CONCENTRIC-LAY-STRANDED BARE CONDUCTORS

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Revision	Data	List of modifications
0	16/05/2014	First emission
01	15/09/2014	Second emission
02	29/04/2016	Updated common list
03	15/12/2020	Merge between HV and MV conductors

CONTENTS

LOCAL SECTION

A LATAM: Sao Paulo (Brazil), Rio de Jainero (Brasil), Goias (Brasil), Ceará (Brasil), Coelce (Brazil), Chilectra (Chile), Codensa (Colombia), Edelnor (Perù), Edesur (Argentine)

B Edistribución redes digitales (Spain)

C ENEL DISTRIBUZIONE (Italy), ENEL DISTRIBUTIE: Banat, Dobrogea, Muntenia, (Romania)

1 SCOPE

The aim of this document is to provide technical requirements for the supply of concentric –lay-stranded bare conductors to be used in the HV and MV overhead electrical distribution lines of the Enel Group Distribution Companies, listed below:

Codensa	*Colombia*
Enel Distribución Perú	*Perú*
Edesur	*Argentina*
e-distributie Banat	*Romania*
e-distributie Dobrogea	*Romania*
e-distributie Muntenia	*Romania*
e-distribuzione	*Italy*
e-distribución	*Spain*
Enel Distribución Chile	*Chile*
Enel Sao Paulo	*Brazil*
Enel Distribuição Ceará	*Brazil*
Enel Distribuição Rio	*Brazil*
Enel Distribuição Goiás	*Brazil*

This standard specifies the electrical and mechanical characteristics and test requirements that must be accomplished by concentric lay stranded bare conductors made from round wires for use as overhead electrical conductors and ground wires by the utilities mentioned above.
This standard replaces all the local standards used up to now by all the Distribution Companies, as long as local regulation allows it.

2 LIST OF CONDUCTORS

This standard includes round wire concentric lay bare overhead electrical conductors stranded in alternate directions, with or without grease, of one of the following types:

•Type ACSR: Concentric-lay-stranded hard drawn aluminum conductors, zinc-coated-steel reinforced.

Aluminum wires: AL1 (EN60889) or 1350-H19 (ASTM B230).

Zinc coated steel wires: ST1A (EN50189) or Class A (ASTM B498)

•Type ACSR/AW: Concentric-lay-stranded hard drawn aluminum conductors, aluminum-coated-steel reinforced.

Aluminum wires: AL1 (EN60889) or 1350-H19 (ASTM B230).

Aluminum clad steel wires: A20SA (EN61232) or Class AW3 (High Strength) (ASTM B502)

•Type AAAC: Concentric-lay-stranded aluminum alloy conductors

Aluminum wires: AL3 (EN50193) or 6201-T18 (ASTM B398).

•Type CC: Conductors made from round medium-hard copper wires as indicated on UNE207015 or ASTM B8.

•Type AC: Zinc coated steel wires strand specifically intended for use as overhead ground wires as indicated on ASTM A363.

•Type ARLE: Aluminum clad steel wire strand specifically intended for use as overhead ground wires as indicated on EN50182 or ASTM B416.

The list of conductor with the main requirements, which is an integral part of the present document, is reported in the GS Type Code List attached. In the following tables are shown a brief of these requirements:

Table 1 - Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced

GS Type Code	Standard	Old Designation	Denomination EN 50182	Denomination GSC003	Al. wires Nº / diam. Ud. / (mm)		Steel wires Nº / diam. Ud. / (mm)		Total diameter (mm)	DC Resistance (Ω/km)	Grease (Yes/No)
GSC003/01	ASTM B233	Swan	21-AL1/4-ST1A	ACSR 25	6	2,12	1	2,12	6,36	1,3203	No
GSC003/08	IRAM 2187-I	25/4	24-AL1/4-ST1A	ACSR 28(G)	6	2,25	1	2,25	6,75	1,1721	Yes
GSC003/02	ASTM B233	Sparrow	34-AL1/6-ST1A	ACSR 39	6	2,67	1	2,67	8,01	0,8324	No
GSC003/11#	EN-50182	-	47-AL1/8-ST1A	ACSR 55	6	3,15	1	3,15	9,45	0,598	No
GSC003/42	EN-50182	-	48-AL1/8-ST1A	ACSR 56	6	3,2	1	3,2	9,6	0,5795	No
GSC003/09	EN-50182	50/8	48-AL1/8-ST1A	ACSR 56(G)	6	3,2	1	3,2	9,6	0,5795	Yes
GSC003/03	ASTM B233	Raven	54-AL1/9-ST1A	ACSR 62	6	3,37	1	3,37	10,11	0,5225	No
GSC003/04#	ASTM B233	Quail	67-AL1/11-ST1A	ACSR 79	6	3,78	1	3,78	11,34	0,4153	No
GSC003/43#	EN-50182	-	70-AL1/11-ST1A	ACSR 81	26	1,85	7	1,44	11,72	0,4034	No
GSC003/77	ASTM B233	Petrel	52-AL1/30-ST1A	ACSR 82	12	2,34	7	2,34	11,7	0,5147	No
GSC003/47	ASTM B233	Leghorn	68-AL1/40-ST1A	ACSR 108	12	2,69	7	2,69	13,45	0,3895	No
GSC003/44	EN-50182	-	94-AL1/15-ST1A	ACSR 110	26	2,15	7	1,67	13,61	0,2987	No
GSC003/10	EN-50182	95/15	94-AL1/15-ST1A	ACSR 110(G)	26	2,15	7	1,67	13,61	0,2987	Yes
GSC003/14#	EN-50182	-	94-AL1/22-ST1A	ACSR 116	30	2	7	2	14	0,2964	No
GSC003/05#	ASTM B233	Penguin	107-AL1/18-ST1A	ACSR 125	6	4,77	1	4,77	14,31	0,2608	No
GSC003/45	EN-50182	-	122-AL1/20-ST1A	ACSR 141	26	2,44	7	1,9	15,46	0,2319	No
GSC003/78	ASTM B233	Dotterel	89-AL1/52-ST1A	ACSR 142	12	3,08	7	3,08	15,4	0,2971	No
GSC003/46	EN-50182	-	128-AL1/21-ST1A	ACSR 149	26	2,5	7	1,95	15,85	0,2209	No
GSC003/06#	ASTM B233	Partridge	135-AL1/22-ST1A	ACSR 157	26	2,57	7	2	16,28	0,2091	No
GSC003/79	ASTM B233	Cochin	107-AL1/62-ST1A	ACSR 169	12	3,37	7	3,37	16,85	0,2482	No

to be used in the construction of new lines

GS Type Code	Standard	Old Designation	Denomination EN 50182	Denomination GSC003	Al. wires Nº / diam. Ud. / (mm)		Steel wires Nº / diam. Ud. / (mm)		Total diameter (mm)	DC Resistance (Ω/km)	Grease (Yes/No)
GSC003/53	EN-50182	0101-0440 (EDESUR)	149-AL1/24-ST1A	ACSR 173	26	2,7	7	2,1	17,1	0,1894	No
GSC003/95	EN-50182	0101-0440 (EDESUR)	149-AL1/24-ST1A	ACSR 173(G)	26	2,7	7	2,1	17,1	0,1894	Yes
GSC003/17#	EN-50182	-	147-AL1/34-ST1A	ACSR 182	30	2,5	7	2,5	17,5	0,1897	No
GSC003/07#	ASTM B233	Linnet	171-AL1/28-ST1A	ACSR 198	26	2,89	7	2,25	18,31	0,1653	No
GSC003/96	EN-50182	-	184-AL1/30-ST1A	ACSR 214(G)	26	3,00	7	2,33	19,0	0,1535	Yes
GSC003/54#	EN-50182	ACSR 280 (Hawk)	242-AL1/39-ST1A	ACSR 281	26	3,44	7	2,68	21,8	0,1167	No
GSC003/98	EN-50182	ACSR 280 (Hawk)	242-AL1/39-ST1A	ACSR 281(G)	26	3,44	7	2,68	21,8	0,1167	Yes
GSC003/48	ASTM B233	Osprey	282-AL1/16-ST1A	ACSR 298	18	4,47	1	4,47	22,35	0,1011	No
GSC003/80	ASTM B233	Dove	283-AL1/46-ST1A	ACSR 329	26	3,72	7	2,89	23,55	0,0998	No
GSC003/55	EN-50182	Peacock 605	306-AL1/40-ST1A	ACSR 346	24	4,03	7	2,69	24,19	0,0925	No
GSC003/56	EN-50182	0101-0264 (EDESUR)	304-AL1/49-ST1A	ACSR 354	26	3,86	7	3	24,44	0,0927	No
GSC003/97	EN-50182	0101-0264 (EDESUR)	304-AL1/49-ST1A	ACSR 354(G)	26	3,86	7	3	24,44	0,0927	Yes
GSC003/49	ASTM B233	Grosbeak	322-AL1/50-ST1A	ACSR 372	26	3,97	7	3,01	24,91	0,0878	No
GSC003/57#	EN-50182	ACSR 380 (Gull)	337-AL1/44-ST1A	ACSR 381	54	2,82	7	2,82	25,38	0,0842	No
GSC003/58#	EN-50182	ACSR 455 (Condor)	402-AL1/52-ST1A	ACSR 454	54	3,08	7	3,08	27,72	0,0706	No
GSC003/50	ASTM B233	Drake	403-AL1/65-ST1A	ACSR 468	26	4,44	7	3,45	28,11	0,0701	No
GSC003/51	ASTM B233	Rail	484-AL1/34-ST1A	ACSR 517	45	3,7	7	2,47	29,61	0,0592	No
GSC003/59#	EN-50182	ACSR 547(Cardinal)	485-AL1/63-ST1A	ACSR 547	54	3,38	7	3,38	30,42	0,0586	No
GSC003/99	EN-50182	ACSR 547(Cardinal)	485-AL1/63-ST1A	ACSR 547(G)	54	3,38	7	3,38	30,42	0,0586	Yes
GSC003/60	EN-50182	Plover 900	727-AL1/97-ST1A	ACSR 824	54	4,14	19	2,55	37,59	0,039	No
GSC003/12#	ASTM B233	Swan	21-AL1/4-ST1A	ACSR/AW 55	6	3,15	1	3,15	9,45	0,5802	No
GSC003/81	IRAM 2187-I	25/4	24-AL1/4-ST1A	ACSR/AW 55(G)	6	3,15	1	3,15	9,45	0,5802	Yes
GSC003/92#	ASTM B233	Sparrow	34-AL1/6-ST1A	ACSR/AW 79	6	3,78	1	3,78	11,34	0,403	No
GSC003/13	EN-50182	-	47-AL1/8-ST1A	ACSR/AW 79(G)	6	3,78	1	3,78	11,34	0,403	Yes
GSC003/102#	EN-50182	-	48-AL1/8-ST1A	ACSR/AW 125	6	4,77	1	4,77	14,31	0,2531	No
GSC003/15	EN-50182	50/8	48-AL1/8-ST1A	ACSR/AW 125(G)	6	4,77	1	4,77	14,31	0,2531	Yes
GSC003/103	ASTM B233	Raven	54-AL1/9-ST1A	ACSR/AW 148	15	3,15	4	3,15	15,75	0,2264	No
GSC003/16	ASTM B233	Quail	67-AL1/11-ST1A	ACSR/AW 148(G)	15	3,15	4	3,15	15,75	0,2264	Yes
GSC003/41#	EN-50182	-	70-AL1/11-ST1A	ACSR/AW 149	26	2,5	7	1,95	15,85	0,2144	No
GSC003/52	ASTM B233	Petrel	52-AL1/30-ST1A	ACSR/AW 149(G)	26	2,5	7	1,95	15,85	0,2144	Yes
GSC003/61#	ASTM B233	Leghorn	68-AL1/40-ST1A	ACSR/AW 157	26	2,57	7	2	16,28	0,203	No
GSC003/104#	EN-50182	-	94-AL1/15-ST1A	ACSR/AW 182	30	2,5	7	2,5	17,5	0,1819	No
GSC003/18	EN-50182	95/15	94-AL1/15-ST1A	ACSR/AW 182(G)	30	2,5	7	2,5	17,5	0,1819	Yes
GSC003/62#	EN-50182	-	94-AL1/22-ST1A	ACSR/AW 281	26	3,44	7	2,68	21,8	0,1133	No
GSC003/63#	ASTM B233	Penguin	107-AL1/18-ST1A	ACSR/AW 381	54	2,82	7	2,82	25,38	0,0822	No
GSC003/64#	EN-50182	-	122-AL1/20-ST1A	ACSR/AW 454	54	3,08	7	3,08	27,72	0,0689	No
GSC003/65#	ASTM B233	Dotterel	89-AL1/52-ST1A	ACSR/AW 547	54	3,38	7	3,38	30,42	0,0572	No
GSC003/100	EN-50182	-	128-AL1/21-ST1A	ACSR/AW 594	54	3,52	7	3,52	31,68	0,0528	No

