UL 60320-1

STANDARD FOR SAFETY

Appliance Couplers for Household and Similar General Purposes – Part 1: General Requirements

UL Standard for Safety for Appliance Couplers for Household and Similar General Purposes – Part 1: General Requirements, UL 60320-1

Third Edition Edition, Dated February 15, 2019

Summary of Topics

This revision of ANSI/UL 60320-1 dated March 25, 2022 includes the following changes in requirements:

Resistance of insulating material to heat, fire and tracking oversight; 27.1.1DV.1, 27.1.1DV.2, 27.2DV

Preselection Material Requirements; 2DV.2, 27.1.1DV.1, 27.2DV

This is an adoption of IEC 60320-1, Third Edition, issued by the IEC June 2015 and includes IEC Corrigendum 1 published January 2016. Please note that the National Difference document incorporates all of the U.S. national differences for UL 60320-1.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated November 12, 2021.

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CSA Group
CSA C22.2 No. 60320-1:19
Second Edition
(IEC 60320-1:2015 MOD)

Underwriters Laboratories Inc.
UL 60320-1
Third Edition

Appliance Couplers for Household and Similar General Purposes - Part 1: General Requirements

February 15, 2019

(Title Page Reprinted: March 25, 2022)

This national standard is based on publication IEC 60320-1, Third Edition (2015).

Approved American National Standard

ANSI/UL 60320-1-2022

Commitment for Amendments

This standard is issued jointly by the the Canadian Standards Association (operating as “CSA Group”) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of CSA Group and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of the IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the Third Edition including revisions through March 25, 2022.

The most recent designation of ANSI/UL 60320-1 as an American National Standard (ANSI) occurred on March 25, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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Preface

This is the harmonized CSA Group and UL standard for Appliance Couplers for Household and Similar General Purposes - Part 1: General Requirements. It is the second edition of CSA C22.2 No. 60320-1, and the third edition of UL 60320-1. This edition of CSA C22.2 No. 60320-1 supersedes the previous edition published on May 12, 2011. This edition of UL 60320-1 supersedes the previous edition published on May 12, 2011. This harmonized standard has been jointly revised on March 25, 2022. For this purpose, CSA Group and UL are issuing revision pages dated March 25, 2022.

This harmonized standard is based on IEC Publication 60320-1: third edition, Appliance Couplers for Household and Similar General Purposes – Part 1: General Requirements issued June 2015, as revised by corrigendum 1 issued January 2016. IEC 60320-1 is copyrighted by the IEC.

This harmonized standard was prepared by the CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Subcommittee, [THSC 23BC-9, Appliance Couplers] on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Integrated Committed on Wiring Devices, under the jurisdiction of the CSA Technical Committee on Wiring Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 60320-1 Appliance Couplers for Household and Similar General Purposes – Part 1: General Requirements, copyright 2015, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword is not a part of the requirements of this standard but is included for information purposes only

NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60320-1, Appliance Couplers for Household and Similar General Purposes – Part 1: General Requirements, copyright 2015, are indicated by notations (differences) and are presented in bold text.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES – Part 1: General requirements

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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6) All users should ensure that they have the latest edition of this publication.

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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

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

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

This third edition cancels and replaces the second edition published in 2001 and Amendment 1:2007. This edition constitutes a technical revision.

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

a) Standard sheets moved from IEC 60320-1 to IEC 60320-3.

b) Clarification of requirements for non-standardized appliance couplers.

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

FDIS	Report on voting
23G/345/FDIS	23G/346/RVD

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

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

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

Part 1 is to be used in conjunction with the following parts of the IEC 60320 series, if applicable.

IEC 60320-2-1, *Appliance couplers for household and similar general purposes – Part 2-1: Sewing machine couplers*

IEC 60320-2-3, *Appliance coupler for household and similar general purposes – Part 2-3: Appliance coupler with a degree of protection higher than IPX0*

IEC 60320-2-4, *Appliance couplers for household and similar general purposes – Part 2-4: Couplers dependent on appliance weight for engagement*

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

NOTE If these standards are referring to another edition of IEC 60320-1, that edition is applicable.

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

• reconfirmed,

• withdrawn,

• replaced by a revised edition, or

• amended.

A bilingual version of this publication may be issued at a later date.

101DV DE *Modification: Add the following to the IEC Foreword:*

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES – Part 1: General requirements

1 Scope

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

This part of IEC 60320 is also valid for appliance inlets/appliance outlets integrated or incorporated in appliances.

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

Appliance couplers complying with this part of IEC 60320 are suitable for normal use at ambient temperatures not normally exceeding +40 °C, but their average over a period of 24 h does not exceed +35 °C, with a lower limit of the ambient air temperature of –5 °C.

Appliance couplers are not suitable for

– use in place of plug and socket-outlet systems according to IEC 60884-1.

– use in place of devices for connecting luminaires (DCLs) according to IEC 61995 or luminaire supporting couplers (LSCs).

NOTE Requirements for d.c. are under consideration.

1DV.1 D1 ***Modify Clause 1, third paragraph, by replacing with the following:***

The rated voltage does not exceed 250 V (a.c.) and the rated current does not exceed 20 A.

This standard does not apply directly to the following devices, but supplements the standards applying to such devices:

– devices produced integrally with flexible cord or cable, which are covered by CSA C22.2 No. 21 and UL 817.

1DV.2 D1 ***Modify Clause 1 by replacing the text of the NOTE with the following:***

Requirements for d.c. are under consideration and do not apply.

1DV.3 DR ***Modification to add the following after the first paragraph:***

This standard covers the above-noted products that are intended to be installed or used in accordance with:

– CSA C22.1, Canadian Electrical Code, Part 1, in Canada

– NFPA 70, National Electrical Code (NEC), in the United States.

2 Normative references

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.

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

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

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

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

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

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

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

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

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

IEC 60664-1:2007, *Insulation coordination for equipment within low voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-12:2000, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13:2000, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-10-2, *Fire hazard testing – Part 10: 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)*

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

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

2DV.1 D2 *Modify Clause 2 by deleting the following IEC publications:*

IEC 60227

IEC 60245

IEC 61058

2DV.2 D2 *Modify Clause 2 by adding the following Canadian, IEC, and USA reference publications:*

CSA Group

CAN/CSA-C22.2 No. 0-10, *General Requirements – Canadian Electrical Code, Part II*

C22.1-18, *Canadian Electrical Code, Part I*

CAN/CSA-C22.2 No. 0.17-00, *Evaluation of properties of polymeric materials*

C22.2 No. 21-14, *Cord sets and power supply cords*

C22.2 No. 24-15, *Temperature-indicating and -regulating equipment*

C22.2 No. 49-14, *Flexible cord and cables*

C22.2 No. 60320-3, *Appliance couplers for household and similar general purposes – Part 3: Standard sheets and gauges*

CAN/CSA-C22.2 No. 61058-1:17, *Switches for appliances – Part 1: General requirements*

CAN/CSA-C22.2 No. 61058-1-1:17, *Switches for appliances – Part 1-1: Requirements for mechanical switches*

CAN/CSA-C22.2 No. 61058-1-2:17, *Switches for appliances – Part 1-2: Requirements for electronic switches*

CAN/CSA-E60730-2-11:18, *Automatic electrical controls for household and similar use – Part 2: Particular requirements for energy regulators*

IEC

IEC 60695-11-10:2013, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

NFPA

NFPA 70, *National Electrical Code (NEC)*

UL

UL 62, *Flexible Cords and Cables*

UL 94, *Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*

UL 746A, *Polymeric Materials — Short Term Property Evaluations*

UL 746C, *Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 817, *Cord Sets and Power-Supply Cords*

UL 873, *Temperature-Indicating and -Regulating Equipment*

UL 60320-3, *Appliance Couplers for Household and Similar General Purposes – Part 3: Standard Sheets and Gauges*

UL 60730-2-11, *Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Energy Regulators*

UL 61058-1, *Switches for Appliances – Part 1: General Requirements*

UL 61058-1-1, *Switches for Appliances – Part 1-1: Requirements for Mechanical Switches*

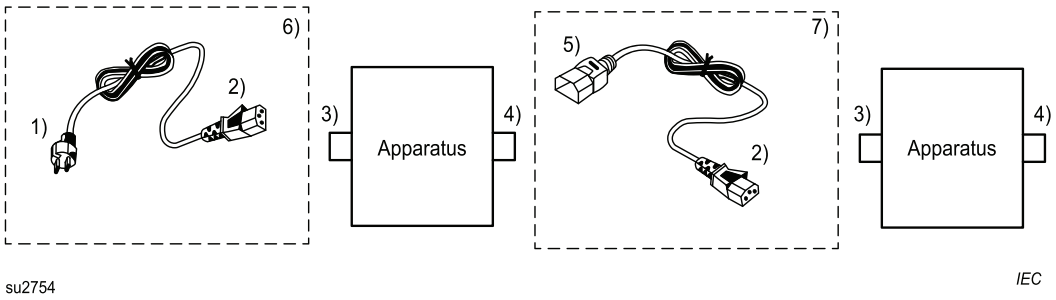
UL 61058-1-2, *Switches for Appliances – Part 1-2: Requirements for Electronic Switches*

3 Definitions

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

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

SEE: Figure 1.



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

Figure 1

Intended use of appliance couplers

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

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-02]

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

SEE: Figure 1.

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

SEE: Figure 1.

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

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

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-09]

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

SEE: Figure Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-08]

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

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

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

SEE: Figure 1.

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

SEE: Figure 1.

[SOURCE: IEC 60050-442:1998, 442-07-06, modified – “a” has been changed to “one” in two places and a reference to Figure 1 has been added.]

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

3.8 **incorporated appliance coupler**
appliance coupler built in or fixed to an appliance or equipment, but that can be tested separately

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

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

3.11 **rated voltage**
voltage assigned by the manufacturer for a specified operating condition of an accessory

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

3.11DV D1 ***Modify 3.11 as follows:***

Replace "by the manufacturer" with "according to North American Ratings Table 1ADV".

3.12 **rated current**
current assigned by the manufacturer for a specified operating condition of an accessory

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

3.12DV D1 ***Modify 3.12 as follows:***

Replace "by the manufacturer" with "according to North American Ratings Table 1ADV".

3.13 **terminal**
part of an accessory to which a conductor is attached, providing a re-usable connection

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

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

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

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

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

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

[SOURCE: IEC 60050-811:1991, 811-10-04]

3.17 **routine test**
test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

[SOURCE: IEC 60050-811:1991, 811-10-05]

4 General requirements

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

Non-standardized appliance couplers shall comply with all safety requirements of this standard and shall be tested together with its counterpart.

Compliance is checked by carrying out all the tests specified.

Appliance couplers according to this standard are not intended to be used in portable accessories covered by IEC TC 23.

4DV.1 D1 ***Modify Clause 4 by adding the following:***

New product evaluation (in Canada)

A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve a risk of fire, electric shock, or injury to persons, shall be evaluated using the appropriate

additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

4DV.2 D2 ***Modify Clause 4 by deleting the fourth paragraph.***

4DV.3 DR ***Modification to add the following to Clause 4 (Canada only):***

CAN/CSA-C22.2 No. 0 shall form a part of, and be read in conjunction with, this standard as far as the requirements apply, except that, where this standard contains requirements that are at variance with those of CAN/CSA-C22.2 No. 0, the requirements of this standard shall take precedence.

5 General notes on tests

5.1 General

Tests shall be made to prove compliance with the requirements laid down in this standard, where applicable.

Tests are as follows:

– Type tests shall be made on representative samples of each accessory.

– Routine tests shall be conducted by the manufacturer and made on each accessory.

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

– Unless otherwise specified, appliance couplers are tested with their counterparts, complying with this standard.

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

– Appliance couplers are considered to comply with this standard if there is not more than one failure of one test sample in one of the tests. If one test 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 test samples, all of which shall then comply with the repeated tests.

Subclauses 5.2 to 5.3 are applicable to type tests. For number of samples and test sequences, see Annex C.

5.2 Test samples

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

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

5.2DV D1 ***Modify Clause 5.2, first paragraph, by replacing it with the following:***

Unless otherwise specified, the test samples shall be tested as delivered and under normal conditions assembled and installed as in normal use according to the manufacturer's instructions at an ambient temperature of 20°C ±5°C; they shall be tested with a.c. at 50 Hz or 60 Hz.

5.3 Failures

In general, only the test which caused the failure need be repeated unless

a) a failure occurs to one of the three test samples when tested in accordance with Clauses 19, 20 or 21, in which case the tests are repeated from Clause 16 onwards; or

b) a failure occurs to one of the three test samples when tested in accordance with Clauses 22 or 23 (except 22.3), in which case the tests are repeated from Clause 18 onwards.

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

5.3DV D1 ***Delete Clause 5.3:***

This clause is not applicable.

5.4 Routine tests

Routine tests are specified in Annex B.

5.4DV D1 ***National Difference Deleted***

6 Standard ratings

6.1 The maximum permitted rated voltage is 250 V.

6.2 The maximum permitted rated current is 16 A.

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

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

6DV D1 ***Modify Clause 6 by replacing it with the following:***

The standard rated voltage and current shall be the North American rating in accordance with Table 1ADV. Furthermore, references throughout this standard to configuration sheets shall be associated with the North American ratings in Table 1ADV. This applies to all standard sheets and figures.

Compliance with this requirement shall be determined by visual inspection of the marking.

