INTERNATIONAL STANDARD

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AMENDMENT 1
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Amendment 1

Round wire concentric lay overhead electrical stranded conductors

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

FOREWORD

This amendment has been prepared by IEC technical committee 7: Overhead electrical conductors.

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

FDIS	Report on voting
7/502/FDIS	7/506/RVD

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

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1 Scope

Amend as follows:

1.1 This International Standard specifies the electrical and mechanical characteristics of round wire, concentric lay, overhead, electrical and stranded conductors made of combinations of any of the following metal wires:

a) Aluminium wires
   - hard drawn aluminium as per IEC 60889 designated A1*;
   - aluminium alloy type B as per IEC 60104, designated A2*;
   - aluminium alloy type A as per IEC 60104, designated A3*.

b) Zinc coated steel wires (as per IEC 60888):
   - regular strength steel, designated S1A or S1B, where A and B are zinc coating classes, corresponding respectively to classes 1 and 2;
   - high strength steel, designated S2A or S2B,
   - extra high strength steel, designated S3A.

c) Aluminium-clad steel wires (as per IEC 61232):
   - class 20SA, types A and B, designated respectively SA1A and SA1B;
   - class 27SA, designated as SA2.

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* The resistivity of these metals is as follows (in increasing order):

A1: 28,264 nΩm (corresponding to 61 % IACS),

A2: 32,530 nΩm (corresponding to 53 % IACS),

A3: 32,840 nΩm (corresponding to 52,5 % IACS).

1.2 The conductor designations included in this standard are:

A1, A2, A3,

A1/S1A, A1/S1B, A1/S2A, A1/S2B, A1/S3A,

A2/S1A, A2/S1B, A2/S3A,

A3/S1A, A3/S1B, A3/S3A,

A1/A2, A1/A3,

A1/SA1A, A2/SA1A, A3/SA1A,

S1A, S1B, S2A, S3A,

SA1A, SA1B, SA2.

NOTE – Conductors made of the same wire designation are called homogeneous conductors (e.g. A1, A2, S1A, SA2, etc.). Furthermore, whenever reference is made to steel wires or conductors, these can either be aluminium-clad or zinc-coated (Sx or SAx).

2 Normative references

Add, to the list, the title of the following standard:

IEC 61232: 1993, *Aluminium-clad steel wires for electrical purposes*

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3 Designation system

Add the following paragraphs at the end of 3.2:

Homogeneous conductors made of zinc-coated steel wires are designated S1A, S1B, S2A, S3A.

Homogeneous conductors made of aluminium-clad steel wires are designated SA1A, SA1B or SA2.

Add the following paragraph at the end of 3.4:

When aluminium-clad steel wires SA1A are used in a composite conductor instead of zinc-coated wires, the designation becomes Ax/SA1A.

Add the following paragraphs at the end of 3.5:

500-A1/SA1A-54/7: Conductor made of 54 wires of A1 aluminium and 7 wires of aluminium-clad steel class 20SA wires, type A (SA1A). The area of the A1 aluminium wires is equal to 484 mm^2 and 62,8 mm^2 for the aluminium-clad steel wires which can be found in the tables of annex D.

40-SA1A-19: Conductor made of 19 wires of aluminium-clad steel wires class 20SA, type A (SA1A). The area of aluminium-clad steel wires is 120 mm^2 which has the same conductivity as 40 mm^2 of A1 aluminium wires.

40-S1A-19: Conductor made of 19 wires of regular strength steel wires, with a zinc coating type A (S1A). The area of steel wires is 271,1 mm^2 which has the same conductivity as 40 mm^2 of A1 aluminium wires.

4 Definitions

Amend, on page 11, the definition of "**steel ratio**" *as follows:*

steel ratio: The ratio of steel cross-sectional area to aluminium cross-sectional area given as a percentage.

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5.1 *Material*

Amend as follows:

Conductors shall be made up of round aluminium wires, or round steel wires (zinc-coated or aluminium-clad) or their combinations. All wires shall have before stranding the properties specified in IEC 60104, IEC 60888, IEC 60889, and IEC 61232.

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5.4 *Stranding*

Amend 5.4.4 as follows:

5.4.4 The lay ratios for steel wires (zinc-coated or aluminium-clad) shall be as follows:

a) The lay ratio for the 6-wire layer of the 7 and 19-wire steel cores shall be not less than 16 nor more than 26.

b) The lay ratio for the 12-wire layer of 19-wire steel core shall be not less than 14 nor more than 22.

c) The lay ratio for homogeneous steel conductors shall not be less than 10 nor more than 16 for all layers.

