BRITISH STANDARD

BS EN
60999-2:2003

Connecting devices — Electrical copper conductors — Safety requirements for screw-type and screwless-type clamping units —

Part 2: Particular requirements for clamping units for conductors above 35 mm^2 up to 300 mm^2 (included)

The European Standard EN 60999-2:2003 has the status of a British Standard

ICS 29.120.20; 29.130.20

BSI British Standards

National foreword

This British Standard is the official English language version of EN 60999-2:2003. It is identical with IEC 60999-2:2003.

The UK participation in its preparation was entrusted by Technical Committee PEL/17, Switchgear, controlgear, and HV-LV co-ordination, to Subcommittee PEL/17/2, Low-voltage switchgear and controlgear, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

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EUROPEAN STANDARD **EN 60999-2**

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ICS 29.120.20;29.130.20

English version

Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)

(IEC 60999-2:2003)

Dispositifs de connexion – Conducteurs électriques en cuivre - Prescriptions de sécurité pour organes de serrage à vis et sans vis Partie 2: Prescriptions particulières pour les organes de serrage pour conducteurs au-dessus de 35 mm² et jusqu'à 300 mm² (inclus)
(CEI 60999-2:2003)

Verbindungsmaterial – Elektrische Kupferleiter - Sicherheitsanforderungen für Schraubklemmstellen und schraubenlose Klemmstellen Teil 2: Besondere Anforderungen für Klemmstellen für Leiter über 35 mm² bis einschließlich 300 mm²
(IEC 60999-2:2003)

This European Standard was approved by CENELEC on 2003-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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CENELEC

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

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Ref. No. EN 60999-2:2003 E

Foreword

The text of document 17B/1274/FDIS, future edition 2 of IEC 60999-2, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60999-2 on 2003-07-01.

This part of EN 60999 should be read in conjunction with EN 60999-1:2000.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-04-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-07-01

As the AWG sizes are not used in Europe the following apply:

- Clause 6: delete the note;
- Table 1: delete columns 4, 5 and 6;
- Table 1: delete the text of the note after “IEC 60228A”;
- Table 2: delete column 2;
- Table C.2: delete Table C.2 completely;
- Bibliography: delete the bibliography completely.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes B, C and ZA are normative and annex A is informative.
Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60999-2:2003 was approved by CENELEC as a European Standard without any modification.

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CONTENTS

INTRODUCTION

This safety standard is a continuation of IEC 60999-1 and covers clamping units for copper conductors above 35 mm^2 up to and including 300 mm^2. The scope of IEC 60999-1 is limited up to 35 mm^2. This standard gives guidance to technical committees using clamping units above 35 mm^2 up to 300 mm^2.

CONNECTING DEVICES – ELECTRICAL COPPER CONDUCTORS – SAFETY REQUIREMENTS FOR SCREW-TYPE AND SCREWLESS-TYPE CLAMPING UNITS –

Part 2: Particular requirements for clamping units for conductors above 35 mm^2 up to 300 mm^2 (included)

1 Scope

This part of IEC 60999 applies to screw-type and screwless-type clamping units for connecting devices, either as separate entities or as integral parts of equipment, for the connection of electrical copper conductors (complying with IEC 60228), rigid stranded and/or flexible, having a cross-section above 35 mm^2 and up to and including 300 mm^2 and equivalent AWG/kcmil sizes with a rated voltage not exceeding 1 000 V a.c. and a frequency up to and including 1 000 Hz and 1 500 V d.c.

It applies to clamping units primarily suitable for connecting unprepared conductors.

This standard does not apply to clamping units:

– for connection by crimping or soldering;

– for non-universal clamping units defined in 3.10.2 of IEC 60999-1.

2 Normative references

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

IEC 60228:1978, *Conductors of insulated cables*
Amendment 1 (1993)

IEC 60228A:1982, *Conductors of insulated cables – First supplement*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm^2 up to 35 mm^2 (included)*

3 Definitions

For the purposes of this part of IEC 60999, Clause 3 of IEC 60999-1 applies, with the following modifications.

Definition 3.10.2 of IEC 60999-1 is not applicable.

3.11
rated cross-section of a clamping unit
value of connectable conductor cross-section stated by the manufacturer and to which certain thermal, mechanical and electrical requirements are referred

NOTE The rated cross-section is the equivalent of the rated connecting capacity in accordance with 3.11 of IEC 60999-1.

4 General

Clause 4 of IEC 60999-1 applies.

