	GLOBAL STANDARD	Page 1 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

CONCENTRIC-LAY-STRANDED BARE CONDUCTORS

	Elaborated by	Verified by	Approved by
Solution Development Center	L. Foddai	R. Emma	I. Gentilini
Global I&N – NT/NCS	N. Cammalleri	N. Cammalleri G. Egea Brufau	F. Giammanco

This document is intellectual property of Enel Spa; reproduction or distribution of its contents in any way or by any means whatsoever is subject to the prior approval of the above mentioned company which will safeguard its rights under the civil and penal codes.
This document is for Internal Use.

Revision	Data	List of modifications
0	16/05/2014	First emission
01	15/09/2014	Second emission
02	29/04/2016	Updated common list

	GLOBAL STANDARD	Page 2 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

CONTENTS

1 SCOPE	3
2 LIST OF CONDUCTORS	3
3 REFERENCE LAWS AND STANDARDS	4
4 See local section. TERMINOLOGY	5
5 DESIGN AND MANUFACTURE	5
6 TESTS	8
7 CONDITIONS OF SUPPLY	9
8 PACKING AND MARKING	9
9 LENGTH TOLERANCE	9
10 Warranty	9

LOCAL SECTION

- A LATAM: Ampla (Brazil), Chilectra (Chile), Codensa (Colombia), Coelce (Brazil), Edelnor (Perù), Edesur (Argentine)
- B ENDESA DISTRIBUCIÓN ELÉCTRICA (Spain)
- C ENEL DISTRIBUZIONE (Italy), ENEL DISTRIBUTIE: Banat, Dobrogea, Muntenia, (Romania)

	GLOBAL STANDARD	Page 4 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

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.

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

Standard	Cod. GSC	Code Words	Size (mm ²)	Quantity of Aluminum wires	DC Resistance at 20 °C (Ω/km)
ASTM B399	019	-	25	7	1,3400
	020	-	50	7	0,6700
	021	-	70	19	0,4780
	022	-	70	7	0,4780
	023	-	120	19	0,2790
	024	-	160	19	0,2050
	025	-	200	19	0,1640
	026	-	240	37	0,1419
	027	-	240	61	0,1393
	028	-	315	37	0,1040
	029	-	400	37	0,0820
030	-	500	37	0,0660	
031	-	630	37	0,0520	
EN-50182	032	148-AL3	148,1	19	0,2234

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

Standard	Cod. GSC	Code Words	Size (mm ²)	Quantity of Cooper wires	DC Resistance at 20 °C (Ω/km)
ASTM B8	033	-	25	7	0,795
	034	-	35	7	0,538
	035	-	70	19	0,276
	036	-	95	19	0,198
UNE-207015	037	C 35	34,9	7	0,529
	038	C 50 E	49,5	7	0,372
	039	C 70	70,3	19	0,268
	040	C 95	94,8	19	0,196

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

See local section.

3.2 List of replaced Standards

See local section

3.3 Local Standards

See local section

	GLOBAL STANDARD	Page 5 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

4 See local section. 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. Specific characteristics are detailed in Common List.

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 shown in the section 3.1 of the Local Section.

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. The wires shall be "20SA" class and "A" type.

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 IEC 60889, or aluminum 1350-H19, manufacture under the standard ASTM B230 y ASTM B231, as indicated in the section 3.1 of the Local Section.

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, as indicated in the section 3.1 of the Local Section.

	GLOBAL STANDARD	Page 6 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

5.1.5 Copper wires

Copper wires shall be uncoated, under the standards ASTM B2 or UNE 207015, as indicated in the section 3.1 and 3.3 of the Local Section.

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

Aluminum conductors shall be assembled with aluminum wires, as indicated in the section 5.1.3.

5.2.2 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).

5.2.3 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).

5.2.4 Alloy-aluminum conductors

The alloy-aluminum conductors shall be assembled with alloy-aluminum wires, as indicated in the section 5.1.4.

5.2.5 Copper conductors

The uncompressed copper conductors shall be assembled with copper wire, as indicated in the section 5.1.5.

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 Common List.