Note 1 – The conductors designated by abbreviations AL1/A20SA are concentric-lay-stranded aluminum conductors, aluminum-coated-steel reinforced. However, the conductors designated by abbreviations AL1/ST1A are concentric-lay-stranded aluminum conductors, zinc-coated-steel reinforced.

to be used in the construction of new lines

Table 2 - Concentric-Lay-Stranded Aluminum-Alloy Conductors

GS Type Code	Standard	Old Designation	Denomination EN 50182	Denomination GSC003	Al. wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Grease (Yes/No)
GSC003/19	ASTM B399	-	25-AL3	AAAC 25	7	2,13	24,94	6,39	1,3313	No
GSC003/82	ASTM B399	-	25-AL3	AAAC 25 (G)	7	2,13	24,94	6,39	1,3313	Yes
GSC003/20	ASTM B399	-	50-AL3	AAAC 50	7	3,02	50,14	9,06	0,6623	No
GSC003/83	ASTM B399	-	50-AL3	AAAC 50 (G)	7	3,02	50,14	9,06	0,6623	Yes
GSC003/22	ASTM B399	-	67-AL3	AAAC 67 (G)	7	3,5	67,35	10,5	0,4931	Yes
GSC003/21	ASTM B399	-	70-AL3	AAAC 70	19	2,17	70,27	10,85	0,4753	No
GSC003/84	ASTM B399	-	70-AL3	AAAC 70 (G)	19	2,17	70,27	10,85	0,4753	Yes
GSC003/23	ASTM B399	-	120-AL3	AAAC 120	19	2,83	119,51	14,15	0,2795	No
GSC003/85	ASTM B399	-	120-AL3	AAAC 120 (G)	19	2,83	119,51	14,15	0,2795	Yes
GSC003/32	EN-50182		148-AL3	AAAC 148	19	3,15	148,07	15,75	0,2256	No
GSC003/24	ASTM B399	-	161-AL3	AAAC 161	19	3,28	160,54	16,4	0,208	No
GSC003/86	ASTM B399	-	161-AL3	AAAC 161 (G)	19	3,28	160,54	16,4	0,208	Yes
GSC003/66	EN-50182	D180	188-AL3	AAAC 188	19	3,55	188,06	17,75	0,1776	No
GSC003/25	ASTM B399	-	200-AL3	AAAC 200	19	3,66	199,90	18,3	0,1671	No
GSC003/87	ASTM B399	-	200-AL3	AAAC 200 (G)	19	3,66	199,90	18,3	0,1671	Yes
GSC003/26	ASTM B399	-	236-AL3	AAAC 236 (G)	37	2,85	236,04	19,95	0,142	Yes
GSC003/27	ASTM B399	-	240-AL3	AAAC 240	61	2,24	240,39	20,16	0,1399	No
GSC003/67	EN-50182	D280	279-AL3	AAAC 279	37	3,1	279,26	21,7	0,12	No
GSC003/68	EN-50182	304	303-AL3	AAAC 303 (G)	37	3,23	303,18	22,61	0,1106	Yes
GSC003/28	ASTM B399	-	315-AL3	AAAC 315	37	3,29	314,55	23,03	0,1066	No
GSC003/88	ASTM B399	-	315-AL3	AAAC 315 (G)	37	3,29	314,55	23,03	0,1066	Yes
GSC003/69	EN-50182	D380	381-AL3	AAAC 381	61	2,82	380,99	25,38	0,0883	No
GSC003/29	ASTM B399	-	400-AL3	AAAC 400	37	3,71	399,98	25,97	0,0838	No
GSC003/89	ASTM B399	-	400-AL3	AAAC 400 (G)	37	3,71	399,98	25,97	0,0838	Yes
GSC003/70	EN-50182	D450	454-AL3	AAAC 454	61	3,08	454,49	27,72	0,074	No
GSC003/71	EN-50182	490	500-AL3	AAAC 500 (G) 61H	61	3,23	499,83	29,07	0,0673	Yes
GSC003/30	ASTM B399	-	500-AL3	AAAC 500	37	4,15	500,48	29,05	0,067	No
GSC003/90	ASTM B399	-	500-AL3	AAAC 500 (G)	37	4,15	500,48	29,05	0,067	Yes
GSC003/101	EN-50182	-	607-AL3	AAAC 607 (G)	61	3,56	607,18	32,04	0,0554	Yes
GSC003/31	ASTM B399	-	631-AL3	AAAC 631	37	4,66	631,05	32,62	0,0531	No
GSC003/91	ASTM B399	-	631-AL3	AAAC 631 (G)	37	4,66	631,05	32,62	0,0531	Yes
GSC003/72	EN-50182	680	681-AL3	AAAC 681	61	3,77	680,93	33,93	0,0494	No

Table 3 - Concentric-Lay-Stranded Copper Conductors, Medium-Hard Temper

GS Type Code	Standard	Old Designation	Denominat. EN 207015	Denominat. GSC003	Copper wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Grease (Yes/No)	Direction of Lay
GSC003/33	ASTM B8	25	-	CC 23	7	2,06	23,33	6,18	0,795	No	Left(S)
GSC003/34	ASTM B8	35	-	CC 34	7	2,5	34,36	7,5	0,538	No	Left(S)
GSC003/37	UNE-207015	-	C 35	CC 35	7	2,52	34,91	7,56	0,529	No	Right(Z)
GSC003/38	UNE-207015	-	C 50 E	CC 49	7	3	49,48	9	0,372	No	Right(Z)
GSC003/35	ASTM B8	70	-	CC 67	19	2,12	67,07	10,6	0,276	No	Left(S)
GSC003/39	UNE-207015	-	C 70	CC 70	19	2,17	70,27	10,85	0,268	No	Right(Z)
GSC003/36	ASTM B8	95	-	CC 93	19	2,5	93,27	12,5	0,198	No	Left(S)
GSC003/40	UNE-207015	-	C 95	CC 95	19	2,52	94,76	12,6	0,196	No	Right(Z)
GSC003/94	ASTM B8	500	C 500	CC 500	61	3,23	499,83	29,07	0,0366	No	Left(S)
GSC003/93	ASTM B8	1000	-	CC 1015	127	3,19	1015,02	41,47	0,018	No	Left(S)

Table 4 - Concentric-Lay-Stranded Steel Conductors intended for use as overhead ground wires

GS Type Code	Standard	Old Designation	Denominat. EN 50182	Denominat. GSC003	Steel wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Grease (Yes/No)	Direction of Lay
GSC003/73	ASTM A363	AC-50	51-ST1A	AC 51	7	3,05	51,14	9,15	3,7959	No	Left(S)
GSC003/74	ASTM A363	AC-70	69-ST1A	AC 69	7	3,55	69,29	10,65	2,8019	No	Left(S)
GSC003/75	EN-50182	ARLE 8,71	47-A20SA	ARLE 47	7	2,91	46,56	8,73	1,8417	No	Right(Z)
GSC003/76	EN-50182	ARLE 9,78	58-A20SA	ARLE 58	7	3,26	58,43	9,78	1,4675	No	Right(Z)

3 REFERENCE LAWS AND STANDARDS

The list of reference laws and standards used to develop this specification and that shall be used as test method are mentioned below in this document

3.1 International Standards

IEC 60050-466 International Electrotechnical Vocabulary (IEV) - Part 466: Overhead lines

IEC-TR 61597Overhead electrical conductors - Calculation methods for stranded bare conductors

EN 50182 Conductors for overhead lines - Round wire concentric lay stranded conductors

EN 50183 Conductors for overhead lines — Aluminium-magnesium-silicon alloy wires

EN 50189 Conductors for overhead lines — Zinc coated steel wires

EN 50326 Conductors for overhead lines - Characteristics of greases.

EN 60889 Hard-drawn aluminium wire for overhead line conductors.

EN 61232 Aluminium-clad steel wires for electrical purposes.

EN 61394 Overhead lines - Requirements for greases for aluminium, aluminium alloy and steel bare conductors

ASTM B230 Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes.

ASTM B232 Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR).

ASTM A363 Standard Specification for Zinc-Coated (Galvanized) Steel Overhead Ground Wire Strand

ASTM B398 Standard Specification for Aluminum-Alloy 6201-T81 Wire for Electrical Purposes.

ASTM B399 Standard Specification for Concentric-Lay-Stranded Aluminum-Alloy 6201-T81 Conductors.

ASTM B498 Standard Specification for Zinc-Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR).

ASTM B500 Standard Specification for Metallic Coated Stranded Steel Core for Aluminum Conductors, Steel Reinforced (ACSR).

ASTM B502 Standard Specification for Aluminum-Clad Steel Core Wire for Use in Overhead Electrical Aluminum Conductors

ASTM B2 Standard specification for medium-hard-drawn copper wire.

ASTM B8 Standard specification for concentric-lay-stranded copper conductors, hard medium-hard, or soft.

3.2 List of replaced Standards

See local section

3.3 Local Standards

See local section

4 TERMINOLOGY

In addition to IEC 60050-466 terminology, the following ones shall be noted:

Direction of lay: The direction of lay is defined as right-hand or left-hand. With right-hand lay, the wires conform to the direction of the central part of the letter Z when the conductor is held vertically. With left-hand lay, the wires conform to the direction of the central part of letter S when the conductor is held vertically;

Lay ratio: means the ratio of the axial length of one complete turn of the helix formed by the the wire of a stranded conductor to the external diameter of the corresponding layer of wires;

Nominal: the name or identifying value of a measurable property by which a conductor or component of a conductor is identified ant to which tolerance are applied. Nominal values should be target values;

Wire: a filament of draw metal having a constant circular cross-section;

Rated Tensile Strength: sum of the tensile strength of all wires considering the rupture load of the weakest wire.

