

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

CONTENTS

1	DOCUMENT AIMS AND APPLICATION AREA	2
1.1	Related documents to be implemented at country level	2
2	DOCUMENT VERSION MANAGEMENT	3
3	UNITS IN CHARGE OF THE DOCUMENT	3
4	REFERENCES	4
5	ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY	7
6	DEFINITIONS AND ACRONYMS.....	7
7	DESCRIPTION	8
7.1	List of Components	8
7.2	Service conditions	14
7.3	Technical characteristics.....	14
7.4	Overall Dimensions	15
7.5	Construction Characteristics	19
7.6	Content of the kit	33
7.7	Testing.....	34
7.8	Supply requirements	38
7.9	Technical conformity assesment.....	40
8	ANNEXES	41
8.1	Technical check list example	41

THE HEAD OF NETWORK COMPONENTS

Fabrizio Gasbarri

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES

Application Areas

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1 DOCUMENT AIMS AND APPLICATION AREA

This Global Standard applies to 12/20(24) kV and 18/30(36) kV indoor and outdoor separable connectors for Medium Voltage cables with extruded insulation, both full and reduced insulating thickness, with copper wires or aluminum tape screen.

These Global Standard applies to the Distribution Companies of Enel Group listed below

Country	Distribution Company
Argentina	Edesur
Brazil	Enel Distribuição Rio (RJ) Enel Distribuição Ceará (CE) Enel Distribuição Goiás (GO) Enel Distribuição São Paulo (SP)
Chile	Enel Distribución Chile
Colombia	Codensa
Iberia	e-distribución
Italy	e-distribuzione
Perú	Enel Distribución Perú
Romania	e-distributie Banat e-distributie Dobrogea e-distributie Muntenia

These requirements apply to the distribution network with rated maximum voltage of 24 kV and 36 kV. Other existing rated maximum voltage levels up to 24 kV are covered by the 12/20(24) kV class, whereas those with rated maximum voltage up to 36 kV are covered by the 18/30(36) kV class.

1.1 RELATED DOCUMENTS TO BE IMPLEMENTED AT COUNTRY LEVEL

This document applies to both Enel Global Infrastructure and Networks Srl Company and to Infrastructure and Networks Business Line perimeter when each Company does not have to issue further documents.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES

Application Areas

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Service Function: -

Business Line: *Infrastructure & Networks*

2 DOCUMENT VERSION MANAGEMENT

Version	Date	Main changes description
00	25/11/2015	First emission.
01	23/02/2018	Material codes updated. Chapter on barcode updated, Painted semiconducting layer not allowed; New tests: UV test for outdoor accessories; Modification of requirements for resistance to fire; Modification of requirements of screen connecting plate; modification of requirements of tracking and erosion test, introduction of PE-bag packaging instead of obstruction cups. Class 24 kV for Italy and Rumania. Modification of max width for elbow type. Rated short time withstand current in the screen, Increase of the minimum section of the earthing lug for Italy, Rumania, Spain and Peru from 16 to 25 mm ²
02	25/05/2018	Revised tables 8, 9 and 10.
03	09/07/2018	Tracking and erosion test withdrawn. Revised material codes for Brazil.
Addendum Ed 1.	12/2020	Enel Distribuição São Paulo is included; Revised material code for Argentina, Brasil, Chile, Colombia, Italia, and Peru; Rated short time withstand current in the screen (kA) is updated for Colombia; Revised table 6.; Special consideration for São Paulo in type tests.
04	12/05/2021	The inner cone separable connector size 0, is introduced; Separable connectors compatible with 25 mm ² cross-section cables are included for pre-assembled cables links solutions; Rated short time withstand current in the screen (kA) is updated for smaller cross-section cable; Material codes and type codes updated; list of component table is reorganized; Earthing lug section is reported directly in the list of component table; The maximum dimensions allowed for the 36Kv elbow connector are modified; Modification of requirements of screen connecting plate (grater), for smaller and larger cross-sections cables, with aluminum tape screen; type test according to HD-629 S3 for separable connectors and extension of compliance for family and Connectors; Modifications to Acceptance Test chapter; Chapter on barcode updated; paragraph on technical conformity assessment (TCA) is added, recognition of homologation for previous revision of the standard.

3 UNITS IN CHARGE OF THE DOCUMENT

Responsible for drawing up the document:

- Global Infrastructure and Networks: Operation and Maintenance / Network Components Standardization

Responsible for authorizing the document:

- Global Infrastructure and Networks: Head of Operation and Maintenance unit
- Global Infrastructure and Networks: Head of Health, Safety, Environment and Quality unit.

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4 REFERENCES

- Code of Ethics of Enel Group;
- Enel Human Right Policy;
- The Enel Group Zero Tolerance of Corruption (ZTC) Plan;
- Organization and management model as per Legislative Decree No. 231/2001;
- RACI Handbook Infrastructure and Networks no. 06;
- Enel Global Compliance Program (EGCP);
- Integrated Policy of Quality, Health and Safety, Environment and anti-Bribery.
- ISO 9001:2015 - Quality Management System - Requirements;
- ISO 14001:2015 - Environmental Management System - Requirements and user guide;
- ISO 45001:2018 - Occupational Health and Safety Management System - Requirements and user guide;
- ISO 50001:2018 - Energy management systems - Requirements with guidance for use;
- ISO 37001:2016 - Anti-bribery Management System - Requirements with guidance for use.
- MAT-O&M-NCS-2021-0033-EGIN version 3 "Global Infrastructure and Networks – GSCG002 Technical Conformity Assessment".
- CNS-O&M-S&L-2021-0032-EGIN "Global Infrastructure and Networks Barcode specification.

International technical references related with the material:

Reference documents listed below (amendments included) shall be the edition in-force at the contract date.

ISO/IEC 17000	Conformity assessment – Vocabulary and general principles
ISO/IEC 17020	General criteria for the operation of various types of bodies performing inspection
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
ISO/IEC 17050-1	Conformity assessment - Supplier's declaration of conformity - Part 1: General requirements (ISO/IEC 17050-1:2004, corrected version 2007-06-15)
ISO/IEC 17050-2	Conformity assessment - Supplier's declaration of conformity - Part 2: Supporting documentation (ISO/IEC 17050-2:2004)
ISO/IEC 17065	Conformity assessment – Requirements for bodies certifying products, processes and services
EN 50181	Plug-in type bushings above 1 kV up to 52 kV and from 250 A to 2,50 kA for equipment other than liquid filled transformers.

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HD 629.1 S3	Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV Part 1: Accessories for cables with extruded insulation
IEC 61238-1	Compression and mechanical connectors for power cables - Part 1: Test methods and requirements
IEC 60587	Electrical insulating materials used under severe ambient conditions - Test methods for evaluating resistance to tracking and erosion
IEC 62217	Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria
IEC 60695-11-10	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods
IEC 60721-2-1	Classification of environmental conditions - Part 2-1: Environmental conditions appearing in nature - Temperature and humidity.
ISO IEC 17067	Conformity assessment — Fundamentals of product certification and guidelines for product certification schemes.

Enel Global Standards

- GSC001¹ "Underground Medium Voltage Cables".
- GSCC015 "Cable preparation for MV Cables"
- GSCC008 "Medium Voltage Aerial Bundled Cables"

¹ The characteristics of the cables are included in the Enel Group Global Standard. Besides installation on new cables, which comply to GSC001, the termination 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).

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES**Application Areas**Perimeter: *Global*

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Business Line: *Infrastructure & Networks*

*Local Standard**Italy*

- Nota Operativa PVR001 – Rev. 2 – Ott. 2012 - Gestione Garanzie dei materiali di ENEL Distribuzione.

Brazil

- NBR14643, Corrosão atmosférica – Classificação da corrosividade de atmosferas
- Nr-10, Segurança em Instalações e Serviços em Eletricidade

Colombia

- RETIE – Reglamento Técnico de Instalaciones Eléctricas.

Chile

- NSEC 5 Reglamento de Instalaciones Eléctricas de Corrientes Fuertes

Iberia

- R.D. 614/2001, de 8 de junio, sobre disposiciones mínimas para la protección de la salud y seguridad de los trabajadores frente al riesgo eléctrico.
- R.D. 337/2014, de 9 de mayo, por el que se aprueban el Reglamento sobre condiciones técnicas y garantías de seguridad en instalaciones eléctricas de alta tensión y sus Instrucciones Técnicas Complementarias ITC-RAT 01 a 23.
- R. D, 223/2008 de 15 de febrero, por el que aprueba el Reglamento sobre condiciones técnicas y garantías de seguridad en líneas eléctricas de alta tensión y sus instrucciones técnicas complementarias ITC-LAT 01 a 09 (R.L.A.T.).

Romania

- Legea securității și sănătății în muncă nr.319/2006, cu modificările și completările ulterioare.
- Ordonanța de Urgență nr. 195/22.12.2005 privind protecția mediului, cu toate modificările și completările în vigoare.
- Legea nr. 211/25.11.2011 privind regimul deșeurilor.
- H.G. 1037/03.11.2010 privind deșeurile de echipamente electrice și electronice.

Europa

- Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006.
- Directive 2004/108/EC electromagnetic compatibility.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES

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5 ORGANIZATIONAL PROCESS POSITION IN THE PROCESS TAXONOMY

Value Chain/Process Area: Networks Management

Macro Process: Materials management

Process: Network Components Standardization

6 DEFINITIONS AND ACRONYMS

Acronym and Key words	Description
Medium Voltage (MV)	Any set of nominal voltage levels exceeding 1 kV and below a value between 30 kV and 100 kV. NOTE: The boundary value between medium voltage and high voltage depends on local and historical circumstances or on common usage. Nevertheless the band 30 kV to 100 kV normally contains the accepted boundary.
Technical Conformity Assessment (TCA)	A “conformity assessment” with respect to “specified requirements” consists in functional, dimensional, constructional and test characteristics required for a product (or a series of products) and quoted in technical specifications and quality requirements issued by Enel Group distribution companies. This also includes the verification of conformity with respect to local applicable regulation and laws and possession of relevant requested certifications.
Type A documentation	Not confidential documents used for product manufacturing and management from which it is possible to verify the product conformity to all technical specification requirements, directly or indirectly.

Additional terms and definitions are available in Cenelec HD 629.1 S3 and HD 629.2 S2 (See Chapter 4).