The grease shall be chemically neutral with respect to aluminum, zinc and steel, free of impurities, uniform throughout of length of the conductor, hot applied (type B). Its drop point shall be greater than 110 °C and the stability under short-circuit must be tested with 250 °C for 1,5 seconds. It must have the characteristics described in the standards EN 50326 or IEC 61394, as indicated in the Common List.

The conductors shall be provided with grease only when explicitly requested in the purchase order.

	GLOBAL STANDARD	Page 7 of 16
	CONCENTRIC-LAY-STRADED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

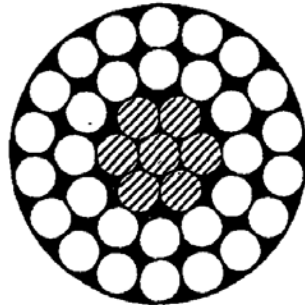


Figure 1 – Greased Conductors.

The volume of the grease shall be calculated with the following equation:

$$V_g = 0,25 \pi (D_o^2 - n_a d_a^2 - n_s d_s^2)$$

Where:

V_g = Volume of grease per length

D_o = outer diameter for the conductor

d_a = diameter of the aluminum wire

d_s = diameter of steel wire.

n_a = number of aluminum wires in the conductor

n_s = number of steel wires in the conductor

Consequently, with the density of the grease of $0,87 \text{ g/cm}^3$ and with fill factor of 0,8, the mass of the grease will be:

$$M_g = 0,8 V_g \delta$$

M_g = mass of grease per length

δ = density of grease

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 standards shown in the Common List.

5.5 Stranding

All wires of the conductor shall be concentrically stranded.

	GLOBAL STANDARD	Page 8 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

Adjacent wire layers shall be stranded with reverse lay directions. The directions of lay of the external layer shall be “right-hand” to aluminum conductors. The direction of lay of the external layer to copper conductor shall be “right-hand” or “left-hand”, as indicated in the Local Section.

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 from a joint in the same wire or in any other wire of the completed conductor. The quantity of joints per length shall not greater than values indicated in the standards shown in the Common List.

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 $\pm 2\%$.

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 standards shown in the Common List.

5.9 Electrical resistance

The electrical DC resistance at 20 °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

	GLOBAL STANDARD	Page 9 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

changed. The type test shall be analyzed by the purchaser using the requirements of this Global Standard and requirements of his homologation procedures.

The list of type tests of wires and conductors are shown in the Local Section and shall be carried out as the procedures of standards indicated in the Common List.

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 standards indicated in the Common List.

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 a 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 $\pm 5\%$ of the length indicated in the order. The equipment used to measure the length of the conductor shall be accurate to $\pm 1\%$.

10 Warranty

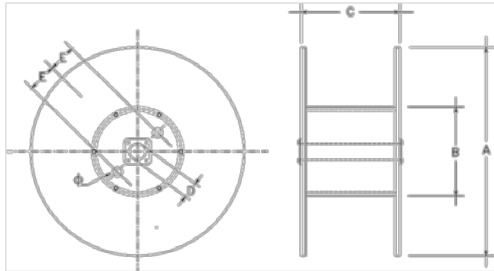
Requirement of warranty will be indicated the moment of request for bids it, indicating periods and standards.

	GLOBAL STANDARD	Page 10 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

LOCAL SECTION A – LATAM: Ampla (Brazil), Chilectra (Chile), Codensa (Colombia), Coelce (Brazil), Edelnor (Perù), Edesur (Argentina)


