

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Connecteurs pour usages domestiques et usages généraux analogues –
Partie 2-4: Connecteurs à connexion par gravité**

IEC 60320-2-4:2005

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INTERNATIONAL
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CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references.....	5
3 Definitions	6
4 General requirements	7
5 General notes on tests.....	7
6 Standard ratings	7
7 Classification	8
8 Marking	9
9 Dimensions and compatibility	10
10 Protection against electric shock.....	11
11 Provision for earthing.....	11
12 Terminals and terminations.....	11
13 Construction	12
14 Moisture resistance.....	13
15 Insulation resistance and electric strength.....	14
16 Forces necessary to insert and withdraw the connector	15
17 Operation of contacts.....	15
18 Resistance to heating of appliance couplers for hot conditions or very hot conditions.....	15
19 Breaking capacity	16
20 Normal operation	16
21 Temperature rise	17
22 Cords and their connection.....	18
23 Mechanical strength.....	19
24 Resistance to heat and ageing	19
25 Screws, current-carrying parts and connections	20
26 Creepage distances, clearances and distances through insulation	20
27 Resistance of insulating material to heat, fire and tracking	25
28 Resistance to rusting	26
29 Electromagnetic compatibility (EMC) requirements.....	26
Annex AA (normative) Proof tracking test	28
Annex BB (normative) Needle flame test	29
Annex CC (normative) Apparatus for the test of Subclause 14.2	30
Figure 101 – Examples of clearances	27
Figure CC.1 – Apparatus for the test of Subclause 14.2.....	30
Table 101 – Test voltages	14
Table 102 – Rated impulse voltage.....	21
Table 103 – Minimum clearances	21
Table 104 – Minimum creepage distances for basic insulation	23

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**APPLIANCE COUPLERS FOR HOUSEHOLD
AND SIMILAR GENERAL PURPOSES –****Part 2-4: Couplers dependent on appliance weight
for engagement**

FOREWORD

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International Standard IEC 60320-2-4 has been prepared by subcommittee 23G: Appliance couplers, of IEC technical committee 23: Electrical accessories

This consolidated version of IEC 60320-2-4 consists of the first edition (2005) [documents 23G/251/FDIS and 23G/252/RVD] and its amendment 1 (2009) [documents 23G/290/CDV and 23G/291/RVC].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

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

IEC 60320 consists of the following parts, under the general title *Appliance couplers for household and similar general purposes*:

Part 1: General requirements

Part 2-1: Sewing machine couplers

Part 2-2: Interconnection couplers for household and similar equipment

Part 2-3: Appliance couplers with a degree of protection higher than IPX0

Part 2-4: Couplers dependent on appliance weight for engagement

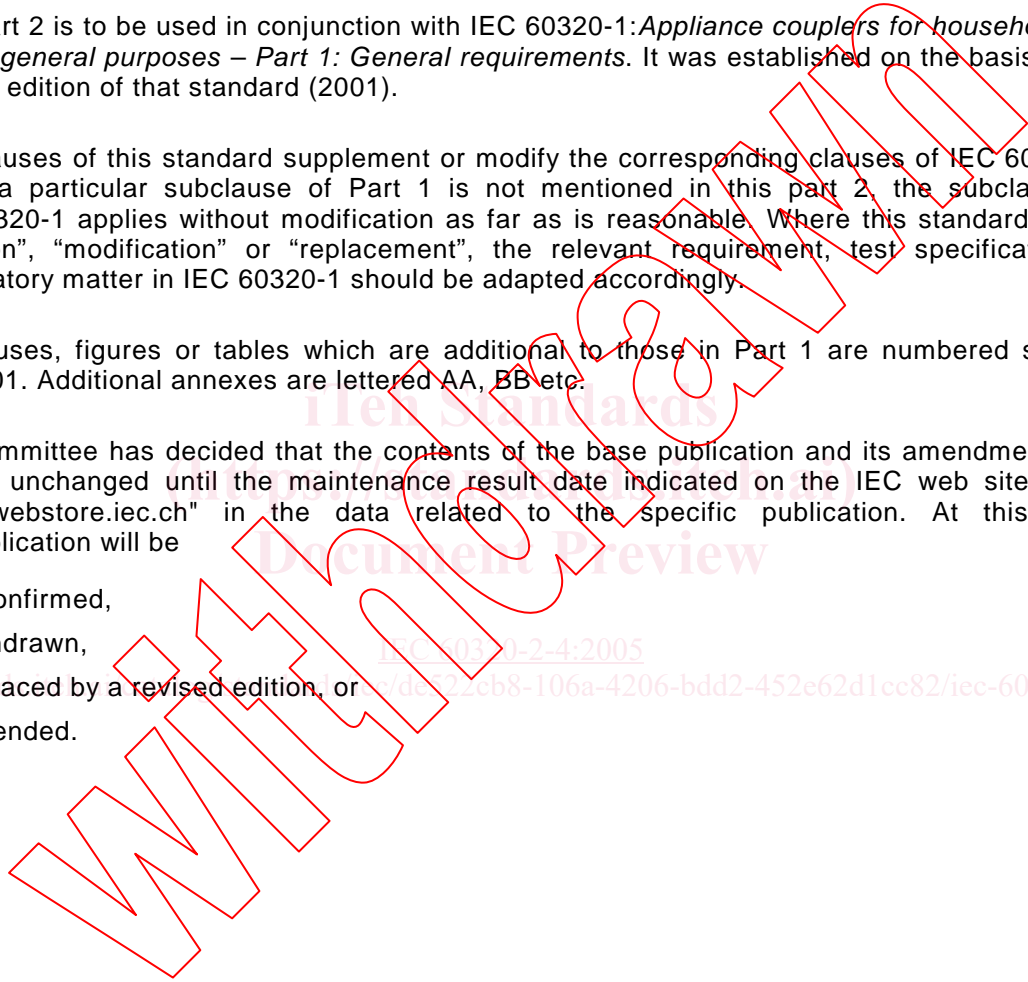
This part 2 is to be used in conjunction with IEC 60320-1: *Appliance couplers for household and similar general purposes – Part 1: General requirements*. It was established on the basis of the second edition of that standard (2001).

The clauses of this standard supplement or modify the corresponding clauses of IEC 60320-1. When a particular subclause of Part 1 is not mentioned in this part 2, the subclause of IEC 60320-1 applies without modification as far as is reasonable. Where this standard states “addition”, “modification” or “replacement”, the relevant requirement, test specification or explanatory matter in IEC 60320-1 should be adapted accordingly.

Subclauses, figures or tables which are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered AA, BB etc.

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

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



APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES –

Part 2-4: Couplers dependent on appliance weight for engagement

1 Scope

This clause of IEC 60320-1 is replaced as follows:

This standard is applicable to two-pole appliance couplers for a.c. only, with or without earthing contact, with a rated voltage not exceeding 250 V and a rated current not exceeding 16 A, for household and similar general purposes and intended for incorporation or integration within electric appliances or other electric equipment of multi-part construction for 50 Hz or 60 Hz supply which depend on the weight of the appliance to ensure correct engagement.

NOTE 1 Appliance couplers complying with this standard are suitable for use in appliances which are used in an ambient temperature not normally exceeding 25 °C but occasionally reaching 35 °C. However the ambient temperature surrounding the appliance coupler may exceed these figures and is to be declared by the manufacturer. It is possible that the maximum working ambient temperature for the appliance inlet and for the connector may be different.

NOTE 2 Appliance couplers dependent on appliance weight for engagement may be subject to spillage of liquid in normal use. They are classified according to whether protection against liquid spillage is provided, when installed in accordance with the manufacturer's installation instructions.

NOTE 3 If appliance inlets according to this standard are used with appliances or other equipment which may be subject to spillage of liquid affecting the appliance inlet when the functioning part of the appliance or equipment is seated on its power base, then protection against moisture is to be provided by the equipment.