5 General notes on tests

Clause 5 of IEC 60999-1 applies.

6 Main characteristics

The standard rated cross-sections of a clamping unit are: 50 mm^2, 70 mm^2, 95 mm^2, 120 mm^2, 150 mm^2, 185 mm^2, 240 mm^2 and 300 mm^2.

NOTE For the time being, in some countries, the designation by wire gauges (e.g. AWG in USA and Canada) may be used instead of the cross-sections expressed in square millimetres. For the approximate relationship between square millimetres and AWG/kcmil see Annex A.

7 Connection of conductors

7.1 In general, clamping units are suitable to accept one conductor only. Certain types may also be used for two or more conductors of the same or of different nominal cross-sections or compositions.

Clamping units shall accept unprepared conductors.

NOTE Screw-type clamping units are not suitable for the connection of flexible conductors with tin soldered ends.

7.2 Each clamping unit, if not otherwise stated in the relevant product standard, shall, in addition to its rated cross-section, accept at least the two successive smaller cross-sections (e.g. a clamping unit having the rated cross-section of 70 mm^2 shall reliably clamp a conductor of the same type of 35 mm^2, 50 mm^2 or 70 mm^2).

If a clamping unit covers a range larger than the minimum, this shall be marked either on the clamping unit or stated in the manufacturer's literature.

7.3 The theoretical diameter of the largest conductor and the relationship between the rated cross-section and connectable conductors are given in Table 1.

Table 1 – Relationship between rated cross-section and diameter of conductors

Rated cross-section	Theoretical diameter of the largest conductor					Connectable conductors	
	Metric		AWG/kcmil				
	Rigid stranded	Flexible [a]	Gauge	Rigid stranded	Flexible		
mm²	mm	mm		mm	mm	Rigid	Flexible
50	9,1	11,0	0	9,64	12,08	To be specified in the relevant product standard	
70	11,0	13,1	00	11,17	13,54		
95	12,9	15,1	000	12,54	15,33		
–	–	–	0000	14,08	17,22		
120	14,5	17,0	250	15,34	19,01		
150	16,2	19,0	300	16,80	20,48		
185	18,0	21,0	350	18,16	22,05		
–	–	–	400	19,42	24,05		
240	20,6	24,0	500	21,68	26,57		
300	23,1	27,0	600	23,82	30,03		

[a] Dimensions for class 5 flexible conductors only, according to IEC 60228A.

NOTE Diameters of the largest rigid and flexible conductors are based on Table 1 and Table 3 of IEC 60228A and, for AWG conductors, on ASTM B 172-71 [1][1], ICEA Publication S-19-81 [2], ICEA Publication S-66-524 [3] and ICEA Publication S-66-516 [4].

7.4 Clamping units, unless otherwise specified by the manufacturer, shall accept rigid stranded and flexible conductors as indicated in Table 1, in which case no markings are necessary.

If a clamping unit according to the manufacturer's specification can accept only one type of conductor (rigid or flexible), this shall be either clearly marked on the end product, respectively by the letters “r” or “f”, or indicated on the smallest package unit and/or in the technical information.

Compliance shall be checked by inspection and by the tests of 9.1 and 9.6.

7.5 On screwless-type clamping units, the connection or disconnection of conductors shall be made by the use of a general purpose tool, or of a convenient device integral with the clamping unit, in order to open it for the insertion or the withdrawal of the conductors.

Compliance shall be checked by inspection and by the test of 9.3.

8 Constructional requirements

Clause 8 of IEC 60999-1 applies with the following modifications.

Replace 8.1.1 of IEC 60999-1 as follows:

[1] Figures in square brackets refer to the bibliography.

8.1.1 Parts of clamping units mainly intended for carrying current, shall be of

- copper, or
- an alloy containing at least 58 % copper for parts that are worked cold or at least 50 % copper for other parts, or
- other metal with surface protection offering a resistance to corrosion not less than that of copper and having mechanical properties at least equivalent.

Compliance shall be checked by inspection and by the test specified in the relevant product standard.

8.1.2 Not applicable.

8.4 The note is not applicable.

9 Tests

9.1 The insertion of the largest conductor is checked by the test according to Annex B, or by the insertion of the largest conductor after the insulation has been removed and the ends of the rigid stranded and of the flexible conductors have been reshaped.

NOTE The manufacturer may specify the test method.

The stripped end of the conductor shall be able to enter completely within the clamping unit aperture, without use of undue force.