ITEM	TITLE	DESCRIPTION
3.1	International Standards	<u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Edelnor (Perù)</u> <ul style="list-style-type: none"> • 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.
3.2	List of replaced Standards	<u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Edelnor (Perù), Edesur(Argentina)</u> <ul style="list-style-type: none"> • E-MT-003: Especificación Técnica de Conductores desnudos para líneas aéreas de tensión hasta 36 kV.
3.3	Local Standards	<u>Edesur(Argentina)</u> <ul style="list-style-type: none"> • IRAM 2187-I: Conductores de aluminio y de aleación de aluminio con alma de acero de resistencia mecánica normal para líneas aéreas de energía. <u>Codensa (Colombia).</u> <ul style="list-style-type: none"> • <u>RETIE: Reglamento Técnico de Instalaciones Eléctricas.</u>
5.1.5	Copper wires	<u>Ampla (Brazil), Chilectra (Chile),Codensa (Colombia), Coelce (Brazil), Edelnor (Perù), Edesur (Argentina).</u> Copper wires shall be medium-hard temper, uncoated, under the standards ASTM B2.
5.2.6	Greases	<u>Ampla (Brazil), Chilectra (Chile),Coelce (Brazil), Edelnor (Perù), Edesur (Argentina).</u> Shall be applied the standard IEC- 61089. <u>Ampla (Brazil).</u> Conductors shall be provided with greases, applied to the internal layers as indicated in the Common List. <u>Edelnor (Perù).</u> Conductors shall be provided with greases, applied to the both internal or external layers as indicated in the Common List. <u>Codensa (Colombia).</u> It is not required greases for conductors.



5.5	Stranding	<p><u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Edelnor (Perú), Edesur(Argentina)</u></p> <p>The directions of lay of the external layer shall be “left-hand” to copper conductors.</p>												
6.1	Type Test	<p><u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Edelnor (Perú), Edesur(Argentina)</u></p> <ul style="list-style-type: none"> • 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 <p>For Edesur consider the standard IRAM-2187-I</p>												
6.2	Sample test	<p><u>Ampla(Brasil), Coelce(Brasil), Chilectra (Chile), Codensa(Colombia), Edelnor (Perú), Edesur(Argentina)</u></p> <ul style="list-style-type: none"> • 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 <p>The acceptance level shall be determined according to the procedure described in standard IEC 60410 considering AQL 1,5%, level II, simple sampling.</p> <p>For Edesur consider the standard IRAM-2187-I</p>												
7	CONDITIONS OF SUPPLY	<p><u>Ampla (Brazil), Chilectra (Chile), Codensa (Colombia), Coelce (Brazil), Edelnor (Perú), Edesur (Argentina).</u></p> <p>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.</p> <p>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.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Figure 2 – Reel</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A(1) mm</th> <th>B mm</th> <th>C(1) mm</th> <th>D(2) mm</th> <th>E mm</th> <th>Φ(mm)</th> </tr> </thead> <tbody> <tr> <td>1730</td> <td>(3)</td> <td>1120</td> <td>80</td> <td>(4)</td> <td>50</td> </tr> </tbody> </table> <p style="text-align: center;">Table 4 – Dimensions of reel</p>	A(1) mm	B mm	C(1) mm	D(2) mm	E mm	Φ(mm)	1730	(3)	1120	80	(4)	50
A(1) mm	B mm	C(1) mm	D(2) mm	E mm	Φ(mm)									
1730	(3)	1120	80	(4)	50									



		<p>Notes:</p> <ol style="list-style-type: none">(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. <p>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.</p> <p>Each reel shall be protected with a plastic coat than avoids the corrosion of the conductor.</p> <p>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%.</p> <p>The maximum gross weight of the packaged spool must not exceed 2500 kg.</p> <p><u>Codensa (Colombia)</u></p> <p>In additional to above specified, for Codensa the manufacturers shall to attach the RETIE certification in the first supply.</p>
8	PACKING MARKING AND	<p><u>Ampla (Brazil), Chilectra (Chile),Codensa (Colombia), Coelce (Brazil), Edelnor (Perú), Edesur (Argentina).</u></p> <p>The spools must:</p> <p>Indicate the correct rolling direction with an arrow on its side.</p> <p>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):</p> <ul style="list-style-type: none">• 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.