5 DESIGN AND MANUFACTURE

5.1 RAW MATERIALS OF WIRES

The following sections provides general information about the raw material of wires considered in this Global Standard.

5.1.1 Zinc-Coated (Galvanized) Steel Core Wires

Zinc-Coated (Galvanized) Steel Core Wires used for mechanical reinforcement in the manufacture of aluminum conductors, must be manufactured with the requirements of the standards EN50189 (Type ST1A) or ASTM B498 (Class A).

5.1.2 Aluminum-Coated (Aluminized) Steel Core Wires

Aluminum-Coated (Aluminized) Steel Core Wires used for mechanical reinforcement in the manufacture of aluminum conductors, must be manufactured with the requirements of the EN 61232 ("20SA" class and "A" type) or ASTM B502 (wires Class AW3 -High Strength).

5.1.3 Aluminum Wires

Aluminum wires used to assemble the bare conductors considered in this Global Standard shall be made of pure aluminum, manufacture under the standards EN 60889, or aluminum 1350-H19, manufacture under the standard ASTM B230.

5.1.4 Aluminum-Alloy Wires

Aluminum-alloy wires used to assemble the bare conductors considered in this Global Standard shall be made of 6201-T81 aluminum-alloy under the standard ASTM B398 or identified as AL3 under the standard Norma EN 50183.

5.1.5 Copper wires

Copper wires shall be uncoated, under the standards ASTM B2 or UNE 207015.

5.2 CONSTRUCCIÓN

The following sections provides the description of the conductors in function of the wires use to assemble them. The Standards use to manufacture the conductors are indicated in the Common List and in the section 2.

5.2.1 Aluminum Conductors, Zinc-Coated-Steel Reinforced

Aluminum conductors, coated-steel reinforced are assembled with aluminum wires (see 5.1.3) in the external layers and zinc-coated (galvanized) steel core wires in the internal layers (see 5.1.1). Manufactured as indicated on EN 50182 or ASTM B233.

5.2.2 Aluminum Conductors, Aluminum-Coated-Steel Reinforced

Aluminum conductors, aluminum-coated-steel reinforced are assembled with aluminum wires (see 5.1.3) in the external layers and aluminum-coated (Aluminized) steel core wires in the internal layers (see 5.1.2).

Manufactured as indicated on EN 50182 or ASTM B549.

5.2.3 Alloy-aluminum conductors

The alloy-aluminum conductors shall be assembled with alloy-aluminum wires, as indicated in the section 5.1.4. and manufactured as indicated on EN 50182 or ASTM B399.

5.2.4 Copper conductors

The uncompressed copper conductors shall be assembled with copper wire, as indicated in the section 5.1.5. and manufactures as indicates on ASTM B8 or UNE207015.

5.2.5 Steel Overhead Ground Wire Strand

The coated steel conductors shall be assembled with galvanized or aluminum-clad steel wires, as indicated in the section 5.1.1. and 5.1.2. Galvanized ground wires shall be manufactured as indicated on ASTM A363 and aluminum-clad ground wires as indicated on EN50182.

5.2.6 Greases

The Concentric-Lay-Stranded Aluminum Conductors, Aluminum-Coated-Steel Reinforced and Alloy-Aluminum Conductors could be provided with or without greases, applied to the both internal or external layers (see Figure 1), as indicated in the GS Type Code List.

The grease shall be chemically neutral with respect to aluminum, zinc and steel, free of impurities, uniform throughout of length of the conductor and cold applied (Type A). It must have the characteristics described in the standards EN 50326 or IEC 61394 for a designation 30A125. and the stability under short-circuit must be tested with 250 ºC for 1,5 seconds.

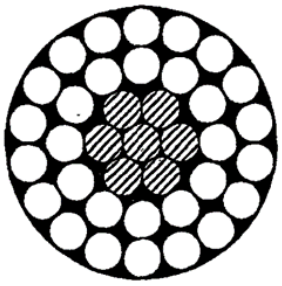

Figure 1 – Greased Conductors.

The volume and mass of the grease shall be calculated as indicated on Annex B from EN-50182. Special conditions other than that could be specified on Local Sections or specific orders.

5.3 SURFACE

The surface of the conductor shall be free from all imperfections visible to the unaided eye (normal corrective lenses accepted), such as nicks, indentations, etc., not consistent with good commercial practice.

5.4 Conductor diameter

The diameter of the conductor shall not vary from the nominal values more than the limits indicated in the referenced standards.

5.5 Stranding

All wires of the conductor shall be concentrically stranded.

Adjacent wire layers shall be stranded with reverse lay directions.

The directions of lay of the external layer shall be “right-hand” (Z) to conductors type ACSR, ACSR/AW, AAAC and ARLE.

The directions of lay of the external layer shall be “left-hand” (S) to conductors type AC.

The direction of lay of the external layer to copper conductor shall be “right-hand” or “left-hand”, as indicated in the GS Type List.

The wires in each layer shall be every and closely stranded around the underlying wire of wires.

5.6 Joints

Conductors with only one steel wire, shall not be made any joints after heat treatment of wires or rods. There shall be no joints of any kind made in the zinc-coated or aluminum-coated steel core wire or wires during stranding.

Before stranding, no more than one joint shall be accepted in the aluminum wires per length of conductor. During stranding, no wire welds shall be made for the purpose of achieving the required conductor length.

Joints are permitted in aluminum or copper wires unavoidably broken during stranding, provided such breaks are not associated with either inherently defective wire or with the use of short lengths of wires. Joints shall conform to the geometry of original wire, i.e., joints shall be dressed smoothly with a diameter equal to that of the parent wires and shall not be kinked. Joints shall not be made in the finished copper wires composing conductors of seven wires or less.

Joints in wires shall not be closer than 15 m form a joint in the same wire or in any other wire of the completed conductor. The quantity of joints per length shall not be greater than values indicated in the standards of reference.

Joints shall be made by electric butt welding, electric butt cold upset welding or cold pressure welding and other approved methods. These joints shall be made in accordance with good commercial practice. The first type of joints shall be electrically annealed for approximately 250 mm on both sides of the weld.

5.7 Mass per unit of length

The mass per unit length of the conductor shall be calculated using densities, stranding increments and cross-sectional areas of all kind of wires. The mass per unit length of the conductor without grease shall not vary from its nominal value by more than ± 2 %.

The mass per unit length of the grease on greased conductors shall not vary from its nominal value by more than ± 20 %.

5.8 Rated tensile strength

Rated tensile strength are result of sum of the tensile strength of all wires that compose the conductor, as indicated in the referenced standards shown in the GS Type Code List.

5.9 Electrical resistance

The electrical DC resistance at 20 ^{o}C of a conductor, expressed in Ω / km and with three decimals, is calculated using the value of the resistivity of the wires used.

6 TESTS

6.1 Type Test

Type test shall be carried out over conductors considered in this Global Standard in order to verify its main characteristics that depended mainly on its design.

Each manufacture shall make these tests once for a new design or manufacturing process of conductor and the subsequently repeated only when the design or manufacturing process is changed. The type test shall be analyzed by the purchaser using the requirements of this Global Standard and requirements of homologation procedures.

Type tests of wires and conductors of type ACSR, ACSR/AW, AAAC, AC and ARLE shall be carried out as the procedures of EN50182 and are shown in the table below. Additional test could be indicated in Local Section.

Type Tests		Clause EN50182
Conductor	- surface condition	6.4.1
	- diameter	6.4.2
	- inertness	6.4.3
	- lay ratio and direction of lay	6.4.4
	- number and type of wires	6.4.5
	- mass per unit length	6.4.6
	- stress-strain curve	6.4.7
	- tensile breaking strength	6.4.8
	- stringing test	6.4.9
Aluminium wires	diameter	6.5.2
	- tensile strength	6.5.2
	- elongation (1)	6.5.2
	- resistivity	6.5.2
	- wrapping test	6.5.2
	- welding	6.5.3
Zinc coated Steel wires	- diameter	6.5.2
	- tensile strength	6.5.2
	- stress at 1 % extension	6.5.2
	- elongation or torsion test	6.5.2
	- wrapping test	6.5.2
	- mass of zinc	6.5.2
	- zinc dip test	6.5.2
	- adhesion of zinc coating	6.5.2
Aluminium-clad Steel wires	- diameter	6.5.2
	- tensile strength	6.5.2
	- stress at 1 % extension	6.5.2
	- elongation	6.5.2
	- torsion	6.5.2
	- cladding thickness/uniformity	6.5.2
	- resistivity	6.5.2
Grease	- mass per unit length	6.6.1
	- drop point (high temperature stability)	6.6.2
(1) Elongation test for AL1 wires is not required		

Type tests for cooper conductors, type CC, shall be carried out as the procedures of UNE207015 and are shown in the table below. Additional test could be indicated in Local Section.

Type Tests		Clause UNE207015
Conductor	- surface condition	5.3
	- diameter	5.4 and 5.5
	- lay ratio and direction of lay	9.3.5
	- number and type of wires	5.4
	- mass per unit length	8.2
	- tensile breaking strength	9.3.4
	- electrical resistance	8.1 and 9.4.2
Cooper wires	- hard cooper	5.1
	- diameter	5.4 and 5.5
	- elongation	9.3.1
	- alternative bends	9.3.2
	- resistivity	9.4.1
	- torsion	9.3.3
	- welding	7

6.2 Sample test

Sample test shall be carried out to guarantee the quality of conductors and compliance with the requirements of this standard. Shall be informed in the purchase order about the presence of a inspector as representative of the purchaser during the sample tests

The list of sample tests of wires and conductors are shown in the Local Section and shall be carried out as the procedures of referenced standards.

7 CONDITIONS OF SUPPLY

The conductor shall be suitably protected against damage which could in ordinary handling and shipping. The reel shall be protected with staves or similar protection

The reel shall be capable to supporting the weight of the conductor both during and after transport, by truck, crane movements or forklift truck, without cause damage to the conductor.

The drum bore shall be capable to supporting the weight of the conductor and respect the minimum bend radio.

The reel shall be loaded and unloaded by crane capable to support its weight.

These ends internally secured to the spools, must be mechanically protected against possible damages resulting from handling and transportation of each spool, leaving both ends accessible through the use of an internal helix or reel on each spool.

Specific characteristics are detailed in Local Section.

8 PACKING AND MARKING

Each reel shall be identified with an indelible and easily legible mark on the external faces, as indicated in the Local Section

9 LENGTH TOLERANCE

The admitted tolerance for a size is equal to ± 5% of the length indicated in the order. The equipment used to measure the length of the conductor shall be accurate to ± 1%.

10 Warranty

Requirement of warranty will be indicated the moment of request for bids it, indicating periods and standards.

