METAL-OXIDE POLYMER-HOUSED SURGE ARRESTERS FOR MV LINES

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INDEX

1 SCOPE

The aim of this document is to provide technical requirements for the supply of MV surge arresters to be used in the MV lines of the distribution networks of Enel Group Distribution Companies, listed below:

- Enel Distribución Colombia — Colombia
- Enel Distribución Peru — Perú
- Edesur — Argentina
- E-distributie Banat — Romania
- E-distributie Dobrogea — Romania
- E-distributie Muntenia — Romania
- E-distribuzione — Italy
- Endesa Distribución Eléctrica — Spain
- Enel Distribución Chile — Chile
- Enel Distribuição Ceará — Brazil
- Enel Distribuição Rio — Brazil
- Enel Distribuição Goiás — Brazil

This document specifies the characteristics and tests that must be accomplished by the surge arresters used in the medium voltage distribution network, which shall be according to the IEC 60099-4.
Additional prescriptions or integration of the main common part are reported in Local Sections with the same corresponding clause or sub-clause number.
The local standards replaced by this standard appear in the local section.

2 REFERENCE LAWS AND STANDARDS

The list of reference laws and standards are mentioned below in this document.

2.1 Laws

Brazil

- NR-10 - Segurança em Instalações e Serviços em Eletricidade

Chile

- NSEG5. E.n.71 Reglamento de Instalaciones Eléctricas de Corrientes Fuertes.

Colombia

- RETIE, Reglamento Técnico de Instalaciones Eléctricas.

Peru

- Código Nacional de Electricidad – Suministro 2011.

Romania

- NTE 001/03/00 – Normativ privind alegerea izolației, coordonarea izolației și protecția instalațiilor electroenergetice împotriva supratensiunilor
- NTE 003/04/00 – Normativ pentru construcția liniilor electrice aeriene de energie electrică cu tensiuni peste 1000 V

Spain

- 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 se aprueban 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.

2.2 Standards

The following standards are needful for the application of this Global Standard.

- IEC 60050. International Electrotechnical Vocabulary
- IEC 60099-4: Metal-oxide surge arresters without gaps for a.c. systems
- IEC 60695-11-10 Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods.
- ISO 1461. Hot dip galvanized coatings on fabricated iron and steel articles -- Specifications and test methods.
- IEC TS 60815-1: Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles
- IEC TS 60815-3: Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 3: Polymer insulators for a.c. systems.
- IEC 60587: Electrical insulating materials used under severe ambient conditions - Test methods for evaluating resistance to tracking and erosion
- IEC TR 62271-300: High-voltage switchgear and controlgear - Part 300: Seismic qualification of alternating current circuit-breakers
- ISO 3676:2012: Packaging -- Complete, filled transport packages and unit loads -- Unit load dimensions

2.3 Local standards

See local section

3 DEFINITIONS

3.1 Continuous operating voltage of an arrester (Uc)

Designated permissible r.m.s. value of power-frequency voltage that may be applied continuously between the arrester terminals in accordance with IEC 60099-4.

3.2 Distribution class arrester

Arrester intended to be used on distribution systems, typically of Us≤ 52 kV, in order to protect components primarily from the effects of lightning.

3.3 High current impulse of an arrester

Peak value discharge current having a 4/10 impulse shape which is used to test the stability of the arrester on direct lightning strokes.

3.4 Lightning current impulse

8/20 current impulse with limits on the adjustment of equipment such that the measured values are from 7 µs to 9 µs for the virtual front time and from 18 µs to 22 µs for the time to half-value on the tail.

3.5 Metal-oxide surge arrester without gaps

Arrester having non-linear MO resistors connected in series and/or in parallel without any integrated series or parallel spark gaps, incorporated in a housing with terminals for electrical and mechanical connection.

3.6 Nominal discharge current of an arrester (In)

Peak value of lightning current impulse which is used to classify an arrester in accordance with IEC 60099-4.

3.7 Non-linear metal-oxide resistor (MO resistor)

Part of the surge arrester which, by its non-linear voltage versus current characteristics, acts as a low resistance to overvoltages, thus limiting the voltage across the arrester terminals and as a high resistance at normal power-frequency voltage.

