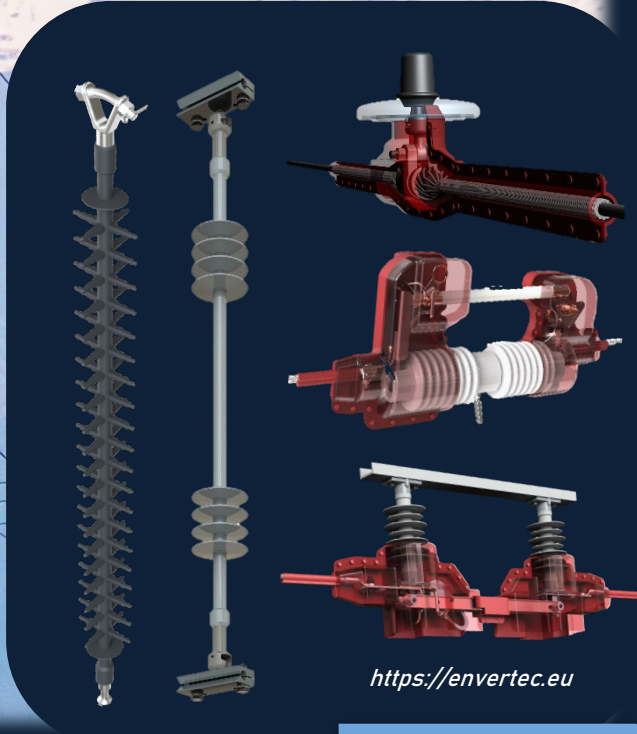


BIRD PROTECTION SYSTEMS AND DEVICES · ANTI-ELECTROCUTION · ANTI-PERCHING · ANTI-COLLISION · PREVENTION OF POWER OUTAGES AND FOREST FIRES

CAON-KORWI®



CATAVIF_012021



<https://envertec.eu>

INTERACTIVE CATALOGUE



15kV – 132kV MV/HV NETWORKS.

FOREWORD AND REGULATIONS

GENERAL CONTENTS

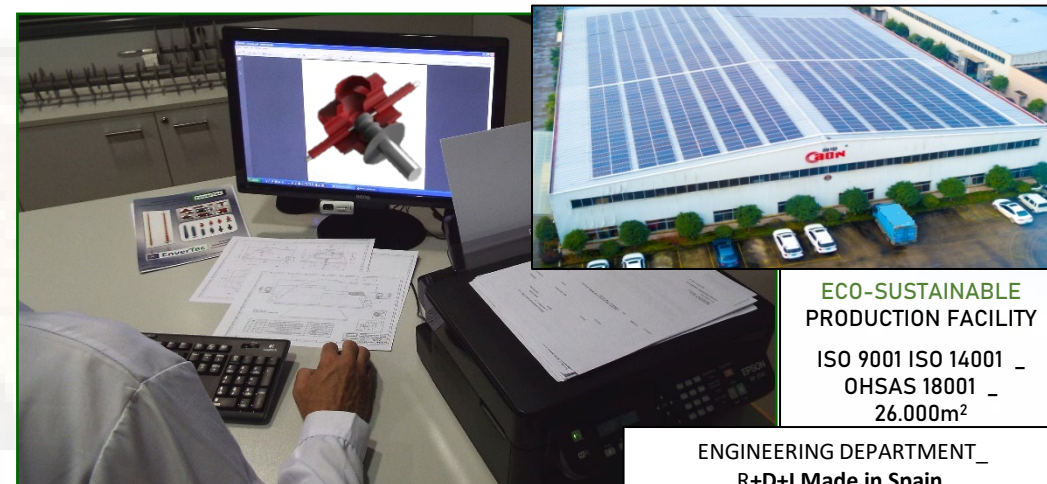
PERFORMANCE MONITORING

EFFECTIVE SOLUTIONS DESIGNED TO PRESERVE WILDLIFE AND ENSURE A CONTINUOUS POWER SUPPLY.



TRACK RECORD OF ENVERTEC S.L. IN THIS FIELD.

- Full awareness and expert field knowledge of the existing problems.
- The CAON®-KORWI® brand products were pioneers in this field with the development in 2011 and 2015 of a specific solution for new power lines:
 - Polymer Bird Protection Insulators models C3670EBAV and C3670EBAV_AR
 - More than 33,000 Bird Protection Insulators installed over the past 10 years with no reported incidents.
- Implementation of a pioneering Quality and Traceability assurance system that was the first of its kind in the industry: R+D+I - In-House Design and Engineering, included in the scope of our [>> ISO 9001:2015 \(Pg. 4\)](#) certification, control of production throughout all stages, traceability of the end product and batch control of the safe raw materials used, allowing the assessment of the product throughout its entire life cycle and proper recycling at the end of its service life



CAON®-KORWI® SILICONE COVERS _ PROVEN EFFECTIVENES

- An Innovation due to the material used: HTV SILICONE with HYDROPHOBICITY level Hc2/WC2 and Shore A >65 _ FLAMMABILITY TYPE V0 IEC60695-11-10:2013.
- Repels moisture build-up: Optimum performance in Saline Atmospheres.
- Exceptional performance under exposure to UV Radiation: Shows no colour degradation or crystallisation. [>>Ongoing field performance assessment report during the last 8 years \(Pg. 75\).](#)
- Withstands high continuous operating temperatures up to 105°C.
- Minimum silicone thickness of 3 -4 mm: High Dielectric Strength-Safe Devices.

VERIFIED QUALITY AND PERFORMANCE – SHORT REFERENCES

- Design and type tests carried out with successful results by prestigious officially accredited independent testing laboratories.
- Track record of installed devices in the field: More than 205,000 Pre-Molded Covers and over 304,000m of bare conductor Covers installed without any incidents in SPAIN – PORTUGAL – COSTA RICA – MEXICO -....





CURRENTLY EXISTING PROBLEMS AND REGULATORY FRAMEWORK.

BACKGROUND:

- The development of rural areas requires a suitable power distribution and supply network based on medium and high voltage lines.
- These lines frequently have to run across high environmental value areas (ZEPA).
- The natural heritage of the areas affected is an essential pillar of their natural wealth and financial income.
- The coexistence of these two factors leads to specific situations that compromise both: Natural Heritage and Continuous Power Supply , therefore our efforts and developments are focused on PREVENTING:
 - Electrocutation of birds belonging to protected species.
 - Forest Fires arising from short circuits caused by bird-related accidents, among others.
 - Outages in electric power supply.



CURRENT REGULATORY REQUIREMENTS

Effective solutions suitable for new-build systems and systems currently in operation.

▪ Compliance with applicable legislation and regulations:



R.D. 1432/2008



REGIONAL REGULATIONS_ MITECO

- Royal Decree (RD) 1432/2008
- Official Andalusian Government Gazette (BOJA) 209 178/2006 and other regional Regulations and Utility internal regulations.
- AENOR EA0058: 2016 Specification
- Quality and Traceability assurance for installed devices. Monitoring of Environmental Impact.