11 GS Type Codes List

GS Type Code	Denomination GSC003	Al. wires Nº / diam. Ud. / (mm)		Steel wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Mass per unit length (kg/Km)	Rated strength (daN)	Coeff. Of linear expansion (x10-6)	Final Modulus of elasticity (kN/mm2)	Grease (Yes/No)
GSC003/01	ACSR 25	6	2,12	1	2,12	24,71	6,36	1,3203	85,5	794	18,8	74,3	No
GSC003/08	ACSR 28 (G)	6	2,25	1	2,25	27,83	6,75	1,1721	96,3	895	18,8	74,3	Yes
GSC003/02	ACSR 39	6	2,67	1	2,67	39,19	8,01	0,8324	135,6	1.209	18,8	74,3	No
GSC003/11#	ACSR 55	6	3,15	1	3,15	54,55	9,45	0,598	188,8	1.629	18,8	74,3	No
GSC003/42	ACSR 56	6	3,2	1	3,2	56,30	9,6	0,5795	194,8	1.681	18,8	74,3	No
GSC003/09	ACSR 56 (G)	6	3,2	1	3,2	56,30	9,6	0,5795	194,8	1.681	18,8	74,3	Yes
GSC003/03	ACSR 62	6	3,37	1	3,37	62,44	10,11	0,5225	216,1	1.864	18,8	74,3	No
GSC003/04#	ACSR 79	6	3,78	1	3,78	78,55	11,34	0,4153	271,8	2.312	18,8	74,3	No
GSC003/43#	ACSR 81	26	1,85	7	1,44	81,29	11,72	0,4034	282,2	2.627	18,9	73,9	No
GSC003/77	ACSR 82	12	2,34	7	2,34	81,71	11,7	0,5147	377,9	4.335	15,3	104,7	No
GSC003/47	ACSR 108	12	2,69	7	2,69	107,98	13,45	0,3895	499,5	5.695	15,3	104,7	No
GSC003/44	ACSR 110	26	2,15	7	1,67	109,73	13,61	0,2987	380,6	3.493	18,9	73,9	No
GSC003/10	ACSR 110 (G)	26	2,15	7	1,67	109,73	13,61	0,2987	380,6	3.493	18,9	73,9	Yes
GSC003/14#	ACSR 116	30	2	7	2	116,24	14	0,2964	432,5	4.317	17,9	80,5	No
GSC003/05#	ACSR 125	6	4,77	1	4,77	125,09	14,31	0,2608	432,9	3.681	18,8	74,3	No
GSC003/45	ACSR 141	26	2,44	7	1,9	141,42	15,46	0,2319	491,0	4.450	18,9	73,9	No
GSC003/78	ACSR 142	12	3,08	7	3,08	141,56	15,4	0,2971	654,8	7.212	15,3	104,7	No
GSC003/46	ACSR 149	26	2,5	7	1,95	148,53	15,85	0,2209	516,0	4.679	18,8	74,0	No
GSC003/06#	ACSR 157	26	2,57	7	2	156,87	16,28	0,2091	544,5	4.866	18,9	73,9	No
GSC003/79	ACSR 169	12	3,37	7	3,37	169,47	16,85	0,2482	783,9	8.634	15,3	104,7	No
GSC003/53	ACSR 173	26	2,7	7	2,1	173,11	17,1	0,1894	600,8	5.367	18,9	73,9	No
GSC003/95	ACSR 173 (G)	26	2,7	7	2,1	173,11	17,1	0,1894	600,8	5.367	18,9	73,9	Yes
GSC003/17#	ACSR 182	30	2,5	7	2,5	181,62	17,5	0,1897	675,8	6.494	17,9	80,5	No
GSC003/07#	ACSR 198	26	2,89	7	2,25	198,39	18,31	0,1653	688,7	6.156	18,9	73,9	No
GSC003/96	ACSR 214 (G)	26	3,00	7	2,33	213,60	19,0	0,1535	741,0	6.522	18,9	73,8	Yes
GSC003/54#	ACSR 281	26	3,44	7	2,68	281,13	21,8	0,1167	976,2	8.489	18,9	74,0	No
GSC003/98	ACSR 281 (G)	26	3,44	7	2,68	281,13	21,8	0,1167	976,2	8.489	18,9	74,0	Yes
GSC003/48	ACSR 298	18	4,47	1	4,47	298,17	22,35	0,1011	899,5	6.246	21,1	62,1	No
GSC003/80	ACSR 329	26	3,72	7	2,89	328,50	23,55	0,0998	1139,6	9.756	18,9	73,9	No
GSC003/55	ACSR 346	24	4,03	7	2,69	345,92	24,19	0,0925	1156,2	9.433	19,4	70,5	No
GSC003/56	ACSR 354	26	3,86	7	3	353,74	24,44	0,0927	1227,3	10.509	18,9	73,9	No
GSC003/97	ACSR 354 (G)	26	3,86	7	3	353,74	24,44	0,0927	1227,3	10.509	18,9	73,9	Yes
GSC003/49	ACSR 372	26	3,97	7	3,01	371,65	24,91	0,0878	1278,4	10.629	19	73,1	No
GSC003/57#	ACSR 381	54	2,82	7	2,82	380,99	25,38	0,0842	1274,6	10.718	19,4	70,5	No
GSC003/58#	ACSR 454	54	3,08	7	3,08	454,49	27,72	0,0706	1520,5	12.375	19,4	70,5	No
GSC003/50	ACSR 468	26	4,44	7	3,45	468,00	28,11	0,0701	1623,6	13.639	18,9	73,9	No
GSC003/51	ACSR 517	45	3,7	7	2,47	517,39	29,61	0,0592	1599,3	11.565	20,8	63,8	No
GSC003/59#	ACSR 547	54	3,38	7	3,38	547,33	30,42	0,0586	1831,1	14.904	19,4	70,5	No
GSC003/99	ACSR 547 (G)	54	3,38	7	3,38	547,33	30,42	0,0586	1831,1	14.904	19,4	70,5	Yes
GSC003/60	ACSR 824	54	4,14	19	2,55	823,95	37,59	0,039	2770,1	22.693	19,4	70,9	No
GSC003/12#	ACSR/AW 55	6	3,15	1	3,15	54,55	9,45	0,5802	179,5	1.707	19,7	69,9	No
GSC003/81	ACSR/AW 55 (G)	6	3,15	1	3,15	54,55	9,45	0,5802	179,5	1.707	19,7	69,9	Yes
GSC003/92#	ACSR/AW 79	6	3,78	1	3,78	78,55	11,34	0,403	258,5	2.312	19,7	69,9	No
GSC003/13	ACSR/AW 79 (G)	6	3,78	1	3,78	78,55	11,34	0,403	258,5	2.312	19,7	69,9	Yes
GSC003/102#	ACSR/AW 125	6	4,77	1	4,77	125,09	14,31	0,2531	411,6	3.503	19,7	69,9	No
GSC003/15	ACSR/AW 125 (G)	6	4,77	1	4,77	125,09	14,31	0,2531	411,6	3.503	19,7	69,9	Yes
GSC003/103	ACSR/AW 148	15	3,15	4	3,15	148,07	15,75	0,2264	529,8	5.669	18,6	76,9	No

to be used in the construction of new lines

GS Type Code	Denomination GSC003	Al. wires Nº / diam. Ud. / (mm)		Steel wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Mass per unit length (kg/Km)	Rated strength (daN)	Coeff. Of linear expansion (x10-6)	Final Modulus of elasticity (kN/mm2)	Grease (Yes/No)
GSC003/16	ACSR/AW 148 (G)	15	3,15	4	3,15	148,07	15,75	0,2264	529,8	5.669	18,6	76,9	Yes
GSC003/41#	ACSR/AW 149	26	2,5	7	1,95	148,53	15,85	0,2144	491,0	4.742	19,8	69,6	No
GSC003/52	ACSR/AW 149 (G)	26	2,5	7	1,95	148,53	15,85	0,2144	491,0	4.742	19,8	69,6	Yes
GSC003/61#	ACSR/AW 157	26	2,57	7	2	156,87	16,28	0,203	518,2	4.932	19,8	69,6	No
GSC003/104#	ACSR/AW 182	30	2,5	7	2,5	181,62	17,5	0,1819	634,7	6.700	19	74,7	No
GSC003/18	ACSR/AW 182 (G)	30	2,5	7	2,5	181,62	17,5	0,1819	634,7	6.700	19	74,7	Yes
GSC003/62#	ACSR/AW 281	26	3,44	7	2,68	281,13	21,8	0,1133	929,0	8.726	19,8	69,6	No
GSC003/63#	ACSR/AW 381	54	2,82	7	2,82	380,99	25,38	0,0822	1222,3	10.980	20,3	66,9	No
GSC003/64#	ACSR/AW 454	54	3,08	7	3,08	454,49	27,72	0,0689	1458,1	12.897	20,3	66,9	No
GSC003/65#	ACSR/AW 547	54	3,38	7	3,38	547,33	30,42	0,0572	1756,0	15.406	20,3	66,9	No
GSC003/100	ACSR/AW 594	54	3,52	7	3,52	593,62	31,68	0,0528	1904,5	16.174	20,3	66,9	No
GSC003/19	AAAC 25	7	2,13	-	-	24,94	6,39	1,3313	68,1	735	23	63,30	No
GSC003/82	AAAC 25 (G)	7	2,13	-	-	24,94	6,39	1,3313	68,1	735	23	63,30	Yes
GSC003/20	AAAC 50	7	3,02	-	-	50,14	9,06	0,6623	136,9	1.479	23	63,30	No
GSC003/83	AAAC 50 (G)	7	3,02	-	-	50,14	9,06	0,6623	136,9	1.479	23	63,30	Yes
GSC003/22	AAAC 67 (G)	7	3,5	-	-	67,35	10,5	0,4931	183,9	1.986	23	63,30	Yes
GSC003/21	AAAC 70	19	2,17	-	-	70,27	10,85	0,4753	192,9	2.072	23	61,20	No
GSC003/84	AAAC 70 (G)	19	2,17	-	-	70,27	10,85	0,4753	192,9	2.072	23	61,20	Yes
GSC003/23	AAAC 120	19	2,83	-	-	119,51	14,15	0,2795	328,1	3.525	23	61,20	No
GSC003/85	AAAC 120 (G)	19	2,83	-	-	119,51	14,15	0,2795	328,1	3.525	23	61,20	Yes
GSC003/32	AAAC 148	19	3,15	-	-	148,07	15,75	0,2256	406,5	4.368	23	61,20	No
GSC003/24	AAAC 161	19	3,28	-	-	160,54	16,4	0,208	440,7	4.736	23	61,20	No
GSC003/86	AAAC 161 (G)	19	3,28	-	-	160,54	16,4	0,208	440,7	4.736	23	61,20	Yes
GSC003/66	AAAC 188	19	3,55	-	-	188,06	17,75	0,1776	516,3	5.547	23	61,20	No
GSC003/25	AAAC 200	19	3,66	-	-	199,90	18,3	0,1671	548,8	5.896	23	61,20	No
GSC003/87	AAAC 200 (G)	19	3,66	-	-	199,90	18,3	0,1671	548,8	5.896	23	61,20	Yes
GSC003/26	AAAC 236 (G)	37	2,85	-	-	236,04	19,95	0,142	650,2	6.963	23	58,90	Yes
GSC003/27	AAAC 240	61	2,24	-	-	240,39	20,16	0,1399	664,4	7.091	23	58,30	No
GSC003/67	AAAC 279	37	3,1	-	-	279,26	21,7	0,12	769,3	8.238	23	58,90	No
GSC003/68	AAAC 303 (G)	37	3,23	-	-	303,18	22,61	0,1106	835,2	8.943	23	58,90	Yes
GSC003/28	AAAC 315	37	3,29	-	-	314,55	23,03	0,1066	866,5	9.279	23	58,90	No
GSC003/88	AAAC 315 (G)	37	3,29	-	-	314,55	23,03	0,1066	866,5	9.279	23	58,90	Yes
GSC003/69	AAAC 381	61	2,82	-	-	380,99	25,38	0,0883	1053,0	11.239	23	58,30	No
GSC003/29	AAAC 400	37	3,71	-	-	399,98	25,97	0,0838	1101,9	11.799	23	58,90	No
GSC003/89	AAAC 400 (G)	37	3,71	-	-	399,98	25,97	0,0838	1101,9	11.799	23	58,90	Yes
GSC003/70	AAAC 454	61	3,08	-	-	454,49	27,72	0,074	1256,1	13.407	23	58,30	No
GSC003/71	AAAC 500 (G) 61H	61	3,23	-	-	499,83	29,07	0,0673	1381,4	14.745	23	58,30	Yes
GSC003/30	AAAC 500	37	4,15	-	-	500,48	29,05	0,067	1378,7	14.764	23	58,90	No
GSC003/90	AAAC 500 (G)	37	4,15	-	-	500,48	29,05	0,067	1378,7	14.764	23	58,90	Yes
GSC003/101	AAAC 607 (G)	61	3,56	-	-	607,18	32,04	0,0554	1678,1	17.911	23	58,30	Yes
GSC003/31	AAAC 631	37	4,66	-	-	631,05	32,62	0,0531	1738,4	18.615	23	58,90	No
GSC003/91	AAAC 631 (G)	37	4,66	-	-	631,05	32,62	0,0531	1738,4	18.615	23	58,90	Yes
GSC003/72	AAAC 681	61	3,77	-	-	680,93	33,93	0,0494	1881,9	20.087	23	58,30	No
GSC003/73	AC 51	-	-	7	3,05	51,14	9,15	3,7959	401,9	5.626	11,5	190	No
GSC003/74	AC 69	-	-	7	3,55	69,29	10,65	2,8019	544,4	7.621	11,5	190	No
GSC003/75	ARLE 47	-	-	7	2,91	46,56	8,73	1,8417	309,9	5.587	13	159	No
GSC003/76	ARLE 58	-	-	7	3,26	58,43	9,78	1,4675	388,9	6.895	13	159	No