3.8 Rated frequency of an arrester

Frequency of the power system on which the arrester is designed to be used.

3.9 Rated short-circuit current (Is)

Highest tested power-frequency current that may develop in a failed arrester as a short-circuit current without causing violent shattering of the housing or any open flames for more than two minutes under the specified test conditions.

3.10 Rated voltage of an arrester (Ur)

Maximum permissible 10 s power-frequency r.m.s. overvoltage that can be applied between the arrester, as verified in the TOV test and the operating duty test.

3.11 Reference current of an arrester

Peak value (the higher peak value of the two polarities if the current is asymmetrical) of the resistive component of a power-frequency current used to determine the reference voltage of the arrester.

3.12 Reference unified specific creepage distance, RUSCD

Initial value of unified specific creepage distance for a pollution site before correction for size, profile, mounting position, etc. according to this technical specification and generally expressed in mm/Kv (see IEC/TS 60815-3). RUSCD values are related to the higher voltage between phase and ground.

3.13 Reference voltage of an arrester (Uref)

Peak value of power-frequency voltage divided by √2, which is obtained when the reference current flows through the arrester.

3.14 Repetitive charge transfer rating (Qrs)

Maximum specified charge transfer capability of an arrester, in the form of a single event or group of surges that may be transferred through an arrester without causing mechanical failure or unacceptable electrical degradation to the MO resistors.

3.15 Residual voltage of an arrester (Ures)

Peak value of voltage that appears between the terminals of an arrester during the passage of discharge current.

3.16 Steep current impulse

Current impulse with a virtual front time of 1 µs with limits in the adjustment of equipment such that the measured values are from 0,9 µs to 1,1 µs and the virtual time to half-value on the tail is no longer than 20 µs.

3.17 Switching current impulse of an arrester

Peak value of discharge current a virtual front time greater than 30 µs but less than 100 µs and a virtual time to half-value on the tail of roughly twice the virtual front time.

3.18 Thermal charge transfer rating (Qth)

Maximum specified charge that may be transferred through an arrester or arrester section within 3 minutes in a thermal recovery test without causing a thermal runaway.

4 SERVICE CONDITIONS

4.1 General service conditions

The reference service conditions are the normal service conditions of IEC 60099-4, see point 5.4.1.

4.2 Specific service conditions

4.2.1 Pollution level

The pollution levels considered in any country and the minimum RUSCD according to IEC/TS 60815 series are (see part IEC/TS 60815-3):

	ARGENTINA	BRAZIL	COLOMBIA	CHILE	ESPAÑA	ITALIA	PERU	ROMANIA
SPS Class (IEC/TS 60815 series)	(c) Medium	(c) Medium (d) Heavy (e) Very Heavy	(c) Medium	(c) Medium	(c) Medium (d) Heavy (e) Very Heavy	(d) Heavy	(e) Very Heavy	(d) Heavy
RUSCD (mm/kV)	34,7	53,7	34,7	34,7	34,7 - 43,3 - 53,7	43,3	53,7	43,3

Table 1

Note: RUSCD values are related to the higher voltage between phase and ground.

4.2.2 Seismic qualification level

It shall be considered the following considerations upon the seismic qualification level:

	ARGENTINA	BRAZIL	COLOMBIA		CHILE	ESPAÑA	ITALIA	PERU	ROMANIA
Standard	NA	NA	IEC/TR 62271-300	Reglamento Colombiano de Construcción Sismo resistente	ETGI-1020	NA	IEC/TR 62271-300	IEC/TR 62271-300	IEC/TR 62271-300
Level	NA	NA	AF3			NA	AF5	AF5	AF5

Table 2

4.2.3 Altitude

The reference altitude in Colombia is 2.700 masl.

5 TECHNICAL REQUIREMENTS

This type of surge-arresters shall protect the equipments from overvoltages, mainly the ones produced by the effects of lightning.

According to the IEC 60099-4 classification, surge arresters for MV lines will be Distribution High class, this is:

Arrester class Distribution High (DH)	
I_n (Nominal discharge current)	10 kA
Q_{rs} (Repetitive charge transfer rating)	≥ 0,4 C
Q_{th} (Thermal charge transfer rating)	≥ 1,1 C

See the table in Annex A for the technical requirements.