Table 1ADV D1 ***Add the following table:***

Table 1ADV
North American Ratings

Configuration[a]	IEC Rating Reference	North American Rating				
		Non-rewirable Connector	Re-Wirable Connector[b]	Appliance Inlet	Inlet with Integral Supplementary Protector	Appliance Outlet
C1 & C2	0.2 A, 250 Vac	0.2 A, 125 Vac, or 250 Vac	N/A	0.2 A, 250 Vac	N/A	N/A
C5 & C6 Sheets A & B	2.5 A, 250 Vac	7 A, 125 Vac, or 2.5 A, 250 Vac	N/A	7 A, 125 Vac, or 2.5 A, 250 Vac	N/A	7A, 125 V ac, or 2.5 A, 250Vac
C7 & C8 Sheets C & D	2.5 A, 250 Vac	7 A, 125 Vac, or 2.5 A, 250 Vac	N/A	7 A, 125 Vac, or 2.5 A, 250 Vac	N/A	7A, 125 V ac, or 2.5 A, 250Vac
C9 & C10	6 A, 250 Vac	6 A, 250 Vac	N/A	6 A, 250 Vac	N/A	N/A
C13 & C14 Sheets E & F	10 A, 250 Vac	15 A, 125 Vac, or 250 Vac	15 A, 250 Vac	15 A, 250 Vac	10 A, 250 V	15 A, 250 V ac
C15 & C16	10 A, 250 Vac	15 A, 125 Vac, or 250 Vac	15 A, 250 Vac	15 A, 250 Vac	10 A, 250 V	N/A
C15A & C16A	10 A, 250 Vac	15 A, 125 Vac, or 250 Vac	15 A, 250 Vac	15 A, 250 Vac	10 A, 250 V	N/A
C17 & C18 Sheets G & H	10 A, 250 Vac	15 A, 125 Vac, or 250 Vac	N/A	15 A, 250 Vac	10 A, 250 V	15 A, 250 V ac
C19 & C20 Sheets I & J	16 A, 250 Vac	20 A, 125 Vac, or 250 Vac	20 A, 250 Vac	20 A, 250 Vac	15 A, 250 V	20 A, 250 V ac
C21 & C22	16 A, 250 Vac	20 A, 125 Vac, or 250 Vac	20 A, 250 Vac	20 A, 250 Vac	15 A, 250 V	N/A
C23 & C24 Sheets K & L	16 A, 250 Vac	20 A, 125 Vac, or 250 Vac	N/A	20 A, 250 Vac	15 A, 250 V	20 A, 250 V ac

[a] See UL 60320-3 for configurations in this table.

[b] N/A denotes not permitted.

Compliance with this requirement shall be determined by visual inspection of the marking.

NOTE The North American ampacities in this table are based on the use of AWG conductor size.

7 Classification of appliance couplers

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

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

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

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

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

7.1DV D1 *Modify Clause 7.1 by replacing items a), b), and c) as follows:*

a) devices identified for cold conditions, pin temperature not exceeding 70 °C, are Sheets A through L and Configurations C1, C2, C5, C6, C7, C8, C9, C10 C13, C14, C17, C18, C19, C20, C23, and C24;

b) devices identified for hot conditions, pin temperature not exceeding 120 °C, are Configurations C15 and C16 ;

c) devices identified for very hot conditions, pin temperature not exceeding 155 °C, are Configurations C15A, C16A, C21, and C22 .

7.2 According to the type of equipment to be connected:

a) appliance couplers for class I equipment;

b) appliance couplers for class II equipment.

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

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

7.2DV.1 D1 *Modify Clause 7.2 by replacing items a) and b) with the following:*

a) devices for class I equipment are: Sheets A, B, E, F, I, and J and Configurations C5, C6, C13, C14, C15, C16, C15A, C16A, C19, C20, C21, and C22;

b) appliance couplers for class II equipment are: Sheets C, D, G, H, K, and L and Configurations C1, C2, C7, C8, C9, C10, C17, C18, C23, and C24.

7.2DV.2 D2 *Modify Clause 7.2 by deleting NOTES 1 and 2.*

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

a) rewirable;

b) non-rewirable.

8 Marking

8.1 General

Appliance couplers shall be marked with:

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

– type reference.

NOTE The type reference can be a catalogue number.

8.2 Additional markings

Connectors and plug connectors shall be additionally marked with:

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

– rated voltage in volts;

– symbol for nature of supply;

– the marking as specified in IEC 60999-1 to identify the type of conductors suitable for screwless terminals.

8.2DV.1 D1 ***Modify Clause 8.2 by replacing the first dashed item with the following:***

– rated current in amperes;

8.2DV.2 D2 ***Modify Clause 8.2 by replacing the fourth dashed item with the following:***

– the marking as specified in IEC 60999-1 to identify the type of conductors suitable for screwless terminals; in North America, the conductor size shall not exceed 14 AWG.

8.3 Appliance couplers for class II equipment

Appliance couplers for class II equipment shall not be marked with the symbol for class II construction.

8.3DV D1 ***Modify Clause 8.3 by replacing it with the following:***

Devices for Class II equipment are Sheets C, D, G, H, K, and L, and Configurations C1, C2, C7, C8, C9, C10, C17, C18, C23, and C24 shall not be marked with the symbol for Class II construction.

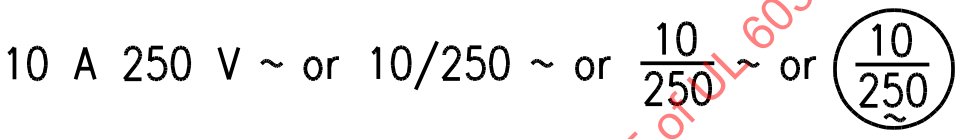
8.4 Symbols or alphanumeric notations

When symbols or alphanumeric notations are used, they shall be as follows:

amperes	A
volts	V
alternating current	AC or ~
protective earth	 [IEC 60417-5019 (2006-08)] or PE
earth	 [IEC 60417-5017 (2006-08)]
neutral terminal	N

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.

NOTE 1 Examples for marking of current, voltage and nature of supply:



NOTE 2 Lines formed by the construction of the tool are not considered as part of the marking.

8.4DV D1 ***Modify Clause 8.4 by replacing it with the following:***

When symbols are used, they shall be as follows:

amperes	**A**
volts	**V**
alternating current	**AC or the symbol ~**
earth	**⏚ or ⏚, or the letter(s) G or GR, or the word "Green", or the color green.**
neutral	**the letter N or W or the word "White", or the white colored screw**

For the marking of rated current and rated voltage, the figure for rated current shall be placed before that for rated voltage. The symbol for nature of supply, or "AC", shall follow the marking for rated current and rated voltage.

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

15A 125 or 250 VAC or

15A 125 or 250V~ or

10 A 250 V ~ or 10/250 ~ or $\frac{10}{250}$ ~ or $\left(\frac{10}{250}\right)_{\sim}$

8.5 Legibility of markings

The marking according to 8.1 of connectors/plug connectors shall still be easily discernible when the connector/plug connector is wired and ready for use.

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

8.6 Terminal markings and wiring instructions

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

– earthing terminal:	the symbol ⏚ or PE
– neutral terminal:	the letter N

In non-rewirable, polarized connectors/plug connectors, no marking of contacts is necessary, but conductors shall be connected as specified in 22.1.

Appliance inlets/appliance outlets, other than those integrated or incorporated in an appliance or equipment, for use with connectors/plug connectors according to 8.6 shall have terminal markings to correspond with 8.6.

Rewirable connectors/plug connectors shall be supplied with the following instructions:

a) a diagram illustrating the method of connection of the conductors, in particular the excess length of the earthing conductor;

b) a diagram illustrating the method of the operation of the cord anchorage;

c) a diagram showing the length of sleeving and insulation to be stripped back;

d) the sizes and types of the suitable cable or cord.

NOTE Connectors/plug connectors supplied directly to an equipment manufacturer do not need these instructions with each unit, but will be made available to the equipment manufacturer.

8.6DV.1 D1 ***Modify Clause 8.6 by replacing the first paragraph with the following:***

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

Earthing terminal	**⏚ or ⏚, or the letter(s) G or GR, or the word "Green", or the green color screw.**
Neutral terminal:	**the letter N or W, or the word "White", or the white color screw.**

8.6DV.2 D1 ***Modify Clause 8.6 by adding a final paragraph as follows:***

Polarity of the contacts as defined in Clause 8.6 applies to supply systems with line and neutral conductors. For supply systems with two line conductors, line contacts shall be in the lower two positions and earth contact shall be in the upper central position.

8.7 Durability

The marking required by the standard shall be easily legible and durable. The marking shall not be placed on screws, removable washers or other removable parts.

8.8 Test and inspection

Compliance with the requirements of 8.1 to 8.7 is checked by inspection and by the following test.

The marking is rubbed 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.

After this test and all non-destructive tests of the standard, the marking shall remain legible. It shall not be easily possible to remove labels and they shall not show curling.

Marking made by moulding, pressing or engraving is not subjected to this test.

9 Dimensions and compatibility

9.1 General

Appliance couplers shall be designed and constructed so that unintended or improper connection is prevented.

Compliance is checked by inspection and in case of doubt by the test according to 9.2 to 9.5.

9.2 Single-pole connections

It shall not be possible to make single-pole connections between connectors/appliance outlets and appliance intlets/plug connectors.

Compliance is checked by manual test.

9.3 Compatibility

It shall not be possible to engage:

– connectors for class II equipment in appliance inlets/plug connectors for class I equipment;

– plug connectors for devices of the protection class I in connectors/appliance outlets for devices of the protection class II;

– connectors for cold conditions in appliance inlets/plug connectors for hot or very hot conditions;

– plug connectors for cold conditions in appliance outlets for hot or very hot conditions;

– connectors for hot conditions in appliance inlets/plug connectors for very hot conditions;

– plug connectors for hot conditions in appliance outlets for very hot conditions;

– connectors in appliance inlets/plug connectors having a higher rated current than the connector.

– plug connectors in appliance outlets having a lower rated current than the plug connector.

Engagement of a connector or plug connector is attempted in any unintended configuration using a force of 60 N for 60 s.

During the test there shall be no contact of the pins.

Compliance is checked by inspection, by manual test according to 9.4 and by use of all components supplied by the manufacturer.

9.4 Dimensions for standardized appliance couplers

Standardized appliance couplers shall comply with the relevant standard sheets according to IEC 60320-3.

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

9.4DV D1 ***Modify Clause 9.4 by replacing the first paragraph with the following:***

Standardized appliance couplers shall comply with the relevant standard sheets according to CSA-C22.2 No. 60320-3/UL 60320-3.

9.5 Dimensions for non-standardized appliance couplers

Non-standardized appliance couplers which do not refer to the dimensions specified in the standard sheets according to IEC 60320-3 are acceptable if they do not adversely affect the purpose and safety of appliance couplers complying with the standard sheets, especially with regard to interchangeability and non-interchangeability.

Small deviations from the dimensions as specified in the standard sheets, which give the impression of a standardized coupler and lead to confusion with standardized appliance couplers, are not allowed.

Changes which adversely affect the contact-making ability are not allowed.

It shall not be possible to engage a part of a non-standard appliance coupler with a complementary part of an appliance coupler complying with the standard sheets in any part of IEC 60320-3.

It shall not be possible within a given system to make improper connections other than the intended position or partial connections causing deformation which can impair the further use of the appliance for:

– a connector and associated appliance inlet;

– an appliance outlet with the associated plug connector.

Compliance is checked by manual test.

9.5DV.1 D1 ***Modify Clause 9.5 by replacing the first paragraph with the following:***

Non-standardized appliance couplers which do not refer to the dimensions specified in the standard sheets according to CSA-C22.2 No. 60320-3/UL 60320-3 are acceptable if they do not adversely affect the purpose and safety of appliance couplers complying with the standard sheets, especially with regard to interchangeability and non-interchangeability.

9.5DV.2 D1 ***Modify Clause 9.5 by replacing the fourth paragraph with the following:***

It shall not be possible to engage a part of a non-standard appliance coupler with a complementary part of an appliance coupler complying with the standard sheets in any part of CSA-C22.2 No. 60320-3/UL 60320-3.

10 Protection against electric shock

10.1 Accessibility of live parts

Appliance couplers shall be so designed that live parts are not accessible when in partial or complete engagement.

Connectors/appliance outlets shall be so designed that live parts are not accessible when the connectors/appliance outlets are properly assembled and wired as in normal use.

Compliance is checked by inspection and by a test with the standard test probe B of IEC 61032.

The test probe 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 elastomeric 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.

NOTE An electrical indicator with a voltage between 24 V and 50 V is used to show contact with the relevant part.

10.1DV D1 ***Modify Clause 10.1 by replacing the third paragraph with the following:***

Compliance shall be checked by inspection and by a test with the standard test probe shown in Figure 1ADV.