to be used in the construction of new lines

GS Type Code	Denomination GSC003	Copper wires Nº / diam. Ud. / (mm)		Total Area (mm2)	Total diameter (mm)	DC Resistance (Ω/km)	Mass per unit length (kg/Km)	Coeff. Of linear expansion (x10-6)	Final Modulus of elasticity (kN/mm2)	Grease (Yes/No)	Direction of Lay
GSC003/33	CC 23	7	2,06	23,33	6,18	0,795	212	17	105	No	Left(S)
GSC003/34	CC 34	7	2,5	34,36	7,5	0,538	312	17	105	No	Left(S)
GSC003/37	CC 35	7	2,52	34,91	7,56	0,529	317	17	105	No	Right(Z)
GSC003/38	CC 49	7	3	49,48	9	0,372	449	17	105	No	Right(Z)
GSC003/35	CC 67	19	2,12	67,07	10,6	0,276	612	17	105	No	Left(S)
GSC003/39	CC 70	19	2,17	70,27	10,85	0,268	641	17	105	No	Right(Z)
GSC003/36	CC 93	19	2,5	93,27	12,5	0,198	850	17	105	No	Left(S)
GSC003/40	CC 95	19	2,52	94,76	12,6	0,196	864	17	105	No	Right(Z)
GSC003/94	CC 500	61	3,23	499,83	29,07	0,0366	4586	17	105	No	Left(S)
GSC003/93	CC 1015	127	3,19	1015,02	41,47	0,018	9272	17	105	No	Left(S)

Values of DC Resistance, Mass per unit length, Rated Strength, Coefficient of linear expansion and Final Modulus of elasticity presented on the tables above are calculated values using the method indicated on relevant standard and IEC-TR 61597.

Nominal values specified on the local sections or a specific order could present some variation from the indicated values, with a deviation no greater than ±2% of the value indicated.

12 Common List

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GS Type Code	**Type**	**Code Words**	**Distribution Company and Country**	**Country Code**	**TAM Description**
GSC003/33	CC	CC 23	Enel Chile	310129	CABLE CU DESN SEMIDURO 25MM2 7H
GSC003/34	CC	CC 34	Enel Chile	310130	CABLE CU DESN SEMIDURO 35MM2 7H
GSC003/35	CC	CC 67	Enel Chile	310131	CABLE CU DESN SEMIDUR 70MM2 19H GSC003
GSC003/94	CC	CC 500	Enel Chile	tbd	-
GSC003/93	CC	CC 1015	Enel Chile	tbd	-
GSC003/21	AAAC	AAAC 70	Enel Chile	310152	CABLE AL DESN AAAC 70MM2 19H E-MT-003
GSC003/23	AAAC	AAAC 120	Enel Chile	310153	CABLE AL DESN AAAC 120MM2 19H E-MT-003
GSC003/27	AAAC	AAAC 240	Enel Chile	310154	CABLE AL DESN AAAC 240MM2 61H E-MT-003
GSC003/04	ACSR	ACSR 79	Enel Chile	310009	Conductor ACSR MT 78,6 mm2 Quail
GSC003/07	ACSR	ACSR 198	Enel Chile	310010	Conductor ACSR MT 198,4 mm2 Linnet
GSC003/24	AAAC	AAAC 161	Enel Chile	310017	Conduc AAAC 161-AL3 GSC003/24
GSC003/25	AAAC	AAAC 200	Enel Chile	310016	Conduc AAAC 200-AL3 GSC003/25
GSC003/28	AAAC	AAAC 315	Enel Chile	310015	Conduc AAAC 315-AL3 GSC003/28
GSC003/29	AAAC	AAAC 400	Enel Chile	310014	Conduc AAAC 400-AL3 GSC003/29
GSC003/30	AAAC	AAAC 500	Enel Chile	310013	Conduc AAAC 500-AL3 GSC003/30
GSC003/31	AAAC	AAAC 631	Enel Chile	310012	Conduc AAAC 631-AL3 GSC003/31
GSC003/73	AC	AC 51	Enel Chile	310011	Conduc AC 51-ST1A GSC003/73
GSC003/41	ACSR/AW	ACSR/AW 149	Enel Romania	310016	Conductor OL-AL 128 /21 mm2 tip ACSR/AW149 GSC003/41
GSC003/42	ACSR	ACSR 56	Enel Romania	631302	CONDUCTOR AL-OL NEIZOLAT 50/8MMP
GSC003/43	ACSR	ACSR 81	Enel Romania	631303	CONDUCTOR AL-OL NEIZOLAT 70/12MMP
GSC003/44	ACSR	ACSR 110	Enel Romania	631248	CONDUCTOR OL-AL.NORM. 95/15, PT.LEA
GSC003/45	ACSR	ACSR 141	Enel Romania	631305	CONDUCTOR AL-OL NEIZOLAT 120/21MMP
GSC003/46	ACSR	ACSR 149	Enel Romania	tbd	-
GSC003/95	ACSR	ACSR 173 (G)	Enel Romania	310011	Conductor OL-AL 149/24 mmp2 tip ACSR 173 (G) GSC003/95
GSC003/96	ACSR	ACSR 214 (G)	Enel Romania	310012	Conductor OL-AL 184/30 mmp2 tip ACSR 214 (G) GSC003/96
GSC003/97	ACSR	ACSR 354 (G)	Enel Romania	310014	Conductor OL-AL 304/49 mmp2 tip ACSR 354 (G) GSC003/97
GSC003/98	ACSR	ACSR 281 (G)	Enel Romania	310013	Conductor OL-AL 242/39 mmp2 tip ACSR 281 (G) GSC003/98
GSC003/99	ACSR	ACSR 547 (G)	Enel Romania	310015	Conductor OL-AL 485/63 mmp2 tip ACSR 547 (G) GSC003/99
GSC003/13	ACSR/AW	ACSR/AW 79 (G)	Enel Peru	310407	ACSR/AW 79 (G)
GSC003/18	ACSR/AW	ACSR/AW 182 (G)	Enel Peru	310405	ACSR/AW 182 (G)
GSC003/52	ACSR/AW	ACSR/AW 149 (G)	Enel Peru	310406	ACSR/AW 149 (G)
GSC003/68	AAAC	AAAC 303 (G)	Enel Peru	310379	CONDUCTORDESN.AAAC.37H.304MM2-C/GRASA
GSC003/71	AAAC	AAAC 500 (G)	Enel Peru	310380	CONDUCTOR DESN.AAAC.61H.490MM2-C/GRASA
GSC003/101	AAAC	AAAC 607 (G)	Enel Peru	310373	CONDUCTOR DESN.AAAC.61H.608 MM2-C/GRASA
GSC003/02	ACSR	ACSR 39	Enel Colombia	6762310	CABLE 2 AWG ACSR DESNUDO
GSC003/03	ACSR	ACSR 62	Enel Colombia	6762276	CABLE 1/0 AWG ACSR DESNUDO
GSC003/04	ACSR	ACSR 79	Enel Colombia	6762335	CABLE 2/0 ACSR DESNUDO
GSC003/05	ACSR	ACSR 125	Enel Colombia	6762309	CABLE 4/0 AWG ACSR DESNUDO
GSC003/06	ACSR	ACSR 157	Enel Colombia	6762293	CABLE 266,8 MCM ACSR DESNUDO
GSC003/12	ACSR/AW	ACSR/AW 55	E-distribuzione Italia	317056	CORDA AL-AC DIAM 9,45 LINEE MT
GSC003/41	ACSR/AW	ACSR/AW 149	E-distribuzione Italia	317011	CORDA ALAC 150MMQ
GSC003/08	ACSR	ACSR 28 (G)	Edesur Argentina	0101-0374	CONDUCTOR DESNUDO AL-AO 25/4 MM² LAMT
GSC003/09	ACSR	ACSR 56 (G)	Edesur Argentina	0101-0254	CONDUCTOR DESN AL AO 50 8 MM2 LAMT
GSC003/10	ACSR	ACSR 110 (G)	Edesur Argentina	0101-0255	CONDUCTOR DESN AL AO 95 15 MM2 LAMT
GSC003/11	ACSR	ACSR 55	edistribución España	310071	CONDUCTOR 47AL1/8ST1A (COD.ANT.:LA-56)
GSC003/14	ACSR	ACSR 116	edistribución España	310050	CONDUCTOR 94-AL1/22-ST1A(COD.ANT.LA-110)