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7 DESCRIPTION
7.1 LIST OF COMPONENTS

Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm ²)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm ²)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/11	ED-ITALY	273175	12/20(24)	Elbow	A	25	250	215	320	16	3kA@1 seg	17/22
GSCC006/11	ED-ROMANIA	273175	12/20(24)	Elbow	A	25	250	215	320	16	3kA@1 seg	17/22
GSCC006/11	ED-ARGENTINA	0115-0473	12/20(24)	Elbow	A	25	250	215	320	--	3kA@1 seg	17/22
GSCC006/11	ED -BRAZIL	270307	12/20(24)	Elbow	A	25	250	215	320	16	3kA@1 seg	17/22
GSCC006/11	ED-CHILE	270297	12/20(24)	Elbow	A	25	250	215	320	16	3kA@1 seg	17/22
GSCC006/11	ED-PERU	270280	12/20(24)	Elbow	A	25	250	215	320	16	3kA@1 seg	17/22
GSCC006/12	ED-ITALY	273171	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/12	ED-ROMANIA	273171	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/12	ED-SPAIN	270329	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/12	ED-ARGENTINA	0115-0366	12/20(24)	Elbow	A	35÷50	250	215	320	--	3kA@1 seg	14.9/21.8
GSCC006/12	ED -BRAZIL	275031	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/12	ED-COLOMBIA	270286	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/13	ED-ITALY	273142	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED-ROMANIA	273142	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED -BRAZIL	270323	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED-COLOMBIA	270164	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED-PERU	270166	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED-SPAIN	270118	12/20(24)	Elbow	A	70÷120	250	215	320	25	5kA@1 seg	17.6/26.6
GSCC006/13	ED-ARGENTINA	0115-0417	12/20(24)	Elbow	A	70÷120	250	215	320	--	5kA@1 seg	17.6/26.6
GSCC006/14	ED-SPAIN	270119	12/20(24)	Elbow	B	70÷120	400	270	410	25	5kA@1 seg	17.6/26.6
GSCC006/15	ED -BRAZIL	275291	12/20(24)	Elbow	B	150÷185	400	270	410	25	5kA@1 seg	22.3/28
GSCC006/16	ED -BRAZIL	270306	18/30(36)	Elbow	B	35÷50	400	270	410	25	3kA@1 seg	21/26.6
GSCC006/16	ED-CHILE	270296	18/30(36)	Elbow	B	35÷50	400	270	410	25	3kA@1 seg	21/26.6
GSCC006/16	ED-SPAIN	270183	18/30(36)	Elbow	B	35÷50	400	270	410	25	3kA@1 seg	21/26.6

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Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm2)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm2)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/17	ED -BRAZIL	990263	18/30(36)	Elbow	B	70÷120	400	270	410	25	5kA@1 seg	24/30
GSCC006/17	ED-CHILE	270009	18/30(36)	Elbow	B	70÷120	400	270	410	25	5kA@1 seg	24/30
GSCC006/18	ED-CHILE	270158	18/30(36)	Elbow	B	150÷185	400	270	410	25	5kA@1 seg	27.3/33
GSCC006/18	ED-SPAIN	270120	18/30(36)	Elbow	B	150÷185	400	270	410	25	5kA@1 seg	27.3/33
GSCC006/19	ED-ARGENTINA	0115-0472	12/20(24)	Straight	A	25	250	-	-	--	3kA@1 seg	17/22
GSCC006/19	ED -BRAZIL	270305	12/20(24)	Straight	A	25	250	-	-	16	3kA@1 seg	17/22
GSCC006/19	ED-PERU	270279	12/20(24)	Straight	A	25	250	-	-	16	3kA@1 seg	17/22
GSCC006/20	ED-ITALY	273170	12/20(24)	Straight	A	35÷50	250	-	-	25	3kA@1 seg	14.9/21.8
GSCC006/20	ED-ROMANIA	273170	12/20(24)	Straight	A	35÷50	250	-	-	25	3kA@1 seg	14.9/21.8
GSCC006/20	ED-ARGENTINA	0115-0397	12/20(24)	Straight	A	35÷50	250	-	-	--	3kA@1 seg	14.9/21.8
GSCC006/20	ED -BRAZIL	275290	12/20(24)	Straight	A	35÷50	250	-	-	25	3kA@1 seg	14.9/21.8
GSCC006/20	ED-COLOMBIA	270285	12/20(24)	Straight	A	35÷50	250	-	-	25	3kA@1 seg	14.9/21.8
GSCC006/21	ED-ITALY	273163	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/21	ED-ROMANIA	273163	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/21	ED-ARGENTINA	0115-0418	12/20(24)	Straight	A	70÷120	250	-	-	--	5kA@1 seg	17.6/26.6
GSCC006/21	ED -BRAZIL	275287	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/21	ED-COLOMBIA	274568	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/21	ED-PERU	274214	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/21	ED-SPAIN	270121	12/20(24)	Straight	A	70÷120	250	-	-	25	5kA@1 seg	17.6/26.6
GSCC006/22	ED -BRAZIL	601658	12/20(24)	Straight	B	150÷185	400	-	-	25	5kA@1 seg	22.3/28
GSCC006/23	ED -BRAZIL	270304	18/30(36)	Straight	B	35÷50	400	-	-	25	3kA@1 seg	21/26.6
GSCC006/24	ED -BRAZIL	990262	18/30(36)	Straight	B	70÷120	400	-	-	25	5kA@1 seg	24/30
GSCC006/24	ED-CHILE	270008	18/30(36)	Straight	B	70÷120	400	-	-	25	5kA@1 seg	24/30
GSCC006/25	ED-SPAIN	270122	18/30(36)	Straight	B	150÷185	400	-	-	25	5kA@1 seg	27.3/33
GSCC006/25	ED-CHILE	270159	18/30(36)	Straight	B	150÷185	400	-	-	25	5kA@1 seg	27.3/33

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Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm2)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm2)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/60	ED-ITALY	270029	12/20(24)	TEE	C	25(Cu)	400	300a ;220b	410	25	3kA@1 seg	16/21.8
GSCC006/26	ED-ITALY	270027	12/20(24)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	16/21.8
GSCC006/26	ED-ROMANIA	273254	12/20(24)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	16/21.8
GSCC006/26	ED-SPAIN	270006	12/20(24)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	16/21.8
GSCC006/27	ED -BRAZIL	270324	12/20(24)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	14.9/21.8
GSCC006/27	ED-PERU	274192	12/20(24)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	14.9/21.8
GSCC006/28	ED-ITALY	273226	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/28	ED-ROMANIA	273226	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/28	ED -BRAZIL	990270	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/28	ED-COLOMBIA	274590	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/28	ED-PERU	274245	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/28	ED-SPAIN	270005	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/29	ED-ITALY	273247	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED-ROMANIA	273247	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED -BRAZIL	990269	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED-COLOMBIA	274567	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED-PERU	270157	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED-SPAIN	270112	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/29	ED-ARGENTINA	0115-0365	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	--	5kA@1 seg	22.3/28
GSCC006/30	ED-ITALY	273153	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED-ROMANIA	273153	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED -BRAZIL	276650	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED-COLOMBIA	274569	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED-PERU	274249	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED-SPAIN	270113	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/30	ED-ARGENTINA	0115-0413	12/20(24)	TEE	C	240	630	300a ;220b	410	--	5kA@1 seg	26.1/32.2
GSCC006/31	ED-ARGENTINA	0115-0414	12/20(24)	TEE	C	300	630	300a ;220b	410	--	5kA@1 seg	29.9/37.5
GSCC006/32	ED-PERU	274246	12/20(24)	TEE	C	400	630	300a ;220b	410	25	5kA@1 seg	31/37.5

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES
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Perimeter: Global

Staff Function: -

GSCC006/32	ED-SPAIN	Service Function - 270114	12/20(24)	TEE	C	400	630	300a ;220b	410	25	5kA@1 seg	31/37.5
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Business Line: Infrastructure & Networks

Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm2)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm2)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/32	SP -BRAZIL	990265	12/20(24)	TEE	C	400	630	300a ;220b	410	25	5kA@1 seg	31/37.5
GSCC006/32	ED-ARGENTINA	0115-0415	12/20(24)	TEE	C	400	630	300a ;220b	410	--	5kA@1 seg	31/37.5
GSCC006/33	RJ/CE/GO -BRAZIL	275288	12/20(24)	TEE	C	400	630	300a ;220b	410	50	10kA@0,5 seg	31/37.5
GSCC006/34	ED-ARGENTINA	0115-0416	12/20(24)	TEE	C	500	630	300a ;220b	410	--	5kA@1 seg	34/42.5
GSCC006/34	SP -BRAZIL	270325	12/20(24)	TEE	C	500	630	300a ;220b	410	25	5kA@1 seg	34/42.5
GSCC006/35	ED-COLOMBIA	270303	12/20(24)	TEE	C	500	630	300a ;220b	410	50	10kA@0,5 seg	34/42.5
GSCC006/36	ED-SPAIN	270004	18/30(36)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	21/26.6
GSCC006/36	ED -BRAZIL	270326	18/30(36)	TEE	C	35÷50	630	300a ;220b	410	25	3kA@1 seg	21/26.6
GSCC006/37	ED -BRAZIL	601818	18/30(36)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	24/30
GSCC006/37	ED-CHILE	270007	18/30(36)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	24/30
GSCC006/37	ED-SPAIN	270003	18/30(36)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	24/30
GSCC006/38	ED -BRAZIL	601820	18/30(36)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	27.3/33
GSCC006/38	ED-CHILE	270160	18/30(36)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	27.3/33
GSCC006/38	ED-SPAIN	270115	18/30(36)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	27.3/33
GSCC006/39	ED -BRAZIL	601821	18/30(36)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	31.2/37.2
GSCC006/39	ED-CHILE	270012	18/30(36)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	31.2/37.2
GSCC006/39	ED-COLOMBIA	270302	18/30(36)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	31.2/37.2
GSCC006/39	ED-SPAIN	270116	18/30(36)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	31.2/37.2
GSCC006/40	ED-SPAIN	270117	18/30(36)	TEE	C	400	630	300a ;220b	410	25	5kA@1 seg	34.9/42.5
GSCC006/40	SP -BRAZIL	270334	18/30(36)	TEE	C	400	630	300a ;220b	410	25	5kA@1 seg	34.9/42.5
GSCC006/41	ED-CHILE	270011	18/30(36)	TEE	C	400	630	300a ;220b	410	50	10kA@0,5 seg	34.9/42.5
GSCC006/41	RJ/CE/GO -BRAZIL	990259	18/30(36)	TEE	C	400	630	300a ;220b	410	50	10kA@0,5 seg	34.9/42.5
GSCC006/42	ED-CHILE	270010	18/30(36)	TEE	C	630	630	300a ;220b	410	50	10kA@0,5 seg	41.3.9/49.7

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES
Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm2)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm2)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/43	ED-ITALY	273270	12/20(24)	TEE WITH JOINT ELEMENT	C	35÷50	250	300	410	25	3kA@1 seg	16/21.8
GSCC006/43	ED-ROMANIA	273270	12/20(24)	TEE WITH JOINT ELEMENT	C	35÷50	250	300	410	25	3kA@1 seg	16/21.8
GSCC006/43	ED-SPAIN	270319	12/20(24)	TEE WITH JOINT ELEMENT	C	35÷50	250	300	410	25	3kA@1 seg	16/21.8
GSCC006/44	ED-ITALY	273227	12/20(24)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	17.6/26.6
GSCC006/44	ED-ROMANIA	273227	12/20(24)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	17.6/26.6
GSCC006/44	ED-PERU	274239	12/20(24)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	17.6/26.6
GSCC006/44	ED-SPAIN	110574	12/20(24)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	17.6/26.6
GSCC006/45	ED-ITALY	273248	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/45	ED-ROMANIA	273248	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/45	ED -BRAZIL	990268	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/45	ED-PERU	270165	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/45	ED-SPAIN	110575	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/46	ED-ITALY	273275	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/46	ED-ROMANIA	273275	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/46	ED -BRAZIL	601665	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/46	ED-PERU	274240	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/46	ED-SPAIN	110576	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/47	SP -BRAZIL	990264	12/20(24)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	31/37.5
GSCC006/47	ED-PERU	274241	12/20(24)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	31/37.5
GSCC006/47	ED-SPAIN	110577	12/20(24)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	31/37.5
GSCC006/48	RJ/CE/GO -BRAZIL	276649	12/20(24)	TEE WITH JOINT ELEMENT	C	400	630	300	410	50	10kA@0,5 seg	31/37.5
GSCC006/49	ED-SPAIN	270320	18/30(36)	TEE WITH JOINT ELEMENT	C	35÷50	630	300	410	25	3kA@1 seg	21/26.6
GSCC006/50	ED-SPAIN	270321	18/30(36)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	24/30
GSCC006/51	ED-ARGENTINA	0115-0370	18/30(36)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	--	5kA@1 seg	27.3/33

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES
Application Areas

Perimeter: Global

Staff Function: -

GSCC006/51	ED -BRAZIL	990261	18/30(36)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	27.3/33
GSCC006/51	ED-CHILE	270161	18/30(36)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	27.3/33
GSCC006/51	ED-SPAIN	110578	18/30(36)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	27.3/33

Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm ²)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm ²)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/52	ED -BRAZIL	990260	18/30(36)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	31.2/37.2
GSCC006/52	ED-CHILE	270162	18/30(36)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	31.2/37.2
GSCC006/52	ED-SPAIN	110579	18/30(36)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	31.2/37.2
GSCC006/53	ED-SPAIN	110580	18/30(36)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	34.9/42.5
GSCC006/53	SP -BRAZIL	990258	18/30(36)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	34.9/42.5
GSCC006/54	ED-CHILE	270163	18/30(36)	TEE WITH JOINT ELEMENT	C	400	630	300	410	50	10kA@0,5 seg	34.9/42.5
GSCC006/55	SP -BRAZIL	270333	18/30(36)	TEE WITH JOINT ELEMENT	C	630	630	300	410	50	10kA@0,5 seg	41.3.9/49.7
GSCC006/57	ED-ITALY	273114	12/20(24)	Inner Cone Plug-in	Size 0	25 (Cu)	250	-	-	16	3kA@1 seg	17.7/19.3
GSCC006/57	ED-ROMANIA	273114	12/20(24)	Inner Cone Plug-in	Size 0	25 (Cu)	250	-	-	16	3kA@1 seg	17.7/19.3
GSCC006/58	ED-ITALY	273112	12/20(24)	Inner Cone Plug-in	Size 0	50 (Al)	250	-	-	16	3kA@1 seg	19.5/21.9
GSCC006/58	ED-ROMANIA	273112	12/20(24)	Inner Cone Plug-in	Size 0	50 (Al)	250	-	-	16	3kA@1 seg	19.5/21.9

a: symmetric with protection cap plugged-in.

b: asymmetric with protection cap plugged-in.