Figure 1ADV D1 ***Add the following figure:***

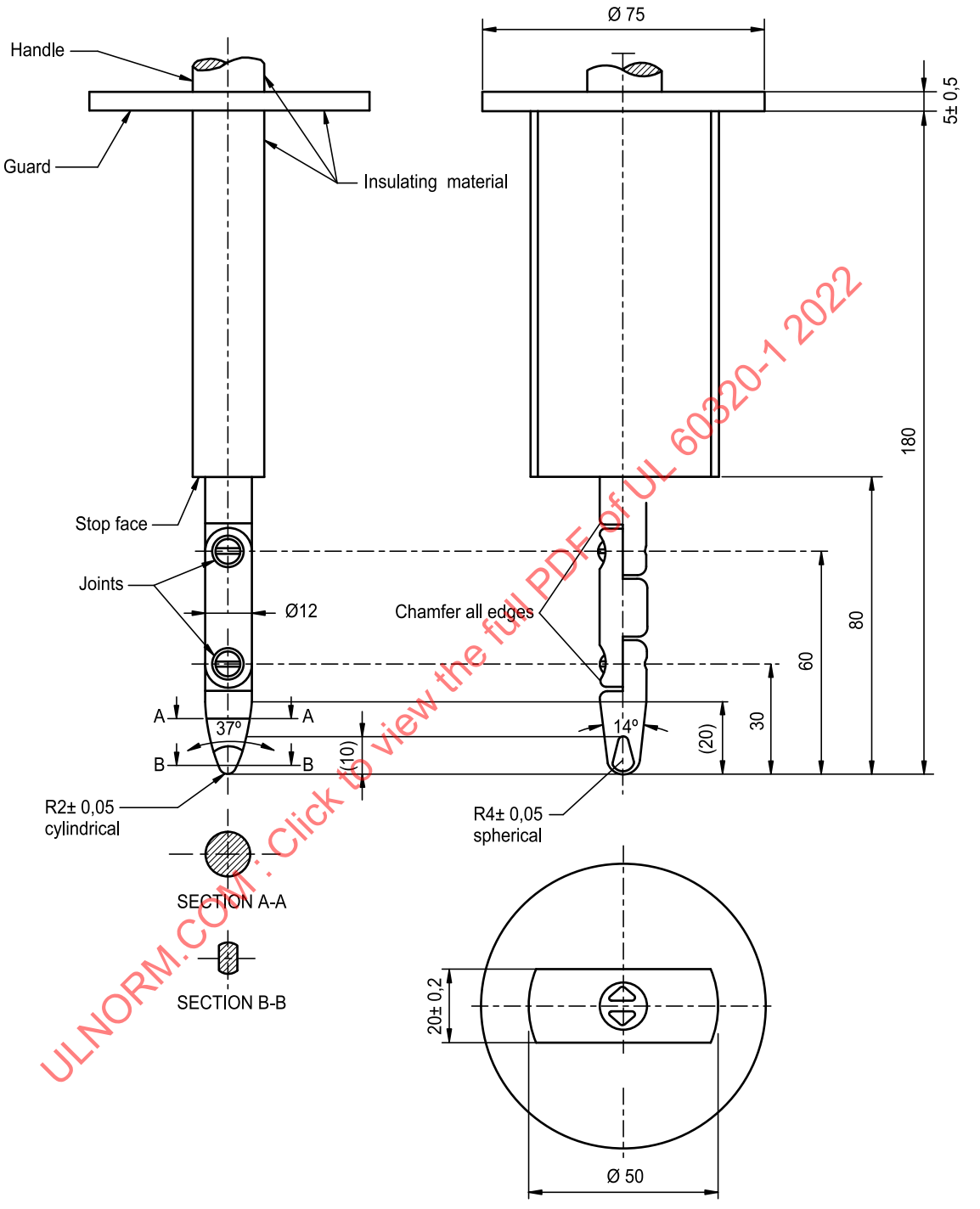


Figure 1ADV

IEC 61032 Test Probe B

10.2 Protection against single pole connection

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

Compliance is checked by manual test followed by the test of 10.1.

10.3 Protection against access to live parts

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

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/appliance outlet.

Compliance is checked by inspection and by manual test.

10.4 External parts

External parts of connectors, appliance outlets and plug connectors, with the exception of assembly screws and the like, shall be of insulating material.

Compliance is checked by inspection.

10.5 Shrouds

The shroud and the base of appliance inlets without earthing contact and those of 2,5 A appliance inlets/appliance outlets with earthing contact, shall be of insulating material.

Compliance is checked by inspection.

NOTE The suitability of the insulating material is checked during the insulation tests of Clause 15.

10.5DV D1 ***Modify Clause 10.5 by replacing the first paragraph with the following:***

The shroud and the base of appliance inlets without earthing contact of Configurations C2, C8, C10, C18, and C24 and those of appliance inlets/outlets of Configurations C6, C8, and Sheets B and D shall be of insulating material.

11 Provision for earthing

Appliance couplers with protective earthing contact shall be so constructed that the protective earthing contact will first make and last break relative to any other contact.

Compliance is checked by inspection.

12 Terminals and terminations

12.1 General

For terminals and terminations the requirements in the appropriate IEC standard apply.

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.

12.1DV D1 ***Modify Clause 12.1 by deleting the first paragraph.***

12.2 Rewirable appliance couplers

Rewirable appliance couplers shall be provided with screw-type clamping units or screwless clamping units according to IEC 60999-1.

Compliance is checked by inspection.

12.2DV D1 ***Modify Clause 12.2 by replacing the first paragraph with the following:***

Rewirable appliance couplers shall be provided with screws and nuts for clamping the conductors that shall have either a metric ISO thread or an ANSI Unified Screw Thread.

12.3 Non-rewirable appliance couplers

Non-rewirable appliance couplers shall be provided with soldered, welded, crimped or equally effective screwless connections, which shall not allow the possibility to disconnect the conductor.

Compliance is checked by inspection.

13 Construction

13.1 Risk of accidental contact

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

13.2 Contact positions

In non-reversible connectors/plug connectors, the contact positions shall be established by looking at the engagement face of the connectors/plug connectors as shown in the standard sheets overview in Clause 4 of IEC 60320-3:2014.

Their position shall be as in Table 1.

Table 1
Position of contacts

Type of contact	Position of contacts	
	Non-reversible connectors	Non-reversible plug connectors
Earthing contact	Preferably in a symmetrical arrangement	Preferably in a symmetrical arrangement
Line contact	Lower right-hand position	Lower left-hand position
Neutral contact	Lower left-hand position	Lower right-hand position

In non-reversible appliance couplers, which do not comply with the standard sheets shown in the overview of Clause 4 of IEC 60320-3:2014, the correct polarization shall be verified.

Compliance is checked by inspection.

NOTE Conformity to the standard sheets ensures compliance with this requirement.

13.2DV.1 D1 ***Modify Clause 13.2 by replacing the first paragraph with the following:***

In non-reversible connectors/plug connectors, the contact positions shall be established by looking at the engagement face of the connectors/plug connectors as shown in the standard sheets overview in Clause 4 of CSA-C22.2 No. 60320-3/UL 60320-3.

13.2DV.2 D1 ***Modify Clause 13.2 by replacing the third paragraph with the following:***

In non-reversible appliance couplers which do not comply with the standard sheets shown in the overview of Clause 4 of CSA-C22.2 No. 60320-3/UL 60320-3, the correct polarization shall be verified.

13.3 Parts covering live parts

Parts covering live parts shall be adequately locked against loosening.

Compliance is checked by inspection and by the tests of Clauses 18, 20 and 23.

13.4 Pin construction

13.4.1 Prevention of rotation

Pins of appliance inlets/plug connectors and contacts of connectors/appliance outlets shall be locked against rotation.

Compliance is checked by inspection and by manual test.

NOTE Clamping screws can serve to prevent contacts from rotating.

13.4.2 Pin retention

Pins of appliance inlets/plug connectors 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. The pins shall not protrude beyond the rim of the shroud.

A minimal movement of the pins is allowed.

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

The test sample is heated to the temperature according to the appropriate temperature class given in 7.1 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/plug connector 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.

Each pin is subjected to a force of 60 N ± 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/plug connector, and then in the direction towards the base of the appliance inlet/plug connector.

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 the removal of the pulling-out test force, all pins remain within the tolerances of the standard sheets or, for non-standardized appliance couplers, as specified by the manufacturer.

Compliance is checked by inspection and by manual test.

13.4.3 Non-solid pins

Non-solid pins are additionally tested by the following test after all other tests have been completed.

The shroud is removed from the appliance inlet/plug connector and the pin supported as shown in Figure 2.

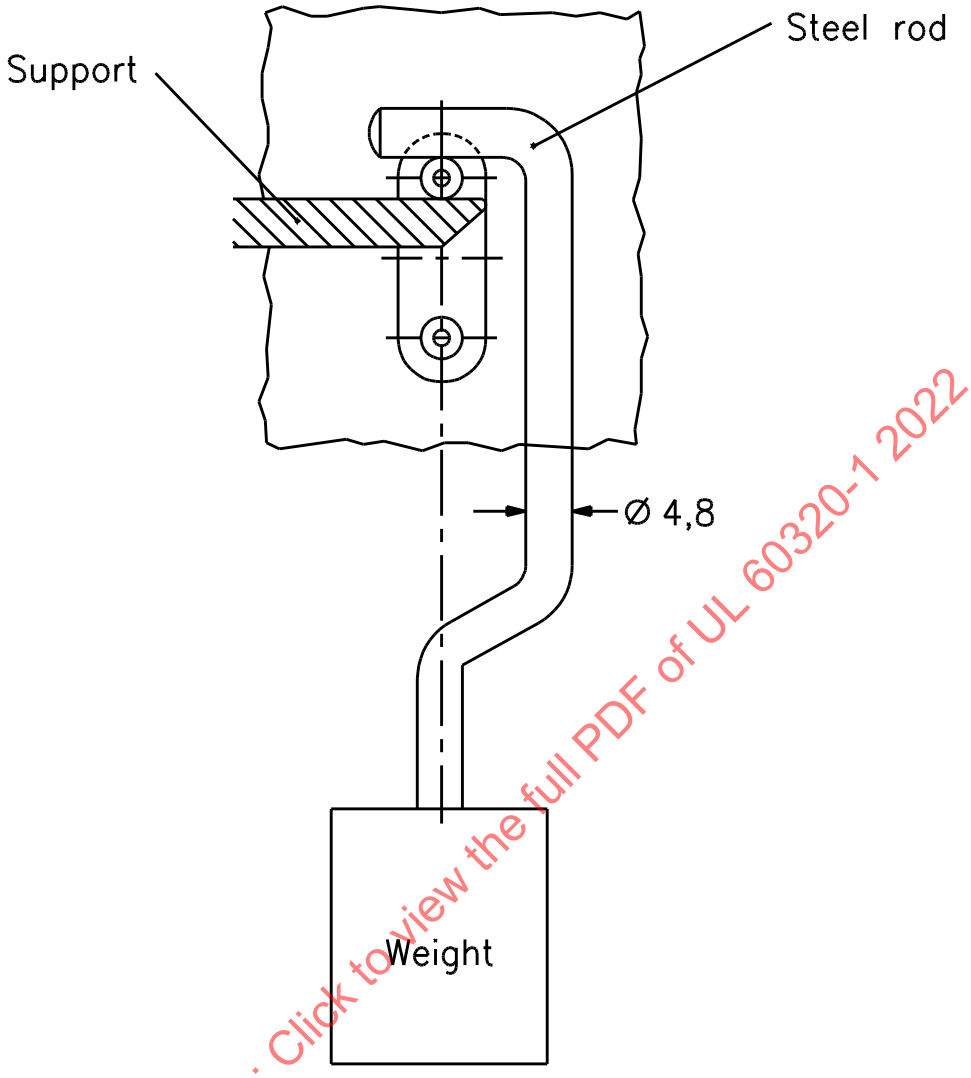


Figure 2

Device for testing non-solid pins

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.

13.5 Contact pressure

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

For connectors/appliance outlets 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 16 to 21 inclusive.

13.5DV D1 *Modify Clause 13.5 by replacing the second paragraph with the following:*

For connectors/appliance outlets, self-adjustment of the contacts shall not depend upon the resiliency of insulating material.

13.6 Enclosure

13.6.1 General

Parts of the body of connectors/plug connectors shall be reliably fixed to one another.

Compliance is checked by inspection, by manual test and by the test of 23.6.

13.6.2 Rewirable connectors/plug connectors

It shall not be possible to dismantle the connector/plug connector without the aid of a tool.

The enclosure of rewirable connectors/plug connectors shall completely enclose the terminals and the ends of the cord, at least as far as to the point from which the sheath has to be removed.

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/plug connector is assembled and wired as in normal use, there is no risk of

– pressing the cores together in such a way that it causes damage to the core insulation, likely to result in a break-down of the insulation;

– a core, the conductor of which is connected to a live terminal, being likely to be pressed against accessible metal parts;

– a core, the conductor of which is connected to the earthing terminals, being likely to be pressed against live parts.

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.

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

For rewirable connectors/plug 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 is checked by inspection and by manual test.

13.6.3 Non-rewirable connectors/plug connectors

Non-rewirable accessories 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

NOTE 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.

Compliance is checked by inspection and by manual test.

13.7 Earth connection

For connectors/plug connectors, the earthing contact/earthing pin shall be fixed to the body. If the earthing contact/earthing pin 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.

Metal parts of appliance couplers shall be so designed that corrosion shall not impair safety with regard to electrical and mechanical characteristics.

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

Compliance is checked by inspection.

13.8 Location of terminals and terminations

13.8.1 General

Terminals of rewirable accessories and terminations of non-rewirable accessories shall be so located or shielded that loose wires of a conductor in the accessory will not present a risk of electric shock.

For non-rewirable moulded-on accessories, means shall be provided to prevent loose wires of a conductor from reducing the minimum isolation distance requirements between such wires and all accessible external surfaces of the accessory, with the exception of the engagement face of the inlet.

Compliance is checked by the following:

– for rewirable accessories, the test of 13.8.2;

– for non-rewirable non-moulded-on accessories, the test of 13.8.3;

– for non-rewirable moulded-on accessories, by verification and inspection according to 13.8.4.