PROACTIVE EFFORTS BY ENVERTEC

In view of the currently existing problem and the requirements laid down in the applicable legislation, ENVERTEC made the commitment to devote all its technological and industrial inventive capabilities – evidenced by the patents to its name – to developing a range of recyclable and environmentally safe products aimed at preserving bird species and preventing power outages, both in newly built lines (bird-protection insulators) and in existing lines (polymer spacers and anti-electrocution protective covers), for use on high voltage overhead lines. We were pioneers in establishing quality parameters, some of which were finally included in Specification EA0058:2016 published by Spanish standards body AENOR, where we had the privilege of being invited from the outset – 2014 – to participate in the drafting of the specification as members of the BIRD PROTECTION WORKING GROUP .





European Quality Assurance Spain

Certifica que el Sistema de Gestión de la Calidad adoptado por la organización

ENVERTEC, S.L.

Polígono La Fuente, C/ Huelva, nº 10
18340 Fuente Vaqueros (Granada)

Es conforme con los requisitos de la Norma

UNE - EN - ISO 9001:2015

El Sistema de Gestión de la Calidad se aplica a los ámbitos siguientes

Diseño, desarrollo y comercialización de aisladores, cubiertas de silicona, y equipos de apareamiento eléctrica para uso de media y alta tensión.



European Quality Assurance Spain

Certifies that the Quality Management System adopted by the organization

ENVERTEC, S.L.

Polígono La Fuente, C/ Huelva, nº 10
18340 Fuente Vaqueros (Granada)

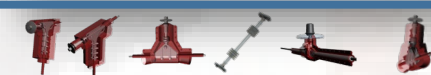
Meets the requirements of the Standard

UNE - EN - ISO 9001:2015

The Quality Management System applies to the following scope:

Design, development and commercialization of insulators, silicone covers, and electrical switchgear equipment for medium and high voltage use.

CERTIFICADO DE CONFORMIDAD



CERTIFICATE OF CONFORMITY

Número 10285-E

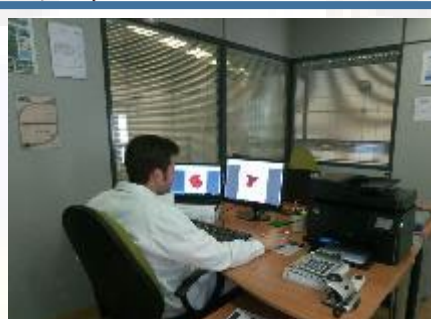
Fecha de emisión: 11 / 10 / 2017
Fecha de expiración: 10 / 10 / 2020

Firmado:

Director

European Quality Assurance Spain, S.L. (EQA España) - Camino de la Zorrauda, 15 - Edificio 2, 1º Planta 28023 Madrid
Queda sujeta al "Procedimiento de Calificación y Condiciones Generales" establecido por EQA.

Dec. Certificación ISO 9001:2015 ver. 1 Mayo 15



Number 10285-E

Certificate Issue Date: 11 / 10 / 2017
Certification Expiry Date: 10 / 10 / 2020

Signed:

Director

European Quality Assurance Spain, S.L. (EQA España) - Camino de la Zorrauda, 15 - Edificio 2, 1º Planta 28023 Madrid
This certificate is subject to the "Certification and General Conditions Procedures" established by EQA.

Dec. Certificación ISO 9001:2015 ver. 1 Mayo 15



AENOR

Certificado de conformidad Material para transporte y distribución eléctricos

A30J000088

AENOR certifica que a petición de

ENVERTEC, S.L.

con domicilio social en LUIS AMADOR, 26 18014 (Granada - España)
 se ha ensayado el producto Formos de Protección Antielectrocucion de la Avifauna
 y ha resultado conforme con BNA001 - 1 edición Mayo 2017

FABRICANTE ENVERTEC, S.L
 MARCA COMERCIAL CAON-KORWI

Más información en el anexo al certificado.

Centro(s) de producción ZONE LISHUI CITY 323000 ZHEJIANG PROVINCE (China)

Esquema de certificación Este certificado de conformidad se ha concedido de acuerdo con lo establecido en el Reglamento Particular de Certificación de AENOR RP A30.02. Este certificado no está sometido a seguimiento.

Fecha de primera emisión 2018-04-11

**CLASS 0 COVERS
 DISTRIBUTION LINES**

Rafael GARCÍA MEIRO
 Director General

AENOR INTERNACIONAL S.A.U.
 Génova, 6. 28004 Madrid, España
 Tel. 91 432 60 00 - www.aenor.com



AENOR website interface showing search results for 'ENVERTEC, S.L.' under the category 'Formos de Protección Antielectrocucion'.

AENOR

Certificate of conformity Electrical Transmission and Distribution Material

A30J000121

AENOR certifies that on request of

ENVERTEC, S.L.

registered office LUIS AMADOR, 26 18014 (Granada - España)
 the product Anti-Electrocution Bird Protection Covers (EA)
 has been tested and found to be compliant with EA 0058:2016

Manufacturer ENVERTEC, S.L
 Trade Mark CAON-KORWI

See annex for more information.

Production site ZONE LISHUI CITY 323000 ZHEJIANG PROVINCE (China)

Certification scheme This Certificate of Conformity has been granted in accordance with the stipulations of the AENOR Scheme Specific Rules RP A30.02. This Certificate is not subjected to surveillance.

First issued on 2019-10-01

**CLASS I COVERS
 TRANSPORT LINES**

Rafael GARCÍA MEIRO
 Chief Executive Officer

AENOR INTERNACIONAL S.A.U.
 Génova, 6. 28004 Madrid, España
 Tel. 91 432 60 00 - www.aenor.com

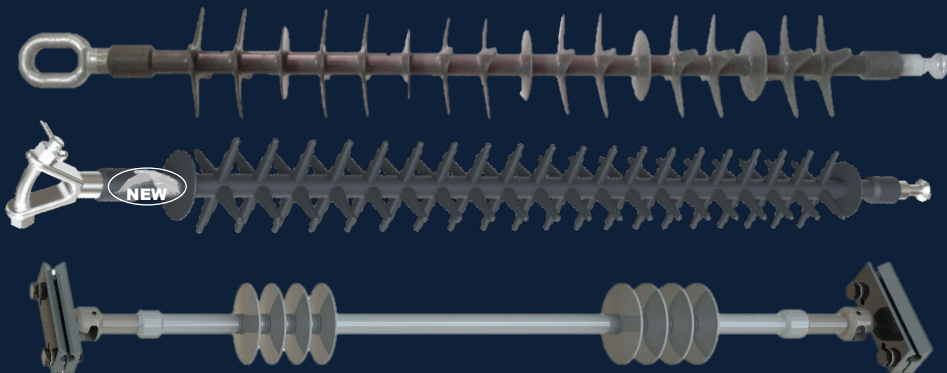




BIRD ANTI-ELECTROCUTION PROTECTION SYSTEMS FOR MV / HV NETWORKS - ANTI-PERCHING AND ANTI-COLLISION DEVICES



General Contents List of Solutions. Law 26/2007 - R.D. 1432/2008 - BOJA 209 178/2006.