Note: ED-BRAZIL is the acronym for all the companies of the ENEL group in Brazil RJ/CE/GO/SP

Table 1 – Separable connector type

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.2 Service Conditions

7.2.1 General Service conditions.

According to IEC 60721-2-1 (see chapter 4), for Colombia (Enel Distribución Colombia): the reference altitude is 2.700 m.

7.3 Technical characteristics

7.3.1 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) ²	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 withstand current in the screen (kA)	See Table 1	

Table 2 – Electrical characteristics

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

² Rated power frequency withstand voltage (kV) values for type test is according to HD629 (EN 61442)

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

Rated voltage of the separable connector $U_0/U (U_m)$ (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) Enel Distribución Colombia (Colombia)	8.7/15(17.5)	-
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

7.4 Overall Dimensions

With reference to Figure 1, Figure 2, Figure 3 and Figure 4, overall dimension of terminations are defined in Table 4:

Dimensions ¹	Elbow		Straight	Tee (symmetric and asymmetric)	Tee (symmetric with joint element)	Inner Cone Plug-in
	Interface A	Interface B				
Width max (mm)	215	270	-	300 ^a ; 220 ^b	300 ^c	-
Length max (mm)	320	410	-	410	410	-
1: refer to Figure 1, Figure 2, and Figure 3. a: symmetric with protection cap plugged-in. b: asymmetric with protection cap plugged-in. c: with junction element plugged-in.						

Table 4 - Dimensional characteristics

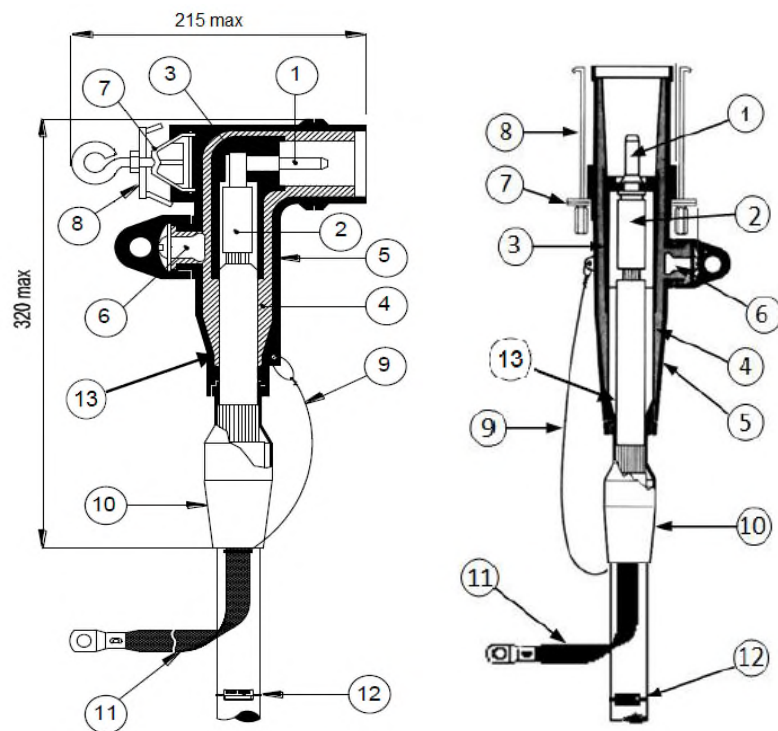
Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*


Note: maximum width (215 mm or 270 mm) allowed for elbow connectors (Interface A and interface B respectively), may be referred according to the design to the edge of the fastening device (as in the figure) or to the edge of the protection cap of the capacitive socket.

1	Contact pin	8	Fastening device
2	Lug	9	Equipotential connection
3	Internal semiconductor layer	10	Cable adapter
4	Insulating layer	11	Earthing connection
5	External semiconductor layer	12	Phase marking plate
6	Capacitive socket with protection cap	13	Electric field control
7	Coupling device for fastening		

Figure 1 – Elbow and straight separable connector

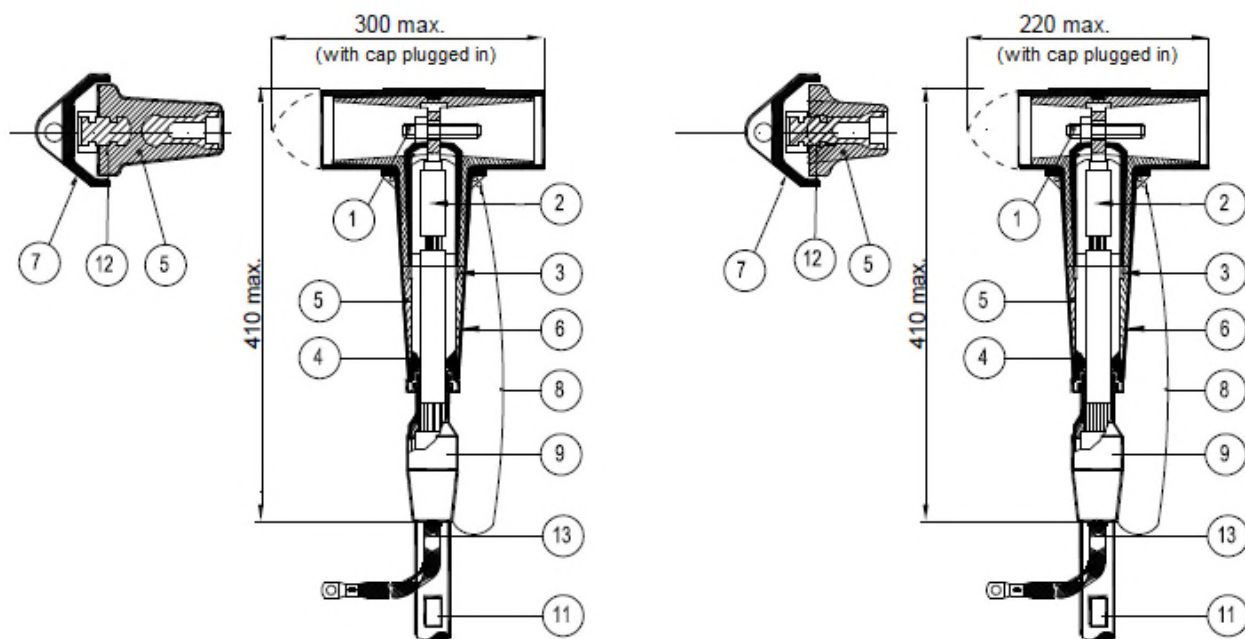
Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*


1	Contact screw	7	Protection cap
2	Lug	8	Equipotential connection
3	Internal semiconductor layer	9	Cable adapter
4	Electric field control	11	Phase marking plate
5	Insulating layer	12	Capacitive socket
6	External semiconductor layer	13	Earthing connection

Figure 2 – Tee (symmetric and asymmetric) separable connector

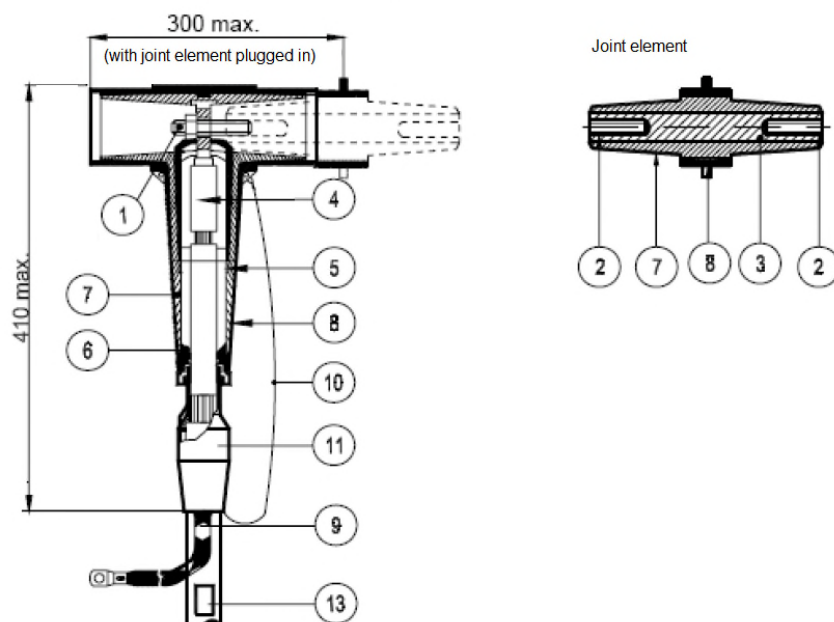
Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

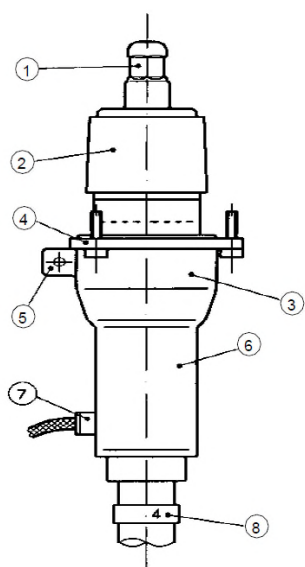
Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*


1	Contact screw	7	Insulating layer
2	Screw hole	8	External semiconductor layer
3	Copper connection	9	Earthing connection
4	Lug	10	Equipotential connection
5	Internal semiconductor layer	11	Cable adapter
6	Electric field control	13	Phase marking plate

Figure 3 – Tee (symmetric with joint element) separable connector



1	Lug - Contact screw
2	Elastic insulator, with electric field control element.
3	Metal body, complete with elastic insulator pressure device
4	Mounting flange to bushing with internal plug connection provided with captive screws.
5	Metal body earthing ground terminal
6	Locking device
7	Insulated earth connection
8	Phase marking plates.

Figure 4 – Inner Cone Size 0 separable connector

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5 CONSTRUCTION CHARACTERISTICS

7.5.1 General Characteristics

7.5.1.1 Resistance to corrosion, infiltrations, moisture and dust

The external surfaces of separable connectors (including caps used in shipping and storage) shall be resistant to atmospheric conditions that can occur during normal operation (moisture, dust, UV rays, etc.). The insulating body shall ensure non-infiltration of moisture and dust and there shall be no standing water at the seals under normal conditions of installation.

The supplier shall provide appropriate documentation of the material used, the characteristics of aging, the details of construction and assembly demonstrating the reliability of seals; the use of paints, enamels or similar materials is not be considered sufficient to ensure the level of protection required.