13.8.2 Free wire test for rewirable accessories

A length of 6 mm of insulation is removed from the end of a flexible conductor having a cross-sectional area of 0,75 mm^2. One wire of the flexible conductor is left free and the remaining wires are fully inserted into and clamped in the terminal, as for normal use.

The free wire is bent, without tearing the insulation back, in every possible direction, but without making sharp bends around the barriers.

NOTE The prohibition against making sharp bends around the barriers does not imply that the free wire has to be kept straight during the test. Sharp bends, moreover, are made if it is considered likely that such bends can occur during the normal assembly of the accessory, for example when a cover is pushed on.

The free wire of a conductor connected to a live terminal shall not touch any accessible metal part or be able to emerge from the enclosure when the accessory has been assembled.

The free wire of a conductor connected to an earthing terminal shall not touch a live part.

If necessary, the test is repeated with the free wire in another position.

13.8.2DV D1 ***Modify Clause 13.8.2 by replacing the first paragraph with the following:***

A length of 6 mm of insulation is removed from the end of a 18 AWG stranded conductor. One wire of the flexible conductor shall be left free and the remaining wires shall be fully inserted into and clamped in the terminal, as for normal use.

13.8.3 Free wire test for non-rewirable non-moulded-on accessories

A length of insulation equivalent to the maximum designed stripping length declared by the manufacturer plus 2 mm is removed from the end of a flexible conductor having the cross-sectional area as fitted. One wire of the flexible conductor is left free in the worst position whilst the remaining wires are terminated in a manner as used in the construction of the accessory.

The free wire is bent, without tearing the insulation back, in every possible direction but without making sharp bends around the barriers.

NOTE The prohibition against making sharp bends around the barriers does not imply that the free wire has to be kept straight during the test. Sharp bends, moreover, are made if it is considered likely that such bends can occur during the normal assembly of the accessory, for example when a cover is pushed on.

The free wire of a conductor connected to a live termination shall not touch any accessible metal part or reduce the creepage distance and clearance through any constructional gap to the external surface below 1,5 mm.

The free wire of a conductor connected to an earth termination shall not touch any live parts.

13.8.4 Free wire verification for non-rewirable moulded-on accessories

Non-rewirable moulded-on accessories shall be inspected to verify that there are means to prevent stray wires of the conductor and/or live parts reducing the minimum distance through insulation to the external accessible surface (with the exception of the engagement face of inlets) below 1,5 mm.

NOTE The verification of means may require the checking of the product construction or assembly method.

13.9 Connectors/plug connectors without earthing contact

Connectors/plug connectors without earthing contact and 2,5 A connectors/plug connectors with earthing contact shall be part of a cord set or an interconnection cord set.

Compliance is checked by inspection.

13.9DV D1 ***Delete Clause 13.9:***

Clause 13.9 does not apply.

13.10 Fuses, relays, thermostats, thermal cut-outs and switches

Fuses, relays, thermostats and thermal cut-outs shall not be incorporated in connectors and plug connectors complying with the standard sheets of IEC 60320-3.

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

Switches incorporated in appliance couplers shall comply with IEC 61058.

Energy regulators incorporated in appliance couplers shall comply with IEC 60730-2-11.

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

13.10DV D1 ***Modify Clause 13.10 by replacing it with the following:***

Fuses, relays, thermostats, and thermal cut-outs shall not be incorporated in connectors and plug connectors complying with the standard sheets of CSA-C22.2 No. 60320-3/ UL 60320-3.

Fuses, relays, thermostats and thermal cut-outs incorporated in appliance inlets and appliance outlets shall comply with the relevant UL and/or CSA standard.

An inlet with an integral supplementary protector (fuse) shall comply with the fuseholder temperature test described in UL 498.

Switches incorporated in appliance couplers shall comply with UL 61058-1 or CAN/CSA-C22.2 No. 61058-1, UL 61058-1-1 or CAN/CSA-C22.2 No. 61058-1-1, UL 61058-1-2 or CAN/CSA-C22.2 No. 61058-1-2, as applicable.

Energy regulators incorporated in appliance couplers shall comply with CAN/CSA-E60730-2-11/UL 60730-2-11 or CSA-C22.2 No. 24/UL 873.

Compliance shall be checked by inspection and by testing the switches, fuses, relays, thermostats, thermal cut-outs, and energy regulators according to the relevant North American standard.

14 Moisture resistance

Appliance couplers shall be able to withstand humid conditions which may occur in normal use.

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

Compliance is checked by the humidity treatment described in Clause 14, followed immediately by the tests of Clause 15.

Connectors/plug connectors and appliance inlets/appliance outlets are not in engagement when subjected to the humidity treatment; rewirable connectors/plug connectors are not fitted with a 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 test samples can be located, is maintained within ± 1 °C of any convenient value *t* °C between 20 °C and 30 °C.

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

The test samples are kept in the cabinet for

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

– 48 h (2 days) in all other cases.

NOTE 1 In most cases, the test samples can be brought to the specified temperature by keeping them at this temperature for at least 4 h before the humidity treatment.

NOTE 2 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.

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

15 Insulation resistance and electric strength

15.1 General

Appliance couplers shall have adequate insulation resistance and dielectric strength.

Compliance is checked by the tests of 15.2 and 15.3 immediately after the humidity treatment according to Clause 14.

Indicators which might otherwise be damaged by the tests of 15.2 and 15.3, such as neon lamps, shall be disconnected at one pole prior to testing.

The insulation resistance is measured considering the following conditions:

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

b) for appliance inlets with a connector in engagement, between each pin in turn and the others connected together;

c) for appliance outlets with a plug connector in engagement, between the current-carrying contacts connected together and the body;

d) for appliance outlets without a plug connector in engagement, between the current-carrying contacts connected together and the body;

e) for appliance outlets with a plug connector in engagement, between each pin in turn and the others connected together;

f) for connectors, between the current-carrying contacts connected together and the body;

g) for connectors, between each contact in turn and the others connected together;

h) for plug connectors, between the current-carrying contacts connected together and the body;

i) for plug connectors, between each contact in turn and the others connected together.

Additional test for rewirable connectors and plug connectors:

j) for rewirable connectors, between any metal part of the cord anchorage, including clamping screws, and the earthing contact or earthing terminal;

k) for rewirable connectors, between any metal part of the cord anchorage, excluding clamping screws, and a metal rod, of the maximum diameter of the cord as specified in Table 2, inserted in its place.

l) for rewirable plug connectors, between any metal part of the cord anchorage, including clamping screws, and the earthing contact or earthing terminal;

m) for rewirable plug connectors, between any metal part of the cord anchorage, excluding clamping screws, and a metal rod, of the maximum diameter of the cord as specified in Table 2, inserted in its place.

The term "body" used in items a), c), d), f) and h) above includes all accessible metal parts, fixing screws, external assembly screws and the like and a metal foil in contact with the outer surface of external parts of insulating material, in items d), f) and h) including the engagement face of connectors or appliance outlets but excluding the engagement face of plug connectors.

The metal foil is wrapped round the outer surface of external parts of insulating material; however, it is not pressed into openings.

Table 2
Maximum diameters of the cords

Type of cord	Number of conductors and nominal cross-sectional area mm²	Maximum diameter mm
60227 IEC 53	3 × 0,75	7,6
	3 × 1	8,0
	3 × 1,5	9,4
60245 IEC 53	3 × 0,75	8,1
	3 × 1	8,5
	3 × 1,5	10,4

Table 2DV D1 ***Delete Table 2:***

This table is not applicable.

The test voltage according to 15.2 and 15.3 is applied in the case of:

– functional insulation: between the different poles of the appliance coupler;

– basic insulation: between all live parts connected together and a metal foil covering the outer surface of the basic insulation and/or exposed conductive parts;

– supplementary insulation: between two metal foils covering separately the inner, normally inaccessible surface, of the supplementary insulation and its accessible surface;

– reinforced insulation: between all live parts connected together and a metal foil covering the accessible surface of the reinforced insulation.

The clearances and creepage distances shall be maintained when preparing the sample for this test.

In cases where basic insulation and supplementary insulation cannot be tested separately, the insulation provided is subjected to the test voltages specified for reinforced insulation.

15.1DV.1 D1 ***Modify Clause 15.1 by replacing item (k) with the following:***

k) for rewirable connectors between any metal part of the cord anchorage, excluding clamping screws, and a metal rod of the maximum diameter of the largest flexible cord type as specified by the manufacturer.

15.1DV.2 D1 ***Modify Clause 15.1 by replacing item (m) with the following:***

m) for rewirable plug connectors, between any metal part of the cord anchorage, excluding clamping screws, and a metal rod of the maximum diameter of the largest flexible cord type as specified by the manufacturer.

15.2 Insulation resistance

The insulation resistance of the sample is measured with an applied d.c. voltage of 500 $^{+50}_{0}$ V, the measurement being made 60 s ± 5 s after application of the voltage. The insulation resistance shall not be less than that specified in Table 3.

Table 3
Minimum insulation resistance

Insulation to be tested	Insulation resistance MΩ
Functional	2
Basic	2
Supplementary	5
Reinforced	7

Table 3DV D1 ***Delete Table 3:***

This table is not applicable.

NOTE Materials such as glazed ceramic or porcelain are considered to have insulation resistance and are not subjected to the insulation resistance tests.

15.2DV D1 ***Modify Clause 15.2 by replacing the second sentence of the first paragraph with the following:***

The insulation resistance shall not be less than 5MΩ.

15.3 Dielectric strength

The test sample is subjected to a voltage of substantially sine wave form, having a nominal frequency 50 Hz or 60 Hz. The voltage is applied for 60 s ± 5 s across the insulation as specified in Table 4.

Initially, not more than half the prescribed voltage is applied, and then it is raised rapidly to the full value. No flashover or breakdown shall occur. Glow discharges without drop in voltage are neglected.

Table 4
Dielectric strength

Insulation or disconnection to be tested[b]	Test voltage (r.m.s.)[a]		
	Rated voltage up to and including 50 V V	Rated voltage above 50 V up to and including 130 V V	Rated voltage above 130V up to and including 250V V
Functional insulation[c]	500	1 300	1 500
Basic insulation[d]	500	1 300	1 500

Table 4 Continued on Next Page

Table 4 Continued

Insulation or disconnection to be tested[b]	Test voltage (r.m.s.)[a]		
	Rated voltage up to and including 50 V V	Rated voltage above 50 V up to and including 130 V V	Rated voltage above 130V up to and including 250V V
Supplementary insulation[d]	500	1 300	1 500
Reinforced insulation[d,e]	500	2 600	3 000

NOTE 1 Up to 50 V: Not intended to be connected directly to the mains and not expected to be subjected to temporary overvoltages as defined in IEC 60364-4-44.

NOTE 2 Over 50 V: The values are based on IEC 60364-4-44. For functional, basic and supplementary insulation, the values are calculated with the formula: U_0 + 1 200 V and rounded. In this standard the maximum voltage considered between line and earth is U_0 = 300 V.

[a] The high-voltage transformer used for the test shall be designed so that, when the output terminals are short-circuited after the output voltage has been adjusted to the test voltage, the output current is at least 200 mA. The overcurrent relay shall not trip when the output current is less than 100 mA. Care is taken that the r.m.s values of the test voltage are measured within ± 3 %.

[b] Special components which might render the test impractical such as discharge lamps, coils, windings, or capacitors are disconnected at one pole, or bridged, as appropriate to the insulation being tested.

[c] An example is the insulation between poles.

[d] For the test all live parts are connected together and care is taken to ensure that all moving parts are in the most onerous position.

[e] For appliance couplers incorporating reinforced insulation as well as double insulation care is taken that the voltage applied to the reinforced insulation does not overstress the basic or the supplementary parts of the double insulation.

Table 4DV D1 *Delete Table 4:*

This table is not applicable.

15.3DV D1 *Modify Clause 15.3 by replacing the first paragraph with the following:*

The test sample shall be subjected to a voltage of substantially sine wave form, having a nominal frequency of 50 Hz or 60 Hz. This voltage shall be applied for 60 s ± 5 s across the insulation as specified in 15.1 (a) through (m).

The value of the test voltage shall be 3 000 V ± 60 V when applied between the parts and the body specified in items (a) and (c) and 1 500 V ± 60 V in all other cases.

16 Forces necessary to insert and to withdraw the connector/appliance

16.1 General

The construction of appliance couplers shall allow the easy insertion and withdrawal of the connector/appliance outlet, and prevent the connector/appliance outlet from working out of the appliance inlet/plug connector in normal use.

Compliance is checked for connectors/appliance outlets by the following tests:

– 16.2 to ascertain that the maximum force necessary to withdraw the connector/appliance outlet from the appliance inlet/plug connector shall not be higher than the maximum force specified in Table 5. For test purposes the relevant counterpart of the connector/appliance outlet shall be used (multi-pin gauge);

– 16.3 to ascertain that the minimum force necessary to withdraw a single pin from the individual contact assembly shall not be lower than the minimum force specified in Table 5.

Table 5
Maximum and minimum withdrawal forces

Type of connector/ appliance outlet	Withdrawal forces N	
	16.2 Multi-pin gauge maximum	16.3 Single-pin minimum
0,2 A, 2,5 A, 6 A and 10 A	50	1,5
16 A	60	2

Table 5DV D1 ***Modify Table 5 by replacing it with Table 5DV:***

Table 5DV
Maximum and minimum withdrawal forces

Type designation	Withdrawal forces N	
	Multi-pin gauge maximum	Single-pin minimum
Configurations C1, C5, C7, C9, C13, C15, C15A, C17, Sheets B, D, F, H	**50**	**1,5**
Configurations C19, C21, C23, Sheets J, L	**60**	**2**

Accessories with retaining devices are tested with the retaining device inoperative.