NEW LINES CONSTRUCTION AND LINE RETROFITS

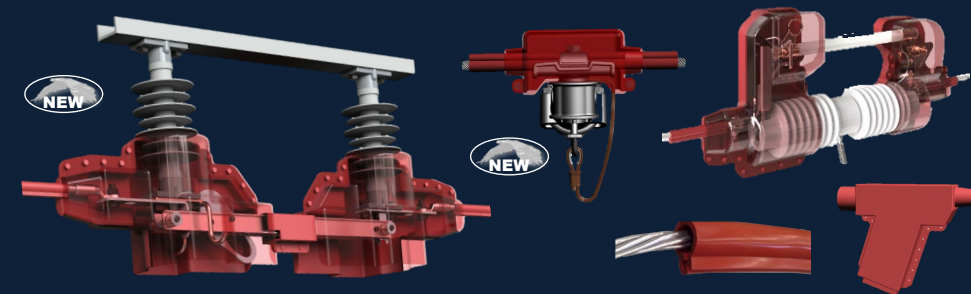
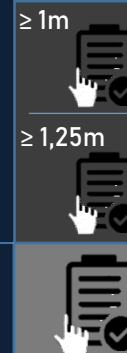
CAON®-KORWI® BIRD PROTECTION INSULATORS FOR ZEPA

USE ON 15-36kV DISTRIBUTION LINES.



POLYMER PHASE SPACERS.

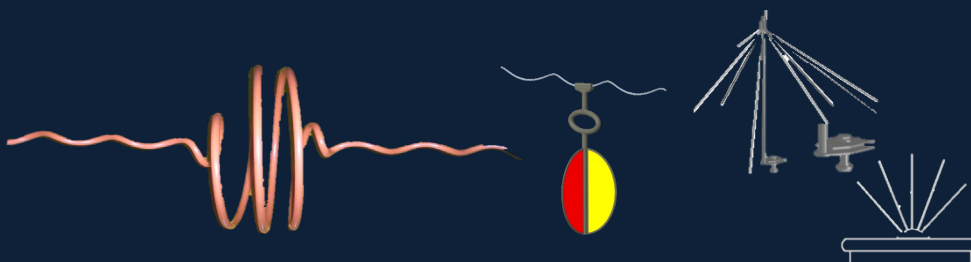
USE ON 15-132kV MEDIUM AND HIGH VOLTAGE DISTRIBUTION AND TRANSMISSION OVERHEAD LINES



RETROFITTING OF EXISTING LINES

CAON-KORWI® SILICONE DEVICES

USE ON 15 - 66kV DISTRIBUTION OVERHEAD LINES AND TRANSPORT_ CATENARIES_15-66kV.



ANTI-COLLISION AND ANTI-PERCHING DEVICES

DESIGNED TO PREVENT BIRD COLLISIONS WITH BARE CONDUCTORS ON DISTRIBUTION LINES AND PREVENT PERCHING ON POWER SYSTEM STRUCTURES.



INSTALLATION IMAGE GALLERY

PRODUCT SUPPLY HIGHLIGHTS





BIRD PROTECTION SYSTEMS FOR 15kV – 132kV MV/ HV NETWORKS

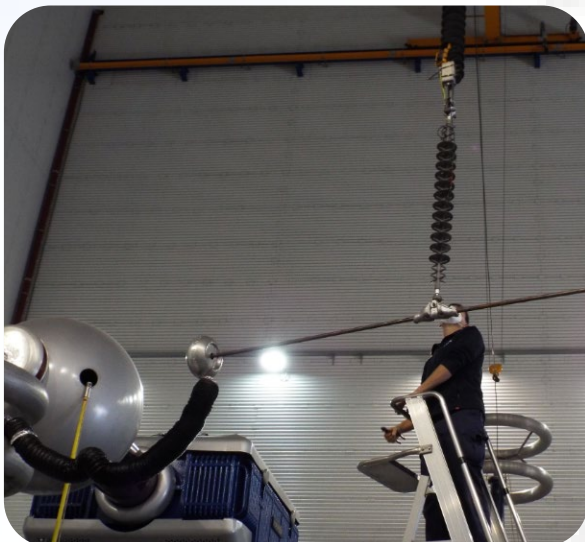
CAON-KORWI® STRUCTURAL SOLUTIONS









POLYMER SURFACE COATING AND HIGHLY EFFICIENT INSULATING CORE.

INNOVATIVE SOLUTIONS FOR NEW-BUILD LINES _ 15-36kV / 70kN

Law 26/2007 – Royal Decree 1432/2008 – BOJA 209 178/2006



<p>EDISTRIBUCIÓN - ENEL TAM 300020 / GSCC010 _ 2nd Ed.</p>  <p>LONGITUDINALLY INSULATED SURFACE $\geq 1m$</p>	
<p>I-DE Smart Electric Networks 4803214 / N.I. 48.08.03</p>  <p>LONGITUDINALLY INSULATED SURFACE $\geq 1m$</p>	
<p>NEW HIGH SAFETY DEVELOPMENTS WITH LOW LEAKAGE CURRENT</p>  <p>HIGHER SAFETY DISTANCE PHASE-EARTH IN DEADEND STRINGS</p> <p>LONGITUDINALLY INSULATED SURFACE $\geq 1,25m$.</p>	

BIRD PROTECTION INSULATORS FOR ZEPA

EXCLUSIVE MIXED SHED SYSTEM: DIELECTRIC FUNCTION + BIRD PERCHING DETERRENT FUNCTION





IMPROVED FEATURES AND PERFORMANCE. DESIGN EVOLUTION.



C3670EBAV C3670EBV_AR

- Model C3670EBAV_AR is an evolved version of the CAON®-KORWI® Model C3670EBAV insulator: This *exclusive* revolutionary design by ENVERTEC S.L. is an evolution of model C3670EBAV (more than 14,140 units installed in Spain with zero incidents), which has been fitted with 12 star-shaped sheds to provide the insulator with UNIQUE ADDITIONAL FEATURES, turning it into a PERCHING DETERRENT element.

- Excellent Dielectric Performance:

Insulator suitable for MEDIUM VOLTAGE LINES UP TO 36 kV with a Rated Mechanical Load of 70 kN.

- LEVEL IV Leakage path design:

Engineered to achieve a Limited leakage distance to *avoid overprotecting the line*, through simulations to balance the shed diameters with the total insulation length provided by this insulator (> 1m) . The result is an Insulator with a Leakage distance of 1,350 mm - VERY HIGH POLLUTION - AND012, Ed. 4/2015 - and a Protected Leakage Distance >1,000 mm.

Regulations and TYPE APPROVALS

Designed in accordance with Standard UNE-EN 61109:2010 (IEC 61109:2008).

The CAON®-KORWI® model C3670EBAV_AR insulator is the first of its kind to have been type-approved by an electric utility, in this case ENDESA DISTRIBUCION (current Edistribucion) , according to its regulation GE AND012-4ªEd. Hence, since 23/06/2015 it is an Approved Product with SIE Code No 6709926 - TAM 300020 .