Furthermore, special precautions must be taken to avoid the risk of corrosion resulting from contact of different metals. All parts of ferrous material in contact with the air, including hardware, must be made of austenitic stainless steel.

7.5.1.2 Heating

All the materials that make up the separable connector shall withstand the heating conditions expected during operation, without having an adverse effect on their proper functioning of the separable connector or the cable.

7.5.1.3 Resistance to fire

The main insulating housing shall be resistant to fire

7.5.1.4 Resistance to surface currents

The main insulating housing (see 7.5.2.3) shall be resistant to surface currents

7.5.1.5 Materials compatibility

All the component parts of the separable connector shall be made out of materials that can be in contact with each other and with the parts that make up the cable, without having an adverse effect on their proper functioning. Greases and sealing compounds, if any, shall be absolutely neutral in relation to the materials with which they are in contact and shall remain stable in contact with air.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.2 Outer Cone Separable Connectors

Outer cone separable connectors are composed by the following elements:

1. Shear bolt lug
2. Cable adapter
3. Main insulating housing
4. Capacitive socket
5. Protection cap
6. Interface and contact device
7. Metallic screen earthing connection
8. Equipotential connection
9. Fastening device
10. Phase marking plates
11. Greases and sealing compounds

Separable connectors shall be supplied as a single, pre-assembled part, including the main insulating housing and protection cap.

7.5.2.1 Shear bolt lug

The shear bolt lug shall be made of tin plated aluminum alloy suitable for both aluminum and copper cables and shall be compliant with IEC 61238-1, Class A.

No additional hole (e.g. for inspection) shall be made. The shear bolts shall be made to break inside their holes, assuring that no spike of any projection of material remain on the lug surface.

The lugs shall have a lock to assure the correct positioning of the conductor, even for the smaller sections.

The internal and external surface of the lugs shall not have sharp edges, spikes or deformities.

Lugs must be designed and constructed so that, when properly installed, the electrical resistance of the connection is not greater than the equivalent resistance of the reference conductor.

It is allowed to use greases to improve the electrical contact between the lug and the cable conductor and avoid corrosion as well as a sealing compound to fill screw cavities of the lug.

Lug shall be designed to assure the connection and interface with the contact device specified in Table 7

Depending on the type of separable connector, interface and contact device, the following requirements apply:

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

	Elbow		Straight		Symmetric or Asymmetric Tee
Interface	A	B	A	B	C
Contact device	Pin		Pin		Screw
Lug	Palm lug with a threaded through hole, able to receive the threaded end of the contact pin		Pin		Palm lug with a smooth through hole ¹ (diameter min 18 mm).
Lug/contact device assembling	The contact pin shall be screwed to the lug using a torque wrench		The pin is pre-assembled with the lug		The contact screw is inserted into the lug and screwed to the type C interface using a torque wrench
1: the internal surface of the hole shall not be tin plated.					

Table 5 – Lug

7.5.2.2 Cable Adapter

It shall be made of a semiconductor prefabricated rubber to cover the area between the outer sheath of the cable and the main insulating housing.

7.5.2.3 Main insulating housing

The main insulating housing consists of:

- 1) an internal semiconductor layer which functions as a shield for the electrical connections. Painted semiconducting layers are not allowed.
- 2) an insulating layer;
- 3) an external semiconductor layer for the electrical field control which also functions as an electrostatic shield. Painted semiconducting layers are not allowed;
- 4) a capacitive socket as described in par. 7.5.2.4;
- 5) a protection cap for the capacitive socket as described in par. 7.5.2.5;
- 6) a coupling device for inserting and detaching the terminal which is also capable of bearing the stress of the fastening device described in par. 7.5.2.10 (only for elbow and straight separable connectors).

7.5.2.4 Capacitive socket

Separable connectors shall be provided with a capacitive socket made of a metal electrode which faces the outside of the main insulating housing, and a circular surface with a diameter in the range 15 ÷ 24 mm, easily accessible with an insulated rod.

The Ctc capacity (measured between the electrode and the cable conductor) must be greater than 1 pF.

The ratio between Cte capacity (measured between the electrode and earth) and Ctc capacity shall be less than 12 ($C_{te}/C_{tc} \leq 12$).

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.2.5 Protection cap

Separable connectors shall be supplied with a protection cap firmly fastened to its position. When properly installed, it shall provide IP 66 degree of protection.

The protection cap is used in order to protect the separable connector capacitive socket from water and dust during transport and storage, as well as during the operation. It shall be made of semi-conductive rubber with an eyelet of $15 \pm 0,5$ mm in diameter. The protection cap shall be linked to the main insulating housing so that it is not lost when it is removed. The protection cap shall withstand at least the secondary voltage of the capacitive divider.

7.5.2.6 Interface and contact device for Outer Cone Separable connectors

The dimensions of the interfaces of separable outer cone connector are stated in EN 50181; these dimensions are reported in Figure and Figure and in Table and Table , relative to the dimensions of the outer cone interface and the contact device (pin or screw), respectively.

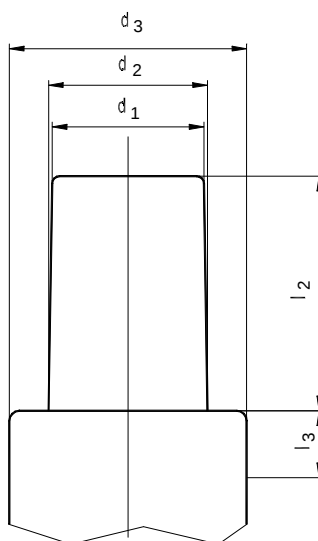


Figure 5 – Interface

Interface type	U_m (kV)	I_n (A)	d_1 (mm)	d_2 (mm)	d_3 (mm)	l_2 (mm)	l_3 (mm)	Contact type
A	24	250	$31^{+0.1}_{-0.3}$	32.5 ± 0.2	48.5 ± 0.2	$48^{+0}_{-0.2}$	9	Pin
B	24; 36	400	46 ± 0.2	56 ± 0.2	70 ± 0.2	90 ± 0.2	11	Pin
C	24; 36	630	46 ± 0.2	56 ± 0.2	70 ± 0.2	90 ± 0.2	11	Screw

Table 6 – Interface dimensions

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

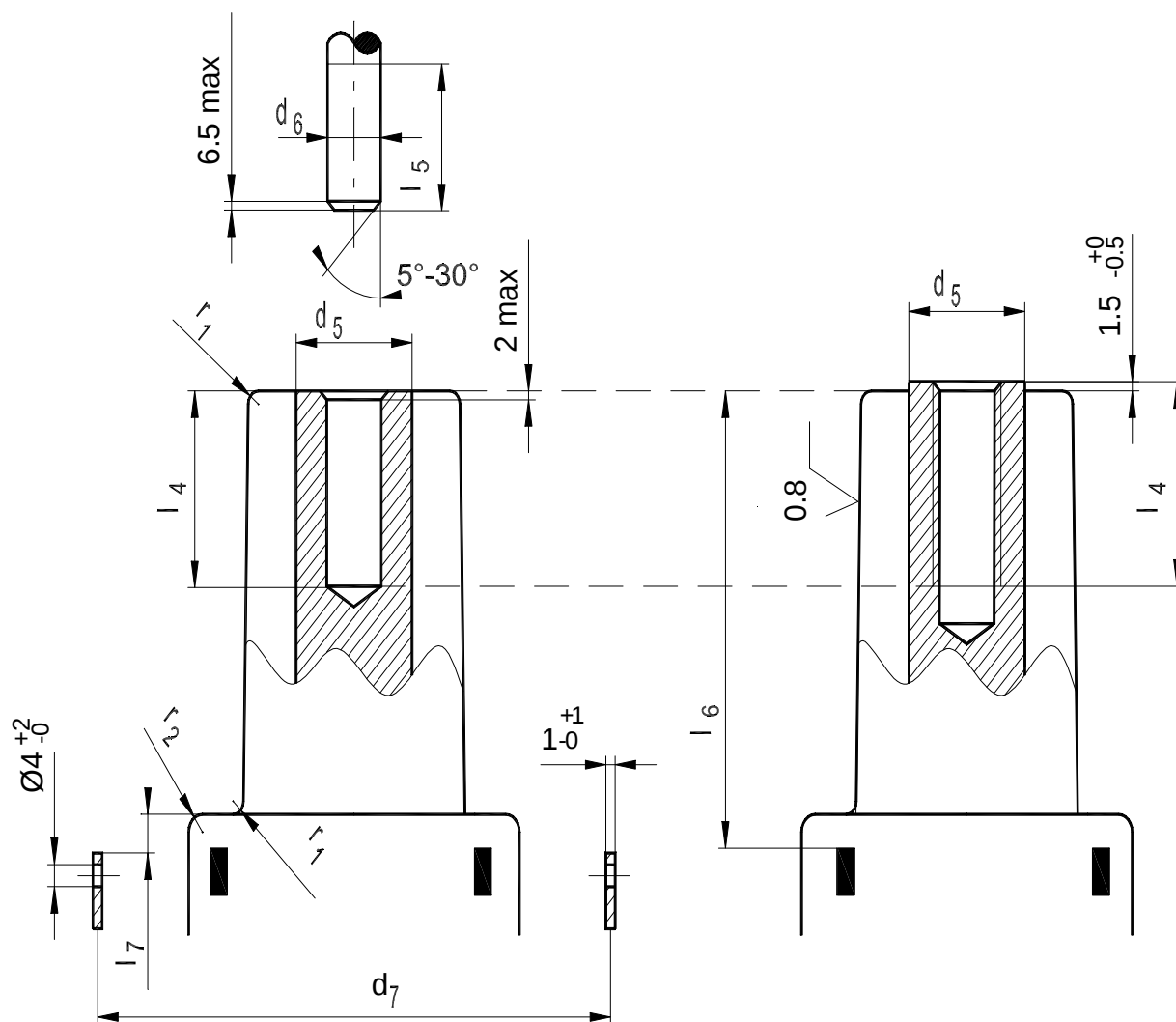
Business Line: *Infrastructure & Networks*


Figure 6 – Contact and fastening device dimensions (mm)

Interface type	U _m (kV)	I _n (A)	Contact zone						l ₅ (mm)	l ₆ max. (mm)	l ₇ max. (mm)	r ₁ max. (mm)	r ₂ max. (mm)	Fastening device zone	
			Contact type	Material	d ₅ (mm)	d ₆ (mm)	Thread	l ₄ min. (mm)						d ₇ (mm)	n°
A	24	250	Pin	Cu	-	7.9 ^{+0.02} _{-0.05}	-	32	30	54	3.5	1	2	90 ^{±0.5}	2
B	24; 36	400	Pin	Cu	-	14 ⁺⁰ _{-0.04}	-	40	38	97	5.5	3	3	102 ^{±0.5}	2
C	24; 36	630	Screw	Cu ¹	22 min.	-	M16	29	-	97	-	3	3	102 ^{±0.5}	2

¹: aluminum alloy is also accepted

Table 7 - Contact device and interface dimensions (mm)

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.2.7 Joint element

The joint element shall have the dimension of type C interface as defined 7.5.2.6, an insulating layer and an external semiconducting layer. Painted semiconducting layers are not allowed.

7.5.2.8 Metallic screen earthing connection

The metallic screen earthing connection as defined in par. 7.5.4

7.5.2.9 Equipotential connection

The main housing shall be stably connected to the cable screen earth connection through an annealed tinned copper wire of 1.0÷1.2 mm in diameter (or a equivalent system).

7.5.2.10 Fastening device

Elbow and straight separable connectors must be equipped with fastening devices made out of austenitic stainless steel to lock the connector of the outer cone interface and ensure the required pressure.

The sizes of the fastening devices for connectors are indicated in Figure 7 and Figure 8. The geometric details of the figures are provided only as a guideline.