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GS Type Code	**Type**	**Code Words**	**Distribution Company and Country**	**Country Code**	**TAM Description**
GSC003/17	ACSR	ACSR 182	edistribución España	310051	CONDUCTOR 147-AL1/34-ST1A(COD.ANT.LA-180
GSC003/32	AAAC	AAAC 148	edistribución España	160297	CONDUCTOR 148-AL3 (CODIGO ANTIGUO:D-145)
GSC003/37	CC	CC 35	edistribución España	310059	CABLE LINEAS AÉREAS COBRE C35
GSC003/38	CC	CC 49	edistribución España	310060	CABLE LINEAS AÉREAS COBRE C50E
GSC003/39	CC	CC 70	edistribución España	310010	CABLE LINEAS AÉREAS COBRE C70
GSC003/40	CC	CC 95	edistribución España	310061	CABLE LINEAS AÉREAS COBRE C95
GSC003/54	ACSR	ACSR 281	edistribución España	310018	CABLE 242-AL1/39-ST1A (LA-280)
GSC003/57	ACSR	ACSR 381	edistribución España	310019	CABLE 337-AL1/44-ST1A (LA-380)
GSC003/58	ACSR	ACSR 454	edistribución España	310030	CABLE 402-AL1/52-ST1A (LA-455)
GSC003/59	ACSR	ACSR 547	edistribución España	310080	CABLE 485-AL1/63-ST1A (LA-545)
GSC003/62	ACSR/AW	ACSR/AW 281	edistribución España	310032	CABLE 242-AL1/39-A20SA (LARL HAWK)
GSC003/63	ACSR/AW	ACSR/AW 381	edistribución España	310033	CABLE 337-AL1/44-A20SA (LARL GULL)
GSC003/64	ACSR/AW	ACSR/AW 454	edistribución España	310034	CABLE 402-AL1/52-A20SA (LARL CONDOR)
GSC003/66	AAAC	AAAC 188	edistribución España	310014	CABLE 188-AL3 (D-180)
GSC003/67	AAAC	AAAC 279	edistribución España	310015	CABLE 279-AL3 (D-280)
GSC003/69	AAAC	AAAC 381	edistribución España	310016	CABLE 381-AL3 (D-400)
GSC003/70	AAAC	AAAC 454	edistribución España	310017	CABLE 454-AL3 (D-450)
GSC003/73	AC	AC 51	edistribución España	710063	CABLE ACERO GALVANIZADO 49ST1A (AC-50)
GSC003/74	AC	AC 69	edistribución España	710064	CABLE ACERO GALVANIZADO 69ST1A (AC-70)
GSC003/75	ARLE	ARLE 47	edistribución España	310020	CABLE TIERRA ACERO 47-A20SA (ARLE-8,71)
GSC003/76	ARLE	ARLE 58	edistribución España	310021	CABLE TIERRA ACERO 58-A20SA (ARLE-9,78)
GSC003/12	ACSR/AW	ACSR/AW 55	edistribución España	tbd	CONDUCTOR 47AL1/8-A20SA(LARL-56)NO GRASA
GSC003/81	ACSR/AW	ACSR/AW 55 (G)	edistribución España	tbd	CONDUCT. 47AL1/8-A20SA(LARL-56)ENGRASADO
GSC003/92	ACSR/AW	ACSR/AW 79	edistribución España	tbd	CONDUCT. 67AL1/11-A20SA(LARL-78)NO GRASA
GSC003/13	ACSR/AW	ACSR/AW 79 (G)	edistribución España	tbd	CONDUCT.67AL1/11-A20SA(LARL-78)ENGRASADO
GSC003/102	ACSR/AW	ACSR/AW 125	edistribución España	tbd	COND. 107AL1/18-A20SA(LARL-125E)NO GRASA
GSC003/15	ACSR/AW	ACSR/AW 125 (G)	edistribución España	tbd	COND.107AL1/18-A20SA(LARL-125E)ENGRASADO
GSC003/103	ACSR/AW	ACSR/AW 148	edistribución España	tbd	COND. 117AL1/31-A20SA(LARL-145E)NO GRASA
GSC003/16	ACSR/AW	ACSR/AW 148 (G)	edistribución España	tbd	COND.117AL1/31-A20SA(LARL-145E)ENGRASADO

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GS Type Code	**Type**	**Code Words**	**Distribution Company and Country**	**Country Code**	**TAM Description**
GSC003/104	ACSR/AW	ACSR/AW 182	edistribución España	tbd	CONDUC.147AL1/34-A20SA(LARL-180)NO GRASA
GSC003/18	ACSR/AW	ACSR/AW 182 (G)	edistribución España	tbd	COND. 147AL1/34-A20SA(LARL-180)ENGRASADO
GSC003/01	ACSR	ACSR 25	AM-BRASIL	6771976	COND AL NÚ CAA 4AWG PM-1955 I1 R4
GSC003/01	ACSR	ACSR 25	CE-BRASIL	6771524	CABO,NU CAA, 4AWG,6/1F,SWAN,GSC003
GSC003/03	ACSR	ACSR 62	AM-BRASIL	6771977	COND AL NU CAA 1/0AWG PM-1955 I2 R4
GSC003/03	ACSR	ACSR 62	CE-BRASIL	6771526	CABO,NU CAA, 1/0AWG,6/1F,RAVEN,GSC003
GSC003/05	ACSR	ACSR 125	BRASIL	6797685	CABO DE ALUM NU CAA A 4/0 - GSC003 ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO GUILHERME TAVEIRA NO DIA 15/08/2018
GSC003/05	ACSR	ACSR 125	BRASIL	4590452	CABO,NU,CAA,4/0AWG,PENGUIN,B - GSC003 ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO GUILHERME TAVEIRA NO DIA 15/08/2018
GSC003/06	ACSR	ACSR 157	BRASIL	6797686	CABO,NU,CAA,CL.A,266MCM,PARTRIDGE,GSC003 CABO, ELETRICO NU AL CAA, TIPO DO MATERIAL:AL,BITOLA: 266,8 MCM,NUMERO DE FASES:1,DESIGNACAO INTERNACIONAL:,MATERIAL DO CONDUTOR: ALUMINIO,FORMACAO :26 X 2.57MM,TEMPERA :TEMPERA H- 19,CLASSE DE ENCORDOAMENTO:AA, FIOS:26 X 7FIOS, DA ALMA:ACO ZINCADO CLASSE A, :7 X 2.00MM,DIAMETRO NOMINAL:16.31MM,SECAO NOMINAL:157.00MM2, . ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELA EQUIPE DE NORMAS ATRAVÉS DO TEAMS NO DIA 07/05/2020
GSC003/06	ACSR	ACSR 157	BRASIL	4590436	CABO DE ALUM NU CAA B 266,8 I4 211.02.0
GSC003/06	ACSR	ACSR 157	CE-BRASIL	6771528	CABO,NU CAA,266.8MCM,26/7F,PART,GSC003
GSC003/07	ACSR	ACSR 198	AM-BRASIL	6807077	CABO,NU,CAA,336MCM.BLOQUE.SUBST.6789864
GSC003/07	ACSR	ACSR 198	BRASIL	4545171	CABO DE ALUM NU CAA B 336,4 I8 211.02.0
GSC003/19	AAAC	AAAC 25	AM-BRASIL	6799027	CONDUTOR LIGA AL 25MM-AAAC-7F-PM2231I1
GSC003/82	AAAC	AAAC 25 (G)	BRASIL	6789875	COND LIGA AL NU ENGRAX AAAC25MM- GSC-003 CONDUTOR NU ENGRAX ² - AAAC - FORMAÇÃO 7 FIOS - ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO RAFAEL KIPPLER NO DIA 06/04/2018
GSC003/20	AAAC	AAAC 50	AM-BRASIL	6799028	CONDUTOR LIGA AL 50MM-AAAC-7F-PM2231I2
GSC003/83	AAAC	AAAC 50 (G)	BRASIL	6789874	COND LIGA AL NU ENGRAX AAAC50MM²PM2231I2
GSC003/20	AAAC	AAAC 50	CE-BRASIL	6790225	CABO,NU,CAL 50MM2,7F,GSC003
GSC003/84	AAAC	AAAC 70 (G)	BRASIL	6789857	COND LIGA AL NU ENGRAX AAAC70MM²PM2231I3
GSC003/23	AAAC	AAAC 120	CE-BRASIL	6804972	CABO,NU,CAL 120MM2,19F,GSC003
GSC003/24	AAAC	AAAC 161	AM-BRASIL	6797634	CONDUTOR LIGA AL 160MM-AAAC-19F- GSC-003
GSC003/86	AAAC	AAAC 161 (G)	BRASIL	4610301	COND LIGA AL NU ENGRAX AAAC160MMPM2231I4
GSC003/24	AAAC	AAAC 161	BRASIL	4565750	CABO,NU,CAL 160MM2,19F,GSC003
GSC003/25	AAAC	AAAC 200	BRASIL	4582212	CONDUTOR LIGA AL 200MM-AAAC-19F- GSC-003 NU - FORMAÇÃO 19 FIOS - ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO RAFAEL KIPPLER NO DIA 06/04/2018
GSC003/87	AAAC	AAAC 200 (G)	BRASIL	6793792	COND LIGA AL NU ENGRAX AAAC200MM GSC-003
GSC003/88	AAAC	AAAC 315 (G)	BRASIL	6793793	COND LIGA AL NU ENGRAX AAAC315MM GSC-003 CONDUTOR NU ENGRAX ² - AAAC – FORMAÇÃO 37 FIOS - ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO RAFAEL KIPPLER NO DIA 06/04/2018
GSC003/33	CC	CC 23	BRASIL	6771501	CABO,CU NU, 25MM2,7F,MEIO-DURO,GSC003
GSC003/34	CC	CC 34	BRASIL	6771502	CABO COBRE NU 35MM2 M DURA CL2A ; BITOLA: ; NUMERO DE FASES: MONOFASICO/UNIPOLAR; TEMPERA: MEIO DURA; ENCORDOAMENTO: CLASSE 2A; PADRAO: ABNT NBR 6524; REQUISITOS ADICIONAIS: GSC003; 7 FIOS; ESP: COELCE - PM-01/210.01.8 I5.
GSC003/35	CC	CC 67	BRASIL	6771504	CABO,CU NU, 70MM2,19F,MEIO-DURO,GSC003
GSC003/36	CC	CC 93	BRASIL	6771505	CABO,CU NU, 95MM2,19F,MEIO-DURO,GSC003
GSC003/04	ACSR	ACSR 79	(RJ,CE, GO)	T310110	CABO, ELETRICO NU AL CAA, TIPO DO MATERIAL:AL,BITOLA: 2/0 AWG,NUMERO DE FASES:1,DESIGNACAO INTERNACIONAL:QUAIL,MATERIAL DO CONDUTOR:ALUMINIO,FORMACAO DO CONDUTOR:6 X