	GLOBAL STANDARD	Page 13 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

B SECCIÓN LOCAL – ENDESA DISTRIBUCIÓN ELÉCTRICA (España)

ITEM	TITLE	DESCRIPTION																																			
3.1	International Standards	<ul style="list-style-type: none"> • 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). 																																			
3.2	List of replaced Standards	<ul style="list-style-type: none"> • Norma GE AND010: Conductores desnudos para líneas eléctricas aéreas de media tensión hasta 30kV. 																																			
3.3	Local Standards	<ul style="list-style-type: none"> • 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 líneas eléctricas aéreas 																																			
5.2.6	Greases	<p>The weight of the grease per km of each aluminum conductors, aluminum-coated-steel reinforced in this standard is indicated in following Table:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DESIGNACIÓN</th> <th>VOLUMEN GRASA</th> <th>DENSIDAD GRASA</th> <th>FACTOR DE</th> <th>MASA GRASA</th> </tr> </thead> <tbody> <tr> <td>según EN 50182</td> <td>"Vg" (cm³/km)</td> <td>"δ" (g/cm³)</td> <td>RELLENO</td> <td>(kg/km)</td> </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> </tbody> </table> <p>The weight of the grease shall not vary more than ±20% from the values shown in this table.</p>	DESIGNACIÓN	VOLUMEN GRASA	DENSIDAD GRASA	FACTOR DE	MASA GRASA	según EN 50182	"Vg" (cm ³ /km)	"δ" (g/cm ³)	RELLENO	(kg/km)	47-AL1/ 8-A20SA	15586,23	0,87	0,8	10,85	67-AL1/ 11-A20SA	21732,91	0,87	0,8	15,13	107-AL1/ 18-A20SA	35740,17	0,87	0,8	24,88	119-AL1/ 28-A20SA	46758,68	0,87	0,8	32,54	147-AL1/ 34-A20SA	58904,86	0,87	0,8	41,00
DESIGNACIÓN	VOLUMEN GRASA	DENSIDAD GRASA	FACTOR DE	MASA GRASA																																	
según EN 50182	"Vg" (cm ³ /km)	"δ" (g/cm ³)	RELLENO	(kg/km)																																	
47-AL1/ 8-A20SA	15586,23	0,87	0,8	10,85																																	
67-AL1/ 11-A20SA	21732,91	0,87	0,8	15,13																																	
107-AL1/ 18-A20SA	35740,17	0,87	0,8	24,88																																	
119-AL1/ 28-A20SA	46758,68	0,87	0,8	32,54																																	
147-AL1/ 34-A20SA	58904,86	0,87	0,8	41,00																																	
5.5	Stranding	The directions of lay of the external layer shall be "right-hand" to copper conductors.																																			



ITEM	TITLE	DESCRIPTION																																																																																																																																										
6	TESTS	<p>List of type and sample test to aluminum conductors, coated-steel reinforced and alloy-aluminum conductors</p> <table border="1"> <thead> <tr> <th></th> <th></th> <th>Type Test</th> <th>Sample Test</th> <th>Section UNE-EN 50182</th> </tr> </thead> <tbody> <tr> <td rowspan="9">Conductor</td> <td>Surface Condition</td> <td>X</td> <td>X</td> <td>6.4.1</td> </tr> <tr> <td>Conductor diameter</td> <td>X</td> <td>X</td> <td>6.4.2</td> </tr> <tr> <td>Inertness</td> <td>X</td> <td>X</td> <td>6.4.3</td> </tr> <tr> <td>Lay ratio and direction of lay</td> <td>X</td> <td>X</td> <td>6.4.4</td> </tr> <tr> <td>Number and type of wires</td> <td>X</td> <td>X</td> <td>6.4.5</td> </tr> <tr> <td>Mass per unit length</td> <td>X</td> <td>X</td> <td>6.4.6</td> </tr> <tr> <td>Stress-strain curves</td> <td>X</td> <td>-</td> <td>6.4.7</td> </tr> <tr> <td>Tensile breaking strength</td> <td>X</td> <td>-</td> <td>6.4.8</td> </tr> <tr> <td>Stringing test</td> <td>X</td> <td>-</td> <td>6.4.9</td> </tr> <tr> <td rowspan="6">Aluminum wire</td> <td>Diameter</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Tensile strength</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Elongation (*)</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Electrical resistivity</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Winging test</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Welding</td> <td>X</td> <td>-</td> <td>6.5.3</td> </tr> <tr> <td rowspan="8">Zinc-coated steel wire</td> <td>Diameter</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Tensile strength</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Tensile strength at 1 % stretch</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Elongation and torsion</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Winging test</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Zinc weight</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Immersion</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Coated adherence</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td rowspan="8">Aluminum-coated steel wire</td> <td>Diameter</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Tensile strength</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Tensile strength at 1 % stretch</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Elongation</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Torsion</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Coating thickness uniformity</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td>Electrical resistivity</td> <td>X</td> <td>X</td> <td>6.5.2</td> </tr> <tr> <td rowspan="2">Grease</td> <td>Mass of grease per unit length</td> <td>X</td> <td>X</td> <td>6.6.1</td> </tr> <tr> <td>Drop point</td> <td>X</td> <td>X</td> <td>6.6.2</td> </tr> </tbody> </table> <p>(*) The elongation test shall not be done to AL1</p> <p>The sample size shall be described in section 6.2 of the standard EN50182</p>			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 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	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	Grease	Mass of grease per unit length	X	X	6.6.1	Drop point	X	X	6.6.2
		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 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	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																																																																																																																																								
	Grease	Mass of grease per unit length	X	X	6.6.1																																																																																																																																							
Drop point		X	X	6.6.2																																																																																																																																								