9.2 Three new clamping units are fitted with new conductors of the type and of the rated cross-section according to Table 1 and whose core composition complies with Annex C.

Before insertion into the clamping unit, wires of stranded rigid conductors and flexible conductors may be reshaped.

The use of a tool is permitted.

It shall be possible to fit the conductor into the clamping unit without use of undue force.

The conductor is inserted into the clamping unit until it just protrudes from the far side of the clamping unit if possible, and in the position most likely to allow the wire to escape.

The clamping screws, if any, are then tightened with a torque as shown in 9.6.

After the test, no wire of the conductor shall have escaped outside the clamping unit, thus reducing creepage distances and clearances required by the relevant product standard.

9.3 Screwless clamping units according to 7.5 are tested with rigid stranded and flexible conductors having the largest diameter.

Five insertions and disconnections are made with each type of conductor for which the clamping unit is intended to be used.

New conductors are used each time, except for the fifth time, when the conductor used for the fourth insertion is clamped at the same place. For each insertion, the conductors are either pushed as far as possible into the clamping unit or are inserted so that adequate connection is obvious and subsequently disconnected. After these tests, the clamping unit shall not be damaged in such a way as to impair its further use.

9.4 For checking the requirement of 8.10 of IEC 60999-1 (clamping the conductor without undue damage to the conductor), three new clamping units are fitted with new conductors in terms of number, cross-section and type (flexible and/or rigid stranded), as specified by the manufacturer in the equipment shown in Figure 1.

The following tests shall be carried out with:

a) the conductor of the smallest cross-section,

b) the conductor of the largest cross-section

and, if applicable

c) the maximum number of conductors of the smallest cross-section,

d) the maximum number of conductors of the largest cross-section,

e) the maximum number of conductors of the smallest and largest cross-section simultaneously connected to the clamping unit.

NOTE The cross-sections of the conductors specified in c), d) and e) may be different from the cross-sections specified in a) and b).

The length of the test conductor shall be 75 mm longer than the height (*H*) specified in Table 2.

The test conductor is then connected to the clamping unit, and the clamping screws or nuts, if any, are tightened according to 9.6.

Each of the conductors is subjected to the following test.

The end of one conductor is passed through an appropriate sized bushing in a platen positioned at a height (*H*) below the equipment as given in Table 2. The bushing is positioned in a horizontal plane such that its centre line describes a circle of 75 mm diameter, concentric with the centre of the clamping unit in the horizontal (plane); the platen is then rotated at a rate of $(10 \pm 2)\ \text{min}^{-1}$.

The distance between the mouth of the clamping unit and the upper surface of the bushing shall be within ±15 mm of the height indicated in Table 2. The bushing may be lubricated to prevent binding, twisting or rotation of the insulated conductor.

A mass, as specified in Table 2, is suspended from the end of the conductor. The duration of the test is 15 min.

During the test, the conductor shall neither slip out of the clamping unit nor break near the clamping unit; it shall neither be damaged in such a way as to render it unfit for further use.

Immediately after this test, each conductor under test shall be submitted, in the test equipment, to the test of 9.5 (pull test).

Table 2 – Test values for flexion and pull-out tests for round copper conductors

Conductor cross-section		Diameter of bushing hole [a, b]	Height *H* [a]	Mass	Pulling force
mm²	AWG/kcmil	mm	mm	kg	N
50	0	15,9	343	9,5	236
70	00	19,1	368	10,4	285
95	000	19,1	368	14, 0	351
–	0000	19,1	368	14,0	427
120	250	22,2	406	14,0	427
150	300	22,2	406	15,0	427
185	350	25,4	432	16,8	503
–	400	25,4	432	16,8	503
240	500	28,6	464	20,0	578
300	600	28,6	464	22,7	578

[a] Tolerances: for height *H* ± 15 mm, for diameter of the bushing hole ±2 mm.

[b] If the bushing hole diameter is not large enough to accommodate the conductor without binding, a bushing having the next larger hole size may be used.

9.5 After the test of 9.4, the pulling force given in Table 2 shall be applied to each conductor tested in accordance with 9.4. Clamping screws or nuts, if any, shall not be tightened again for this test. The force shall be applied, without jerks, for 1 min, in the direction of the axis of the conductor.

During the test the conductor shall not slip out of the clamping unit.

9.6 The test is carried out on screw-type clamping units with copper conductors having the appropriate rated cross-section in accordance with 7.4.