Replace the text of 5.4.6 by the following:

5.4.6 In a conductor having multiple layers of wires, the lay ratio of any layer shall be not greater than the lay ratio of the layer immediately beneath it.

Amend 5.4.7 as follows:

5.4.7 All steel wires shall lie naturally in their position after stranding, and when cut, the wire ends shall remain in position or be readily replaced by hand and then remain approximately in position. This requirement also applies to the outer layer of aluminium wires of a conductor.

Although it is desirable that all steel wires of a steel conductor remain in position after being cut, it may be difficult to achieve this property for steel conductors with more than 19 wires.

5.5 *Joints*

Amend 5.5.1 as follows:

5.5.1 During stranding, there shall be no joints of any kind made in the zinc-coated or aluminium-clad steel wire or wires.

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5.7 *Conductor strength*

Add, on page 19, the following new text to 5.7.2:

The rated tensile strength (RTS) of homogeneous steel conductors (Sxy or SAx) shall be taken as the sum of RTS of all wires at failure.

NOTE – RTS of A1/SA1A is calculated with the failure strength of component wires, based on the assumption that wires have compatible elongations at rupture.

Add, after 5.7.4, the following new subclause:

5.8 *Conductivity*

The conductivity of composite conductors made of a combination of aluminium and steel wires is calculated while neglecting the contribution of the conductivity of steel wires.

NOTE – An exception to this rule can be admitted, following an agreement between concerned parties, in the case of optical ground wires (OPGW) which are currently being studied by technical committee 7.

The conductivity of homogeneous conductors with aluminium-clad steel wires (SAx) is calculated based on the relevant conductivity in IEC 61232.

The conductivity of homogeneous zinc-coated steel conductors (Sx) is calculated based on an average conductivity of 9 % IACS.

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Ajouter les tableaux conducteurs suivants à la fin de l'annexe D:

Add the following conductor tables at the end of annex D:

Tableau D.17 – Données pour conducteurs du type S1A

Table D.17 – Data for type S1A conductors

Code numérique	Section	Nombre de fils	Diamètre Fils	Diamètre Conducteur	Masse linéique	Résistance à la traction	Résistance en courant continu
Code number	Area	Number of wires	Diameter Wire	Diameter Conductor	Linear mass	Rated strength	DC resistance
	mm^2		mm	mm	kg/km	kN	W/km
4	27,1	7	2,22	6,66	213,3	36,3	7,1445
6,3	42,7	7	2,79	8,36	335,9	55,9	4,5362
10	67,8	7	3,51	10,53	533,2	87,4	2,8578
12,5	84,7	7	3,93	11,78	666,5	109,3	2,2862
16	108,4	7	4,44	13,32	853,1	139,9	1,7861
16	108,4	19	2,70	13,48	857,0	142,1	1,7944
25	169,4	19	3,37	16,85	1339,1	218,6	1,1484
40	271,1	19	4,26	21,31	2142,6	349,7	0,7177
40	271,1	37	3,05	21,38	2148,1	349,7	0,7196
63	427,0	37	3,83	26,83	3383,2	550,8	0,4569

NOTE – Les propriétés des conducteurs sont basées sur une résistance en courant continu de 9 % IACS.
Conductor properties are based on a d.c. resistance of 9 % IACS.

Tableau D.18 – Données pour conducteurs du type S1B

Table D.18 – Data for type S1B conductors

Code numérique	Section	Nombre de fils	Diamètre Fils	Diamètre Conducteur	Masse linéique	Résistance à la traction	Résistance en courant continu
Code number	Area	Number of wires	Diameter Wire	Diameter Conductor	Linear mass	Rated strength	DC resistance
	mm^2		mm	mm	kg/km	kN	W/km
4	27,1	7	2,22	6,66	213,3	33,6	7,1445
6,3	42,7	7	2,79	8,36	335,9	51,7	4,5362
10	67,8	7	3,51	10,53	533,2	80,7	2,8578
12,5	84,7	7	3,93	11,78	666,5	100,8	2,2862
16	108,4	7	4,44	13,32	853,1	129,0	1,7861
16	108,4	19	2,70	13,48	857,0	131,2	1,7944
25	169,4	19	3,37	16,85	1339,1	201,6	1,1484
40	271,1	19	4,26	21,31	2142,6	322,6	0,7177
40	271,1	37	3,05	21,38	2148,1	322,6	0,7196
63	427,0	37	3,83	26,83	3383,2	508,1	0,4569

NOTE – Les propriétés des conducteurs sont basées sur une résistance en courant continu de 9 % IACS.
Conductor properties are based on a d.c. resistance of 9 % IACS.