ITEM	TITLE	DESCRIPTION																																																				
6	TESTS	<p style="text-align: center;"><u>List of type test to copper conductors</u></p> <table border="1" data-bbox="651 517 1265 1061"> <thead> <tr> <th>Type of test</th> <th>Section UNE-207015</th> </tr> </thead> <tbody> <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> </tbody> </table> <p style="text-align: center;"><u>List of sample test to copper conductors</u></p> <table border="1" data-bbox="651 1151 1265 1695"> <thead> <tr> <th>Type of test</th> <th>Section UNE-207015</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">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" style="text-align: center;">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> </tbody> </table> <p>The sample size shall be described in section 9.5.1. of the standard UNE 207015</p> <p>The interpretation of results is performed as indicated in section 9.6</p>	Type of test	Section UNE-207015	Hard Copper	5.1	Diameter	5.4 y 5.5	Elongation curve	9.3.1	Alternate bends	9.3.2	Resistivity	9.4.1	Electrical resistance	8.1 y 9.4.2	Torsion	9.3.3	Tensile strength	9.3.4	Weight	8.2	Lay ratio	9.3.5	Welding	7	Surface Condition	5.3	Type of test	Section UNE-207015	On wires after stranding		Rated tensile strength	9.3.1	Elongation	9.3.1	Alternate bends	9.3.2	Torsion	9.3.3	Resistivity	9.4.1	Measure test	5.4	Welding	7	On the stranded conductor		Weight	8.2	Lay ratio and direction of lay	6.2	Surface Condition	5.3
Type of test	Section UNE-207015																																																					
Hard Copper	5.1																																																					
Diameter	5.4 y 5.5																																																					
Elongation curve	9.3.1																																																					
Alternate bends	9.3.2																																																					
Resistivity	9.4.1																																																					
Electrical resistance	8.1 y 9.4.2																																																					
Torsion	9.3.3																																																					
Tensile strength	9.3.4																																																					
Weight	8.2																																																					
Lay ratio	9.3.5																																																					
Welding	7																																																					
Surface Condition	5.3																																																					
Type of test	Section UNE-207015																																																					
On wires after stranding																																																						
Rated tensile strength	9.3.1																																																					
Elongation	9.3.1																																																					
Alternate bends	9.3.2																																																					
Torsion	9.3.3																																																					
Resistivity	9.4.1																																																					
Measure test	5.4																																																					
Welding	7																																																					
On the stranded conductor																																																						
Weight	8.2																																																					
Lay ratio and direction of lay	6.2																																																					
Surface Condition	5.3																																																					

	GLOBAL STANDARD	Page 16 of 16
	CONCENTRIC-LAY-STRANDED BARE CONDUCTORS	GSC003 Rev. 2 29/04/2016

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: <ul style="list-style-type: none"> • 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
		<u>Not available specifications on this revision.</u> See Common List.