5.1 Creepage distance

Creepage distance shall be, as a minimum, in compliance with IEC 60815-1 and IEC 60815-3. In Annex A, Technical Requirements, it will be determined the creepage distance for each code.

6 DESIGNATION

Surge arrester for the distribution grid shall be designated by the class according IEC 60099-4, followed by the Nominal discharge current, a dash and the Maximum grid voltage.

6.1 Designation Example

Designation for code 170091: DH 10/24, surge arrester type Distribution Class, nominal discharge current, 10 kA, Maximum grid voltage, 24 kV.

7 CONSTRUCTION CHARACTERISTICS

7.1 Constitution

This type of surge arresters shall be constituted by non-linear metal oxide- zinc oxide- resistors without spark gaps.

The arresters shall have a polymeric hydrophobic housing able to withstand voltage during conduction of lightning and switching impulse currents and during anticipated maximum power frequency overvoltages. The housing shall be prepared for external use and it shall be manufactured in silicone-rubber (VMQ - Vinyl-Methyl-Polysiloxane, with filler additives, HTV or LSR silicone rubbers) free of EPDM or other organic rubbers (same characteristics from polymeric insulators silicone rubbers, see Global Standard GSCC010). The silicone-rubber must be type V0 according to the IEC 60695-11-10.

7.2 Fixation

Arresters shall be mounted on an insulating arm, which shall be included in the supply. This insulating support shall be made of organic material. The end not connected to the arrester can be provided with a metal adapter, if this is necessary (see local section of Colombia and Brazil for more details).

The insulating arm shall resist the mechanical stress (surge-arrester weight and wind effect). The organic material of the isolator must be able to withstand over time atmospheric agents (rain, pollution and solar radiation, etc.). In case of intervention of the release device, the support insulator must allow the operation of the network for a certain time, even if limited. The support insulator must have a minimum escape line of 200 mm, and have a dry atmospheric impulse withstand voltage (wave 1.2 / 50μs) and at industrial frequency in rain, equal to 73 kV and 40 kV respectively. The dimensional characteristics of the supporting insulator are shown in the unification tables.

7.3 Terminal

Connection terminal shall be made of stainless steel. It shall be M12.

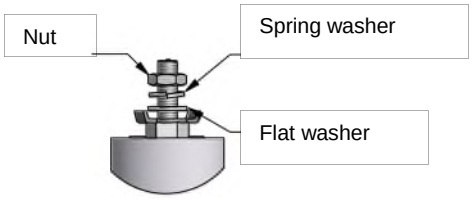


Figure 1

7.4 Disconnector

Surge arresters shall be equipped with a disconnection device that will act in case of failure in operation, avoiding a permanent fault and, at the same time, pointing out the defective item in a visible way (see Annex A for some exceptions).

The disconnector shall be supplied mounted at the bottom of the surge-arrester.

The disconnector shall be connected to a copper braid (minimum cross section, 25 mm² and minimum length 450 mm), the braid shall equip a tinned copper terminal in the opposite extreme (diameter of the braid, 13 mm).

7.5 Protective treatments

Iron parts shall be in non-corrosive material or hot dip galvanized in compliance with ISO 1461 (or other international equivalent standards).

The different metallic materials will always be designed to avoid galvanic corrosion.

Nuts and bolts shall be in stainless steel.

7.6 Grounding

The manufacturer shall ensure the different forming parts of the equipment remain equipotential.

7.7 Other characteristics

The whole design shall make easy its installation and cleaning, avoiding water retention.

8 MARKING

Metal oxide surge arresters shall be identified with a nameplate in stainless steel permanently attached to the arrester. Alternative materials can be considered if the manufacturer proves the marking endurance through time (this solution shall be approved by Enel distribution companies).
In accordance with IEC 60099-4, nameplates shall include:

- Manufacturer's name or trade mark, type and identification of the complete arrester
- Serial number
- The year of manufacture
- Enel Type code
- Designation of arrester (according to its classification)
- Continuous operating voltage, U_c, in kV
- Rated voltage, U_r, in kV
- Rated frequency
- Nominal discharge current, I_n, in kA
- Rated short-circuit current, I_s, in kA

- Contamination withstand level of the enclosure

(Note, see Local Section from Colombia).