Screws and nuts are tightened and loosened five times by means of a suitable test screwdriver or spanner, the tightening torque shall be in accordance with the appropriate column of Table 3 or alternatively a higher tightening torque as specified by the manufacturer.

A new conductor-end is used each time the screw or nut is loosened.

Where a screw has a hexagonal head with a slot and the values in columns III and IV of Table 3 are different, the test is made twice, first on a set of three specimens, applying to the hexagonal head the torque specified in column IV, and then on another set of three specimens, applying the torque specified in column III, by means of a screwdriver. If the values in columns III and IV are the same, only the test with the screwdriver is made.

Screws and nuts for clamping the conductors shall have a metric ISO thread or a thread comparable in pitch and mechanical strength.

During the test the clamping unit shall not be damaged, for example, by the breakage of screws or damage to the head slots of screws, threads, washers or stirrups, so as to prevent their further use.

The shape of the blade of the test screwdriver shall suit the head of the screws to be tested.

The screws and nuts shall not be tightened in jerks.

Table 3 – Tightening torques for the verification of the mechanical strength of screw-type terminals

Diameter of thread mm		Tightening torque Nm		
Metric standard values	**Range of diameter**	**I [a]**	**III [b]**	**IV [c]**
2,5	≤ 2,8	0,2	0,4	0,4
3,0	> 2,8 up to and including 3,0	0,25	0,5	0,5
–	> 3,0 up to and including 3,2	0,3	0,6	0,6
3,5	> 3,2 up to and including 3,6	0,4	0,8	0,8
4	> 3,6 up to and including 4,1	0,7	1,2	1,2
4,5	> 4,1 up to and including 4,7	0,8	1,8	1,8
5	> 4,7 up to and including 5,3	0,8	2,0	2,0
6	> 5,3 up to and including 6,0	1,2	2,5	3,0
8	> 6,0 up to and including 8,0	2,5	3,5	6,0
10	> 8,0 up to and including 10,0	–	4,0	10,0
12	> 10 up to and including 12	–	–	14,0
14	> 12 up to and including 15	–	–	19,0
16	> 15 up to and including 20	–	–	25,0
20	> 20 up to and including 24	–	–	36,0
24	> 24	–	–	50,0

[a] Column I applies to screws without heads which, when tightened, do not protrude from the hole, and to other screws which cannot be tightened by means of a screwdriver with a blade wider than the diameter of the screw.

[b] Column III applies to nuts and screws which are tightened by means of a screwdriver.

[c] Column IV applies to nuts and screws which can be tightened by means other than that of a screwdriver.

9.7 For the temperature-rise test on the end-product, clamping units are connected with the conductor having the appropriate rated cross-section and type, and under the conditions stated in the relevant product standard; the screws or nuts, if any, are tightened with a torque in accordance with that specified in 9.6.

9.8 The electrical performance of screwless-type clamping units is verified by the following test, which is made on 10 new specimens of each design which have not been used for any other test. In the case of clamping units forming part of an equipment, these may be submitted separately.

The test is made with new copper conductors as follows:

– rigid, stranded for clamping units which can accept these conductors only;

– rigid, stranded and flexible for clamping units which can accept both types.

A conductor having the smallest cross-section is connected, as in normal use, to each of five clamping units and a conductor having the largest cross-section is connected, as in normal use, to each of the five other clamping units.

The clamping units are loaded for 1 h with an a.c. current equal to the test current defined in the relevant product standard.

Immediately after this period and with the same current flowing (d.c. current may be used) the voltage drop across each clamping unit is measured as near as possible to the area of contact on the clamping unit (for details, see the product standard).

In no case shall the voltage drop exceed 15 mV.

9.9 Void

9.10 The screwless-type clamping units, already subjected to the determination of the voltage drops specified in 9.8, are placed in a heating cabinet, which is initially kept at a temperature of 20° C ± 2 °C.

During the test, a current equal to the value of the test current passes as defined in the relevant product standard, except during the cooling period.

The whole test arrangement, including the conductors, shall not be moved until all the following voltage drop tests have been completed.

The clamping units are then subjected to 192 temperature cycles, each cycle having a duration of approximately 1 h, as follows.

The air temperature in the cabinet is raised in approximately 20 min to 40 °C or to higher values according to the relevant product standard.

It is maintained within ±5 °C of this value for approximately 10 min. The clamping units are then allowed to cool down, during approximately 20 min to a temperature of approximately 30 °C, forced cooling being allowed.

They are kept at this temperature for approximately 10 min and, if necessary for measuring the voltage drop, allowed to cool down further, to a temperature of 20 °C ± 2 °C.