GS Type Code	Distribution Company and Country	Country code	Standard	Type	Size			Code Words	Class	Aluminum Wires			Steel Wires			Aluminum-Alloy Wires			Copper wires		Outside diameter	Total mass (kg/km)	Rated strength (kN)	D.C resistance (Ω/km)	Grease											
					Kcmil	AWG	mm ²			Number	Diameter	Layers	Number	Diameter	Layers	Number	Diameter	Layers	Number	Diameter					Applied	Type	Θ ₁	Θ ₂	Θ ₃							
GSC003.1	AM-BRASIL	6771976	ASTM B 232/B 232M	ACSR	-	4	-	-	AA	6	2.12	1	1	2.12	0	ACSR/GA-ACSR	-	-	-	-	-	6.35	85.35	8.3	1.3278	No	-	-	-	-	-	-	-	-	-	-
GSC003.1	CE-BRASIL	6771524	ASTM B 232/B 232M	ACSR	-	4	-	-	AA	6	2.12	1	1	2.12	0	ACSR/GA-ACSR or CSR/GB	-	-	-	-	-	6.35	85.35	8.3	1.3278	No	-	-	-	-	-	-	-	-	-	
GSC003.2	CD-COLOMBIA	6782310	ASTM B 232/B 232M	ACSR	-	2	-	-	AA	6	2.67	1	1	2.67	0	ACSR/GA-ACSR	-	-	-	-	-	8.03	135.72	9.3	1.3278	No	-	-	-	-	-	-	-	-	-	
GSC003.3	AM-BRASIL	6771977	ASTM B 232/B 232M	ACSR	-	1/0	-	-	AA	6	3.37	1	1	3.37	0	ACSR/GA-ACSR	-	-	-	-	-	10.11	216.09	19.46	0.5243	No	-	-	-	-	-	-	-	-	-	
GSC003.3	CD-COLOMBIA	6782276	ASTM B 232/B 232M	ACSR	-	1/0	-	-	AA	6	3.37	1	1	3.37	0	ACSR/GA-ACSR	-	-	-	-	-	10.11	216.09	19.46	0.5243	No	-	-	-	-	-	-	-	-	-	
GSC003.3	CE-BRASIL	6771526	ASTM B 232/B 232M	ACSR	-	1/0	-	-	AA	6	3.37	1	1	3.37	0	ACSR/GA-ACSR or CSR/GB	-	-	-	-	-	10.11	216.09	19.46	0.5243	No	-	-	-	-	-	-	-	-	-	
GSC003.4	CD-COLOMBIA	6782335	ASTM B 232/B 232M	ACSR	-	2/0	-	-	AA	6	3.78	1	1	3.78	0	ACSR/GA-ACSR	-	-	-	-	-	11.35	272.04	23.57	0.4160	No	-	-	-	-	-	-	-	-	-	
GSC003.5	AM-BRASIL	6797685	ASTM B 232/B 232M	ACSR	-	4/0	-	-	AA	6	4.77	1	1	4.77	0	ACSR/GA-ACSR	-	-	-	-	-	14.30	432.77	37.06	0.2676	No	-	-	-	-	-	-	-	-	-	
GSC003.5	AM-BRASIL	4590452	ASTM B 232/B 232M	ACSR	-	4/0	-	-	AA	6	4.77	1	1	4.77	0	ACSR/GB-ACSR	-	-	-	-	-	14.30	432.77	37.06	0.2676	No	-	-	-	-	-	-	-	-	-	
GSC003.5	CD-COLOMBIA	6782311	ASTM B 232/B 232M	ACSR	-	4/0	-	-	AA	6	4.77	1	1	4.77	0	ACSR/GA-ACSR	-	-	-	-	-	14.30	432.77	37.06	0.2676	No	-	-	-	-	-	-	-	-	-	
GSC003.6	AM-BRASIL	6797686	ASTM B 232/B 232M	ACSR	266.8	-	-	-	AA	26	2.57	2	7	2.00	0	ACSR/GA-ACSR	-	-	-	-	-	16.31	546.02	50.11	0.2148	No	-	-	-	-	-	-	-	-	-	
GSC003.6	AM-BRASIL	4590436	ASTM B 232/B 232M	ACSR	266.8	-	-	-	AA	26	2.57	2	7	2.00	0	ACSR/GB-ACSR	-	-	-	-	-	16.31	546.02	50.11	0.2148	No	-	-	-	-	-	-	-	-	-	