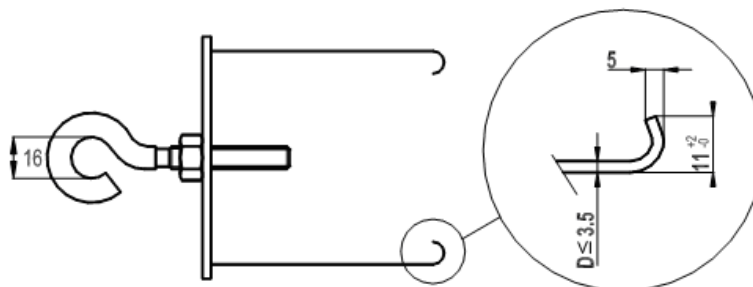


Figure 7 – Fastening device for elbow separable connectors

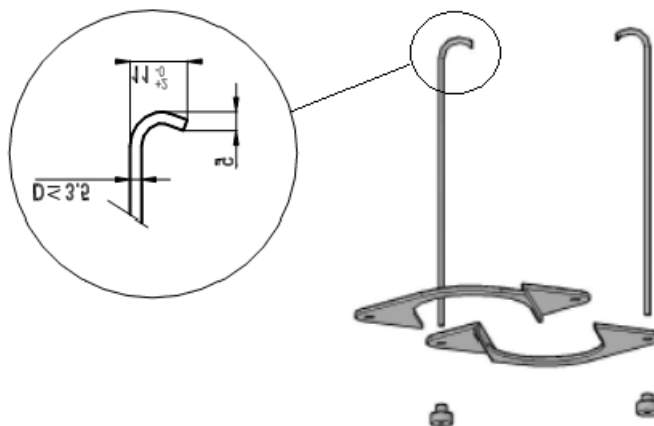


Figure 8 - Fastening device for straight separable connectors

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.2.11 Phase marking plates

Separable connectors shall be provided with anodized aluminum plates, 0.3-0.5 mm thick, bearing the numbers 4, 8 and 12 screen printed in black; the characters shall be 20 ± 2 mm in height; They shall be fastened to the cable by means of polyamide hose clamps.

7.5.2.12 Greases and sealing compounds

Greases are not allowed, except those:

- over the main insulation and the lug.

Sealing compounds are not allowed, except those:

- to seal the separable connector,
- to protect the junction of the metallic screen
- inside the lug screws cavities

Greases and sealing compounds shall have no electrical insulating functions for the assembling of the separable connector but only provide mechanical and/or sealing features.

7.5.3 Inner Cone Separable Connectors

7.5.3.1 Main Characteristics

The terminal shall be designed and constructed in such a way that the electrical insulation of the metal body from the cable screen (≥ 4 kV) is guaranteed and which, when installed in the relevant through-wall insulators with internal cone, has a secure hydraulic seal under 8 m of water.

Inner cone separable connectors are composed by the following elements:

1. Lug – Contact Pin
2. Elastic insulator
3. Metal Body
4. Fastening Device
5. Interface and contact device
6. Locking Device
7. Ground clamp
8. Earthing ground Terminal
9. Insulated earth connection

Separable connectors shall be supplied as a single, pre-assembled part.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3.2 Lug - Contact Pin

A tinned copper lug connector having the dimensions prescribed in figure.9, to be applied by compression, complete with an aluminum alloy pressure ring. For the lug compression, the hexagonal profile riveters defined in figure 10 shall be used. The interface of connection is stated in EN 50181 (see 7.5.3.6).

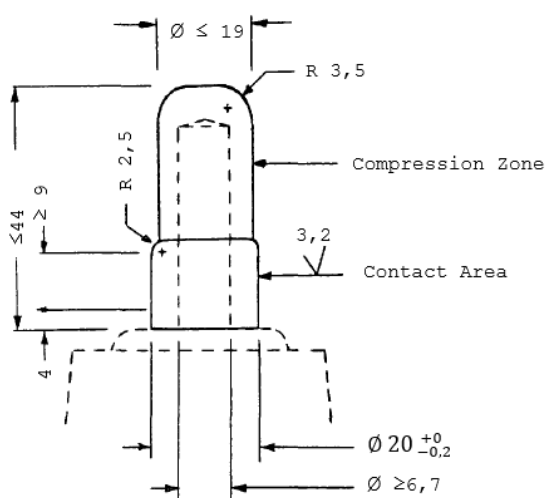


Figure 9 – Dimension of Plug contact pin for $I_n=250\text{ A}$ (mm)

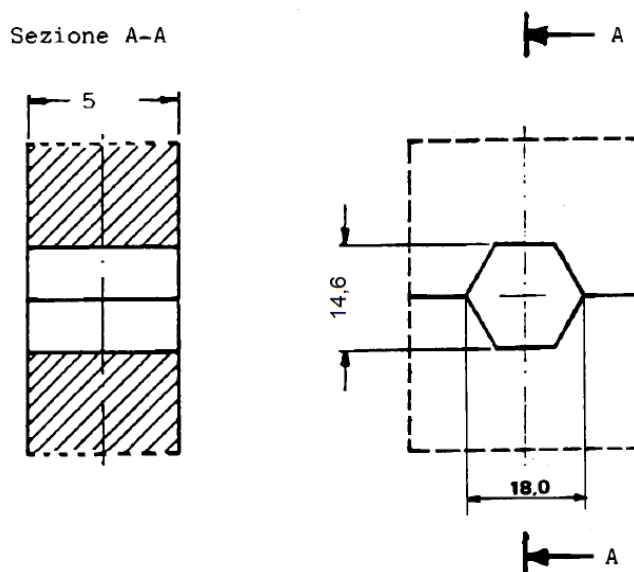


Figure 10 - hexagonal profile matrix for the contact pin lug (mm)

7.5.3.3 Elastic insulator

The elastic insulator shall be a prefabricated elastic insulator of silicone rubber, containing inside the element for the control of the electric field.

7.5.3.4 Metal Body

a metal body, with insulator pressure device, for the connection of the terminal to the through-insulator with plug socket. The metal housing must be equipped with the fastening device (see 7.5.3.5) and the earth terminal (see 7.5.3.9). The insulator pressure device, gasket and screws must be pre-mounted on the metal housing and made non-detachable.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3.5 Fastening Device

The inner cone terminals must be fitted with the fastening device, consisting of the flange shown in figure 11 a, complete with elbow gaskets and the three M8 austenitic stainless steel screws UNI 6900-71, shown in figure 11 b.

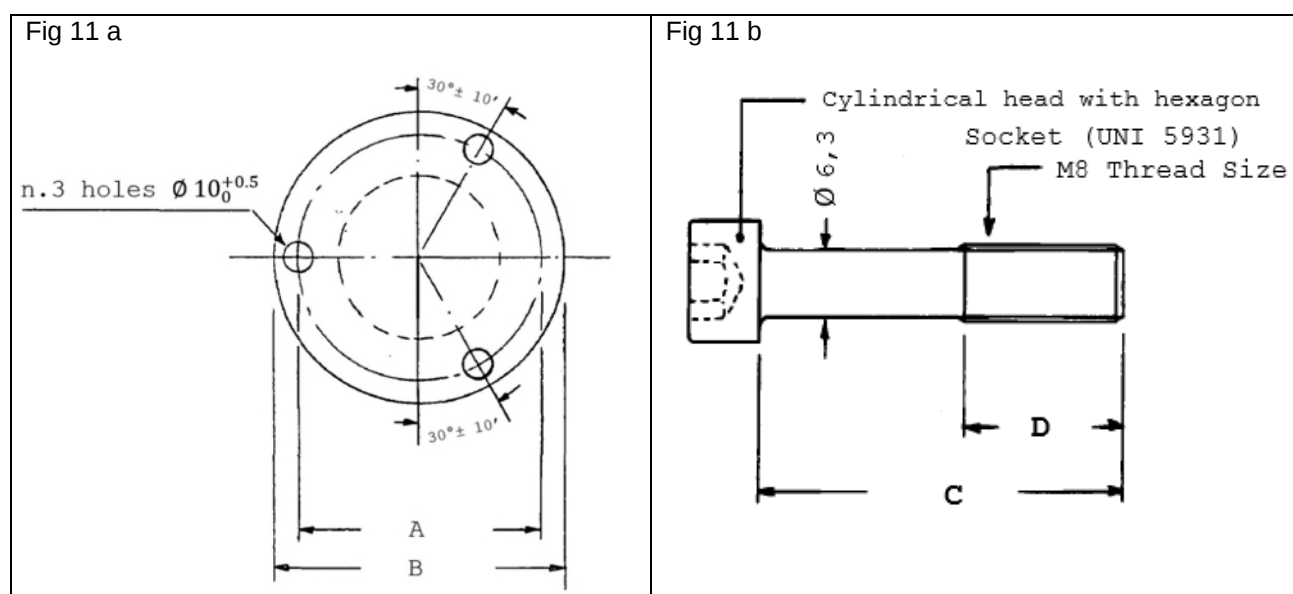


Figure 11 - Fastening device for Inner Cone separable connectors

Rated current In (A)	Dimensions [mm]			
	A	B	C	D
250 A	88 ± 0.1	105^{+3}_{-0}	30^{+0}_{-1}	12
400 A	95 ± 0.1	112^{+3}_{-0}	30^{+0}_{-1}	12

Table 8 - Contact device (mm)

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3.6 Interface and contact device

The dimensions of the interfaces of separable inner cone connector are stated in EN 50181; these dimensions are reported in Figure 12 and Table 9, relative to the dimensions of the inner cone interface and the contact device.

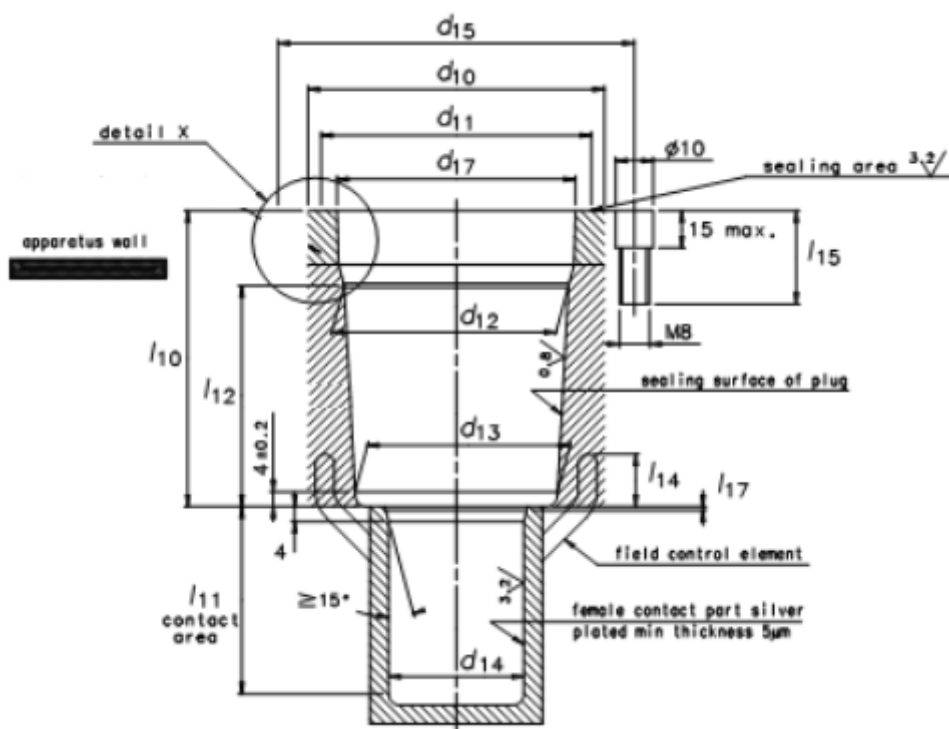


Figure 12 – Interface details of inside cone Plug-in type bushings

U_m	I_r	d_{10}	d_{11}	d_{12} $\pm 0,4$	d_{13} $\pm 0,4$	d_{14} $+0,1$ 0	d_{15}	d_{16}	d_{17}	l_{10} $\pm 1,3$	l_{11}	l_{12} $\pm 0,2$	l_{13}	l_{14} $+2$ -1	l_{15} $+5$ 0	l_{17}	Contact type	Interface Type
kV	A	mm	mm	mm	mm	mm	mm	max. mm	min. mm	mm	mm	mm	mm	mm	mm	mm		
12-24	250	min 69	max 62	53,2	47,5	^a max 19	88	108	59,5	83	44	59	20^{+1}_0	14	23	$1^{+1}_{-0,5}$	Sliding	0
12-24-36	400 630	min 79	max 72	59,8	54	36	95	115	63,5	83	46,5	59	20^{+1}_0	14	23	0	Sliding	1

^a The female part has to be designed according to the requirements of the connector contact pin (See 7.5.3.2)

Table 9 – Interface Dimensions

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3.7 Locking device

A closing device to ensure the hydraulic seal between the terminal's metal body and the cable's PVC sheath and to achieve the centering of the cable itself in relation to the terminal. The closing device must be such that, when the terminal is removed, the pressure exerted on the insulator is completely discharged.