16.2 Verification of the maximum withdrawal force

The appliance inlet/plug connector is fixed to the mounting plate A of an apparatus as shown in Figure 3, so that the axes of the appliance inlet/plug connector pins are vertical and the free ends of the pins are downwards. The total mass consists of the principal mass, the supplementary mass, the clamp and the carrier.

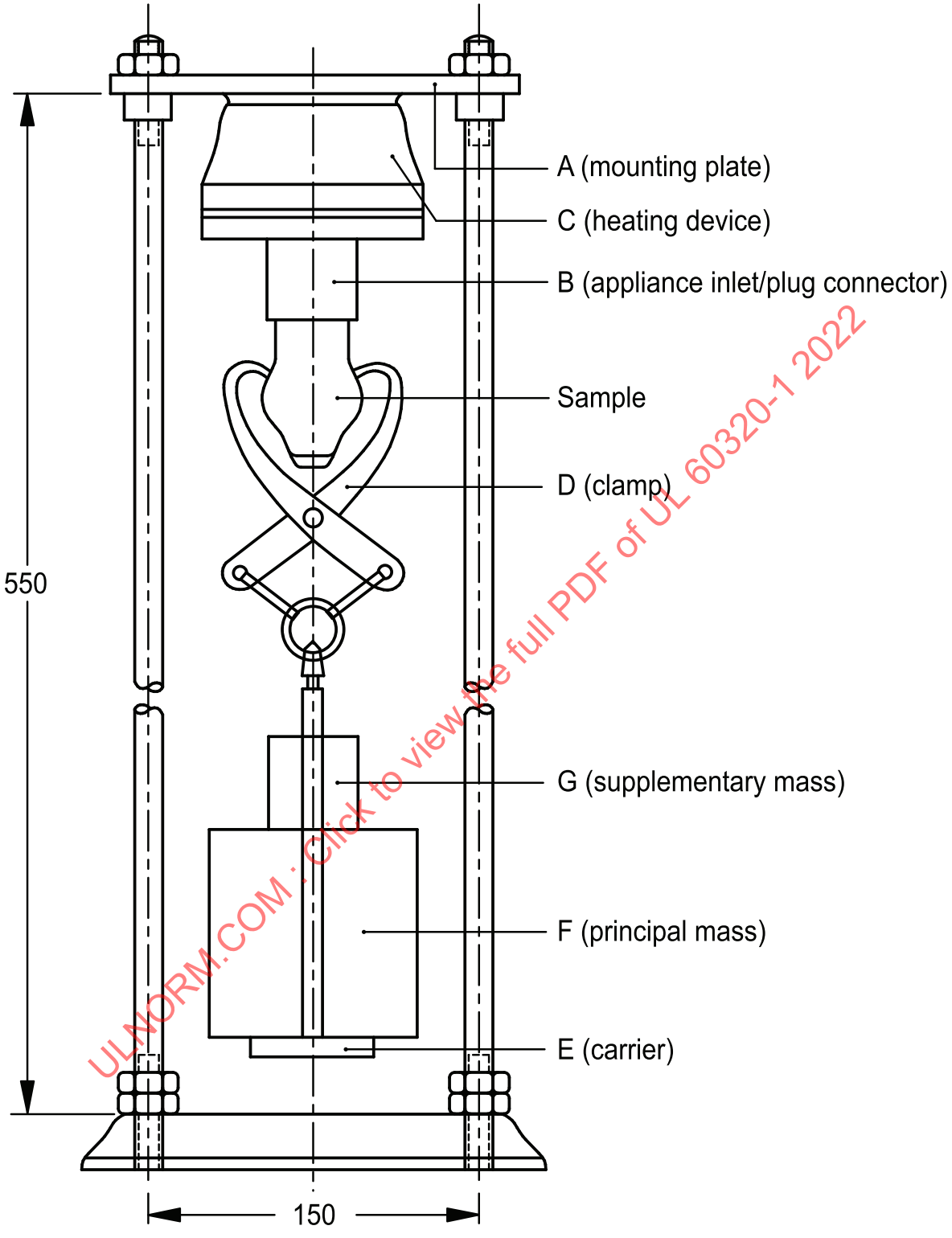


Figure 3

Apparatus for checking the withdrawal force

The pins are wiped free from grease before each test using a cold chemical degreaser.

NOTE 1 When using the liquid specified for the test, adequate precautions can be taken to prevent inhalation of vapour.

The connector/appliance outlet is inserted to the full depth into, and withdrawn from, the appropriate appliance inlet/plug connector 10 times. It is then again inserted, a carrier E for a principal mass F and a supplementary mass G being attached to it by means of a suitable clamp D. The supplementary mass is such that it exerts a force equal to one tenth of the maximum withdrawal force specified in Table 5 and it shall be made in one piece.

The principal mass is hung on the connector/appliance outlet without jolting and the supplementary mass is allowed to fall from a height of 5 cm on to the principal mass. The connector/appliance outlet shall not remain in the appliance inlet/plug connector.

For standardized types:

The appliance inlet/plug connector has finely ground pins of hardened steel, having a surface roughness not exceeding 0,8 µm over their active length and spaced at the nominal distance with a tolerance of $^{+0,02}_{0}$ mm.

The pin dimensions have the maximum values, with a tolerance of $^{0}_{-0,01}$ mm, except that the pin length need only comply with the tolerance of the standard sheet, and the inner dimensions of the shroud have the minimum values, with a tolerance of $^{+0,1}_{0}$ mm, specified in the relevant standard sheet.

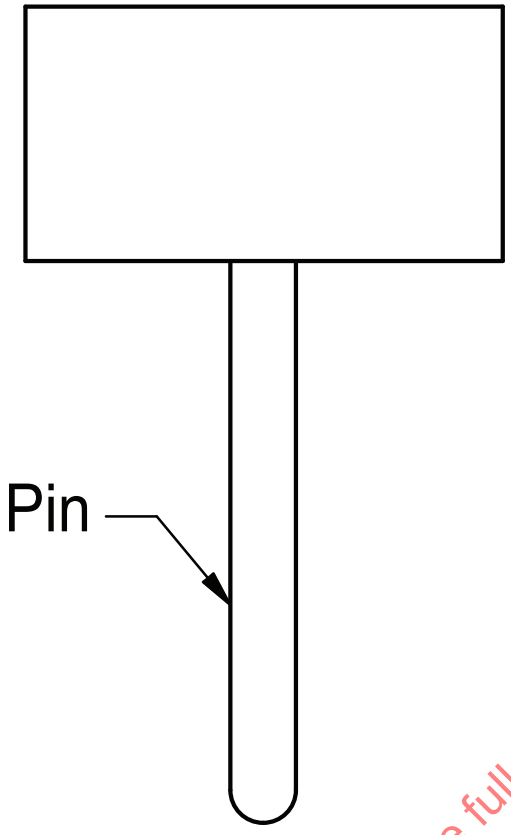
NOTE 2 The maximum value is the nominal plus the maximum tolerance. The minimum value is the nominal minus the maximum tolerance.

For non-standardized types:

The counterpart as specified by the manufacturer shall be used

16.3 Verification of the minimum withdrawal force

The test pin gauge, as illustrated in Figure 4, is applied to each individual connector/appliance outlet contact with the contact axes vertical and the gauge hanging vertically downwards.



Dimensions according to the relevant standard sheet.

su0495

The mass is to be equally positioned around the centre line(s) of the pin.

Figure 4

Gauge for verification of the minimum withdrawal force

The total mass of the test equipment shall be such as to exert the applicable force as shown in Table 5.

The pin is wiped free from grease before each test using a cold chemical degreaser.

The test pin gauge is then inserted into the contact assembly. The test equipment is applied gently, and care is taken not to knock the assembly when checking the minimum withdrawal force.

The test equipment shall not fall from the contact assembly within 3 s.

For standardized types:

The test pin gauge is made of hardened steel, having a surface roughness not exceeding 0.8 µm over its active length.

The pin portion of the gauge shall have dimensions equal to the minimum shown in the appropriate appliance inlet/plug connector standard sheet, with a tolerance of $^{+0,01}_{0}$ mm, except that the pin length need only comply with the tolerance of the standard sheet.

For non-standardized types:

The test pin is a single pin with minimum dimensions as specified by the manufacturer.

17 Operation of contacts

Contacts and pins of appliance couplers shall make connection with a sliding action. The contacts of connectors/appliance outlets shall provide adequate contact pressure and shall not deteriorate in normal use.

The effectiveness of the pressure between contacts and pins and earthing contacts and earthing pins shall not depend upon the resiliency of the insulating material on which they are mounted.

Compliance with the requirements is checked by inspection and by taking into consideration the requirements of Clauses 16, 18, 19, 20 and 21.

18 Resistance to heating of appliance couplers for hot conditions or very hot conditions

18.1 General

Appliance couplers as classified according to 7.1 shall withstand the heating to which they may be subjected by an appliance or other equipment.

Connectors/plug connectors shall be so constructed that the insulation of the conductors is not subjected to excessive heating.

Compliance is checked, for connectors/plug connectors, by the test of 18.2, and, for appliance inlets/appliance outlets, by the test of 18.3.

18.1DV D1 ***Modify Clause 18.1 by replacing the first paragraph with the following:***

Appliance couplers of Configuration C15, C15A, C16, C16A, C21, and C22 shall withstand the heating to which they may be subjected by an appliance or other equipment.

18.2 Heating test for connectors/plug connectors

Rewirable connectors/plug connectors are fitted with a three-core cord, having the minimum allowed cross-sectional area. Non-rewirable connectors/plug connectors are tested with the cord as delivered.

The connector/plug connector is inserted in a suitable appliance inlet/appliance outlet, following the manufacturer's instructions and then placed in a heating cabinet for 96 h at a temperature of:

• 120 °C ± 2 °C for connectors/plug connectors for hot conditions classified in 7.1b);

• 155 °C ± 2 °C for connectors/plug connectors for very hot conditions classified in 7.1c).

After removal from the heating cabinet, the connectors/plug connectors are then allowed to cool down to approximately ambient air temperature and are inserted into and withdrawn from the appliance inlet/appliance outlet 10 times.

The test samples shall show:

– no damage affecting the protection against electric shock;

– no loosening of electrical or mechanical connections;

– no cracks, swelling, shrinkage or the like.

18.2DV.1 D1 ***Modify Clause 18.2 by replacing the first paragraph with the following:***

Rewirable connectors/plug connectors shall be fitted with a three-core cord, having the minimum AWG size conductor as specified by the manufacturer. Non-rewirable connectors/plug connectors shall be tested with the cord as delivered.

18.2DV.2 D1 ***Modify Clause 18.2 by replacing the bullets in the second paragraph with the following:***

• 120 °C ± 2 °C for C15 configuration;

• 155 °C ± 2 °C for C15A, C21 and C23 configurations.

18.3 Heating test for appliance inlets/appliance outlets

Appliance inlets/appliance outlets for hot conditions and those for very hot conditions, other than those integrated or incorporated in an appliance or equipment, are kept in a heating cabinet for 96 h at a temperature of

• 120 °C ± 2 °C for appliance inlets/appliance outlets for hot conditions classified in 7.1b);

• 155 °C ± 2 °C for appliance inlets/appliance outlets for very hot conditions classified in 7.1c).

After the test, the test sample shall show no damage impairing its further use.

18.3DV D1 ***Modify Clause 18.3 by replacing the bullets with the following:***

• 120 °C ± 2 °C for C16 configuration;

• 155 °C ± 2 °C for C16A and C22 configurations.

19 Breaking capacity

Appliance couplers shall have adequate breaking capacity.

Compliance is checked, for connectors/appliance outlets, by the following test.

The connector or appliance outlet is mounted in an appropriate test apparatus, which incorporates the corresponding appliance inlet or plug connector.

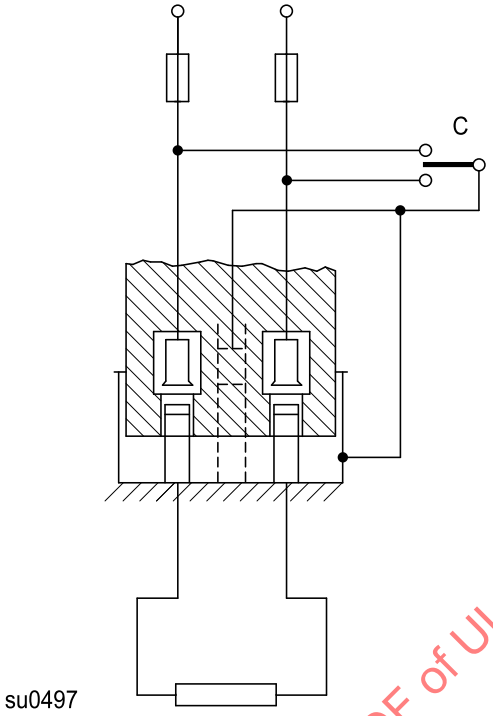
For standardized types, the appliance inlet or plug connector shall have polished, hardened steel pins, and dimensions as specified in the relevant standard sheet. The ends of the pins shall be rounded for rectangular pins and hemispherical for round pins as shown in the standard sheets.