NOTE 4 References to standard sheets within IEC 60320-1 do not apply to appliance couplers dependent on appliance weight for engagement.

NOTE 5 Special constructions may be required:

- in locations where special conditions may prevail, for example, in ships, vehicles and the like;
- in hazardous locations, for example, where explosions are likely to occur.

2 Normative references

This clause of IEC 60320-1 applies with the following additions:

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

IEC 60320-1, *Appliance couplers for household and similar general purposes – Part 1: General requirements*

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

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

IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*

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

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

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

IEC 60730 (all parts), *Automatic electrical controls for household and similar use*

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

IEC 61058-1, *Switches for appliances – Part 1: General requirements*

IEC/TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

ISO 9772, *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*

3 Definitions

This clause of IEC 60320-1 applies with the following additions:

3.101

weight-engaged coupler

coupler that relies on the weight of the functioning part of the appliance, in which it is incorporated or integrated, to ensure correct engagement

NOTE The weight-engaged coupler is used in an appliance which is in two parts, for supplying the part that performs the function of the appliance (the functioning part) from the power base which is connected to the power supply.

3.102

weight-engaged connector

component part of the weight-engaged coupler which carries the power connections, and engages with the corresponding appliance inlet.

3.103

weight-engaged appliance inlet

component part of a weight-engaged coupler intended for integration or incorporation in the functioning part of the appliance

3.104

rewirable weight-engaged connector

weight-engaged connector so constructed that the supply cord can be replaced

NOTE 1 The method of attachment of the supply cord, when installed in accordance with the manufacturer's installation instructions, is classified according to type X or type Y attachment requirements of the appliance standards.

NOTE 2 The requirements for type X or Type Y attachment methods are given in IEC 60335-1.

3.105

type X attachment

method of attachment of the supply cord such that it can easily be replaced

NOTE The supply cord may be specially prepared and only available from the manufacturer or its service agent. A specially prepared cord may include a part of the appliance.

3.106

type Y attachment

method of attachment of the supply cord such that any replacement is intended to be made by the manufacturer, its service agent or similar qualified person

3.107**type Z attachment**

method of attachment of the supply cord such that it cannot be replaced without breaking or destroying the appliance

4 General requirements

This clause of IEC 60320-1 applies.

5 General notes on tests

This clause of IEC 60320-1 applies amended as follows:

5.2 Replacement:

The specimens are tested as delivered and under normal conditions of use, in accordance with the installation instructions of the manufacturer; they are tested with a.c. at 50 Hz or 60 Hz.

Non-rewirable weight-engaged connectors shall be submitted with a cord at least 1 m long.

For those clauses requiring the tests to be carried out on weight-engaged connectors and weight-engaged appliance inlets installed in accordance with the manufacturer's instructions, representative appliances or appliance parts shall be supplied.

5.5 Replacement:

For weight-engaged appliance inlets three specimens are required, to be subjected to the tests specified.

For weight-engaged connectors six specimens are required:

- set 1 of three specimens is subjected to the tests specified, with the exception of those of Clauses 14, 15, 16, 19, 20 and 21, and of 24.2;
- set 2 of three specimens is subjected to the tests of Clauses 14, 15, 16, 19, 20, 21 and 25.101 (including the repetition of Clause 16).

For weight-engaged connectors which are declared as providing protection against liquid spillage, three additional specimens are required, which are subjected to the test of 14.2.

For weight-engaged connectors of elastomeric or thermoplastic material, two additional specimens are required which are subjected to the tests of 24.2.1 or 24.2.2, whichever is applicable.

For non rewirable weight-engaged connectors with indicators, three additional specimens with one pole of the indicator disconnected are required for the tests of Clause 15.

6 Standard ratings

This clause of IEC 60320-1 is replaced as follows

6.1 The standard rated voltage is 250 V. Other rated voltages may be declared by the manufacturer provided they do not exceed 250 V.

6.2 The rated current shall be declared by the manufacturer. A coupler may have different current ratings dependent on use within specified applications. The rated current shall not in any case exceed 16 A.