9 TESTING

Tests shall be performed according to IEC 60099-4.

These tests are divided into three groups:

- Type tests (Design tests)
- Routine tests
- Acceptance tests

Type tests are performed once, during the TCA process. Routine and Acceptance tests shall be carried out on every singular purchased lot, as an acceptance tests.

9.1.1 Type Tests (Design Tests)

Type Tests must be according to IEC 60099-4, see the related clauses in the following table:

	Type tests Surge Arresters	Distribution Class
	Nominal discharge current	10 kA
	Typical Us (kV), rms value	≤ 52
		Clause IEC 60099-4
1	Insulation withstand tests on the arrester housing	10.8.2 (equal to 8.2)
	a) Lightning impulse	8.2.6
	b) Power-frequency	8.2.8
2	Residual voltage test	10.8.3 (equal to 8.3)
	a) Step current impulse	8.3.2
	b) Lightning impulse	8.3.3
3	Test to verify long term stability under continuous operating voltage	10.8.4 (equal to 8.4)
4	Repetitive charge transfer withstand	10.8.5 (equal to 8.5)
5	Heat dissipation behaviour verification of test sample	10.8.6 (equal to 8.6)
6	Operating duty test	10.8.7
7	Power-frequency voltage versus time	18.8.8
8	Arrester diconnector/fault indicator	10.8.9 (equal to 8.9)
9	Short-circuit tests	10.8.10
10	Bending moment	10.8.11
11	Test on insulating base and mounting bracket	8.11.6
12	Enviromental tests	10.8.12
13	Seal leak rate	10.8.13
14	Radio interference voltage (RIV)	10.8.14 (equal to 8.14)
15	Test to verify the dielectric withstand of the internal components of an arrester	10.8.15 (equal to 8.15)
16	Test of internal grading components	10.8.16 (equal to 8.16)
17	Weather ageing test	10.8.17

Table 3

9.1.2 Routine tests

	Routine tests
1	Measurement of reference voltage (U_{ref})
2	Residual voltage test (for lighting current impulse)
3	Internal partial discharge test
4	Current distribution test for multi-column arrester
5	Proper assembly of disconnector

Table 4

See IEC 60099-4, clause 9.1.

9.1.3 Acceptance tests

	Acceptance tests
1	Measurement of power frequency voltage at the reference current
2	Lightning impulse residual voltage at nominal discharge current
3	Internal partial discharge test
4	Bending moment and tensile load test on disconnectors

Table 5

See IEC 60099-4, clause 9.2.

9.1.4 Sample plan

In order to realize the acceptance for each purchased lot, it shall be necessary to accomplish:

- Visual inspection
- Routine tests
- Acceptance tests

These tests shall be made on the nearest lower whole number to the cube root of the number of arresters from the lot, upon detecting a single non-conforming piece this will lead to the rejection of the whole batch.

10 TECHNICAL CONFORMITY ASSESSMENT

Technical Conformity is issued by Enel Group according to the Global Standard GSCG002 and must be supported by accomplishing all of the Type and Sample tests on every type of surge-arrester to be accredited. Type tests are performed once and shall be repeated when it changes the design of the equipment, the materials, production process or the reference standards (if these changes could affect them).

10.1 Local Certifications

For Colombia, RETIE certification shall be also provided according to local regulation (see 2.1).

11 GUARANTEE

Requirement of warranty will be indicated in the request for bids, indicating periods and standards, although any material will be warrantied 24 months as a minimum.

12 CONDITIONS OF SUPPLY

All the packages shall be properly identified about transport and destination.

Manufacturers shall provide appropriate instructions, documents showing routine tests and information covering general conditions during transport, storage and installation of the materials. These instructions must include recommendations for handling, cleaning or maintenance. The documents must be in the local language of the destiny country.

The material will be supplied packed in wood crates or hard cardboard boxes. Boxes can be individuals or include several equipments, but they shall be securely packaged to prevent the surge arresters to touch each other and to avoid any damage to sheds during storing, loading and transportation.

The consistency of the boxes shall permit a three-ply storage/transportation and they shall be prepared for handling by forklift trucks and by boom cranes. They also must be treated to prevent degradation over time.

Package dimension shall be in compliance with palettes 80x120 cm (ISO 3676).