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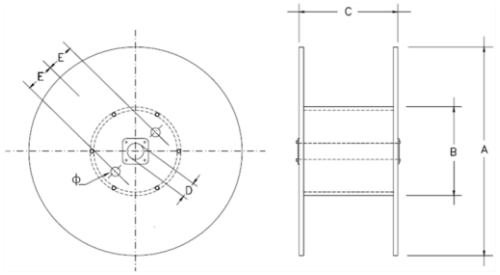
GS Type Code	**Type**	**Code Words**	**Distribution Company and Country**	**Country Code**	**TAM Description**
					3.78MM,TEMPERA DO CONDUTOR:TEMPERA H-19,CLASSE DE ENCORDOAMENTO:AA,NUMERO DE FIOS:6 X 1FIOS,MATERIAL DA ALMA:ACO ZINCADO CLASSE A,FORMACAO DA ALMA:1 X 3.78MM,LANCE NOMINAL POR BOBINA:2080M,DIAMETRO NOMINAL:11.34MM,SECAO NOMINAL:78.55MM2, GSC003.
GSC003/47	ACSR	ACSR 108	(RJ,CE, GO)	6810621	CABO,NU,CAA,134MCM,LEGHORN,B,D21102 ,ALUMÍNIO COM ALMA DE AÇO,,MAT-OMBR-MAT-18-0044- EDBR/ ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO DIOGO GOMES NO DIA 22/07/2019
GSC003/78	ACSR	ACSR 142	(RJ,CE, GO)	T310027	CABO,NU,CAA,176,9MCM,DOTTEREL, B,D21102 - MAT-OMBR-MAT-18-0044-EDBR/D211.02
GSC003/79	ACSR	ACSR 169	(RJ,CE, GO)	T310001	ACSR 169
GSC003/07	ACSR	ACSR 198	(RJ,CE, GO)	6789864	CABO,NU,CAA,336MCM,LINNET,A,D21102.1 ,ALUMÍNIO COM ALMA DE AÇO,336,4,CLASSE
GSC003/80	ACSR	ACSR 329	(RJ,CE, GO)	4616097	CABO,NU,CAA,556MCM,DOVE,B,D21102 ,ALUMÍNIO COM ALMA DE AÇO,556MCM,DOVE,B,MAT-OMBR-MAT-18-0044- EDBR/ ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO DIOGO GOMES NO DIA 22/07/2019
GSC003/49	ACSR	ACSR 372	(RJ,CE, GO)	T310130	CABO, ELETRICO NU AL CAA, 636 MCM 2 TIPO DO MATERIAL:AL,BITOLA:,NUMERO DE FASES:1,DESIGNACAO INTERNACIO NAL:GROSBEAK,MATERIAL DO CONDUTOR:ALUMINIO,FORMACAO :26 X 3.97MM,TEMPERA :TEMP ERA H-19,CLASSE DE ENCORDOAMENTO:AA, FIOS:26 X 7FIOS, DA ALMA:ACO ZINCADO CLASSE A, :7 X 3.09MM,LANCE NOMINAL POR BOBINA:1860M,DIAMETRO NOMINAL:25.15MM,SECAO NOMINAL:37 4.3MM2,ESPECIFICACAO TECNICA CELG:NTC-42 Rev 2.
GSC003/50	ACSR	ACSR 468	(RJ,CE, GO)	T310135	CABO, ELETRICO NU AL CAA, 795 MCM 2 TIPO DO MATERIAL:AL,BITOLA:795 MCM,NUMERO DE FASES:1,DESIGNACAO INTERNACIO NAL:DRAKE,MATERIAL DO CONDUTOR:ALUMINIO,FORMACAO DO CONDUTOR:26 X 4.44MM,TEMPERA DO CONDUTOR:TEMPERA H-19,CLASSE DE ENCORDOAMENTO:AA,NUMERO DE FIOS:26 X 7FIOS,MATERIAL DA ALMA:ACO ZINCADO CLASSE A,FOR MACAO DA ALMA:7 X 3.45MM,LANCE NOMINAL POR BOBINA:1490M,DIAMETRO NOMINAL:28.13MM,SECAO NOMINAL:468MM 2,ESPECIFICACAO TECNICA CELG:NTC-42 Rev 2. , .
GSC003/50	ACSR	ACSR 468	(RJ,CE, GO)	4545168	CABO,NU,CAA,795MCM,DRAKE,B,D21102 ELÉTRICO AL NU CAA 795MCM 26/7 FIOS DRAKE CABO, NÚ,ALUMÍNIO COM ALMA DE AÇO,795MCM,DRAKE,B,MAT-OMBR-MAT-18-0044- EDBR/ ALTERAÇÃO DA DESCRIÇÃO SOLICITADA PELO DIOGO GOMES NO DIA 22/07/2019
GSC003/51	ACSR	ACSR 517	(RJ,CE, GO)	T310471	CABO CAA 954 MCM RAIL,CLASSE DE ZINCAGEM B, CONFORME MAT-OMBR-MAT-18-0044-EDBR / PM-BR 211.02
GSC003/51	ACSR	ACSR 517	(RJ,CE, GO)	6792502	CABO, ELETRICO NU AL CAA, 954 MCM 5 , TIPO DO MATERIAL:AL,BITOLA:,NUMERO DE FASES:1,DESIGNACAO INTERNACIONAL:CARDINAL,MATERIAL DO CONDUTOR:ALUMINIO,FORMACAO :54 X 3.38MM,TEMPERA :H-19,CLASSE DE ENCORDOAMENTO:AA, FIOS:54 X 7FIOS, DA ALMA:ACO ZINCADO CLASSE A, :7 ,DIAMETRO NOMINAL:30.42MM,SECAO NOMINAL:547.30MM2.

LOCAL SECTION A – LATAM: Brazil, Chilectra (Chile), Codensa (Colombia), Enel Distribución Perù, Edesur (Argentina)

ITEM	TITLE	DESCRIPTION
3.1	International Standards	Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Enel Distribución Perú. • ASTM B398: Standard Specification for Aluminum-Alloy 6201-T81 Wire for Electrical Purposes. • ASTM B399: Standard Specification for Concentric-Lay-Stranded Aluminum-Alloy 6201-T81 Conductors. • ASTM B230: Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes. • ASTM B232: Standard Specification for Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Reinforced (ACSR). • ASTM B498: Standard Specification for Zinc-Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR). • ASTM B500: Standard Specification for Metallic Coated Stranded Steel Core for Aluminum Conductors, Steel Reinforced (ACSR). • ASTM B2: Standard specification for médium-hard-grawn copper wire. • ASTM B8: Standard specification for concentric-lay-stranded copper conductors, hard médium-hard, or soft. Para Enel distribución Perú en el caso de conductores ACSR/AW • EN-50182 : Conductores para líneas eléctricas aéreas. Conductores de alambres redondos cableados en capas concéntricas. • EN 60889: Alambre de aluminio duro para Conductores de líneas aéreas de transporte de energía eléctrica. • EN 61232: Alambres de acero recubiertos de aluminio para usos eléctricos. • EN 50326: Conductores para líneas eléctricas aéreas. Características de los productos de protección (grasas).
3.2	List of replaced Standards	Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Enel distribución Perú, Edesur(Argentina) • E-MT-003: Especificación Técnica de Conductores desnudos para líneas aéreas de tensión hasta 36 kV. • E-LT-001 CONDUCTORES DESNDOS PARA LÍNEAS AÉREAS DE ALTA TENSIÓN
3.3	Local Standards	Edesur(Argentina) • IRAM 2187-I: Conductores de aluminio y de aleación de aluminio con alma de acero de resistencia mecánica normal para líneas aéreas de energía. Codensa (Colombia). • RETIE: Reglamento Técnico de Instalaciones Eléctricas.
5.1.5	Copper wires	Ampla (Brazil), Chilectra (Chile),Codensa (Colombia), Coelce (Brazil), Enel distribución Perú, Edesur (Argentina). Copper wires shall be medium-hard temper, uncoated, under the standards ASTM B2.
5.2.6	Greases	Ampla (Brazil), Chilectra (ChileCoelce (Brazil), Enel distribución Perú, Edesur (Argentina).

		Shall be applied the standard IEC- 61089 y standards EN 50326 or IEC 61394. <u>Ampla (Brazil),</u> Conductors shall be provided with greases, applied to the internal layers as indicated in the Common List. <u>Enel distribución Perú,</u> MT conductors shall be provided with greases, applied to the both internal or external layers as indicated in the Common List. AT conductors shall be provided with greases, applied to the internal layers. <u>Codensa (Colombia),</u> It is not required greases for conductors.
5.5	Stranding	<u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Enel distribución Perú, Edesur(Argentina)</u> The directions of lay of the external layer shall be “left-hand” to copper conductors.
6.1	Type Test	<u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Enel distribución Perú, Edesur(Argentina)</u> • Surface Condition • Overall Diameter • Number and type of wires • Cross section area • Mass per unit length • Rated tensile strength • Elongation • Joints • Electrical resistance • Lay ratio and direction of lay • Grease temperature characteristics For Edesur consider the standard IRAM-2187-I
6.2	Sample test	<u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Enel distribución Perú, Edesur(Argentina)</u> • Number and type of wires • Cross section area • Lay ratio and direction of lay • Mass per unit length • Rated tensile strength (wires) • Electrical resistance (wires) • Grease temperature characteristics The acceptance level shall be determined according to the procedure described in standard IEC 60410 considering AQL 1,5%, level II, simple sampling. For Edesur consider the standard IRAM-2187-I For Peru: -para conductores Aluminum Conductors, Aluminum-Coated-Steel Reinforced de acuerdo a lo señalado en la tabla del item 6.1 de la Sección Local. -para los conductores de aleación de aluminio deberán tener en consideración lo siguientes:

		• Las pruebas serán de acuerdo a lo detallado en el ítem b) del numeral 6.6.2 de la norma IEC 61089. • La prueba de resistencia eléctrica será de acuerdo a la IEC 60468 • Un análisis químico de los elementos constitutivos del alambrón de aleación de aluminio elegida al azar. • Análisis metalográfico de los alambres y el conductor cableado antes y luego de ser sometido a envejecimiento artificial • El fabricante entregará copia del certificado del análisis químico del alambrón, realizado por el fabricante en el lugar de origen respectivo del lote.
7	CONDITIONS OF SUPPLY	<u>Ampla (Brazil), Chilectra (Chile),Codensa (Colombia), Coelce (Brazil), Enel distribución Perú, Edesur (Argentina).</u> The cable shall be delivered by the manufacturer on a wooden or metal spool, which will not be returned, as per maximum and minimum dimensions indicated in Table 4 and in accordance with Figure 2. In order to use the reel in a spooling machine, the reel shall be supplied with two holes spaced at 50 cm, equidistant and aligned with central hole.  Figure 2 – Reel A(1) mm | B mm | C(1) mm | D(2) mm | E mm | Φ(mm) 1730 | (3) | 1120 | 80 | (4) | 50 Table 4 – Dimensions of reel Notes: (1) Maximum value (2) Minimum value (3) Twice of the minimum bend ratio of conductor used to transport , as indicated by the manufacturer. (4) 300 ó 180 mm , according to the type of reel. The wooden spools shall be treated according to the international requirements for the control of plant disease, avoiding the compounds “Pentachlorophenol” and “Creosote”. The treatment must include, at least: highly toxic to xylophagous organisms, high penetration and holding power, chemical stability, non-corrosive substances to metals nor should they affect the physical characteristics of wood. Each reel shall be protected with a plastic coat than avoids the corrosion of the conductor. The total length of the cable supplied may not be less than that requested in the purchase order and shall not be longer by any more than 1%. The maximum gross weight of the packaged spool must not exceed 2500 kg. <u>Codensa (Colombia)</u> In additional to above specified, for Codensa the manufacturers shall to attach the RETIE certification in the first supply. <u>Para Peru:</u> Para los conductores de aleación de aluminio de las secciones 304mm2, 491 mm2 y 608 mm2 se indicará las dimensiones de las bobinas y las longitudes de los conductores en las órdenes de compra.