GSC003.6	CD-COLOMBIA	6782293	ASTM B 232/B 232M	ACSR	266.8	-	-	-	AA	26	2.57	2	7	2.00	1	ACSR/GA-ACSR	-	-	-	-	-	16.31	546.02	50.11	0.2100	No	-	-	-	-	-	-	-	-	-	
GSC003.6	CE-BRASIL	6771528	ASTM B 232/B 232M	ACSR	266.8	-	-	-	AA	26	2.57	2	7	2.00	1	ACSR/GA-ACSR or CSR/GB	-	-	-	-	-	16.31	546.02	50.11	0.2100	No	-	-	-	-	-	-	-	-	-	
GSC003.7	AM-BRASIL	6807077	ASTM B 232/B 232M	ACSR	336.4	-	-	-	AA	26	2.89	2	7	2.25	1	ACSR/GA-ACSR	-	-	-	-	-	18.29	687.54	62.91	0.1699	No	-	-	-	-	-	-	-	-	-	
GSC003.7	AM-BRASIL	4545171	ASTM B 232/B 232M	ACSR	336.4	-	-	-	AA	26	2.89	2	7	2.25	1	ACSR/GB-ACSR	-	-	-	-	-	18.29	687.54	62.91	0.1699	No	-	-	-	-	-	-	-	-	-	
GSC003.8	ES-ROMANIA	0101-0254	IRAM 2187-1	ACSR	-	-	35/4	-	-	6	2.25	1	1	2.25	0	Galvanized	-	-	-	-	-	6.80	95.4	9.0	0.2	Yes	-	-	-	-	-	-	-	-	-	
GSC003.9	ES-ARGENTINA	0101-0254	IRAM 2187-1	ACSR	-	-	50/8	-	-	6	3.2	1	1	3.20	0	Galvanized	-	-	-	-	-	9.60	195.0	16.8	0.595	Yes	-	-	-	-	-	-	-	-	-	
GSC003.10	ES-ARGENTINA	0101-0255	IRAM 2187-1	ACSR	-	-	95/15	-	-	26	2.15	2	7	1.67	1	Galvanized	-	-	-	-	-	13.60	380.5	34.9	0.306	Yes	-	-	-	-	-	-	-	-	-	
GSC003.11	EE-ESPAÑA	6700516	EN-50182	AL1/ST1A	-	-	54.6	-	-	6	3.15	-	1	3.15	-	ST1A	-	-	-	-	-	9.45	188.8	16.29	0.6129	No	-	-	-	-	-	-	-	-		
GSC003.12	EE-ESPAÑA	6701801	EN-50182	AL1/A20SA	-	-	54.6	-	-	6	3.15	-	1	3.15	-	A20SA	-	-	-	-	-	9.45	179.5	17.07	0.5802	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.12	ED-ITALIA	317056	EN-50182	AL1/A20SA	-	-	54.6	-	-	6	3.15	-	1	3.15	-	A20SA	-	-	-	-	-	9.45	179.6	17.07	0.5805	No	-	-	-	-	-	-	-	-		
GSC003.13	EE-ESPAÑA	6701802	EN-50182	AL1/A20SA	-	-	78.6	-	-	6	3.78	-	1	3.78	-	A20SA	-	-	-	-	-	11.30	258.5	23.12	0.4029	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.14	EE-ESPAÑA	6701453	EN-50182	AL1/ST1A	-	-	116.2	-	-	30	2	-	7	2	-	ST1A	-	-	-	-	-	14.00	432.5	43.17	0.3067	No	-	-	-	-	-	-	-	-		
GSC003.15	EE-ESPAÑA	6701803	EN-50182	AL1/A20SA	-	-	125.1	-	-	6	4.77	-	1	4.77	-	A20SA	-	-	-	-	-	14.31	411.6	35.02	0.2530	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.16	EE-ESPAÑA	6701804	EN-50182	AL1/A20SA	-	-	147.1	-	-	15	3.15	-	4	3.15	-	A20SA	-	-	-	-	-	15.75	528.3	56.69	0.2265	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.17	EE-ESPAÑA	6701454	EN-50182	AL1/ST1A	-	-	181.6	-	-	30	2.5	-	7	2.5	-	ST1A	-	-	-	-	-	17.50	675.8	64.94	0.1963	No	-	-	-	-	-	-	-	-		