All wood used in the packaging shall be conveniently treated in accordance with the phytosanitary regulations of the destination country.

13 ANNEX A TECHNICAL REQUIREMENTS

Country	GS code	Country code	Grid main voltage	Max grid voltage	Designation	Rated frequency	Rated voltage	Continuous operating voltage (Max)	Nominal discharge current	Min Repetitive charge transfer rating	Min Thermal charge transfer rating	Rated short-circuit current	Max Residual voltage for lightning impulse	BIL	CONTAMINATION LEVEL 60815	Minimum Creepage distance	Surge arrester total length	Max Surge arrester diameter	Bending moment	Disconnector
			U_n	U_S			U_r	U_C	I_n	Q_{rs}	Q_{th}	I_S								
			kV	kV		Hz	kV	kV	kA	C	C	kA	kV	kV		mm	mm	mm	Nm	
Argentina	GSCC016/01	0108-0246	13,2	14,5	DH 10/24	50	12	10,2	10	0,4	1,1	16	43,2	95	C	355				No
Argentina	GSCC016/01	0108-0248	13,2	14,5	DH 10/24	50	12	10,2	10	0,4	1,1	16	43,2	95	C	355				Yes
Chile	GSCC016/01	170377	12	13,2	DH 10/24	50	15	12,7	10	0,4	1,1	16	54	110	C	355				
Chile	GSCC016/01	170471	23	25,3	DH 10/24	50	27	22	10	0,4	1,1	16	97,2	150	C	560				
Colombia	GSCC016/01	6781248	11,4 - 13,2	12,5 - 14,5	DH 10/24	60	12	10,2	10	0,4	1,1	16	43,2	95	C	355				
Spain	GSCC016/01	170191	20	24	DH 10/24	50	25	24,4	10	0,4	1,1	0	96	125	C	750	500	140	20	Yes
Spain	GSCC016/01	170372	11 - 13,2	24	DH 10/24	50	12	10,2	10	0,4	1,1	0	39,2	95	C	462	0	140		Yes
Brazil	GSCC016/02	6771341	11,9 - 13,8	12,5 - 14,4	DH 10/24	60	12	10,2	10	0,4	1,1	16	43,2	95	D	360				Yes
Spain	GSCC016/02	170073	10	12	DH 10/24	50	12	10,2	10	0,4	1,1	0	38,5	95	D	462	500	140		Yes
Spain	GSCC016/02	170075	17,5 - 20	24	DH 10/24	50	21	17	10	0,4	1,1	0	60	125	D	661	500	140		Yes
Brazil	GSCC016/03	6772618	11,9 - 13,8	12,5 - 14,4	DH 10/24	60	12	10,2	10	0,4	1,1	16	43,2	95	E	560				Yes
Italy	GSCC016/03	170011	0	0	DH 10/24	0	12	10	10	0,4	1,1	20	43	0	E	540	750	180		Yes
Italy	GSCC016/03	170012	0	0	DH 10/24	0	17,5	15	10	0,4	1,1	20	65	0	E	805	825	180		Yes
Italy	GSCC016/03	170013	0	0	DH 10/24	0	24	20	10	0,4	1,1	20	87	0	E	1075	950	180		Yes
Perú	GSCC016/03	6757564	10	12	DH 10/24	60	10	8,4	10	0,4	1,1	16	36	75	E	400				
Perú	GSCC016/03	6808941	13,2	14,5	DH 10/24	60	15	12,7	10	0,4	1,1	16	54	95	E	528				
Perú	GSCC016/03	6808943	20	24	DH 10/24	60	18	15,3	10	0,4	1,1	16	64,8	125	E	800				
Perú	GSCC016/03	6785441	22,9	24	DH 10/24	60	24	19,5	10	0,4	1,1	16	86,4	150	E	916				
Spain	GSCC016/03	170039	15 - 15,4	17,5	DH 10/24	50	18	15,3	10	0,4	1,1	0	59,4	95	E	750	500	140		Yes
Spain	GSCC016/03	170076	20	24	DH 10/24	50	24	19,5	10	0,4	1,1	0	70	125	E	763	500	140		Yes
Spain	GSCC016/03	170078	20	24	DH 10/24	50	24	19,5	10	0,4	1,1	0	70	125	E	1320	500	140		Yes
Argentina	GSCC016/04	0108-0247	33	36	DH 10/36	50	30	24,4	10	0,4	1,1	16	108	170	C	760				No
Argentina	GSCC016/04	0108-0249	33	36	DH 10/36	50	30	24,4	10	0,4	1,1	16	108	170	C	760				Yes
Colombia	GSCC016/04	6781249	34,5	38	DH 10/36	60	30	24,4	10	0,4	1,1	16	108	225	C	760				
Brazil	GSCC016/05	T170149	34,5	36	DH 10/36	60	30	24,4	10	0,4	1,1	0	0	170	D	860				Yes
Brazil	GSCC016/06	6800640	34,5	36	DH 10/36	60	30	24,4	10	0,4	1,1	0	0	170	E	1070				Yes
Spain	GSCC016/06	170077	30	36	DH 10/36	50	36	29	10	0,4	1,1	0	96	170	E	1120	570	140		Yes