The voltage drop is measured using the current and test arrangement previously specified in 9.8 after the 24th temperature cycle and after the 192 temperature cycles are completed.

The allowable voltage drop shall not exceed the smaller of the two following values:

– either 22,5 mV;
– or 1,5 times the value measured after the 24th cycle.

The temperature in the heating cabinet shall be measured at a distance of at least 50 mm from the specimens.

After this test an inspection by the naked eye, with normal or corrected vision and without additional magnification, shall show no changes obviously preventing further use, such as cracks, deformations or the like.

The test, according to the relevant product standards, may also be carried out at ambient temperature. In this case, a suitable increase of the test current shall be made so that the clamping unit reaches the proposed heating temperature test of 40 °C ± 5 °C or higher, as defined above. In case of doubt about the results, the test is carried out on a set of new specimens in the heating cabinet, in accordance with this subclause.

Dimensions in millimetres

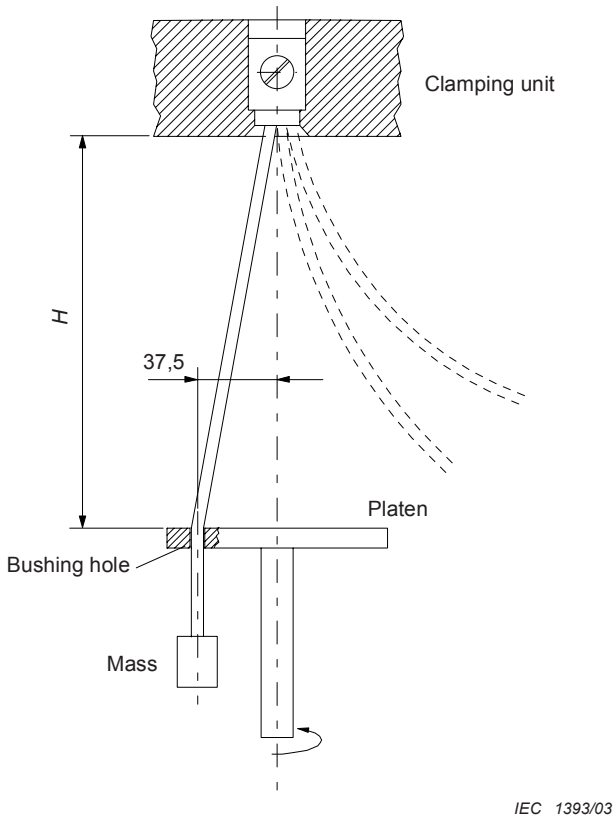

Figure 1 – Test apparatus according to 9.4

Dimensions in millimetres

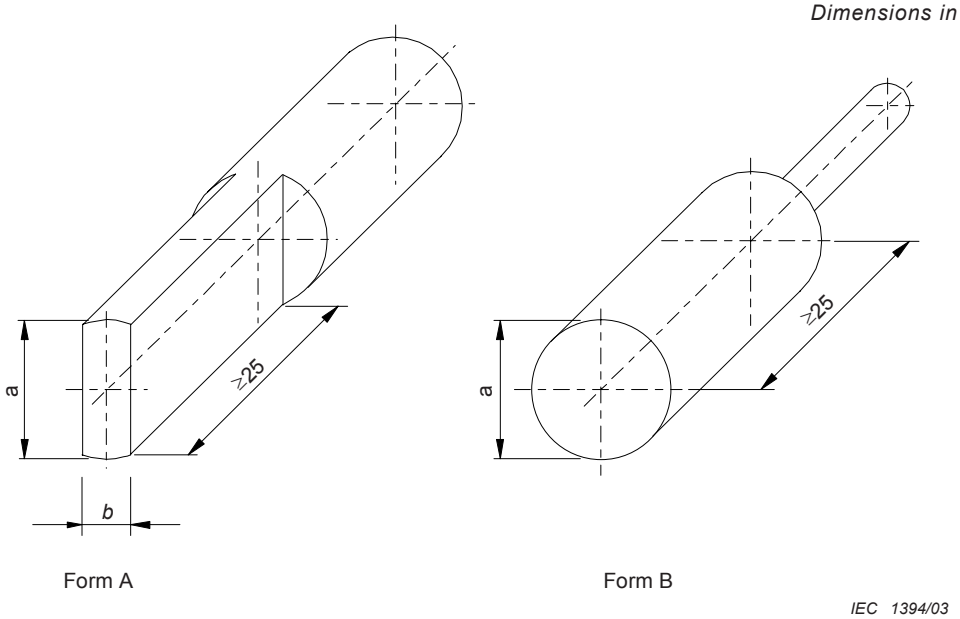

Figure 2 – Gauges of form A and form B

Annex A
(informative)