Compliance with the requirements of 6.1 and 6.2 is checked by visual inspection of the marking or the manufacturer's instructions for installation and use.

7 Classification

This clause of IEC 60320-1 applies amended as follows:

7.1 Replacement:

7.1 Weight-engaged couplers are classified:

7.1.1 According to whether or not protection against liquid spillage is provided when the connector is installed according to the manufacturer's instructions

7.1.2 According to type of equipment to be connected:

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

NOTE For a description of the classes, see IEC 61140

7.1.3 According to whether or not the coupler is intended to be engaged and disengaged with current flowing.

7.1.4 According to the maximum ambient working temperature of the coupler.

NOTE The maximum ambient working temperature of the connector and appliance inlet may be different.

7.1.5 According to the number of cycles to be performed in the test of Clause 20. Preferred values are:

7.1.5.1 100 000

7.1.5.2 60 000

7.1.5.3 30 000

7.1.5.4 20 000

7.1.5.5 10 000

7.1.5.6 6 000

NOTE Different numbers of endurance cycles may be declared for different current ratings of the same coupler. A cycle is two strokes as defined in Clause 19; that is one connection followed by one disconnection.

7.1.6 The following information is recorded to cover required tests.

7.1.6.1 According to the specified minimum cross-sectional area of cord.

7.1.6.2 According to the maximum allowable terminal temperature rise.

7.1.6.3 According to the maximum allowable termination temperature rise.

7.1.6.4 According to the maximum allowable contact temperature rise.

- 7.1.6.5** According to the minimum appliance weight required for correct engagement.
- 7.1.6.6** According to the minimum base weight required for correct disengagement.
- 7.1.6.7** According to maximum pin temperature at the base of the pins of the corresponding appliance inlet:
- appliance couplers for cold conditions (pin temperature not exceeding 70 °C);
 - appliance couplers for hot conditions (pin temperature not exceeding 120 °C);
 - appliance couplers for very hot conditions (pin temperature not exceeding 155 °C).

NOTE Temperature rise limits apply to both the inlet and connector, and can be specified separately if required.

7.2 This subclause of IEC 60320-1 does not apply.

NOTE The notes at the end of this subclause in IEC 60320-1 are also not applicable.

8 Marking

This clause of IEC 60320-1 applies amended as follows:

8.1 Replacement:

Weight-engaged connectors shall be marked with the name, trademark or identification mark of the maker or of the responsible vendor and a type reference.

8.2 Replacement:

Weight-engaged appliance inlets shall be marked with the name, trademark or identification mark of the maker or of the responsible vendor and a type reference.

8.5 This subclause of IEC 60320-1 does not apply.

8.6 Replacement:

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

earthing terminal:

the symbol



neutral terminal:

the letter

N

In non-rewirable, non-reversible weight-engaged connectors, no marking of contacts is necessary, but cores shall be connected as specified in 22.1.

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

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

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

Rewirable connectors shall be supplied with the following instructions:

- (1) a diagram illustrating the method of connection of the conductors, in particular the (excess) length of the earthing conductor and the operation of the cord anchorage;
- (2) a full-scale diagram showing the length of sleeving and insulation to be stripped back;
- (3) the sizes and types of cords suitable.
- (4) the type of attachment for connector and inlet.

NOTE 1 It is essential that the connection of the earthing conductor is shown in an instructive way, preferably with sketches.

NOTE 2 These instructions need not follow connectors supplied directly to an equipment manufacturer.

NOTE 3 In order to comply with the National Electrical Code of the United States the neutral terminal must be either white in colour, or labelled "white". One way of accomplishing this is to nickel plate the neutral terminal and to leave the other terminal(s) unplated.

Additional subclause:

8.101 Instructions for installation and use shall be supplied with weight-engaged appliance couplers. These instructions shall contain the information necessary to ensure compliance with this standard and shall contain the classifications declared by the manufacturer according to Clause 7.

For weight-engaged couplers intended to be exclusively delivered to the equipment manufacturer, the instruction sheet may be replaced by a leaflet, letter, or drawing, etc. It is not necessary for each coupler to be accompanied by such a document.