For non-standardized types, the counterpart as specified by the manufacturer shall be used.

Connectors and appliance outlets for up to 0,2 A are not tested.

The appliance inlet/plug connector is positioned so that the plane through the axes of the pins is horizontal and the earthing pin, if any, is uppermost.

The test apparatus shall be designed and adjusted so as to simulate as far as possible disconnection in normal use (see Figure 5 for circuit diagram).



Key

C selector switch

Figure 5

Circuit diagram for breaking capacity and normal operation tests

For testing 10 A and 16 A connectors with earthing contact, the shroud of the appliance inlet shall be of metal. For testing other connectors and appliance outlets the shroud shall be of insulating material.

Ratings for the tests are taken from Table 6.

Table 6
Ratings for the tests of Clause 19

Rated current [A]	Test voltage [V]	Test current [A]	Power factor (cos φ)	Number of strokes
> 0,2 to < 10	1,1 × rated voltage	1,25 × rated current	0,6 ± 0,05	100
≥ 10	1,1 × rated voltage	1,25 × rated current	0,95 0,05	100
NOTE 1 28 to 30 strokes per minute with continuous movement.				
NOTE 2 Current flow period: $1,5\ ^{+0,5}_{0}$ s .				
NOTE 3 A stroke is an engagement or a disengagement of the sample under test into the counterpart.				
NOTE 4 The test sample is fully inserted into and withdrawn from its counterpart during each cycle.				

No current is passed through the earthing circuit, if any.

The selector switch C, connecting the earthing circuit and accessible metal parts to one of the poles of the supply, is operated after half the number of strokes.

During the test, there shall be no flashover between live parts of different polarity or between live parts and parts of the earthing circuit, if any, nor shall there be any sustained arcing.

After the test, the test sample shall show no damage impairing its further use.

19DV D1 ***Modify Clause 19 by replacing it with the following and with Figure 5DV and Table 6DV:***

19DV Breaking capacity

Appliance couplers shall have adequate breaking capacity.

Compliance shall be checked, for connectors/appliance outlets, by the following test.

The connector or appliance outlet shall be mounted in an appropriate test apparatus, which incorporates the corresponding appliance inlet or plug connector.

For standardized types, mating appliance inlet or plug connector compliant with the dimensions as specified in the relevant standard sheet shall be used.

For non-standardized types, the counterpart as specified by the manufacturer shall be used.

The appliance inlet/plug connector shall be positioned so that the plane through the axes of the pins is horizontal and the earthing pin, if any, is uppermost.

The test apparatus shall be designed and adjusted so as to simulate as far as possible disconnection in normal use (see Figure 5DV for circuit diagram).

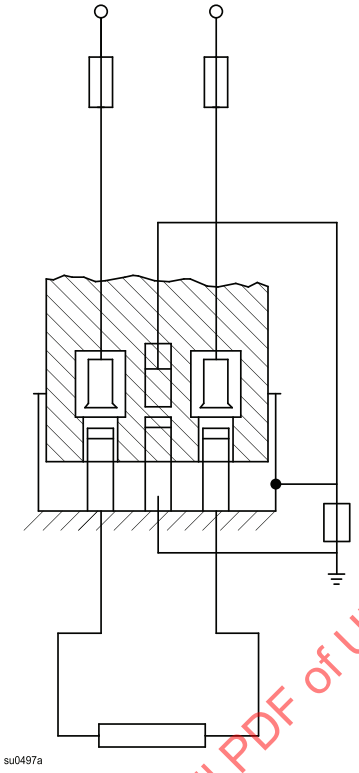


Figure 5DV

Circuit diagram for breaking capacity and normal operation tests

Ratings for the tests are taken from Table 6DV.

Table 6DV
Ratings for the tests of Clause 19DV

Rated current (A)	Test voltage (V)	Test current (A)	Power factor (cos Φ)	Number of strokes
0,2 to < 15	1,1 x rated voltage	1,25 x rated current	0.6 ± 0,05	100
≥ 15	1,1 x rated voltage	1,25 x rated current	0,95 ± 0,05	100

NOTE 1 28 to 30 strokes per minute with continuous movement.

NOTE 2 Current flow period: $1,5\ ^{+0,5}_{0}$ s.

NOTE 3 A stroke is an engagement or a disengagement of the sample under test into the counterpart.

NOTE 4 The test sample is fully inserted into and withdrawn from its counterpart during each cycle.

The grounding contact of the device under test including exposed non-current carrying parts shall be connected through a fuse to the ground. The fuse in the grounding circuit shall be rated 3 A. The fuses in the test circuit shall have the next higher standard fuse rating than the value of the test current.

During the test, there shall be no flashover between live parts of different polarity or between live parts and parts of the earthing circuit, if any, nor shall there be any sustained arcing.

If either the line fuse or the grounding fuse opens during the test, the results are not acceptable.

After the test, the test sample shall show no damage impairing its further use.

20 Normal operation

Appliance couplers shall withstand, without excessive wear or other harmful effects, the mechanical, electrical and thermal stresses occurring in normal use.

Compliance is checked by testing the connectors/appliance outlets in the apparatus described in Clause 19.

Appliance inlets and plug connectors are not tested.

Ratings for the tests are taken from Table 7.

The selector switch C, connecting the earthing circuit and accessible metal parts to one of the poles of the supply, is operated after half the number of strokes at rated current.

Table 7
Ratings for the tests of Clause 20

Rated current [A]	Test voltage [V]	Test current [A]	Power factor (cos Φ)	Minimum number of strokes
≤ 0,2	–	no current	–	4 000
> 0,2 to < 10	rated voltage	rated current	0,6 ± 0,05	2 000
	–	no current	–	6 000
>	rated voltage	rated current	0,95 ± 0,05	2 000
	–	no current	–	6 000

NOTE 1 28 to 30 strokes per minute with continuous movement.

NOTE 2 Current flow period: $1,5\ ^{+0,5}_{0}$ s .

NOTE 3 A stroke is an engagement or a disengagement of the sample under test into the counterpart.

NOTE 4 The test sample is fully inserted into and withdrawn from its counterpart during each cycle.

After the test, the test samples shall withstand an electric strength test as specified in 15.3. The test voltage is reduced to 50 % of the value of Table 4 without humidity treatment.

The test sample shall not show any

– wear impairing its further use;

– deterioration of enclosures or barriers;

– damage to the entry holes for the pins that might impair proper working;

– loosening of electrical or mechanical connections;

– seepage of sealing compound.

The electrical safety shall not be impaired.

20DV.1 D1 ***Modify Clause 20, third paragraph, by replacing it with the following:***

Appliance inlets and plug connectors are not tested but are used to facilitate testing of connectors/appliance outlets.

20DV.2 D1 ***Modify Clause 20, fifth paragraph, by replacing it with the following:***

The selector switch C shall be replaced with a grounding fuse as shown in Figure 5DV. The grounding contact of the device under test including exposed non-current carrying parts shall be connected through a fuse to the ground. The fuse in the grounding circuit shall be rated 3 A. The fuses in the test circuit shall have a fuse rating of the test current.

Table 7DV D1 ***Modify Table 7 by replacing it with Table 7DV:***

Table 7DV
Ratings for the tests of Clause 20

Rated current [A]	Test voltage [V]	Test current [A]	Power factor (cos Φ)	Minimum number of strokes
≤ 0,2	–	no current	–	4 000
> 0,2 to < 15	rated voltage	rated current	0,6 ± 0,05	2 000
	–	no current	–	6 000
≤ 15	rated voltage	rated current	0,95 ± 0,05	2 000
	–	no current	–	6 000

NOTE 1 28 to 30 strokes per minute with continuous movement.

NOTE 2 Current flow period: $1{,}5\ ^{+0{,}5}_{0}$ s .

NOTE 3 A stroke is an engagement or a disengagement of the sample under test into the counterpart.

NOTE 4 The test sample is fully inserted into and withdrawn from its counterpart during each cycle.

21 Temperature rise

Contacts and other current-carrying parts shall be so designed as to prevent excessive temperature rise due to the passage of current.

Compliance is checked, for connectors/appliance outlets, by the following test.

Rewirable connectors are fitted with polyvinyl chloride insulated cords having a length of 1 m and a cross-sectional area according to Table 8.

Appliance outlets are fitted with insulated conductors according to Table 8.

The terminal screws, if any, are tightened with two-thirds of the torque specified in the appropriate column of Table 12.

Table 8
Cords and conductors for the tests of Clause 21

Type of coupler	Rated current [A]	Conductor [mm²]	Test current [A]
Connectors	≤ 0,2	–	not tested
Non-rewirable connectors	> 0,2 to ≤ 16	with cord as delivered	1,25 × rated current
Rewirable connectors	≤ 10	1,0	1,25 × rated current
	> 10	1,5	
Appliance outlets	> 0,2 to ≤ 6	0,75	1,25 × rated current
	> 6 to ≤ 10	1,0	
	> 10	1,5	

Table 8DV D2 *Modify Table 8 by replacing it with Table 8DV:*

Table 8DV
Cords and conductors for the tests of Clause 21

Type of coupler	Rated current [A]	Conductor [mm²]	Conductor [AWG]	Test current [A]
Connectors	**≤ 0,2**	**–**	**with cord as delivered**	**not tested**
Non-rewirable connectors	**> 0,2 to ≤ 20**	**with cord as delivered**	**with cord as delivered**	**1,25 × rated current**
Rewirable connectors	**≤ 10**	**1,0**	**18**	**1,25 × rated current**
	> 10	**1,5**	**16**	
	15	**–**	**14**	
	20	**–**	**12**	
Appliance outlets	**> 0,2 to ≤ 6**	**0,75**	**16**	**1,25 × rated current**
	> 6 to ≤ 15	**1,0**	**14**	
	> 20	**1,5**	**12**	

The connector is inserted into an appliance inlet having brass pins with the minimum dimensions specified in the relevant standard sheet, a tolerance of +0,02 mm being allowed, the distance between pin centres having the value specified in the standard sheet.

Appliance outlets are connected to a plug connector.

For non-standardized appliance couplers, the counterpart specified by the manufacturer is used.

An alternating current of 1,25 times the rated current is passed through the current-carrying contacts for 1 h.

For connectors/appliance outlets with earthing contact, the current is then passed through one current-carrying contact and the earthing contact for 1 h.

The temperature rise of terminals and contacts shall not exceed 45 K.

After this test, the test samples shall withstand the test of Clause 16.

21DV.1 D2 ***Modify Clause 21 by adding the following to the second paragraph:***

This test shall use maximum AWG conductor sizing as specified by the manufacturer.

21DV.2 DR ***Modify Clause 21 by replacing the third and fourth paragraphs with the following:***

Rewirable connectors shall be fitted with insulated cords having a length of 1 m (39 in) and conductor size of 14 AWG for 15 A connectors and 12 AWG for 20 A connectors. The terminal screws shall be tightened to a torque equal to two-thirds of the torque specified by the manufacturer or, if not specified, a torque equal to two-thirds of the torque indicated in the appropriate column of Table 12.

21DV.3 DR ***Modify Clause 21 by replacing the sixth and eighth paragraphs with the following:***

For both standardized and non-standardized appliance couplers, the mating counterpart as specified by the manufacturer shall be used.

22 Cords and their connection

22.1 Cords for non-rewirable connectors/plug connectors

Non-rewirable connectors/plug connectors shall be provided with a cord complying with Table 9 or equivalent.

Non-rewirable connectors/plug connectors shall be provided with a type of cord complying with the standard indicated in Table 9 for the type of connector/plug connector and, in addition, the cord shall have a cross-sectional area not less than that specified in Table 9.

Table 9
Type and nominal cross-sectional area of cords

Type of connector/plug connector	Type of cord[a]	Nominal cross-sectional area mm^2
0,2 A	60227 IEC 41 [b]	–
2,5 A for class I equipment	60227 IEC 52	0,75
2,5 A for class II equipment	60227 IEC 52	0,75[c]
6 A	60227 IEC 52	0,75
10 A for cold conditions	60227 IEC 53 or 60245 IEC 53	0,75[d]
10 A for hot conditions	60245 IEC 53 60245 IEC 89	0,75[d]
10 A for very hot conditions	60245 IEC 53 60245 IEC 89	0,75[d]
16 A for cold conditions	60227 IEC 53 or	1,0[d]

Table 9 Continued on Next Page

Table 9 Continued

Type of connector/plug connector	Type of cord[a]	Nominal cross-sectional area mm^2
	60245 IEC 53	
16 A for very hot conditions	60245 IEC 53 60245 IEC 89	1,0[d]
NOTE For a cross-sectional area using American Wire Gauge (AWG), see Annex D. [a] Other cable or cord with equivalent properties may also be used. [b] In length not exceeding 2 m. [c] If the cord has a length not exceeding 2 m, a nominal cross-sectional area of 0,5 mm^2 is allowed. [d] If the cord has a length exceeding 2 m, nominal cross-sectional areas shall be minimum – 1,0 mm^2 for 10 A connectors; – 1,5 mm^2 for 16 A connectors.		

Table 9DV D2 *Delete Table 9:*

This table is not applicable.

Non-rewirable connectors/plug connectors with earthing contact shall be provided with a three-core cord.

In non-rewirable, non-reversible connectors/plug connectors the cores of the cord shall be connected to the contacts in the following manner:

– green/yellow core to the earthing contact;
– brown core to the line contact;
– light blue core to the neutral contact.

Compliance is checked by inspection and by measurement.

