12/20(24) kV AND 18/30(36) kV COLD SHRINK COMPACT JOINTS FOR MV CABLES

ADDENDUM FOR LATAM

Countries I&N	
Argentina	**C. Espinoza**
Brazil	**R. Sales**
Chile	**D. Sarkis**
Colombia	**J. C. Gomez**
Peru	**R. Sanchez**

	Elaborated by	Verified by	Approved by
Global I&N – O&M/NCS	**Filippo Gentili**	**Jean Pierre Goossens**	**Maurizio Mazzotti**

Revision	Date	List of modifications
00	25/11/2015	First emission.
01	23/02/2018	General review of construction design. Material codes updated. Chapter on barcode updated, Tolerance on the positioning of the body; cover for the connector; Painted or coated semiconducting layer not allowed; Elimination of the spiral support and introduction of the self-ejecting support; Cold shrink system for oil sealing for transition joints; Introduction of a separate material code and kit for the transition joints; Introduction of MV arial cable joint, Specification of “austenitic steel” constant force springs; New tests: robustness test. expiration test. UV test for MV aerial cable joints; Modification of requirements for resistance to fire; Increase of the minimum section of the copper stocking for Italy, Rumania, Spain and Peru from 16 to 25 mm2; Modification of requirements of screen connecting plate (grater); Modification of requirements of sealing compounds; short time duration for Italy, Rumania and Spain. Standard dimension for cable preparation. Class 24 kV for Italy and Rumania.
02	25/05/2018	Revised tables 6, 7 and 8. Expiration test description.
03	09/07/2018	Note on table 8. Edited figure in 10.2. Revised material codes for Brazil.
Addendum Ed 0.	05/2020	Enel Distribuição São Paulo is included; Transition joints for 18/30(36) kV is added ;table 2,Rated short time withstand current in the screen (kA) is updated for Colombia; joints for 18/30(36) for Colombia is added; table 6 updated for Argentina; grounding braid system for São Paulo is added; Material codes updated; The range of sections available for 18/30(36) kV joints is updated; Maximum diameter over insulation for 18/30(36) kV joints with cable section 240-400 is updated; special consideration for São Paulo in type tests.

1 SCOPE

This addendum of the Global Standard GSCC004 rev. 3 specifies the requirements applicable to Enel Distribucion Latam. They are specified in this document with reference to the same paragraph number of GSCC004 rev.3 (09/07/2018)

These Addendum applies to the Distribution Companies of Enel Group listed below:

Enel Distribución Colombia	*Colombia*
Enel Distribución Perú	*Perú*
Edesur	*Argentina*
Enel Distribución Chile	*Chile*
Enel Distribuição Ceará	*Brazil*
Enel Distribuição Rio	*Brazil*
Enel Distribuição Goiás	*Brazil*
Enel Distribuição São Paulo	*Brazil*

3.2 Global Standards

- GSC001[1]
- GSCC015
- GSCC008

6 TYPES OF JOINTS

The following types of joints are defined:

Type code	Rated voltage U_0/U (U_m) (kV)	
	12/20(24)	18/30(36)
GSCC004/1	X	
GSCC004/2		X
GSCC004/3	X[a]	
GSCC004/4	X[b]	
GSCC004/5		X[b]
GSCC004/6		X[a]
a: Transition joint for extruded cables-paper insulated cables b: Joint for MV aerial cable		

Table 1 – Type codes

[1] The characteristics of the cables are included in the Enel Group Global Standard. Besides installation on new cables, which comply to GSC001, the joints may be installed on the existing network, which is made of cables compliant to older local standards. Nevertheless, this Global Standard also takes into account the main characteristics of existing cables for each Country (rated voltage, section and min/max diameter over insulation).

7 ELECTRICAL AND DIMENSIONAL CHARACTERISTICS

The following requirements apply:

Rated voltage U_0/U (U_m) (kV)	**12/20(24)**	**18/30(36)**
Rated power frequency withstand voltage (kV)	50	70
Rated impulse withstand voltage (kV)	125	170
Rated short time withstand current in the conductor (kA)	According to HD629-1 (EN 61442)	
Rated short time (0,5 s[a]) withstand current in the screen (kA)	5[b];10[c]	
NOTE (see Table): a: for E-distribuzione, E-distributie, Endesa Distribución Eléctrica, the rated short time is 1 s b: for 16 mm^2 and 25 mm^2 joint screen c: 50 mm^2 joint screen		

Table 2 – Electrical characteristics

The rated voltage levels of the cables for which is foreseen the installation of the joints is the following:

Rated voltage of the joint U_0/U (U_m) (kV)	**12/20(24)**	**18/30(36)**
Distribution Company (Country)	**Rated voltage of the cables U_0/U (U_m) (kV)**	
Enel Distribuição São Paulo (Brazil)	8.7/15(17.5)	15/25(31) 20/35(42)
Enel Distribuição Ceará (Brazil)	8.7/15(17.5)	-
Enel Distribución Colombia (Colombia)	8.7/15(17.5)	18/30(36)
Enel Distribución Chile (Chile)	8.7/15(17.5)	15/25(31)
Enel Distribución Perú (Perù)	8.7/15(17.5); 12/20(24)	-
Edesur (Argentina) Enel Distribuição Rio (Brazil) Enel Distribuição Goiás (Brazil)	8.7/15(17.5)	18/30(36)
Endesa Distribución Eléctrica (Spain)	12/20(24)	18/30(36)
E-distributie Banat (Romania); E-distributie Dobrogea (Romania); E-distributie Muntenia (Romania); E-Distribuzione (Italy)	12/20(24)	-

Table 3 – Rated voltage of the cables

9.2.5 Copper stocking

The electrical continuity of the metallic screens of the cables shall be made by means of a copper stocking with the minimum sections reported in Table .
It shall be compatible with both aluminum tape and copper wire cable screens.

Distribution Company (Country)	Cable section (mm^2)	Copper stocking section (mm^2)
Enel Distribuição Rio (Brazil) Enel Distribuição Ceará (Brazil) Enel Distribuição Goiás (Brazil) Enel Distribución Chile (Chile) Enel Distribución Colombia (Colombia)	≤ 240[a]	25
	400[a] and 630[a]	50
Edesur (Argentina)	50 (13.2 kV) 185 (33 kV)	25
	all other sections (13.2 kV)	50
Enel Distribuição São Paulo (Brazil) Enel Distribución Perú (Perù) Endesa Distribución Eléctrica (Spain) E-distributie Banat (Romania) E-distributie Dobrogea (Romania) E-distributie Muntenia (Romania) E-Distribuzione (Italy)	all sections[a]	25
NOTE: a: The copper stocking of the joint shall be compatible with both aluminum tape screen and copper wires screen of cables, except for: Edesur(Argentina).		

Table 6 – Copper stocking sections

9.2.9 Grounding Braid

For Enel Distribuição São Paulo (Brazil), a tinned copper rope blocked in one of the ends will be included for grounding, and that should be connected to the wired screen. The Constant force compression system and sealing compounds must ensure that water cannot enter the connection point. The grounding braid will have the following characteristics:

Length (Meters)	Width (mm)	Section (mm2)
1	25.4	25

11 CONTENT OF THE KIT

All the necessary elements and accessories to install the compact joint on-field shall be included, namely:

A. Compact joint for extruded cables:

- 1 (one) pre-assembled joint body (see 9.2)
- 1 (one) shear bolt connector (see 9.2.1);
- 1 (one) shear bolt connector cover (see 9.2.1);
- 2 (two) plates for aluminum tape screen cables (see 9.2.5.1) (except for Argentina, see Table 6)
- Constant force compression system see par. 9.2.5.3 (quantity defined according to supplier's design);
- Greases and sealing compounds (see 9.2.7);
- Accessories for cleaning;
- Plastic bag for collecting residual materials of installation;
- List of materials;
- Identification label (see 14.2.2);
- Installation instructions and templates (see 14.3);
- Other materials, tools and accessories (according to supplier's design)
- Tinned copper rope blocked for grounding (see 9.2.9) (for Enel Distribuição São Paulo Brazil only)

B. Compact joints for transition extruded-paper insulated cables (see Table 8):

- 1 (one) pre-assembled joint body (see 9.2)
- 1 (one) shear bolt connector (see 9.2.1);
- 1 (one) shear bolt connector cover (see 9.2.1);
- 1 (one) plate for aluminum tape screen cables (see 9.2.5.1) (except for Argentina, see Table 6);
- Constant force compression system see par. 9.2.5.3 (quantity defined according to supplier's design);
- Greases and sealing compounds (see 9.2.7);
- Accessories for cleaning;
- Plastic bag for collecting residual materials of installation;
- List of materials;
- Identification label (see 14.2.2);
- Installation instructions and templates (see 14.3);
- Other materials, tools and accessories (according to supplier's design)
- Oil sealing cold shrink tube (see 9.2.8)
- Tinned copper rope blocked for grounding (see 9.2.9) (for Enel Distribuição São Paulo Brazil only).