9 Dimensions and compatibility

This clause of IEC 60320-1 applies amended as follows:

9.1 Replacement:

Weight-engaged appliance couplers may take any form appropriate to their function, but shall comply with the requirements of this standard as far as applicable.

9.2 This subclause of IEC 60320-1 does not apply.

9.3 Replacement:

It shall not be possible to make improper connections between weight-engaged connectors and weight-engaged appliance inlets when installed in accordance with the manufacturer's instructions. In those constructions where the design is such that transient single-pole connections occur as the weight-engaged connector is placed into and withdrawn from the appliance inlet during normal use, then such transient single-pole connections are allowed.

Weight-engaged couplers shall not allow improper connections with plugs or portable socket outlets complying with IEC 60083.

Weight-engaged couplers shall not allow improper connections with connectors or appliance inlets complying with the standard sheets of IEC 60320-1, IEC 60320-2-2 or IEC 60320-2-3.

Compliance is checked by examination and reference to the manufacturer's declarations.

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

If in doubt, reference should be made to the appropriate appliance standards regarding the requirements for weight-engaged connectors and appliance inlets.

9.4 Replacement:

It shall not be possible to engage connectors for class II equipment with appliance inlets for class I equipment.

Compliance is checked by inspection.

9.5 Note 1 of this subclause is not applicable.

9.6 This subclause of IEC 60320-1 does not apply.

10 Protection against electric shock

This clause of IEC 60320-1 applies amended as follows:

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

Weight-engaged appliance connectors shall be so designed that the live parts and parts connected thereto are not accessible when the connector is properly assembled and wired as in normal use.

Note 2 is not applicable.

10.2 This clause of IEC 60320-1 applies amended as follows.

NOTE To be assessed when incorporated in the end product.

10.101 Test probe 13 of IEC 61032 is applied without appreciable force through openings in appliance connectors.

NOTE "Without appreciable force" is considered to be a force not exceeding 1 N.

It shall not be possible to touch live parts with the test probe.

11 Provision for earthing

This clause of IEC 60320-1 applies amended as follows:

11.2 The note of this subclause is not applicable.

12 Terminals and terminations

This clause of IEC 60320-1 applies amended as follows:

Replace the first two paragraphs as follows:

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

12.1 Replacement

For weight-engaged appliance inlets and weight-engaged connectors, the requirements in the appropriate IEC standard for the appliance or equipment into which they are intended to be integrated or incorporated shall apply.

12.2 This subclause of IEC 60320-1 does not apply.

12.3 This subclause of IEC 60320-1 does not apply.

13 Construction

This clause of IEC 60320-1 applies amended as follows:

13.1 The note of this subclause is not applicable.

13.4 Replacement:

Pins of weight-engaged appliance inlets shall

- be securely retained,
- have adequate mechanical strength,
- not be possible to remove without the aid of a tool, and
- live parts shall be surrounded by a shroud.

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

The security of components designed to function as contact pins, whether in the inlet or connector part, is checked by inspection and by the tests of Clause 19 and Clause 20.

13.5 Replacement:

The contact system of a weight-engaged coupler shall be self-adjusting so as to provide adequate contact pressure.

For connectors other than 0,2 A connectors self-adjustment of the contacts shall not depend upon the resiliency of insulating material.

Compliance is checked by inspection.

NOTE The self-adjustment of the contacts may be provided in either the appliance inlet or the connector or both.

13.9 This subclause of IEC 60320-1 applies amended as follows:

NOTE 2 is not applicable.

13.11 This subclause of IEC 60320-1 does not apply.

13.12 Replacement:

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

Switches or energy regulators incorporated in weight-engaged connectors or weight-engaged appliance inlets shall comply with IEC 61058 and IEC 60730 respectively.

Where an weight-engaged appliance inlet is integrated in or incorporated in an appliance or equipment, then that part which can be identified as the appliance inlet shall comply with the requirements of this standard.

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