GSC003.18	EE-ESPAÑA	6704230	EN-50182	AL1/A20SA	-	-	181.6	-	-	30	2.5	-	7	2.5	-	A20SA	-	-	-	-	-	17.50	634.7	67	0.1819	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.19	AM-BRASIL	6799027	ASTM B 399/B 399M	AAAC	-	-	25	-	-	AA	-	-	0	-	-	-	7	2.13	-	-	-	6.39	68.5	7.83	1.3400	No	-	-	-	-	-	-	-	-		
GSC003.21	AM-BRASIL	6799075	ASTM B 399/B 399M	AAAC	-	-	25	-	-	AA	-	-	0	-	-	-	7	2.13	-	-	-	6.39	68.5	7.83	1.3400	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.20	AM-BRASIL	6799028	ASTM B 399/B 399M	AAAC	-	-	50	-	-	AA	-	-	0	-	-	-	7	3.02	-	-	-	9.06	140.3	15.9	0.6700	No	-	-	-	-	-	-	-	-		
GSC003.20	AM-BRASIL	6799674	ASTM B 399/B 399M	AAAC	-	-	50	-	-	AA	-	-	0	-	-	-	7	3.02	-	-	-	9.06	140.3	15.9	0.6700	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.20	CE-BRASIL	6804937	ASTM B 399/B 399M	AAAC	-	-	50	-	-	AA	-	-	0	-	-	-	7	3.02	-	-	-	9.06	140.3	15.9	0.6700	No	-	-	-	-	-	-	-	-		
GSC003.27	AM-BRASIL	6798957	ASTM B 399/B 399M	AAAC	-	-	70	-	-	AA	-	-	0	-	-	-	19	2.17	-	-	-	10.85	192.7	21.7	0.478	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.21	CE-BRASIL	6804970	ASTM B 399/B 399M	AAAC	-	-	70	-	-	AA	-	-	0	-	-	-	19	2.17	-	-	-	10.50	192.7	19.3	0.478	No	-	-	-	-	-	-	-	-		
GSC003.21	CH-CHILE	6753441	ASTM B 399/B 399M	AAAC	-	-	70	-	-	AA	-	-	0	-	-	-	19	2.17	-	-	-	10.50	192.7	19.3	0.478	No	-	-	-	-	-	-	-	-		
GSC003.22	EN-PERU	6755910	ASTM B 399/B 399M	AAAC	-	-	70	-	-	AA	-	-	0	-	-	-	7	3.50	-	-	-	10.50	192.7	19.3	0.478	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.23	CE-BRASIL	6804972	ASTM B 399/B 399M	AAAC	-	-	120	-	-	AA	-	-	0	-	-	-	19	2.83	-	-	-	14.15	327.9	33.8	0.279	No	-	-	-	-	-	-	-	-		
GSC003.23	CH-CHILE	6753442	ASTM B 399/B 399M	AAAC	-	-	120	-	-	AA	-	-	0	-	-	-	19	2.83	-	-	-	14.15	327.9	33.8	0.279	No	-	-	-	-	-	-	-	-		
GSC003.24	EN-PERU	6755911	ASTM B 399/B 399M	AAAC	-	-	120	-	-	AA	-	-	0	-	-	-	19	2.83	-	-	-	14.15	327.9	33.8	0.279	Yes	B	10	110	250 °C (1.5σ)	-	-	-	-		
GSC003.24	AM-BRASIL	6797634	ASTM B 399/B 399M	AAAC	-	-	160	-	-	AA	-	-	0	-																						