8	PACKING AND MARKING	<u>Ampla (Brazil), Chilectra (Chile),Codensa (Colombia), Coelce (Brazil), Enel distribución Perú, Edesur (Argentina).</u> The spools must: Indicate the correct rolling direction with an arrow on its side. Have a stainless steel plate for its identification on each side, each one of which must include at least the following information, in the language of the country where it will be used (Spanish or Portuguese): • Name of the manufacturer • Country of origin of the item • ENEL GROUP • Purchase Order N° • Conductor caliber (en mm²) • Number of the spool within the delivered batch. • Net weight and gross weight in kg. • Cable type • Cable length, in meters. <u>For Perú:</u> A plate/label (stainless or polyethylene) shall be applied in both flanges and shall have the following information (in Spanish): 1) Enel Distribución Peru 2) Name of the manufacturer 3) Country of origin of the item 4) Country code 5) Description of item 6) Cable type 7) Conductor caliber (mm²) 8) Year and month of manufacture 9) Number of the spool within the delivered batch. 10) Cable length, in meters. 11) Manufacture standard 12) Purchase Order N° 13) Net weight and gross weight in kg. 14) Weight of the coil in kg 15) Weight of one meter of cable in kg 16) Coil dimension in mm Note: The plate/label used shall be resistant to UV ray, tearing, chemical substances. The dimension will be at least: Height: 230 mm Width: 140 mm. The size of the letters should be: Width: 4.5 mm; Height: 10 mm. An example is given in the following figure.

		NOMBRE DEL PROVEEDOR **Cliente** **Fabricante** **País de Origen** **Código de País** **Descripción** **Mes/Año de** **Matricula de Carrete** **Punta Inicial** **Punta Final** **Cantidad (m)** **Sección del Conductor (mm2)** **Fase:** **Tipo de Cable / Aislamiento** **Norma de Fabricación** **Tensión Uo/U (Umax)** **Orden de Compra** **Peso Neto (kg)** **Peso metro de cable** **Peso de carrete (kg)** **Dimensiones de** **Peso Bruto (kg)**

B SECCIÓN LOCAL – e-distribución redes digitales (España)

<table>
<tr><th>ITEM</th><th>TITLE</th><th>DESCRIPTION</th></tr>
<tr><td>3.1</td><td>International Standards</td><td>
• IEC 60050-466: Vocabulario electrotécnico internacional. Líneas aéreas.
• EN 50182: Conductores para líneas eléctricas aéreas. Conductores de alambres redondos cableados en capas concéntricas.
• EN 50183: Conductores para líneas eléctricas aéreas. Alambres en aleación de aluminio-magnesio-silicio.
• EN 50189: Conductores para líneas eléctricas aéreas. Alambres de acero galvanizado.
• EN 60889: Alambre de aluminio duro para Conductores de líneas aéreas de transporte de energía eléctrica.
• EN 61232: Alambres de acero recubiertos de aluminio para usos eléctricos.
• EN 50326: Conductores para líneas eléctricas aéreas. Características de los productos de protección (grasas).
</td></tr>
<tr><td>3.2</td><td>List of replaced Standards</td><td>• Norma GE AND010: Conductores desnudos para líneas eléctricas aéreas de media tensión hasta 30kV.</td></tr>
<tr><td>3.3</td><td>Local Standards</td><td>
• UNE 20003: Cobre-tipo recocido e industrial, para aplicaciones eléctricas.
• UNE 21045: Bobinas de madera destinadas a conductores desnudos para conductores de líneas eléctricas aéreas.
• UNE 207015: Conductores desnudos de cobre duro cableados para líneas eléctricas aéreas.
• UNE 21044: Planes de muestreo y criterios de aceptación y rechazo en la recepción de cables desnudos para conductores de l íneas eléctricas aéreas
</td></tr>
<tr><td>5.2.6</td><td>Greases</td><td>
The weight of the grease per km of each aluminum conductors, aluminum-coated-steel reinforced in this standard is indicated in following Table:
<table>
<tr><th>DESIGNACIÓN según EN 50182</th><th>VOLUMEN GRASA “Vg” (cm³/km)</th><th>DENSIDAD GRASA “δ” (g/cm3)</th><th>FACTOR DE RELLENO</th><th>MASA GRASA (kg/km)</th></tr>
<tr><td>47-AL1/ 8-A20SA</td><td>15586,23</td><td>0,87</td><td>0,8</td><td>10,85</td></tr>
<tr><td>67- AL1/ 11-A20SA</td><td>21732,91</td><td>0,87</td><td>0,8</td><td>15,13</td></tr>
<tr><td>107-AL1/ 18-A20SA</td><td>35740,17</td><td>0,87</td><td>0,8</td><td>24,88</td></tr>
<tr><td>119-AL1/ 28-A20SA</td><td>46758,68</td><td>0,87</td><td>0,8</td><td>32,54</td></tr>
<tr><td>147-AL1/ 34-A20SA</td><td>58904,86</td><td>0,87</td><td>0,8</td><td>41,00</td></tr>
</table>
The weight of the grease shall not vary more than ±20% from the values shown in this table.
</td></tr>
<tr><td>5.5</td><td>Stranding</td><td>The directions of lay of the external layer shall be “right-hand” to copper conductors.</td></tr>
</table>

ITEM	TITLE	DESCRIPTION
6	TESTS	List of type and sample test to aluminum conductors, coated-steel reinforced and alloy-aluminum conductors

		Type Test	Sample Test	Section UNE-EN 50182
Conductor	Surface Condition	X	X	6.4.1
	Conductor diameter	X	X	6.4.2
	Inertness	X	X	6.4.3
	Lay ratio and direction of lay	X	X	6.4.4
	Number and type of wires	X	X	6.4.5
	Mass per unit length	X	X	6.4.6
	Stress-strain curves	X	-	6.4.7
	Tensile breaking strength	X	-	6.4.8
	Stringing test	X	-	6.4.9
Aluminum wire	Diameter	X	X	6.5.2
	Tensile strength	X	X	6.5.2
	Elongation (*)	X	X	6.5.2
	Electrical resistivity	X	X	6.5.2
	Winging test	X	X	6.5.2
	Welding	X	-	6.5.3
Zinc-coated steel wire	Diameter	X	X	6.5.2
	Tensile strength	X	X	6.5.2
	Tensile strength at 1 % stretch	X	X	6.5.2
	Elongation and torsion	X	X	6.5.2
	Winging test	X	X	6.5.2
	Zinc weight	X	X	6.5.2
	Immersion	X	X	6.5.2
	Coated adherence	X	X	6.5.2
Aluminum-coated steel	Diameter	X	X	6.5.2
	Tensile strength	X	X	6.5.2
	Tensile strength at 1 % stretch	X	X	6.5.2
	Elongation	X	X	6.5.2
	Torsion	X	X	6.5.2
	Coating thickness uniformity	X	X	6.5.2
	Electrical resistivity	X	X	6.5.2
Grea	Mass of grease per unit length	X	X	6.6.1
	Drop point	X	X	6.6.2

(*) The elongation test shall not be done to AL1

The sample size shall be described in section 6.2 of the standard EN50182

<table>
<tr><th>ITEM</th><th>TITLE</th><th>DESCRIPTION</th></tr>
<tr><td>6</td><td>TESTS</td><td>
<u>List of type test to copper conductors</u>
<table>
<tr><td>Type of test</td><td>Section
UNE-207015</td></tr>
<tr><td>Hard Copper</td><td>5.1</td></tr>
<tr><td>Diameter</td><td>5.4 y 5.5</td></tr>
<tr><td>Elongation curve</td><td>9.3.1</td></tr>
<tr><td>Alternate bends</td><td>9.3.2</td></tr>
<tr><td>Resistivity</td><td>9.4.1</td></tr>
<tr><td>Electrical resistance</td><td>8.1 y 9.4.2</td></tr>
<tr><td>Torsion</td><td>9.3.3</td></tr>
<tr><td>Tensile strength</td><td>9.3.4</td></tr>
<tr><td>Weight</td><td>8.2</td></tr>
<tr><td>Lay ratio</td><td>9.3.5</td></tr>
<tr><td>Welding</td><td>7</td></tr>
<tr><td>Surface Condition</td><td>5.3</td></tr>
</table>
<u>List of sample test to copper conductors</u>
<table>
<tr><td>Type of test</td><td>Section
UNE-207015</td></tr>
<tr><td colspan="2">On wires after stranding</td></tr>
<tr><td>Rated tensile strength</td><td>9.3.1</td></tr>
<tr><td>Elongation</td><td>9.3.1</td></tr>
<tr><td>Alternate bends</td><td>9.3.2</td></tr>
<tr><td>Torsion</td><td>9.3.3</td></tr>
<tr><td>Resistivity</td><td>9.4.1</td></tr>
<tr><td>Measure test</td><td>5.4</td></tr>
<tr><td>Welding</td><td>7</td></tr>
<tr><td colspan="2">On the stranded conductor</td></tr>
<tr><td>Weight</td><td>8.2</td></tr>
<tr><td>Lay ratio and direction of lay</td><td>6.2</td></tr>
<tr><td>Surface Condition</td><td>5.3</td></tr>
<tr><td colspan="2">The sample size shall be described in section 9.5.1.of the standard UNE 207015

The interpretation of results is performed as indicated in section 9.6</td></tr>
</table>
</td></tr>
</table>

ITEM	TITLE	DESCRIPTION
7	CONDITIONS OF SUPPLY	The conductors shall be supplied with reel as indicated in the standard UNE 21045:1974.
8	PACKING AND MARKING	Each reel shall have, in each of the outer surface, an identification plate, weatherproof, with the inscription “ENEL / ENDESA” and the following information: • Name of the manufacturer • Conductor type • Cable length, in meters. • Purchase Order N° • Number of the spool within the delivered batch. • Description of this standard • Manufacture year • Direction of rotation of the coil (with a arrow). • Unwinding direction (if the reel was packaged). • Net weight and gross weight in kg.

C ENEL DISTRIBUZIONE (Italy), ENEL DISTRIBUTIE: Banat, Dobrogea, Muntenia (Romania)

ITEM	TITLE	DESCRIPTION

Not available specifications on this revision. See Common List.

Values for Romania:

GS Type Code	Denomination EN	Denomination GSC003	DC Resistance (Ω/km)	Mass (kg/Km)	Rated strength (daN)	Final Modulus of Elasticity (N/mm2)
GSC003/42	48-AL1/8-ST1A	ACSR 56	0,5939	194,8	1681,00	81000
GSC003/43	70-AL1/11-ST1A	ACSR 81	0,4132	282,2	2627,00	77000
GSC003/44	94-AL1/15-ST1A	ACSR 110	0,3060	380,6	3493,00	77000
GSC003/45	122-AL1/20-ST1A	ACSR 141	0,2376	491,0	4450,00	77000
GSC003/46	128-AL1/21-ST1A	ACSR 149	0,2263	516,0	4679,00	
GSC003/95	149-AL1/24-ST1A	ACSR 173 (G)	0,1940	600,8	5367,00	77000
GSC003/96	184 -AL1/30-ST1A	ACSR 214 (G)	0,1571	741,0	6527,00	77000
GSC003/98	242-AL1/39-ST1A	ACSR 281 (G)	0,1195	976,2	8489,00	
GSC003/97	304-AL1/49-ST1A	ACSR 354 (G)	0,0949	1227,3	10509,00	77000
GSC003/99	485-AL1/63-ST1A	ACSR 547 (G)	0,0597	1831,1	14904,00	
GSC003/41	128-AL1/21-A20SA	ACSR/AW 149	0,21	491,0	4760,00	69640