7.5.3.8 Ground clamp

The metal parts of the external casings of the accessories must be equipped with the earth terminal shown in figure 13, complete with bolt M8 x 30 UNI 5739-88 and relative washers 8,4 x 18 UNI 6582-69, made of austenitic stainless-steel UNI 6900-71.

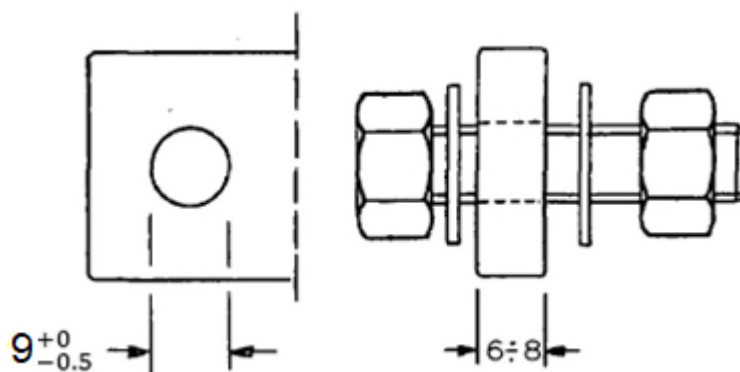


Figure 13 – Ground clamp dimension (mm)

7.5.3.9 Earthing ground terminal

The connection for the earthing of the metal parts of the external enclosures of the inner cone separable connectors consists of a flexible tinned annealed copper conductor with a 16mm² section with a minimum length of 1mm; both ends must be fitted with tinned copper lugs with a flat straight attachment, applied by means of compression. One lug shall have a hole suitable for M8 screws and the other for M12 screws.

7.5.3.10 Insulated earth connection

a cable screen earth connection made as prescribed in paragraph 7.5.4 and with a minimum length of 0,8 m. This connection shall have its own watertight seat for the exit from the terminal (either on the metal body or on the terminal closure device).

7.5.3.11 Phase marking plates

Separable connectors shall be provided with anodized aluminum plates, 0.3-0.5 mm thick, bearing the numbers 4, 8 and 12 screen printed in black; the characters shall be 20 ± 2 mm in height; They shall be fastened to the cable by means of polyamide hose clamps.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.3.12 Marking

The following information must be engraved or embossed on the accessories: name or trademark of the Manufacturer; rated current in A; rated voltage U_0 in kV; year of construction; identification code. The latter indication can be reported on a plate firmly fixed on the body of the accessory.

7.5.4 Metallic screen earthing connection

7.5.4.1 Earthing lug

The metallic screens of the cables shall be connected to earth by means of a tin plated copper palm straight lug with a M12 screw hole, to be applied by compression with the tools indicated in Figure 14 or equivalent.

Dimensions are in mm

$$H = 11,0 \pm 0,1$$

$$L = 9,0 \pm 0,1$$

$$R = 4,0 \pm 0,1$$

$$r = 1,0$$

$$\alpha = 15^\circ$$

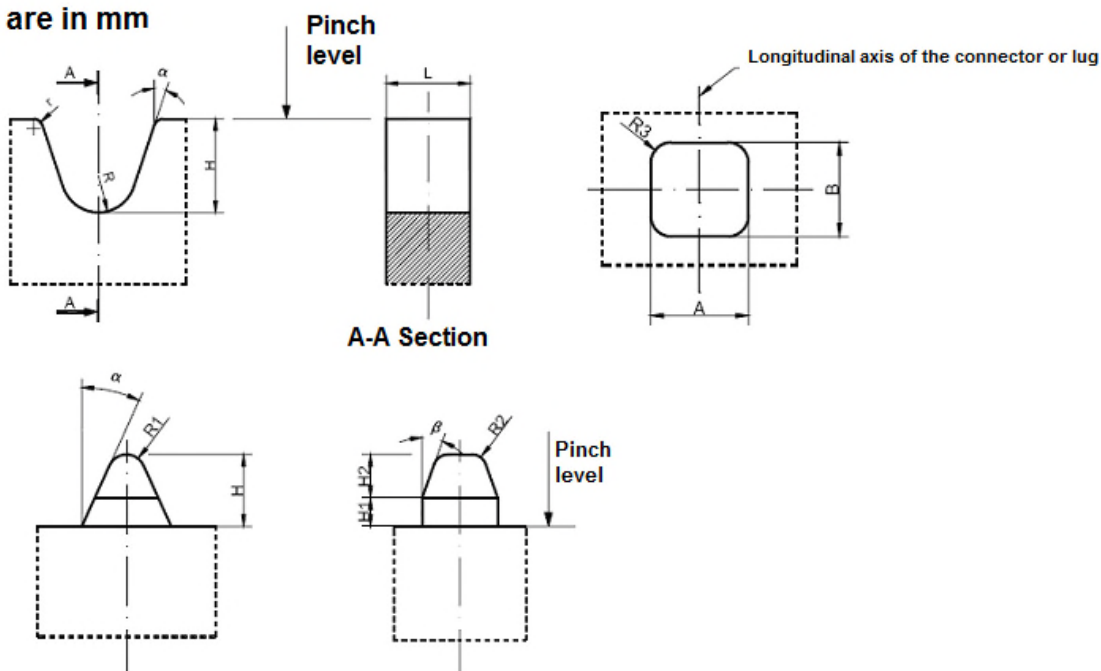


Figure 14 – Tool for compressing the earthing lug

The lug³ shall be suitable for connecting the metallic screen sections reported in Table 1. It shall be compatible with both aluminum tape and copper wire cable screens.

The lug shall be supplied un-mounted and compressed on field. It shall be compatible with both aluminum tape and copper wire cable screens.

The lug shall be supplied un-mounted and compressed on field.

³ for Edesur (Argentina) no earthing lug is required

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.4.2 Cables with aluminum tape screen

In the case of cables with aluminum tape screen, the connection with the screen of the cable shall be made by means of:

- 1) plate of tin-plated hard copper with a tin coating having minimum thickness of 0,5 μm . The plate shall be as shown in Figure 15 and shall be bent on a cylinder of diameter 25 ± 2 mm; the convex side of the plate shall include 65 asperities, arranged as shown in the Figure 15. These asperities shall have a particular shape (see example in Figure 15) in order to allow piercing the aluminum tape, to obtain a satisfactory contact with the screen, and to partly penetrate the outer thermoplastic sheath of the cable, to prevent movement or removal of the device. The edge and the internal side of the plate shall be free of sharp or rough parts, in particular in the lower side in contact with the semiconductive layer of the cable. The lower side going under the aluminum tape shall have no protruding edge (an example is shown in Figure 15) but a small rounded edge lower than the asperities.

As far as possible, the dimensions of the aluminum tape screen are as described here. The supplier can only modify the measurements for use on cables of smaller (35-95 mm²) and larger (400-630) cross-sections in which the dimensions do not allow a correct installation. The proposal will be checked during the TCA process by ENEL.

- 2) A tin coated copper braid with a minimum length of 0,6 m. One end of the braid shall be welded to the rectangular plate described above at the position shown in Figure 15; the other end shall be connected to the lug described in 7.5.4.1. The section of the tin copper braid shall be compatible with the sections prescribed in Table 1

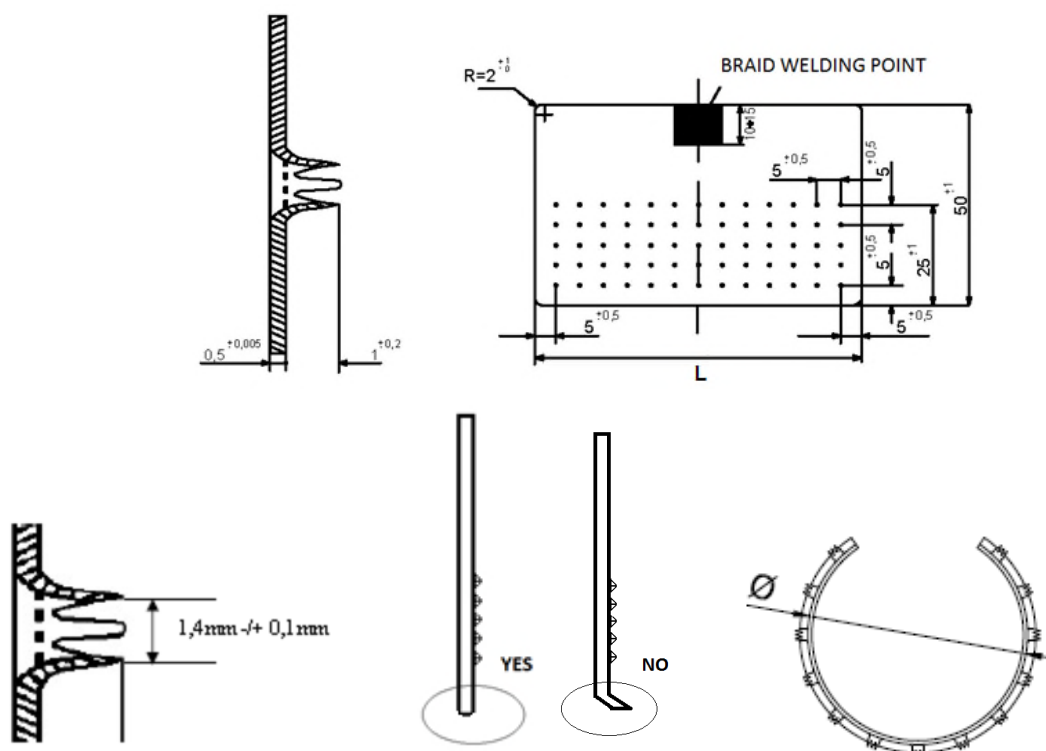


Figure 15 – Detail of rectangular plate for aluminum tape screen connection

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.5.4.3 Cables with copper wires screen

a) For outer cone separable connectors:

For cables with copper wires metallic screen, the earthing connection shall be made by collecting the copper wires of the metallic screen and connecting them to the tin coated copper braid described in 7.5.4.2. number 2. In order to do so, the braid shall be cut at the point of welding to the rectangular plate. The connection of copper wires and the tin coated copper braid shall be made by means of the connector described in. 7.5.4.4

If the distance is sufficient, connection to earth could be made directly connecting the copper wires of the screen to earth with the earthing lug described in 7.5.4.1

b) For inner cone separable connectors:

For cables with copper wires metallic screen, the earthing connection shall be made by collecting the copper wires of the metallic screen and connecting them to the flexible conductor made of annealed not tinned copper, covered with a transparent thermoplastic sheath. The connection of copper wires and the flexible conductor shall be made by means of the connector described in 7.5.4.4. The section of the flexible conductor shall be compatible with the screen sections prescribed in Table 1.