22.1DV.1 D1 *Modify Clause 22.1 by replacing the first paragraph with the following:*

Non-rewirable connectors are tested with the cord as delivered; rewirable connectors are tested with minimum and maximum wire size specified by the manufacturer.

22.1DV.2 D1 *Modify Clause 22.1 by replacing the fourth paragraph with the following:*

Non-rewirable connectors shall be provided with flexible cord or cable that is covered by CSA C22.2 No. 49 and UL 62.

In non-rewirable, non-reversible connectors the cores of the cord shall be connected to the contacts in the following manner:

– green/yellow or green core	**to the earthing contact;**
– brown or black core	**to the line contact;**
– light blue or white core	**to the neutral contact.**

22.2 Cord anchorage

22.2.1 General

Connectors/plug connectors shall be provided with a cord anchorage such that the conductors are relieved from strain, including twisting, where they are connected to the terminals or terminations, and that their outer covering is protected from abrasion.

NOTE Cord anchorages of the "labyrinth" type are allowed, provided they withstand the relevant tests.

22.2.2 Additional requirements for rewirable connectors/plug connectors

Additional requirements for rewirable connectors/plug connectors are:

– it shall be clear how the relief from strain and the prevention of twisting is intended to be effected;

– the cord anchorage, or at least a part of it, shall be integral with or fixed to one of the other component parts of the connector/plug connector;

– makeshift methods, such as tying the cord into a knot or tying the ends with string, shall not be used;

– cord anchorages shall be suitable for the different types of cord which may be connected, and their effectiveness shall not depend upon the assembly of the parts of the body;

– cord anchorages shall be of insulating material or be provided with an insulating lining fixed to the metal parts;

– it shall not be possible for the cord to touch the clamping screws of the cord anchorage if these screws are accessible with the test probe B of IEC 61032 (standard test finger) or are electrically connected to accessible metal parts;

– metal parts of the cord anchorage, including its screws, shall be insulated from the earthing circuit.

22.2.2DV DR *Modify Clause 22.2.2 by replacing the sixth bullet point with the following:*

– it shall not be possible for the cord to touch the clamping screws of the cord anchorage if these screws are accessible with the test probe shown in Figure 1ADV (standard test finger) or are electrically connected to accessible metal parts;

22.2.3 Pull test for cable anchorage

Compliance with the requirements of 22.2.1 and 22.2.2 is checked by inspection and by a pull test in an apparatus similar to that shown in Figure 6, followed by a torque test.

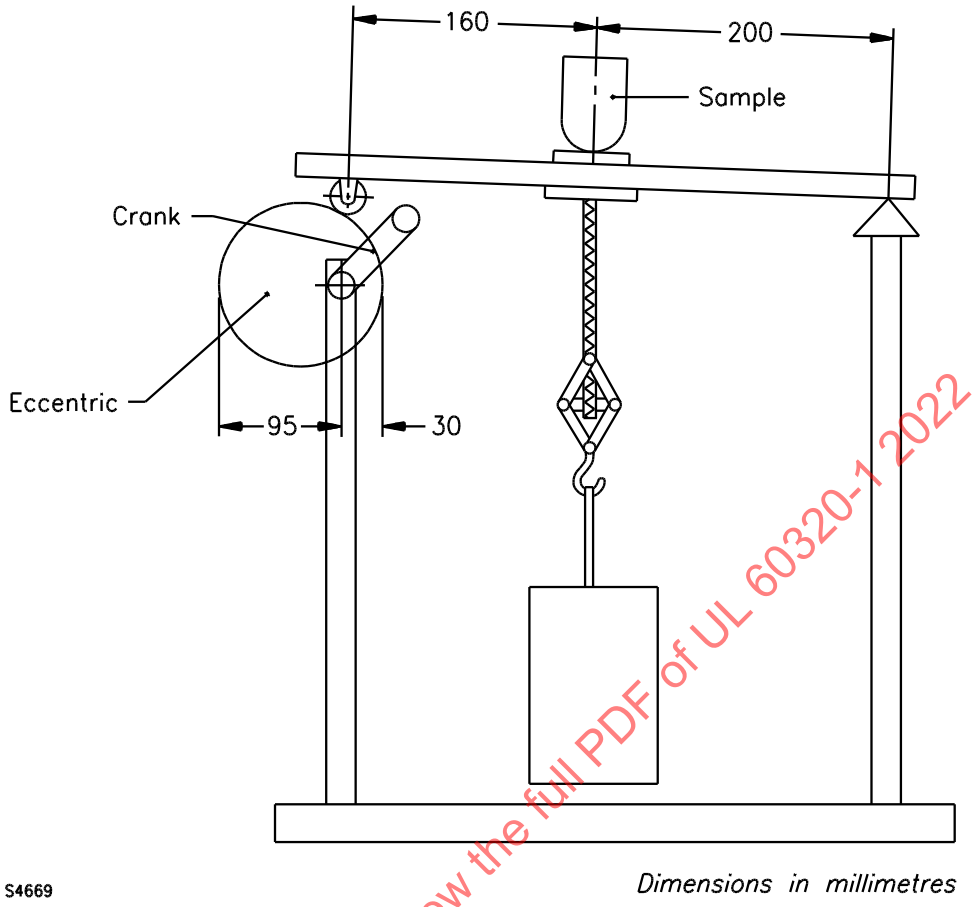


Figure 6

Apparatus for testing the cord anchorage

Non-rewirable connectors/plug connectors are tested with the cord as delivered; rewirable connectors/plug connectors are tested first with one and then with the other type of cord, as specified in Table 10.

Table 10
Types of cord for the rewirable connector/plug connector test

Type of connector/plug connector	Type of cord[a]	Cross-sectional area mm^2	
		Pull test acc. to 22.2.3	Flexing test acc. to 22.3
10 A for cold conditions	60227 IEC 53	0,75	1,0
	60227 IEC 53	1,0	
10 A for hot conditions	60245 IEC 53	0,75	1,0
	60245 IEC 53	1,0	
10 A for very hot conditions	60245 IEC 53	0,75	1,0
	60245 IEC 53	1,0	
16 A for cold conditions	60227 IEC 53	1,0	1,5
	60227 IEC 53	1,5	
16 A for very hot conditions	60245 IEC 53	1,0	1,5
	60245 IEC 53	1,5	

[a] Other cable or cord with equivalent properties may also be used.

Table 10DV D2 *Delete Table 10:*

This table does not apply.

Conductors of the cord of rewirable connectors/plug connectors are introduced into the clamping units, and the screws of clamping units, if any, are tightened just sufficiently to prevent the conductors from easily changing their position.

The cord anchorage is used in the normal way, clamping screws being tightened with a torque equal to two-thirds of the torque specified in the appropriate column of Table 12. After assembly of the test sample, the component parts shall fit snugly and it shall not be possible to push the cord into the connector/plug connector to any appreciable extent.

The test sample is fixed in the test apparatus so that the axis of the cord is vertical where it enters the connector/plug connector.

The cord is then subjected 100 times to a pull of 50 N for connectors/plug connectors having a rated current not exceeding 2,5 A and 60 N for other connectors/plug connectors. The pulls are applied without jerks, each time for 1 s.

Connectors/plug connectors provided with flat twin tinsel cords are not subjected to the torque test.

Immediately afterwards, the cord is subjected for 1 min to a torque of

• 0,1 N·m for cords, other than flat twin tinsel cords, having a nominal cross-sectional area not exceeding 0,5 mm^2;

• 0,15 N·m for two-core cords having a nominal cross-sectional area of 0,75 mm^2;

• 0,25 N·m in all other cases.

During the tests, the cord shall not be damaged.

After the tests, the cord shall not have been displaced by more than 2 mm. For rewirable connectors/plug connectors, the ends of the conductors shall not have moved noticeably in the terminals; for non-rewirable connectors/plug connectors, there shall be no break in the electrical connections.

For the measurement of the longitudinal displacement, a mark is made on the cord before starting the test while subjecting it to a preliminary pull of the value specified; the mark is made at a distance of approximately 2 cm from the end of the connector/plug connector or the cord guard. If, for non-rewirable connectors/plug connectors, there is no definite end to the connector/plug connector or the cord guard, an additional mark is made on the body, from which the distance to the other mark is measured.

After the tests, the displacement of the mark on the cord in relation to the connector/plug connector or the cord guard is measured while the cord is subjected to a pull of the value specified.

22.2.3DV.1 D1 ***Modify Clause 22.2.3 by replacing the first paragraph with the following:***

Non-rewirable connectors shall be tested with the cord as delivered; rewirable connectors shall be tested with minimum and maximum wire size specified by the manufacturer.

22.2.3DV.2 D1 ***Modify Clause 22.2.3 by replacing the fourth paragraph with the following:***

The cord anchorage shall be tightened to a torque equal to two-thirds of the torque specified by the manufacturer or, if not specified, a torque equal to two-thirds of the torque indicated in the appropriate column of Table 12.

22.2.3DV.3 D1 ***Modify Clause 22.2.3 by replacing the sixth and seventh paragraphs with the following:***

The cord shall then be subjected 100 times to a pull of 50 N for connectors/plug connectors of the Configurations C1, C5, C7 and sheets A and C. 60 N for other connectors/plug connectors of the Configurations. The pulls shall be applied without jerks, each time for 1 s.

22.2.3DV.4 D1 ***Modify Clause 22.2.3 by replacing the eighth paragraph bullet points with the following:***

• 0,1 N·m for cords of 20 AWG or less;

• 0,15 N·m for two-conductor cords of 18 AWG;

• 0,25 N·m for all other cases.

22.3 Flexing test

Connectors/plug connectors shall be so designed that the cord cannot be subjected to excessive bending where it enters the connector/plug connector.

Guards provided for this purpose shall be of insulating material and shall be fixed in a reliable manner.

Helical metal springs, whether bare or covered with insulating material, are not allowed as cord guards.

Compliance is checked by inspection and the following test.

For rewirable connectors/plug connectors, before this test is started, the guards are subjected to an accelerated ageing test as specified in

– 24.2.2, if of elastomeric material;

– 24.2.3, if of thermoplastic material.

Connectors/plug connectors are subjected to a test in an apparatus having an oscillating member similar to that shown in Figure 7.

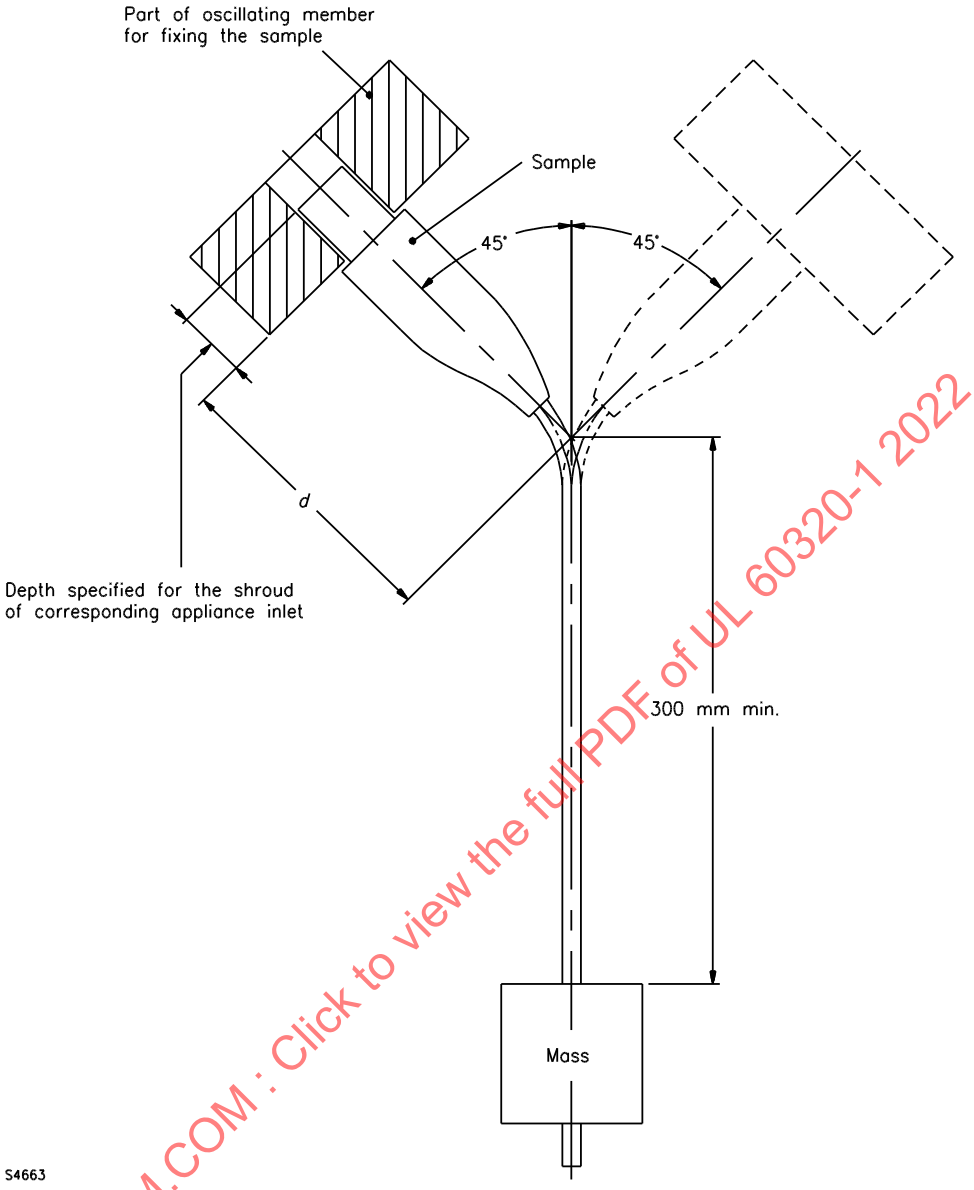


Figure 7

Apparatus for the flexing test

Rewirable connectors/plug connectors are fitted with a cord as specified in Table 10, having an appropriate length and strands of the largest diameter allowed for that type of flexible cord. The cord guard, if any, is put in place.