12 LIST OF COMPONENTS

The list of components included in this Global Standard is reported in the following tables for 12/20(24) kV and 18/30(36) kV rated voltages

Distribution Company (Country)	**Type: GSCC004/1, GSCC004/3 and GSCC004/4**			
Enel Distribuição Rio (Brazil) Enel Distribuição Ceará (Brazil) Enel Distribuição Goiás (Brazil)	T270470[b]	T270469[b]	-	-
Enel Distribuição São Paulo (Brazil)	337829 337835[b]	337836[b]	337830	337831
Enel Distribución Chile (Chile)	-	270107[a]	-	-
Enel Distribución Colombia (Colombia)	270129[b]	270128[b]	-	-
Enel Distribución Perú (Perù)	270117[b]	270114[b]	-	-
Edesur (Argentine)	0114-0188	0114-0189	0114-0193	0114-0192
Characteristics of the cable				
Cable section (mm^2)	35 ÷ 95	95 ÷ 240	240 ÷ 400	400 ÷ 630
Rated voltage U_0/U (U_m) (kV)	See Table 3			
Min/max diameter over insulation (mm)	14.9/ 25.0	20.6/32.2	26.1/37.5	31/43.5
a: Transition joints GSCC004/3 b: Joints for MV aerial cable GSCC004/4				

Table 4 – Material codes for cold shrink 12/20(24) kV compact joints

Distribution Company (Country)	**Type: GSCC004/2, GSCC004/5 and GSCC004/6**			
Enel Distribuição Rio (Brazil) Enel Distribuição Ceará (Brazil) Enel Distribuição Goiás (Brazil)	-	-	-	-
Enel Distribuição São Paulo (Brazil)	337832 337834[a]	-	337833	-
Enel Distribución Chile (Chile)	270125	271917 270104[b]	-	-
Enel Distribución Colombia (Colombia)	-	270115 270127[b]	-	-
Enel Distribución Perú (Perù)	-	-	-	-
Edesur (Argentine)	-	0114-0191	-	-
Characteristics of the cable				
Cable section (mm^2)	35 ÷ 95	95 ÷ 240	240 ÷ 400	400 ÷ 630
Rated voltage U_0/U (U_m) (kV)	See Table 3			
Min/max diameter over insulation (mm)	20.4/30.0	24.8/37.2	29.8 /46	34.9/49.7
a Transition joints GSCC004/6 b Joints for MV aerial cable GSCC004/5				

Table 5 – Material codes cold shrink 18/30(36) kV compact joints

13.2 TYPE TESTS

For each material code, type tests shall be carried out on samples installed on cables, with the maximum section indicated in **Errore. L'origine riferimento non è stata trovata.** and **Errore. L'origine riferimento non è stata trovata.**, respectively for U_o/U (U_m) 12/20(24) kV and 18/30(36) kV (e.g. 270092 shall be tested on a 240 mm2 – 18/30(36) kV cable and 6811501 on a 400 mm^2 12/20(24) kV cable).

Type tests shall be carried out at the maximum rated voltage level prescribed for the joints (i.e. 12/20(24) kV or 18/30(36) kV), except for type code GSCC004/2 (Enel Distribuição São Paulo).

For type code GSCC004/2 (Enel Distribuição São Paulo), type tests shall be carried with the following special considerations:

Description	Test	Notes
Heating cycle voltage in air	Item N° 6 Table 5 HD 629-1	Test requirements for U_o/U (U_m) 20,8/36(42) kV
AC voltage dry	Item N° 13 Table 5 HD 629-1	

The connectors shall be tested both for their maximum and minimum section, according to IEC 61238-1, class A.

The Supplier shall declare the resistance to fire of the main insulating housing according to IEC 60695-11-10 or another equivalent standard.

For E-Distribuzione, E-distributie Banat, E-distributie Dobrogea and E-distributie Muntenia, type tests shall be carried out on both HPTE and XLPE insulated cables.

13.2.1 EXPIRATION TEST

An expiration test shall be performed in order to verify the capability of the joint to maintain its properties during its life according to the expiry date declared by the manufacturer.
The test shall be performed of a new joint and on a joint of the same lot aged 7 days at 65°C in oven in expanded stage (to simulate 2 years of storage at 35°C of mean temperature).

After ageing, the new joint and the aged joint are put in expanded stage at +5°C during 24h. After that cooling phase, the joints are installed on the minimum cross-section cables of their reference range and the loops are immediately immersed in cold water at 0/+5°C.

Then, the following test sequence is applied:

Test	GSCC004/1, GSCC004/2, GSCC004/4 and GSCC004/5 (table 5 of HD 629-1)	GSCC004/3 GSCC004/6 (table 4 of HD 629-2)
Partial discharge measurement	X (test n°3)	n/a
Lightning impulse voltage test	X (test n°12)	X (test n°11)
Power-frequency voltage tests	X (test n°2)	X (test n°2)
Partial discharge measurement	X (test n°3)	n/a
Visual inspection of water penetration	X	X