7.5.4.4 Connector for copper wire screen

a) For outer cone separable connectors:

The copper wires of the metallic screen of the cable shall be connected to the tin-coated copper braid described in 7.5.4.2 Number 2 by means of a straight compression connector with the tools indicated in Figure 14 or equivalent. The section of the connector shall be compatible with the screen sections prescribed in Table 1.

The connector shall be supplied un-mounted and compressed on field.

b) For inner cone separable connectors:

The copper wires of the metallic screen of the cable shall be connected to flexible conductor made of annealed not-tinned copper, covered with transparent thermoplastic sheath described in 7.5.4.3 letter b by means of a straight compression connector with the tools indicated in Figure 14 or equivalent. The section of the connector shall be compatible with the screen sections prescribed in Table 1.

The connector shall be supplied un-mounted and compressed on field.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.6 CONTENT OF THE KIT

All the necessary elements and accessory to install the separable connector on-field shall be included, namely:

A. Outer Cone Separable Connectors (see 7.5.2)

- 1 (one) shear bolt lug (see 7.5.2.1)
- 1 (one) cable adapter (see 7.5.2.2)
- 1 (one) main insulating housing (see 7.5.2.3)
- 1 (one) capacitive socket (see 7.5.2.4) (except for tee symmetric with joint element)
- 1 (one) protection cap (see 7.5.2.5) (except for tee symmetric with joint element)
- 1 (one) contact device (see 7.5.2.6)
- 1 (one) earthing lug (see 7.5.4.1)
- 1 (one) plate for aluminum tape screen cables (see 7.5.4.2)
- 1 (one) connector for copper wire screen (see 7.5.4.4)
- 1 (one) equipotential connection (see 7.5.2.9)
- 1 (one) fastening device (only for elbow and straight separable connectors) (see 7.5.2.10)
- 3 (three) phase marking plates (see 7.5.2.11)
- 1(one) joint element (only for tee symmetric with joint element) (see 7.5.2.7)
- Greases and sealing compounds (see 7.5.2.12)
- Accessories for cleaning;
- Plastic bag for collecting residual materials of installation;
- List of materials;
- Identification label (see 7.8.2.2);
- Installing instructions and templates (see 7.8.3);
- Other materials, tools and accessories (according to supplier's design).

B. Inner Cone Separable Connectors (see 7.5.3)

- 1 (one) lug (see 7.5.3.2)
- 1 (one) Elastic insulator (see 7.5.3.3)
- 1 (one) pre-assembled Metal Body (see 7.5.3.4)
- 1 (one) fastening device (If separated from the body) (see 7.5.3.5)
- 1 (one) earthing lug (see 7.5.4.1)
- 1 (one) Insulated earth connection (see 7.5.3.10)
- 1 (one) plate for aluminum tape screen cables (see 7.5.4.2)
- 1 (one) connector for copper wire screen (see 7.5.4.4)
- 1 (one) Earthing ground terminal (see 7.5.3.9)
- 3 (three) phase marking plates (see 7.5.3.11)
- Greases and sealing compounds (see 7.5.2.12)
- Accessories for cleaning;
- Plastic bag for collecting residual materials of installation;
- List of materials;
- Identification label (see 7.8.2.2);
- Installing instructions and templates (see 7.8.3);
- Other materials, tools and accessories (according to supplier's design).

The separable connector shall be sealed in a PE-bag in order to avoid contamination.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.7 TESTING

7.7.1 General

Tests are classified into:

- Type tests
 - o Test sequences according to HD 629. (see 7.7.2.1)
 - o Additional Type Tests (if applies, see 7.7.2.2)
 - o UV Resistance Test (if applies, see 7.7.2.3)
 - o Lugs Test (see 7.7.2.4)
 - o Resistance to fire (see 7.7.2)
- Acceptance tests

They shall be carried out according to HD 629-1 S3. Lugs shall be tested according to IEC 61238-1 class A

7.7.2 Type Test

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

7.7.2.1 Test sequences according to HD 629

Type tests for a single material code shall be carried out according to table 10 on samples installed on XLPE insulated cables with the minimum diameter over insulation (or lower) specified in Table 1. For E-Distribuzione, E-distributie Banat, E-distributie Dobrogea and E-distributie Muntenia, type tests shall be carried out on HPTE or XLPE insulated cables.

Rated voltage of the cables U0/U (Um) (kV)	Cable cross-section selected	Test Sequence	Standard reference
The rated voltage indicated in Table 1 for selected material code.	The maximum section indicated in Table 1 for selected material code.	Sequence D1 and Sequence D2.	Table 14 HD 629.1 S3:2019
	The minimum(*) section indicated in Table 1 for selected material code.	Sequence as per Table 17(**)	Table 17 HD 629.1 S3:2019
(*) Only for material codes defined to cover a range of cable cross sections (**) Test N° 4 in Table 17, should be performed with 63 cycles in water instead of the 12 described in standard HD 629.1 S3:2019.			

Table 10 – CENELEC HD 629 Type test.

e.g., 270112 shall be tested on a 185 mm² – 12/20(24) kV cable sequence D1 and D2 (Table 14, HD 629.1 S3) and 150 mm² 12/20(24) kV cable sequence as per Table 17 (HD 629.1 S3). The 270116 shall be tested on a 400 mm² – 18/30(36) cable seq. D1 and D2 (Table 14, HD 629.1 S3).

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*
Extent of compliance

Extension of compliance⁴ for the same connector type design⁵ to smaller or larger cross-sections ranges shall be obtained by satisfactory completion of relevant test, according table 11. It shall be mandatory to perform the test N°1 for each rating of separable connector (250;400;630) A.

Rating of separable connector (A)	N°	Test Sequence	Range Approval (mm2)						
			25	35 50	70 120	150 185	240 300	400	630
250	1 ^a	Seq. D1 & D2 from table 14 on 50 mm2 (Cu) cable or 70 mm2 (Al) Cable		Yes		-	-	-	-
	2	Sequence as per Table 17(*) on 25 mm2 cable	Yes	Yes		-	-	-	-
	3	Sequence as per Table 18 on 120 mm2 cable		Yes	Yes	-	-	-	-
400	1 ^a	Seq. D1 & D2 from table 14 on 95 mm2 (Cu) cable or 150 mm2 (Al) Cable	-			Yes	-	-	-
	2	Sequence as per Table 17(*) on 70 mm2 cable	-		Yes	Yes	-	-	-
	3	Sequence as per Table 17(*) on 35 mm2 cable	-	Yes	Yes	Yes	-	-	-
630	1 ^a	Seq. D1 & D2 from table 14 on 185 mm2 (Cu) cable or 300 mm2 (Al) Cable	-			Yes	Yes		
	2	Sequence as per Table 17(*) on 35 mm2 cable	-	Yes	Yes	Yes	Yes		
	3	Sequence as per Table 17(*) on 70 mm2 cable	-		Yes	Yes	Yes		
	4	Sequence as per Table 18 on 400 mm2 cable	-			Yes	Yes	Yes	
	5	Sequence as per Table 18 on 630 mm2 cable	-			Yes	Yes	Yes	Yes

Note:

a: Mandatory test (see Table 3 standard HD 629.1 S3:2019) to obtain the compliance extension for the rating separable connector.

(*): Test N° 4 in Table 17, should be performed with 63 cycles in water instead of the 12 described in standard HD 629.1 S3:2019.

Table 11 – Type test for extend compliance

⁴ Compliance shall extend the use of a connector on cables of the same U₀ as the test cable but with equal or greater nominal insulation thickness.

⁵ Same design includes: same architecture, same manufacturing process, same conception, same materials, same sealings, compatible electrical stress.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.7.2.2 Special consideration for Enel São Paulo

For Enel Sao Paulo Only, an additional test is required for 18/30(36) kv class Separable Connector, shall be carried out all the tests prescribed by HD 629-1, table 17 with the test requirements for Uo/U (Um) 20,8/36(42) kV.

7.7.2.3 UV Resistance Test

Outer Cone Separable Connectors shall be tested according to the IEC 62217 2012 par 9.3.2 (1000 h).

7.7.2.4 Lugs Test

The lugs shall be tested according to IEC 61238-1, class A, and shall be tested both for their maximum and minimum section. The qualification can be extended to an alternative connector by carrying out all tests prescribed by HD 629-1, Table 16. The alternative connector shall comply with all the requirements specified in this document (see 7.5.2.1).

7.7.3 Acceptance Test

For each material code, acceptance tests shall be carried out using the smallest cable section (see Table 1 for reference) with the rated voltage of the cable according to Table 3, (e.g. 270120 shall be tested on a 150 mm² – 18/30(36) kV cable).

For Enel Distribución Peru acceptance tests shall be carried out using the smallest cable section with 12/20(24) kV rated voltage⁶ (e.g. 274192 shall be tested on a 35 mm² – 12/20(24) kV cable).

During the acceptance tests performed autonomously by the supplier: The supplier must perform all tests listed in Table 13 with the sampling criteria indicated in Table 12.

The reports of the tests carried out and the tested samples shall be made available in case of repetition of the acceptance tests at the presence of the Enel or designated inspector

During the repetition of the acceptance tests at the presence of the Enel or designated inspector: The test shall be carried out on a sample chosen randomly from the batch already successfully tested by the supplier.

⁶ Tests performed on a 12/20(24) kV cable are considered sufficient to demonstrate compliance also for the installation on a 8.7/15(17.5) kV cable with normal thickness insulation.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

The samplings plans are the follow:

Sample Type	Batch (units)		
	≤ 50 units	> 50 and ≤ 1200	> 1200
A	2 samples	5 samples	10 samples
B	1 sample	2 samples	3 samples
C	1 sample	2 samples	5 samples
D	1 sample	1 sample	2 samples

Table 12– Samples for acceptance tests

In all cases:

- The quantities are always referred to each type of material code prepared for testing;
- The acceptance number will be 0, and the rejection number will be 1;
- On the scheduled acceptance testing date, the supplier shall prepare the cables, stripped as required by the assembly instructions of separable connectors being tested. This will facilitate the separable connector assembly and reduce the testing time, which benefits both parties.

All the tests to be performed and the relative sampling are listed in the following table:

Test	Sampling during execution by Supplier	Sampling during repetition by Enel	Note
1. Visual check, Accessory manufacturing specifications check, and joint marking	A	C	- Verification of correspondence to the approved prototype (dimensions, completeness of the accessory kit, presence, and correctness of identification labels and joint marking, packaging, and barcodes). - The nominal tightening torque of shear bolts specified by the manufacturer shall always be verified.
2. Accessory assembly check	B	D	- Check the assembly according to the approved manual.
3. Power-frequency withstand test	B	D	- Required values according to table N° 3 and test description according to IEC-61442.
4. Partial discharge test at ambient temperature	B	D	

Table 13 – Acceptance Tests

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.7.4 RETIE Certification (only apply to Enel Distribución Colombia)

For Codensa (Colombia), RETIE certification shall be also provided according to local regulation (see chapter 4). It is requested that this certification be made under the scheme 5 (ISO IEC 17067).

7.8 SUPPLY REQUIREMENTS**7.8.1 LABELLING**

The separable connector and its accessories must bear the following information:

- a) name of the manufacturer.
- b) rated current in A.
- a) maximum voltage U_m in kV;
- b) year and month of manufacture (e.g.: 15/2);

In particular, this information shall be placed on the external surface of the main insulating housing of the separable connector by means of indelible and permanent screen printing or an equivalent method accepted by the Distribution Companies of Enel Group.

7.8.2 PACKAGING

Separable connectors shall be supplied in individual packages which shall bear the following information:

- Material code assigned by the Distribution Companies of Enel Group;
- name of the manufacturer.
- type of separable connector (e.g. elbow separable connector);
- type of cables for which the accessory is intended, section and conductive material allowed;
- year and month of packaging.
- progressive identification number assigned by the manufacturer (or serial number);
- barcode (see 7.8.2.1).
- production batch number.
- identification abbreviation.
- maximum voltage U_m in kV;
- expiry date (year/month) of the materials.