Non-rewirable connectors/plug connectors are tested with the cord as delivered.

The test sample is fixed to the oscillating member of the apparatus so that, when this is at the middle of its travel, the axis of the cord, where it enters the connector/plug connector, is vertical and passes through the axis of oscillation.

The part of the connector/plug connector which, in normal use, is inside the appliance inlet/appliance outlet, is fixed in the test apparatus.

The oscillating member is, by variation of distance d shown in Figure 7, so positioned that the cord makes the minimum lateral movement when the oscillating member of the test apparatus is moved over its full travel.

Test samples with flat cords are mounted so that the major axis of the section is parallel to the axis of oscillation.

The cord is loaded so that the force applied is

– 20 N for rewirable connectors/plug connectors, and for non-rewirable connectors/plug connectors with cords having a nominal cross-sectional area exceeding 0,75 mm^2;

– 10 N for other non-rewirable connectors/plug connectors.

A current equal to the rated current of the connectors/plug connectors is passed through the conductors, the voltage between them being equal to the rated voltage. No current is passed through the earthing conductor, if any.

The oscillating member is moved backwards and forwards through an angle of 90° (45° on either side of the vertical), the number of flexings being 10 000 and the rate of flexing being 60 per minute.

Test samples with circular-section cords are turned through 90° in the oscillating member after half the required number of flexings; test samples with flat cords are only bent in a direction perpendicular to the plane containing the axes of the cores.

During the test there shall be no interruption of the test current, and no short-circuit between conductors.

After the test, the test sample shall show no damage within the meaning of this standard, the guard, if any, shall not have separated from the body and the insulation of the cord shall show no sign of abrasion or wear; moreover, for non-rewirable connectors/plug connectors, broken strands of the conductors shall not have pierced the insulation so as to become accessible.

NOTE 1 A flexing is one movement, either backwards or forwards.

NOTE 2 The test is carried out on test samples not subjected to any other test.

NOTE 3 A short-circuit between the conductors of the cord is considered to occur if the current attains a value equal to twice the rated current of the connector.

22.3DV.1 D1 ***Modify Clause 22.3 by replacing the seventh paragraph with the following:***

Rewirable connectors shall be tested with maximum diameter for flexible cords as specified by the manufacturer.

22.3DV.2 D2 ***Modify Clause 22.3 by replacing the thirteenth paragraph with the following:***

The cord shall be loaded so that the force applied is

– 20 N for rewirable connectors/plug connectors, and for non-rewirable connectors/plug connectors with cords, intended for 18 AWG or larger flexible cord;

– 10 N for other non-rewirable connectors/plug connectors intended for 20 AWG or smaller flexible cord.

23 Mechanical strength

23.1 General

Appliance couplers shall have adequate mechanical strength.

Compliance is checked

– for connectors/plug connectors, by the test of 23.2;

– for connectors/plug connectors with a rating exceeding 0,2 A, by the tests of 23.3 and 23.6;

– for appliance couplers intended for surface mounting and the shrouds of plug connectors, by the tests of 23.4;

– for connectors according to standard sheet C7 of IEC 60320-3, by the additional test of 23.5.

23.1DV D1 ***Modify Clause 23.1 by replacing the second and fourth items with the following:***

– for connectors/plug connectors other than Configurations C5, C7 and Sheets A and C by the tests of 23.3 and 23.6;

– for connectors according to standard sheet C7 of CSA-C22.2 No. 60320-3/UL 60320- 3, by the additional test of 23.5.

23.2 Free fall test

Rewirable connectors/plug connectors are fitted with the cord, specified in 22.3, having the smallest cross-sectional area and a free length of approximately 100 mm, measured from the outer end of the guard.

Terminal screws and assembly screws are tightened with a torque equal to two-thirds of the torque specified in the appropriate column of Table 12.

Non-rewirable connectors/plug connectors are tested with the cord as delivered, the cord being cut so that a free length of approximately 100 mm projects from the outer end of the guard.

The test samples shall be subjected one at a time to the free fall test procedure 2 according to IEC 60068-2-31, the number of falls being

• 500 if the mass of the test sample without cord or cord guard does not exceed 200 g and

• 100 in all other cases.

After the test, the test samples shall show no damage and no part shall have become detached or loosened which may influence the electrical safety.

NOTE 1 Small pieces can be broken off without causing rejection, provided that protection against electric shock is not affected.

NOTE 2 Damage to finish and small dents which do not reduce the creepage distances or clearances below the values specified in Clause 26 are neglected.

NOTE 3 The approximate 100 mm length can be reduced in order to ensure free fall.

23.2DV D1 ***Modify Clause 23.2 by replacing the first and second paragraphs with the following:***

Rewirable connectors shall be fitted with smallest diameter AWG flexible cord as specified by the manufacturer and a free length of approximately 100 mm, measured from the outer end of the guard.

Terminal screws and assembly screws shall be tightened to a torque equal to two-thirds of the torque specified by the manufacturer or, if not specified, a torque equal to two-thirds of the torque indicated in the appropriate column of Table 12.

23.3 Lateral pull test

After the test of 23.2, the connector/plug connector is inserted into the corresponding appliance inlet/appliance outlet.

The appliance inlet/appliance outlet is mounted in an appropriate test apparatus with the pins/contacts pointing upwards.

An example of the test apparatus is shown in Figure 8 a).

Dimensions in milimetres

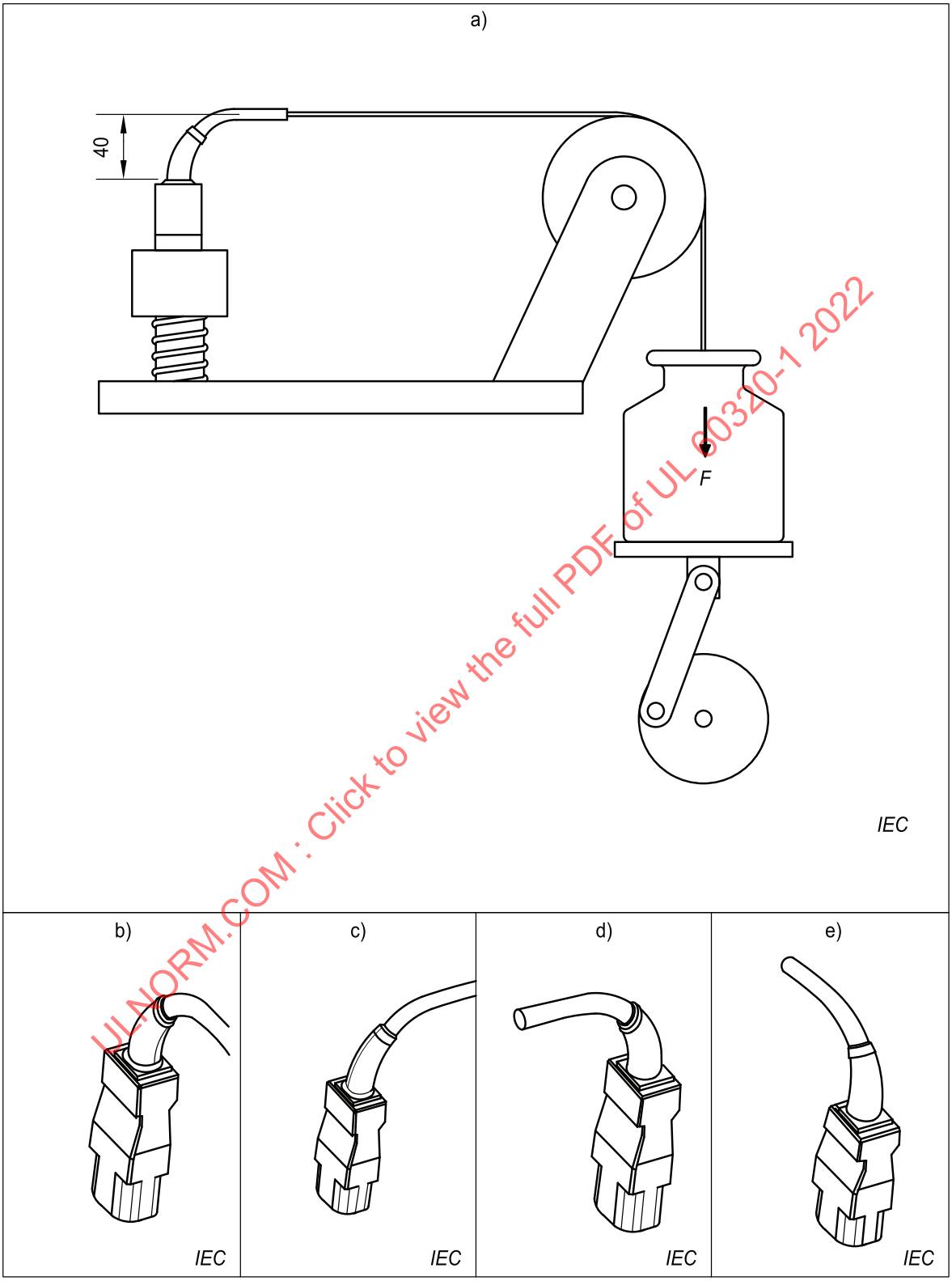


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Figure 8

Example of apparatus for pulling test

A lateral pull force is applied in steps of 90° ± 5° as shown in Figure 8 a), b), c), d) and e) parallel with the plane containing the axes of the current-carrying pins/contacts and parallel with the engagement face of the connector/plug connector.

A pull force according to Table 11 is applied 50 times in each direction to the cord for 1 s ± 0,5 s.

Table 11
Values for the lateral pulls applied

Rated current A	Pull N
2,5	6
6	35
10	35
16	50

Table 11DV D1 ***Modify Table 11 by replacing it with Table 11DV:***

Table 11DV
Values for the lateral pulls applied

Rated current A	Pull N
2,5	**6**
6	**35**
15	**35**
20	**50**

If necessary, the connector/plug connector is prevented from coming out of the appliance inlet/appliance outlet but shall be free to move inside the appliance inlet/appliance outlet.

After the test, the connector/plug connectors shall show no damage and the test samples shall comply with 16.3.

23.4 Impact test

Appliance inlets designed for surface-mounting, and the shrouds of plug connectors and appliance outlets of insulating material, other than elastomeric material, are tested by means of vertical hammer or spring hammer according to IEC 60068-2-75.

The hammer head has a hemispherical face with a radius of 10 mm.

The impact energy is 0,5 J ± 0,05 J.

The hammer head has a hemispherical face of polyamide having a Rockwell hardness of HR 85 to 100.

The test sample is rigidly supported and 12 impacts are applied, three to each of four places chosen so as to include the weakest areas.

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

23.5 Deformation test

For 2,5 A connectors for class II equipment according to standard sheet C7 of IEC 60320-3, the area where the switch cam(s) can touch the connector shall be sufficiently resistant to deformation.

NOTE This area is indicated by "3)" on standard sheet C7.

Compliance is checked by the following test, which is made by means of an apparatus having a rectangular blade as shown in Figure 8 in IEC 60320-3:2014. The test is made with blade A and with blade B successively, which are pressed against the connector body in the area to be checked, with the force as specified in Figure 8 in IEC 60320-3:2014.

The apparatus with the test sample in position is kept in a heating cabinet at a temperature of 70 °C ± 2 °C for 2 h.

The test sample is then removed from the apparatus and cooled down within 10 s to approximately room temperature by immersion in cold water.

The thickness of the connector body is measured immediately at the point of impression. The difference between the thickness values before and after the test shall be not more than 0,2 mm.

23.5DV D1 ***Modify Clause 23.5 by replacing the first and second paragraphs with the following:***

For Configuration C7 of CSA-C22.2 No. 60320-3 and UL 60320-3, the area where the switch cam(s) can touch the connector shall be sufficiently resistant to deformation.

Compliance shall be checked by the following test, which is made by means of an apparatus having a rectangular blade as shown in Figure 8 in CSA-C22.2 No. 60320-3 and UL 60320-3. The test shall be made with blade A and with blade B successively, which shall be pressed against the connector body in the area to be checked, with the force as specified in Figure 8 in CSA-C22.2 No. 60320-3 and UL 60320-3.

23.6 Torque and pull test

The external parts of connectors/plug connectors with a separate front part enclosing the contacts shall be reliably fixed to one another.

Compliance is checked for all connectors and plug connectors by the following test, but for connectors and plug connectors for hot and very hot conditions immediately after the test in 18.2.

The front part and the rear part of the connectors/plug connectors are securely fixed to two claws which are so arranged that they can separate from each other in a straight line. A pull force following Table 12 is applied in the axial direction without jerks to the claws. The force is maintained for 1 min. After having removed the force, a torque following Table 12 is applied twice to the connector, first for 1 min twisting the connector in a direction perpendicular to the axis of the previous applied force and then for 1 min bending the connector in a direction perpendicular to the axis of the previous applied force and torque.