14 ANNEX B- LOCAL SECTIONS

14.1 E-DISTRIBUZIONE-ITALIA, E-DISTRIBUȚIE BANAT, E-DISTRIBUȚIE DOBROGEA, E-DISTRIBUȚIE MUNTENIA

14.1.1 Replaced Local standards:

- DY 557
- DY 1017
- DY 1018

14.2 Supply

Package dimension shall be in compliance with the standard GUI 101 - CARATTERISTICHE GENERALI E PRESCRIZIONI DI IMPIEGO DEL PALLET IN LEGNO DA UTILIZZARE PER L'IMBALLO DI TRASPORTO

14.3 ENDESA DISTRIBUCIÓN ELÉCTRICA- SPAIN

14.3.1 Replaced Local standards:

- AND015
- Technical specifications number 6700522, 6702801, 6703001, 6703002, 6703004, 6703005, 6703007, 6779962

14.4 ENEL DISTRIBUCION COLOMBIA

14.4.1 Replaced Local standards:

- E-MT-031

14.4.2 Reference local law and standards:

- NSR10 Reglamento Colombiano de Construcción Sismo Resistente

14.4.3 Construction Characteristics: fixation

Surge arresters can be fixated to different types of cross-arm, including metallic and wooden types, and also in transformers. The end not connected to the arrester can be provided with a metal adapter, if this is necessary.

Scheme of fixation structure:

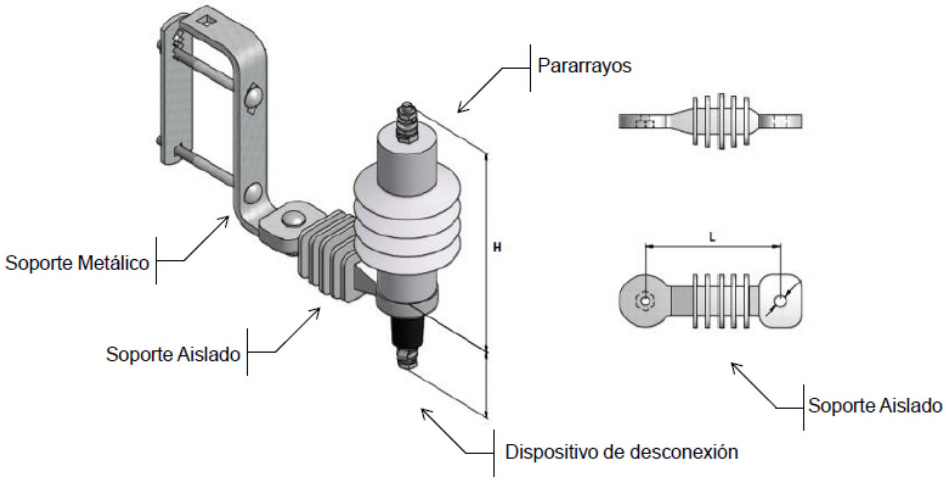


Figure 2

This support shall be according to *ET421 Soporte para fijación de dispositivo de protección contra sobretensión (DPS).*

14.4.4 Marking:

Surge arresters shall also include the wordrs BOG-CUN in the marking.