Very easy to INSTALL AND MAINTAIN _ Reduction in Associated Costs

- SINGLE-PIECE INSULATOR: Better performance under mechanical stress and reduced insulator string weight (3.16 kg), leading to easier transport and installation (vs. articulated insulator strings).
- No need to cover clamps or conductor, preventing moisture build-up due to condensation, and facilitating the detection of Hot Spots and faults on the conductors.
- The star-shaped auxiliary sheds protect the insulator from damage by birds (crow family), through their perching deterrent effect, while also providing a protective barrier for the 5 sheds with a purely dielectric function.



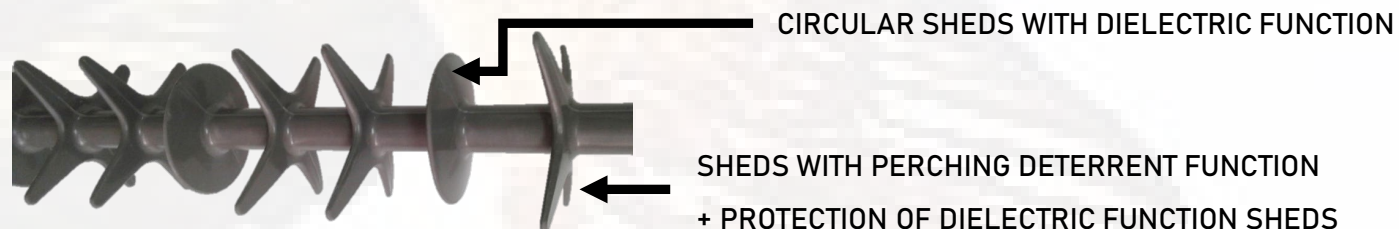
IMPROVED FEATURES AND PERFORMANCE. DIELECTRIC SHEDS AND ANTI-PERCHING SHEDS.



BIRD protection function against Electrocutation.

COMPLIANCE WITH CURRENT NATIONAL REGULATION ON ANTI-ELECTROCUTION BIRD PROTECTION IN 2nd AND 3rd CATEGORY OVERHEAD LINES. (Royal Decree 1432/2008): The guaranteed clearance between Live parts and Perching areas exceeds 1 m. This distance, of totally insulated length is moreover assured by means of the star-shaped sheds which deter the birds from perching along the entire length of the insulator.

• Close-up view of Design:



ANTI-PERCHING function

12 STAR-SHAPED SHEDS are alternated along the insulator with the 5 sheds with a purely dielectric function, providing an effective deterrent element against bird perching:

- During the Design development stage of these Sheds with a 4-pointed star shape, the nature and level of consistency of the material used to manufacture them, as well as the angles, radii and thicknesses used, were carefully considered to ensure they effectively performed a Perching Deterrent Function, without constituting a hazard for birds.

IMPROVEMENT OF THE CONTINUITY OF POWER SUPPLY

- These ANTI-PERCHING SHEDS have been geometrically designed so as not to affect the insulator's dielectric performance.
- They are larger-sized (the star is inscribed in a 130mm circumference) than the dielectric sheds, to perform the ANTI-PERCHING FUNCTION and to protect the dielectric sheds from attack by birds like the crow family, acting as a protective barrier for the 5 sheds with a purely dielectric function, thereby reducing outages and improving the continuity of the power supply.



C3670EBAV_AR

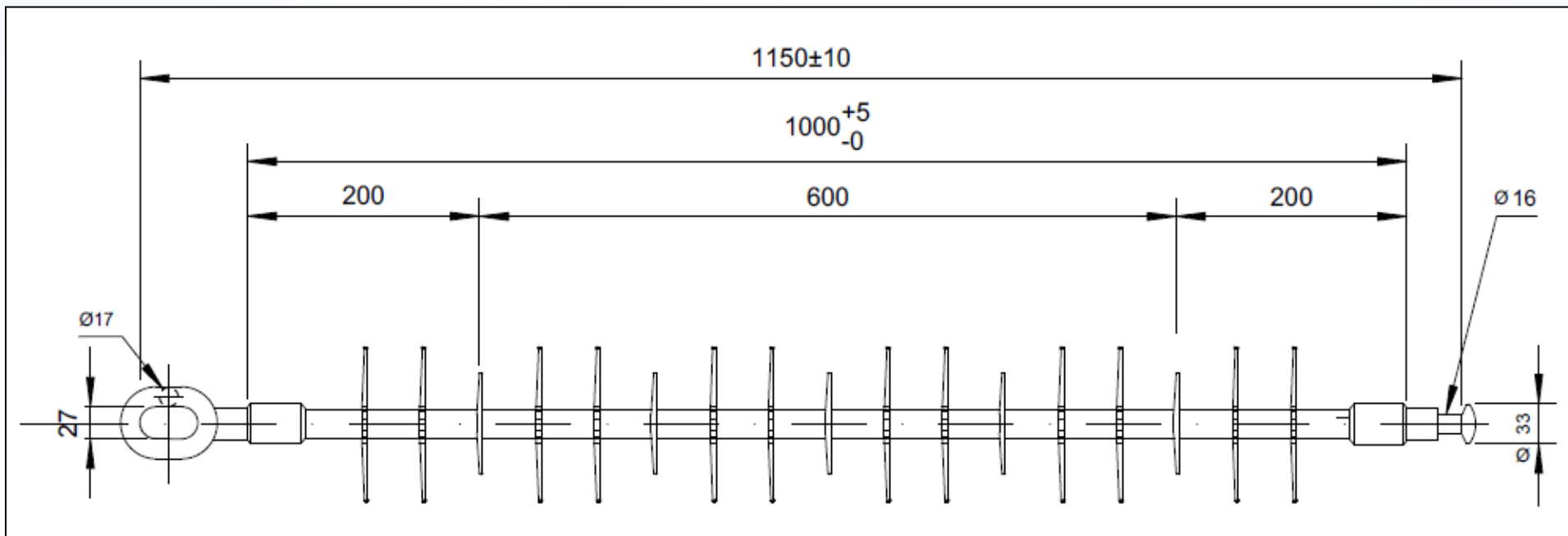




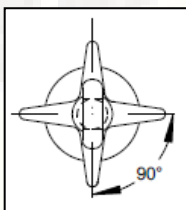
CAON® -KORWI® C3670EBAV_AR POLYMER INSULATOR. DATA SHEET.



C3670EBAV_AR



Type	Rated Voltage	Minimum Leakage Distance	Minimum Protected Leakage Distance	Mechanical Load Rating	Test Voltages	
					1.2/50 BIL	50 Hz/Wet
CAON-KORWI	kV	mm	mm	kN	kV	kV
C3670EBAV_AR	36	1350	1005	70	200	80



Insulator and Whole String Weights		Surface *
Insulator C3670EBAV_AR	1.92 kg	0.0394 m²
Deadend String LA-56 (GA-1)	3.16 kg	0.0507 m²
Deadend String LA-110 (GA-2)	3.94 kg	0.0579 m²

* Use in Wind Resistance Calculations





MATERIALS , FEATURES AND VALUE ADDED. **PROVEN PERFORMANCE.**

COMPONENTS AND MATERIALS

INSULATING CORE: Fibreglass reinforced Epoxy resin – Acid resistant – High Mechanical Stress resistance (70kN).