Relationship between mm^2 and AWG/kcmil sizes

Table A.1 – Approximate relationship between mm^2 and AWG/kcmil sizes

Rated cross-section mm^2	AWG/kcmil size	Equivalent metric area mm^2
–	1	42,4
50	0	53,5
70	00	67,4
95	000	85,0
–	0000	107,2
120	250	127,0
150	300	152,0
185	350	177,0
–	400	203,0
240	500	253,0
300	600	304,0

Annex B
(normative)

Conductor rated cross-section and corresponding gauges

Table B.1 – Rated cross-section and corresponding gauges

Rated cross-section mm²	Theoretical diameter of the largest conductor		Gauges (see figure 2)					Permissible deviation for a and b mm
			Form A			Form B		
	Rigid stranded mm	Flexible [a] mm	Marking	a mm	b mm	Marking	a mm	
50	9,1	11,0	A9	10,2	9,2	B9	10,0	$^{0}_{-0,07}$
			A10	12,3	11,0	B10	12,0	$^{0}_{-0,08}$
70	11,0	13,1		12,3	11,0		12,0	
			A11	14,2	13,1	B11	14,0	
95	12,9	15,1		14,2	13,1		14,0	
			A12	16,2	15,1	B12	16,0	
120	14,5	17,0		16,2	15,1		16,0	
			A13	18,2	17,0	B13	18,0	
150	16,2	19,0		18,2	17,0		18,0	
			A14	20,2	19,0	B14	20,0	
185	18,0	21,0		20,2	19,0		20,0	
			A15	22,2	21,0	B15	22,0	$^{0}_{-0,09}$
240	20,6	24,0		22,2	21,0		22,0	
			A16	26,5	24,0	B16	26,0	
300	23,1	27,0		26,5	24,0		26,0	
							29,0	

[a] Dimensions for class 5 flexible conductors only, according to IEC 60228A.

Test procedure:

The test is carried out with the gauges specified here above. The measuring section of the gauge shall be able to penetrate into the clamping unit aperture by the mass of the gauge alone, without undue force.

Construction of gauges:

The measuring section of the gauge shall be made from gauge steel.

Annex C
(normative)

Construction of stranded and flexible conductors

Table C.1 – Construction of stranded and flexible conductors according to rated cross-sections

Rated cross-section mm²	Minimal number of wires in stranded conductors	Maximum diameter of wires in flexible conductors mm
50	19	0,41
70	19	0,51
95	19	0,51
120	37	0,51
150	37	0,51
185	37	0,51
240	61	0,51
300	61	0,51

Table C.2 – Construction of stranded and flexible conductors according to AWG/kcmil sizes

Conductor size AWG/kcmil	Stranded conductors Minimal number of wires in circular non-compacted conductor	Flexible conductors Maximum diameter of wires in conductor mm
0	19	0,51
00	19	0,51
000	19	0,51
0000	19	0,51
250	37	0,51
300	37	0,51
350	37	0,51
400	37	0,51
500	37	0,51
600	61	0,51

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60228 (mod)	1978	Conductors of insulated cables	HD 383 S2	1986
A1	1993		-	-
IEC 60228A (mod)	1982	Conductors of insulated cables - First supplement: Guide to the dimensional limits of circular conductors	HD 383 S2	1986
IEC 60999-1	1999	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)	EN 60999-1	2000

Bibliography

[1] ASTM B 172-71 (Re-approved 1985), *Standard specification for rope – Lay-stranded copper conductors having bunch-stranded members, for electrical energy*

[2] ICEA Publication S-19-81 (6th edition) / *NEMA Publication WC 3-1980 – Rubber insulated wire and cable for the transmission and distribution of electrical energy*

[3] ICEA Publication S-66-524 (2nd edition) / *NEMA Publication WC 7-1982 – Cross-linked thermosetting polyethylene insulated wire and cable for the transmission and distribution of electrical energy*

[4] ICEA Publication S-68-516 / *NEMA Publication WC 8-1976 – Ethylene propylene-rubber-insulated wire and cable for the transmission and distribution of electrical energy*

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BSI — British Standards Institution

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