Furthermore, the packages shall contain a self-adhesive label with the following information (only for E-distribuzione and Endesa Distribucion):

- Manufacturer identification code (CUI);
- Material code assigned by the Distribution Companies of Enel Group;
- Year and month of manufacture (e.g.: 15/2);
- Progressive identification number (assigned by the manufacturer);
- Barcode (only for E-distribuzione and Endesa Distribucion, see 7.8.2.1)

For E-distribuzione, shipping (of several individual packages) shall meet the requirements of the packaging in compliance with GUI 101 specifications.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.8.2.1 Barcode

The characteristics of the barcode are listed in E-distribuzione specification PVR 006 and Global Infrastructure and Networks Barcode specification CNS-O&M-S&L-2021-0032-EGIN

7.8.2.2 Identification Label

It shall include blank fields to be filled after installation:

Name:

Date:

Company:

7.8.3 Installation instructions and templates

The instruction for the preparation of the cable shall be written in compliance with Enel Global Standard (GSCC015). For E-distribuzione the technical specification DJ4580 also applies.

Accessory assembly instructions shall be written on A4 paper, and the various stages of construction of the joint shall be illustrated by photographs or diagrams in color.

Templates shall be included for the following types of cables:

- Extruded cables with aluminum tape screen
- Extruded cables with copper wires screen

Furthermore, for processing steps that require the use of a special tool, the description of these operations shall be accompanied by the Distribution Companies of Enel Group material code/type code⁷ for the tool and a color photograph.

Additionally a QR code shall be included for each step of the installation instructions to provide a web-link to demonstration videos and tutorials on the related joint. The videos shall be in the local language of the Country of delivery.

Installing instruction and templates shall be in the local language of the Country of delivery and shall be approved by Distribution Companies of Enel Group.

⁷ This information, if any, will be provided by Distribution Companies of Enel Group during the examination of the installation instructions (before the certification process)

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application AreasPerimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

7.9 TECHNICAL CONFORMITY ASSESMENT

7.9.1 General conditions

The manufacturer shall provide personnel and equipment necessary to carry out type tests and acceptance tests described herein. Otherwise, the supplier could hire the service to a laboratory previously accepted by the customer and assume the cost. The product shall comply with the requirements of GSCG002 regarding the Technical Conformity Assessment.

The equipment should be properly calibrated by a laboratory certified or approved by the client. The manufacturer shall possess up to date calibration certificates (to turn over) at the time of inspection.

7.9.2 Acknowledgement of TCA for previous revision of the standard.

Products with TCA in force under the ENEL Global standard GSCC006 Rev 3 of 09/07/2018 and their respective addendums will be recognized as homologated material for the present technical specification, except for elbow connectors interface B, which must comply with the new dimensional requirements.

Products with TCA in force under the ENEL standard DJ1119 Rev V of May 2014 will be recognized as homologated material for the present technical specification for GSCC006/57 and GSCC006/58 type codes only.

Enel, therefore, reserves the right to check that the conditions of supply, contents of the kit, type codes, country codes, manuals, labels, etc., shall comply with the requirements of this technical specification.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

8 ANNEXES

8.1 TECHNICAL CHECK LIST EXAMPLE

The following chart indicates the minimum technical information that suppliers shall provide.

Item	Description	Unit	Required	Offered
1	GENERAL INFORMATION			
1.1	Supplier	-		
1.2	Factory	-		
1.3	Supplier Product Designation	-		
2	MAIN FEATURES			
2.1	Distribution Company and Country	-		
2.2	Country Code	-		
2.3	GS Type Code			
2.4	Rated voltage U0/U (Um)	(kV)		
2.5	Rated power frequency withstand voltage	(kV)		
2.6	Rated impulse withstand voltage			
2.7	Rated short time withstand current in the conductor			
2.8	Rated short time (0,5 s) withstand current in the screen.			
2.9	Earthing lug section.	(mm ²)		
2.10	Max width	(mm)		
2.11	Max length	(mm)		
2.12	Shrink Technology			
2.13	Resistance to fire			
2.14	Type of Lug			
2.15	Connector type			
2.16	Interface Type (EN 50181)			
2.17	Rated current In (A)	(A)		
2.18	Cable section	(mm ²)		
2.19	Min/max diameter over insulation	(mm)		
"Max width and length" dimensions, as defined in Table 4				

Table 14– Check list

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

ADDEMDUM SCOPE

This addendum of the Global Standard GSCC006 rev. 4 specifies the requirements applicable to the Distribution Companies of ENEL Group. They are specified in this document with reference to the same paragraph number of GSCC006 rev.4

COMMON LIST UPDATE

Type code	Distribution Company and Country	Country Code	Rated voltage Uo/U (Um) (kV)	Shape	Interface Type	Cable section (mm2)	Rated current In (A)	Width max (mm)	Length max (mm)	Earthing lug section (mm2)	Rated short time withstand current in the screen (kA)	Min/max Diameter over insulation (mm)
GSCC006/12	ED-CHILE	270630	12/20(24)	Elbow	A	35÷50	250	215	320	25	3kA@1 seg	14.9/21.8
GSCC006/13	ED-CHILE	270105	12/20(24)	Elbow	A	70÷120	250	215	320	25	3kA@1 seg	17.6/26.6
GSCC006/28	ED-CHILE	270640	12/20(24)	TEE	C	70÷120	630	300a ;220b	410	25	5kA@1 seg	17.6/26.6
GSCC006/29	ED-CHILE	270639	12/20(24)	TEE	C	150÷185	630	300a ;220b	410	25	5kA@1 seg	22.3/28
GSCC006/30	ED-CHILE	270638	12/20(24)	TEE	C	240	630	300a ;220b	410	25	5kA@1 seg	26.1/32.2
GSCC006/33	ED-CHILE	270637	12/20(24)	TEE	C	400	630	300a ;220b	410	50	10kA@0,5 seg	31/37.5
GSCC006/44	ED-CHILE	270634	12/20(24)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	17.6/26.6
GSCC006/45	ED-CHILE	270633	12/20(24)	TEE WITH JOINT ELEMENT	C	150÷185	630	300	410	25	5kA@1 seg	22.3/28
GSCC006/46	ED-CHILE	270632	12/20(24)	TEE WITH JOINT ELEMENT	C	240	630	300	410	25	5kA@1 seg	26.1/32.2
GSCC006/47	ED-CHILE	270631	12/20(24)	TEE WITH JOINT ELEMENT	C	400	630	300	410	25	5kA@1 seg	31/37.5
GSCC006/50	ED-CHILE	270635	18/30(36)	TEE WITH JOINT ELEMENT	C	70÷120	630	300	410	25	5kA@1 seg	24/30
GSCC006/60	ED-CHILE	270636	12/20(24)	TEE	C	630	630	300a ;220b	410	50	10kA@0,5 seg	34/42.5
GSCC006/59	ED-ITALY	270047	12/20(24)	Inner Cone Plug-in	Size 0	35(Al)	250	-	-	25	3kA@1 seg	17.7/19.3
GSCC006/100	ED-COLOMBIA	270598	12/20(24)	TEE WITH JOINT DPS	C	150÷185	630	290	-	25	5kA@1 seg	22.3/28
GSCC006/101	ED-COLOMBIA	270597	12/20(24)	TEE WITH JOINT DPS	C	240	630	290	-	25	5kA@1 seg	26.1/32.2

Table 18 – List of Component

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*
OVERALL DIMNSIONS

The original content of this section remains unchanged. Additionally, with reference to Figure 16, the overall dimensions of the termination, including both the separable connector and the surge arrester, are defined in Table 4.

Dimensions ¹	Tee (asymmetric with Surge arrester)
Width max (mm)	290 ^c
Length max (mm)	410

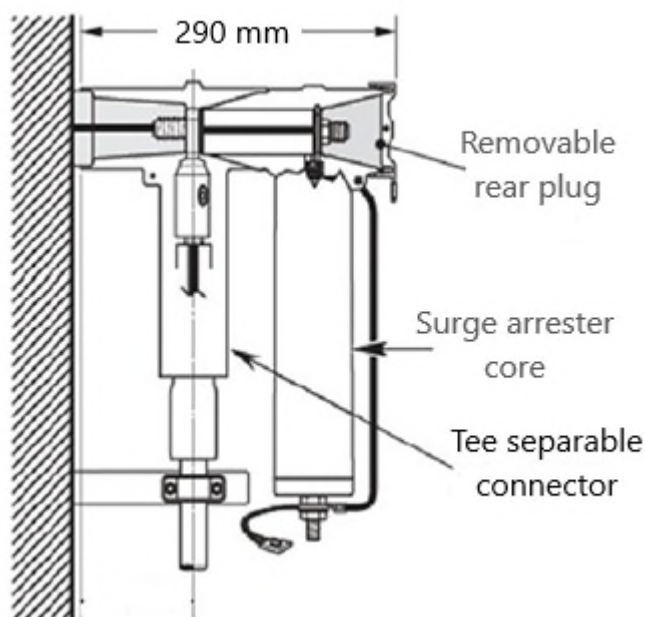


Figure 16 – Tee (asymmetric with Surge arrester) separable connector

7.5.2.13 Additional Connection Interfaces for Separable Connectors

Separable connectors may include additional connection interfaces to allow integration with auxiliary components such as surge arresters, monitoring devices, or grounding accessories. These interfaces shall be designed to ensure electrical performance, mechanical robustness, and compatibility with the main insulating housing while maintaining the overall integrity of the system. The kit shall include both the separable connector and the auxiliary component to be connected. The separable connector shall comply with the requirements of this technical specification, while the auxiliary component shall meet the requirements listed below.

Subject: Global Infrastructure and Networks – GSCC006 SEPARABLE CONNECTORS FOR MV CABLES.

Application Areas

Perimeter: *Global*

Staff Function: -

Service Function: -

Business Line: *Infrastructure & Networks*

Surgearresters:

The surge arrester is designed to be connected to a separable connector and shall conform to the technical requirements of ENEL GSCC016 Rev. 2, considering the country of destination. The specific electrical and mechanical characteristics are defined in Table 20. Any parameters not explicitly stated in Table 20 shall comply with the general provisions of GSCC016. A reference illustration of the surge arrester can be seen in Figure 17

Item	Description	Value
Ur	Maximum overvoltage permissible for 10 sec RMS 60 Hz	12 kV
Uc - MCOV	Continuous operating voltage	9.6 kV
In	Nominal discharge current	10 kA
Qr	Repetitive charge transfer rating (minimum)	0.4 C
Qth	Thermal charge transfer rating (minimum)	1 C
Is	Nominal short-circuit current	20 kA
Ures	Residual voltage for lightning impulse (Maximum)	34.2 kV
BIL	Basic insulation level	95 kV
Note: The definition of each parameter can be found in the ENEL GSCC016 Rev. 2 standard.		

Table 20 – Technical Characteristics of 15 kV Surge Arrester for Colombia

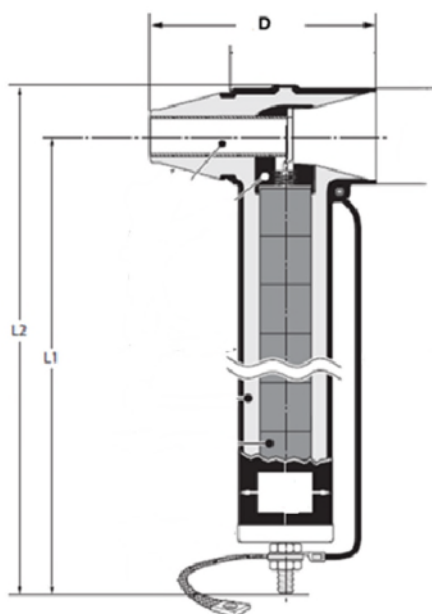


Figure 17 –Screened Surge arrester