· HTV SILICONE CONTINUOUS ENVELOPE WITH Hc2 HYDROPHOBICITY LEVEL: Owing to its composition and nature it repels the build-up of moisture. This insulator has a minimum silicone thickness of 4.5mm , ensuring excellent performance in highly polluted areas.

· METAL FITTINGS: The Zinc (Zn) coating thickness on the fittings –Ring/Ball- has been reinforced to 120 µm, in accordance with the EN 60383-1 standard.

> 10,360 pcs
Installed
2015 - 2019



VALUE ADDED THROUGH

- DESIGN 100% by EnverTec S.L. (Granada – Spain).
- Detailed specification of each manufacturing batch.
- Monitoring of the insulator manufacturing process. Traceability Assurance.
- Extended quality control:
 - Testing at independent accredited laboratory of the polymer envelope material used for each batch.
 - Individual and sampling tests as per UNE-EN 61109:2010 and the criteria set out in the ISO 17025 Standard.
- QUALITY AND TRACEABILITY ASSESSMENT report for each batch of insulators supplied.



C3670EBAV_AR

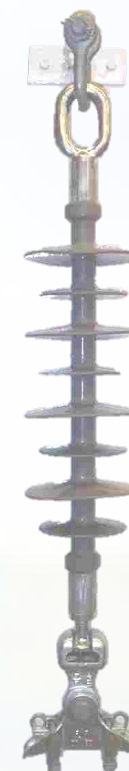
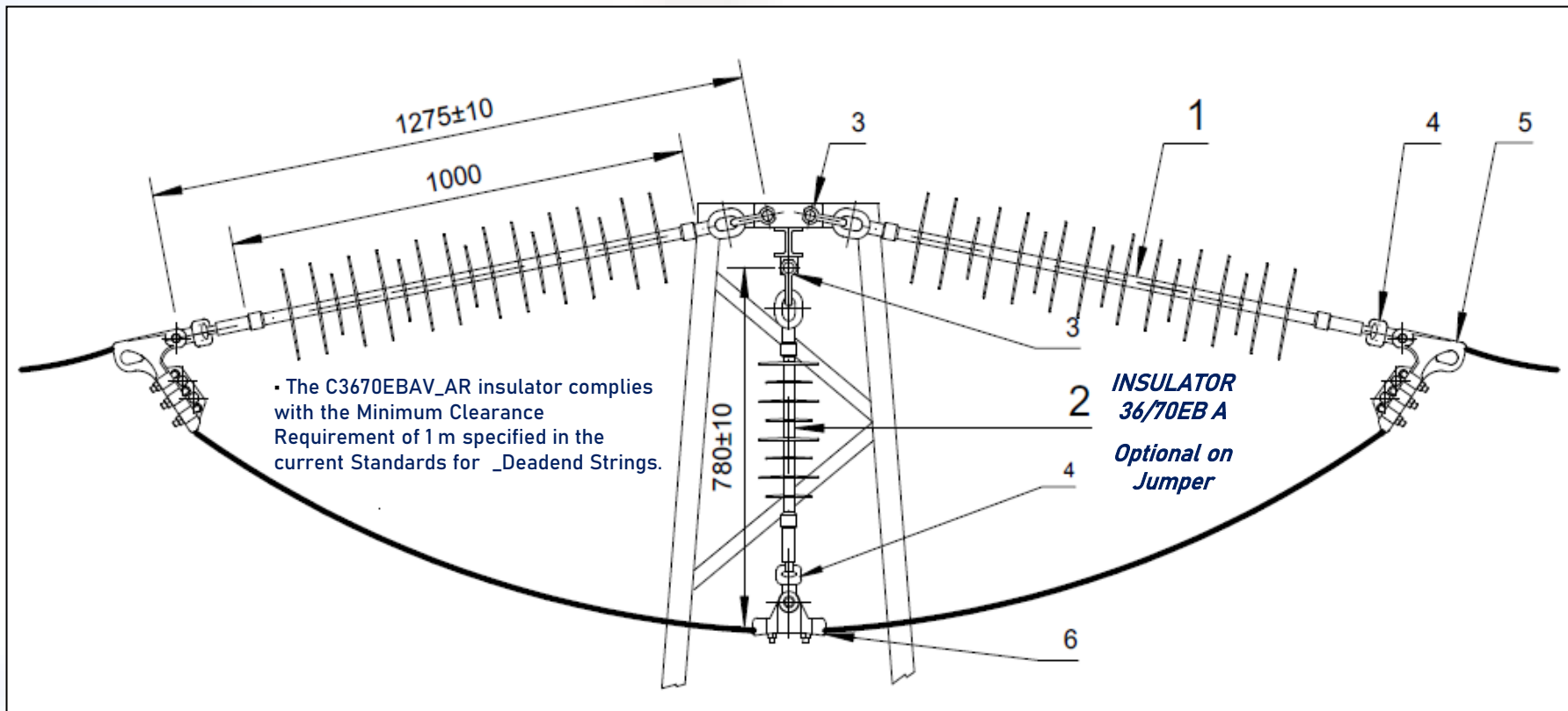




COMPLIANCE WITH ANTI-ELECTROCUTION REGULATON
DISTANCES + INSULATION= **TOTALLY INSULATED DISTANCE.**



C3670EBAV_AR



String Ref.
CAD36PGS
Tangent

MARK	DESCRIPTION
1	C3670EBAV_AR INSULATOR
2	C3670EBA INSULATOR
3	GN SHACKLE
4	R-16 JOINT
5	DEADEND CLAMP
6	SUSPENSION CLAMP

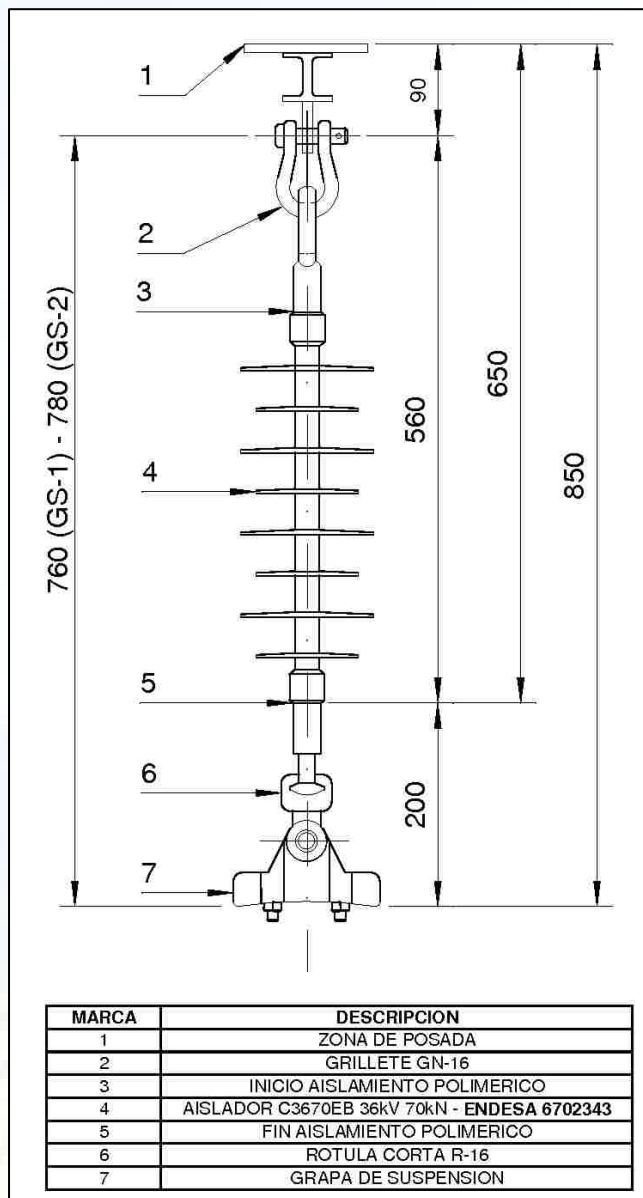
- SINGLE-PIECE STRING - WITHOUT METAL EXTENSIONS
- CONTINUOUS POLYMER INSULATION
- EASIER INSTALLATION - NO JOINED PARTS
- LIGHTER: 3.16 kg vs. 11.6 kg
- EASIER HOT SPOT/ FAULT DETECTION
- VERY COMPETITIVE PRICE