14.5 ENEL DISTRIBUCION PERÚ

14.5.1 Replaced Local standards:

- E-MT-031

14.6 ENEL DISTRIBUCION CHILE

14.6.1 Replaced Local standards:

- E-MT-031

14.6.2 Reference local law and standards:

- ETGI-1020 - Especificaciones técnicas generales - Requisitos de diseño sísmico para equipo eléctrico. Ingendesa, Noviembre 1997.

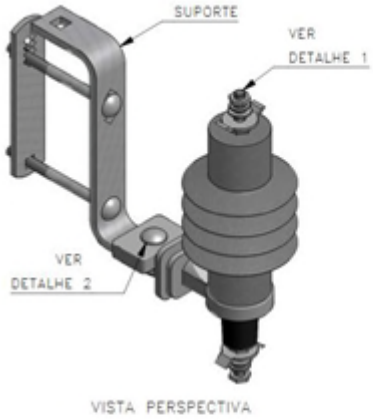
14.7 ENEL DISTRIBUCAO RIO, ENEL DISTRIBUCAO CEARÁ, ENEL DISTRIBUCAO GOIAS

14.7.1 Replaced Local standards:

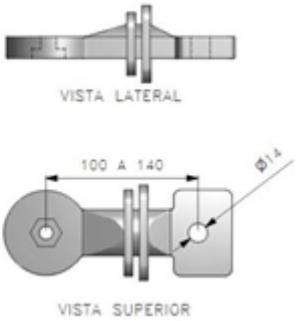
- E-MT-031

14.7.2 Construction Characteristics: fixation

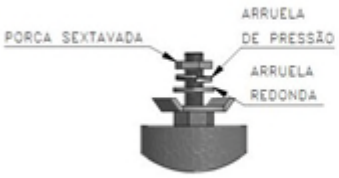
It could be requested an additional metallic support designed as it follows:



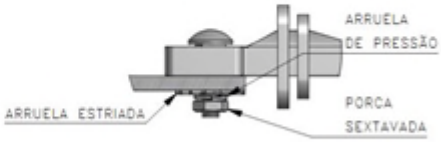
VISTA PERSPECTIVA



VISTAS DO BRAÇO DE MONTAGEM



DETALHE 1
TERMINAIS DE LINHA E DE TERRA



DETALHE 2
FIXAÇÃO AO SUPORTE

15 ANNEX C - TECHNICAL CHECK LIST

Item	Description				
1	**GENERAL INFORMATION**				
1.1	Supplier				
1.2	Factory				
1.3	Distribution Company and Country				
1.4	Country Code				
1.5	GS Type Code				
1.6	Designation				
1.7	Supplier reference				
1.8	Standard	GSCC016			
2	**TECHNICAL CHARACTERISTICS**	**Unit**	**Required**	**Offered**	**Tested**
2.1	Rated Voltage (U_r)	kV			
2.2	Continuous Operating Voltage (U_c)	kV			
2.3	Rated Frequency	Hz			
2.4	Nominal discharge current, lightning impulse 8/20μs (I_n)	kA			
2.5	Class (DH/DM/DL)				
2.6	Insulation withstand test				
2.7	Current for Short-circuit test	kA			
2.8	Residual Voltage for Step current impulse	kV			
2.9	Residual Voltage for Lightning impulse	kV			
2.10	Residual Voltage for Switching impulse	kV			
2.11	Repetitive Charge transfer (Q_{rs})	C			
2.12	Thermal Charge transfer rating (Q_{th})	C			
2.13	Creepage distance	Mm			
2.14	Bending moment	N·m			
2.15	Galvanization	μm			
2.16	Disconnector		Yes		
2.17	Terminal to conductor		Stainless Steel, M12		
2.18	Terminal from disconnector				

16 ANNEX D - STANDARDIZED DESIGNATION TO CREATE NEW CODES

In order to create new codes for insulators included in this standard, the designation for the distribution surge arresters according to this Global Standard shall be:

- SA (SURGE ARRESTER)
- DH (DISTRIBUTION HIGH CLASS, medium or low class could be an alternative although the suggested is high class)
- Nominal discharge current in kA (10 for DH class)
- Maximum grid voltage in kV
- Continuous operating voltage in kV
- Creepage distance in mm

Example for code 170191: SA DH10-24/24-750