to provide adequate contact pressure.

For connectors other than 0.2 A connectors, self-adjustment of the contacts shall not depend upon the resiliency of insulating material.

Compliance is checked by inspection and by the tests of Clauses 15 to 20 inclusive.

12.6 The enclosure of rewirable connectors shall consist of more than one part and shall completely enclose the terminals and the ends of the flexible cable or cord.

Parts of the enclosure linked together by flexible means are considered to be separate parts.

The construction shall be such that, from the point of separation of the cores, the conductors can be properly connected and that, when the connector is assembled and wired as in normal use, there is no risk of:

— the cores being pressed against each other;
— a core, the conductor of which is connected to a live terminal, coming into contact with accessible metal parts;
— a core, the conductor of which is connected to the earthing terminals, coming into contact with live parts.

12.7 For rewirable connectors, it shall not be possible to assemble the connector in such a way that the terminals are enclosed and the contacts are accessible.

This requirement excludes the use of separate front pieces enclosing only the contacts.

12.8 Parts of the body of connectors shall be reliably fixed to one another, and it shall not be possible to dismantle the connector without the aid of a tool.

For rewirable connectors, there shall be separate independent means for fixing and locating the parts of the body with respect to each other, at least one of which, for example a screw, can only be operated with the aid of a tool; thread-cutting screws shall not be used for this purpose.

The resiliency of the contacts shall not depend upon the assembly of the parts of the body.

Partial loosening of assembly screws or the like shall not allow the detachment of parts providing protection against electric shock.

Compliance with the requirements of Sub-clauses 12.6 to 12.8 is checked by inspection and by manual test.

The requirement that it shall not be possible to dismantle the connectors without the aid of a tool does not necessarily mean that their component parts must be fixed to the enclosure.

The requirement with regard to fixing and locating does not preclude the use of one fixing and one locating means.

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12.9 For connectors, the earthing contact shall be fixed to the body. If the earthing contact and the earthing terminal are not in one piece, the various parts shall be fixed together by riveting, welding or in a similar reliable manner.

The connection between the earthing contact and the earthing terminal shall be of metal which is resistant to corrosion.

Compliance is checked by inspection and, if necessary, by special tests.

This requirement does not exclude earthing contacts which are to some extent floating.
The extent of permissible floating is not checked by measurement but by using a gauge.

12.10 Rewirable connectors shall be so designed that, should a wire of a stranded conductor escape from a terminal when the conductors are fitted, there is no risk of:

— part of a conductor straying outside the enclosure or coming into contact with accessible screws or the like;
— contact between live parts and parts of the earthing circuit, if any;
— contact between live parts of different polarity.

Non-rewirable connectors shall be so designed and constructed that loose strands of a conductor are prevented from reducing the distance through insulation between live parts and accessible surfaces below the minimum specified in Clause 25.

Compliance is checked by inspection, by manual test and for rewirable connectors by the following test:

INFORMATION as to original IEC text
The test specification does not include "for rewirable connectors".

An 8 mm length of insulation is removed from the end of a flexible conductor of 0.75 mm² cross-sectional area. One wire of the stranded conductor is left free and the other wires are fully inserted into and clamped in the terminal. The free wire is bent, without tearing the insulation back, in every possible direction, but without making sharp bends round barriers. The free wire of a conductor connected to a live terminal shall not stray outside the enclosure nor come into contact with live parts of different polarity or earthed parts or accessible screws and the like. The free wire of a conductor connected to an earthing terminal shall not touch any live part.

12.11 Connectors without earthing contact and 2.5 A connectors with earthing contact shall be part of a cord set.

Compliance is checked by inspection.

12.12 Fuses, relays, thermostats and thermal cut-outs shall not be incorporated in connectors complying with the Standard sheets.

Fuses, relays, thermostats and thermal cut-outs incorporated in appliance inlets shall comply with the relevant IEC standards.

Switches or energy regulators incorporated in connectors or appliance inlets shall comply with the relevant IEC standards*.

Where an appliance inlet is integrated in or incorporated in an appliance or equipment, then that part which can be identified as the appliance inlet, by reference to the relevant Standard Sheet, shall comply with the requirements of this standard.

Compliance is checked by inspection and by testing the switches, fuses, relays, thermostats, thermal cut-outs or energy regulators according to the relevant IEC standard.

* "For switches for appliances: IEC 328: Switches for Appliances; for energy regulators: IEC 730-1: Automatic electrical controls for household and similar use — Part 1 : General requirements"

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13. **Moisture resistance**

Appliance couplers shall be proof against humid conditions which may occur in normal use.

If such couplers are used with equipment which is subject to spillage of liquid in normal use then protection against moisture shall be provided by the equipment.

INFORMATION as to original IEC text
The explanation to the requirement read:
Where appliance couplers are used on equipment subject to spillage of liquid in normal use, it is assumed that the equipment is provided with a protecting means so that the overflowing liquid does not affect the insulation of the connector or appliance inlet.

Compliance is checked by the humidity treatment described in this clause, followed immediately by the tests of Clause 14.

Connectors and appliance inlets are not in engagement when subjected to the humidity treatment; rewirable connectors are not fitted with a flexible cable or cord.

The humidity treatment is carried out in a humidity cabinet containing air with a relative humidity maintained between 91% and 95%. The temperature of the air, at all places where samples can be located, is maintained within ± 1 °C of any convenient value t between 20 °C and 30 °C.

Before being placed in the humidity cabinet, the samples are brought to a temperature between t and t + 4 °C.

The samples are kept in the cabinet for:

7 days (168 h) for connectors with earthing contact and for appliance inlets with earthing contact, which are submitted as individual accessories, not incorporated in other equipment;

2 days (48 h) in all other cases.

In most cases, the samples may be brought to the specified temperature by keeping them at this temperature for at least 4 h before the humidity treatment.

A relative humidity between 91% and 95% can be obtained by placing in the humidity cabinet a saturated solution of sodium sulphate (Na_2SO_4) or potassium nitrate (KNO_3) in water, having a sufficiently large contact surface with the air.

In order to achieve the specified conditions within the cabinet, it is necessary to ensure constant circulation of the air within and, in general, to use a cabinet which is thermally insulated.

After this treatment, the sample shall show no damage within the meaning of this standard.

14. **Insulation resistance and electric strength**

14.1 The insulation resistance and the electric strength of appliance couplers shall be adequate.

Compliance is checked by the tests of Sub-clauses 14.2 and 14.3, these tests being made immediately after the test of Clause 13, in the humidity cabinet or in the room in which the samples were brought to the prescribed temperature.

14.2 *The insulating resistance is measured with a d.c. voltage of approximately 500 V applied, each measurement being made 1 min after application of the voltage.*

The insulation resistance is measured:

1) for appliance inlets with a connector in engagement, between the current-carrying pins connected together and the body;

2) for appliance inlets with a connector in engagement, between each current-carrying pin in turn and the other, the latter being connected to the body;

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