Mark 2: The 36/70EBA insulator complies with the Minimum Clearance Requirement of 0.75m specified in the current Standards for Suspension/Tangent Strings.





24-36KV SUSPENSION-TANGENT INSULATOR STRINGS. *CLEARANCE* $\geq 0,85m$.

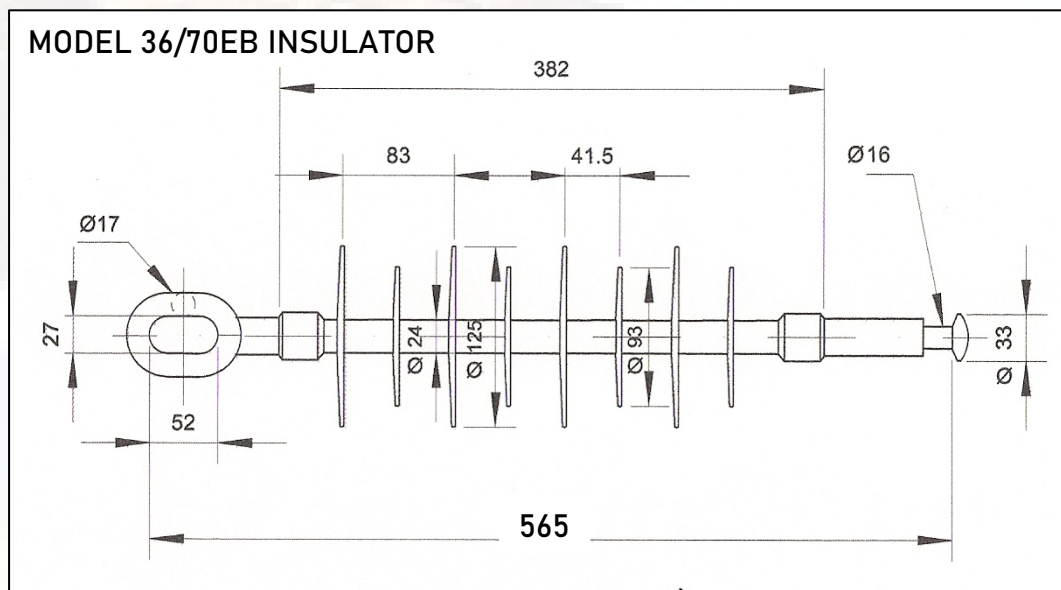


Complete String.
CAD36PGS
Tangent

CAD36PGS SUSPENSION STRING -WITH MODEL 36/70EB A INSULATOR - 36 kV 70kN

STANDARD ENEL GSCC010 / Cod. ENEL TAM 300032

The CAD36PGS insulator string provides a clearance in excess of 0.75 m between the conductor and the crossarm shackle, thereby assuring compliance with the requirements of the current Standard requirements for Suspension/Tangent Strings.



Type	Rated Voltage kV	Minimum Leakage Distance mm	Min. Protected Leakage Dist. mm	Mechanical Load kN	Test Voltages	
					1,2/50 BIL kV	50 Hz/Wet kV
C3670 EB A	36	980	415	70	170	70

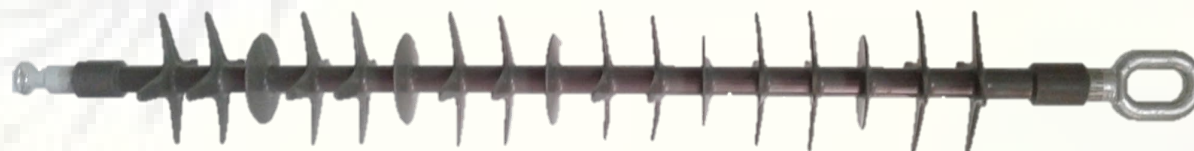
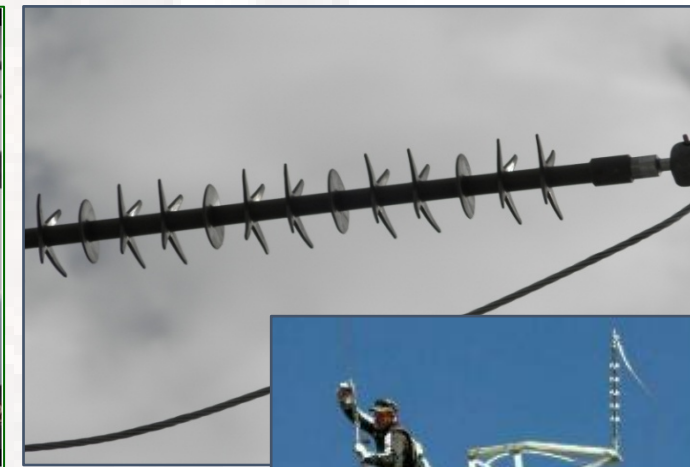
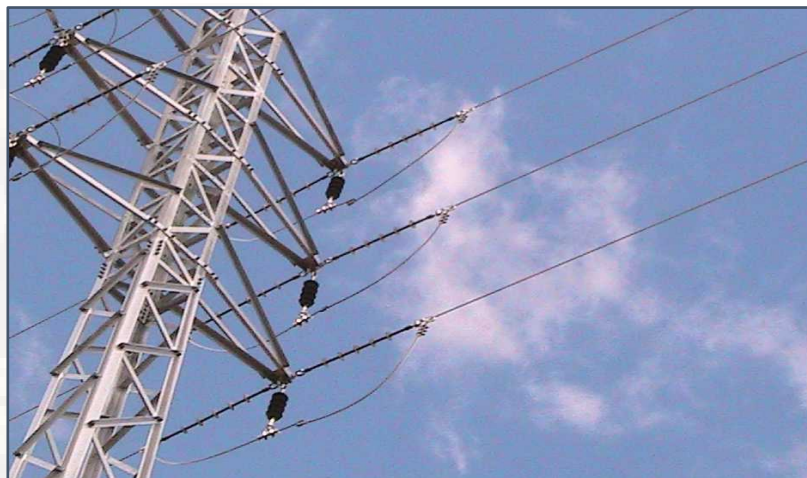
STRINGS SURFACE m2 FOR WIND RESISTANCE CALCULATIONS

LA-56 (GS-1) SUSPENSION STRING	0,0311m2
LA-110 (GS-2) SUSPENSION STRING	0,0313m2





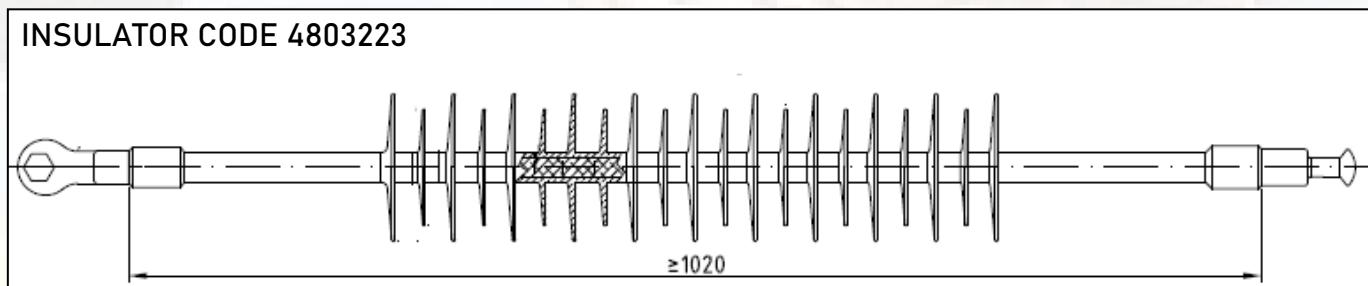
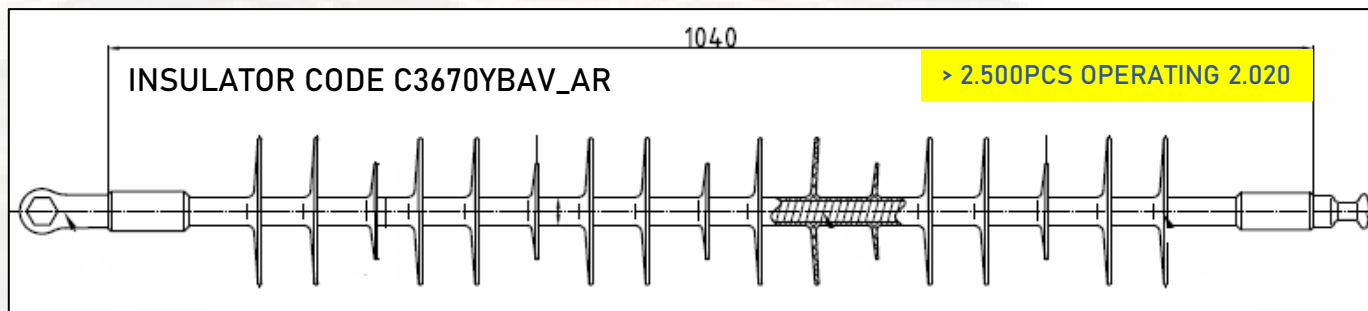
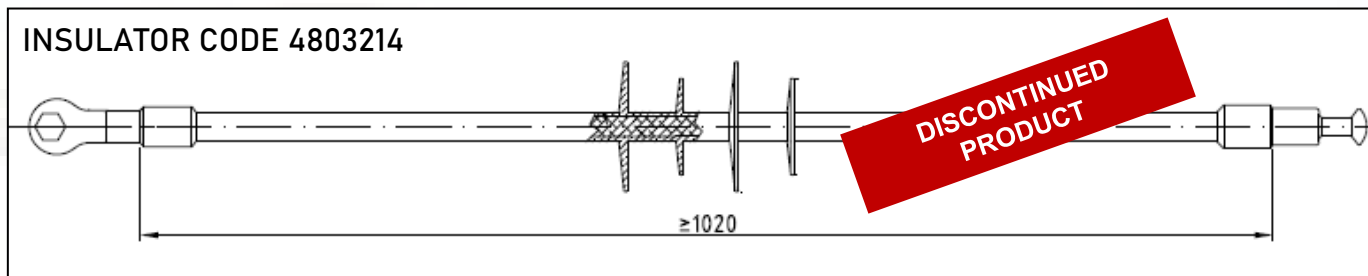
CAON® -KORWI® C3670EBAV_AR POLYMER INSULATOR. *IMAGE GALLERY.*



> 14.500 pcs
Installed
2015 - 2020



POLYMER INSULATORS AS PER IBERDROLA 48.08.03:2018 STANDARDS *DATA SHEET.*



Model	Code	Rated Voltage (kv)	Leakage distance (mm)	Insulated length (mm)	Total length(mm)	Mechanical Load (kN)	Test Voltages(kv)	
							1,2/50 BIL	50Hz /Wet
U70YB30P_AL	4803214	30	1120	1020	1170	70	215	95
C3670YBAV_AR	4803214A	30	1380	1040	1170	70	215	95
U70YB66P_AL	4803223	66	2250	1020	1170	70	380	165

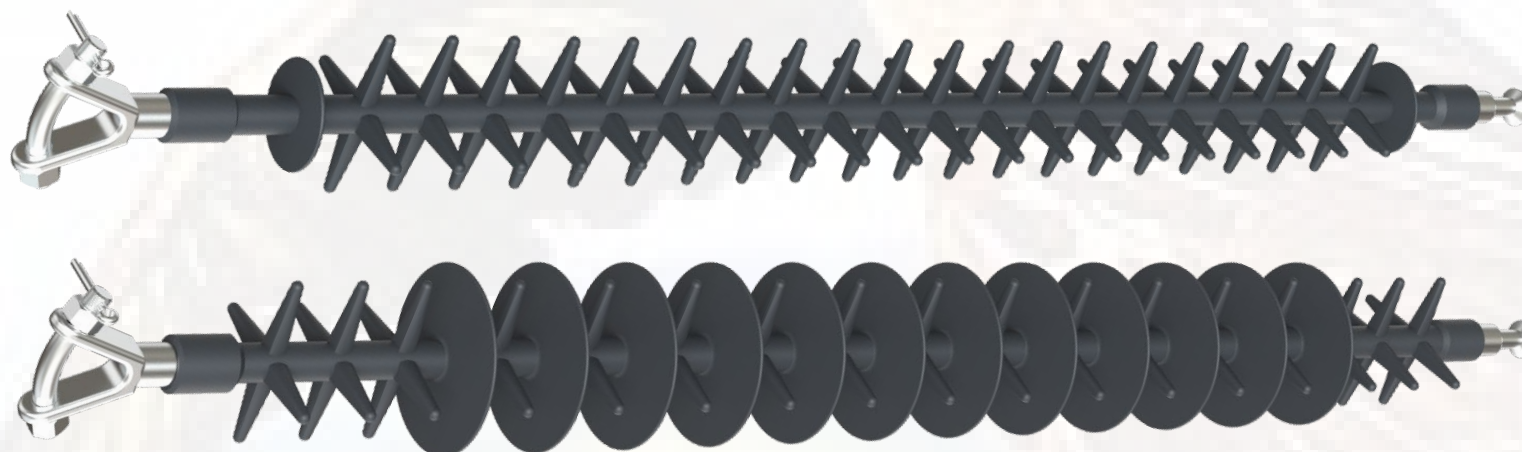




CAON-KORWI® DIELECTRIC CORE BIRD PROTECTION INSULATORS

ANTI-ELECTROCUTION MEASURES FOR 15-66kV / 70kN LINES

ACQUIREMENT OF PHASE-EARTH SAFETY DISTANCE IN DEADEND STRINGS BY \geq
1,25m. LONGITUDINALLY INSULATED SURFACE



Models U70YB30P_ALA / U70YB66P_ALA

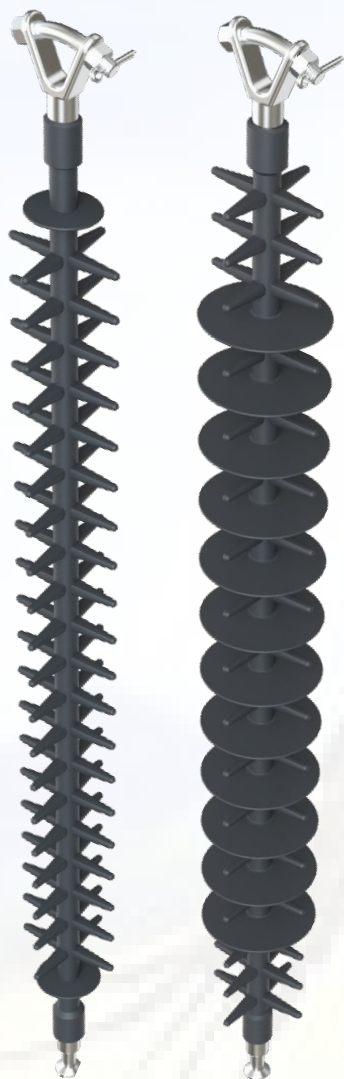
Combination of functions: Dielectric and bird perching deterrent

INSULATED DEADEND STRINGS WITH BIRD PERCHING DETERRENT.





DEVELOPMENT PRESENTATION . INSULATED DISTANCE WITH BIRD PERCHING DETERRENT



U70YB30P_ALA / U70YB66P_ALA

AIM.

The aim of the present development is to present two models of one-piece Insulator with $\geq 1,25m$ longitudinally insulated surface, both fitted with Bird Perching Deterrent Elements with a Specific Design, and with 70kN SML (Specified Mechanical Load). Allowing it to be used in deadend strings in the most usual bare conductors.

LAW

RD.1432/2008_ Natural Heritage and Biodiversity Law (42/2007). Environmental Responsibility Law (26/2007) _ Law 21/1992 - Art.9 _ Law 24/2013-Art. 53.9.

REGULATIONS.

UNE-EN 61109:2008, "Insulators for overhead lines- Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1000 V - Definitions, test methods and acceptance criteria."

UNE 60060-1:2012, "High-voltage test techniques-Part 1: General definitions and test requirements".



SCOPE AND APPLICATION.

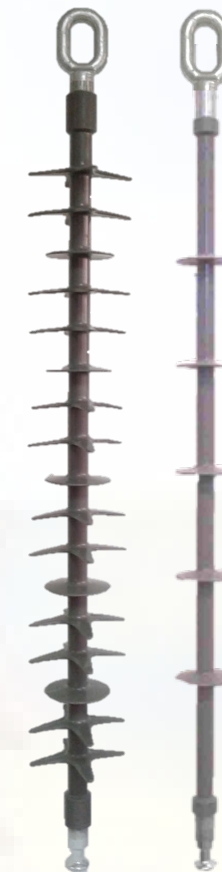
Lines on transmission and distribution networks: 2nd Category (>30kV y $\leq 66kV$) and 3rd Category (>1kV y $\leq 30kV$).

TRACK RECORD OF DESIGN.

This design by ENVERTEC S.L. is an evolution of model C3670EBAV² and C3670EBAV_AR¹, adding together more than 25,000 units installed in Spain with zero incidents since 2012.

STRUCTURAL SOLUTION.

The presented models constitute a **structural solution** guaranteeing a Phase-Earth safety distance **fully insulated** $\geq 1,25m$, between the end of the crossarm and the deadend clamp, obtained thanks to the dielectric core and the continuous surface insulating coating of a polymeric nature which they incorporate.



1. 2.

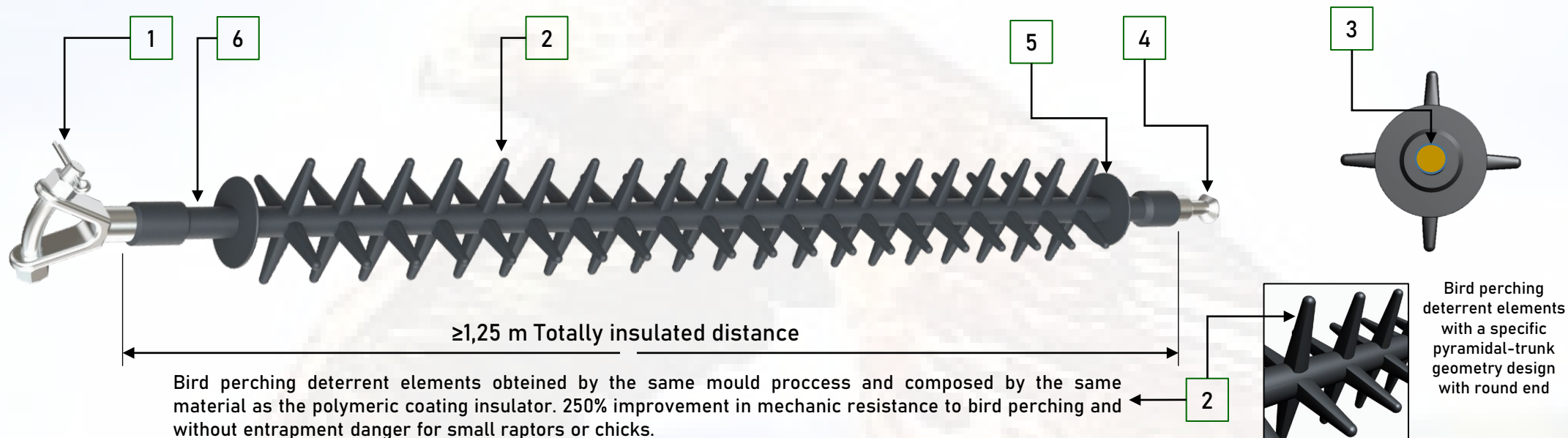
1. C3670EBAV_AR Model : 2.015

2. C3670EBAV Model : 2.012





MODEL U70YB30P_ALA INSULATED . DIMENSIONS , PARTS AND MATERIALS.



1.
Fork 16 Standard.
(IEC60120 - 16)
120µm hot galvanized forged Steel. Docking on structure side.
It is posible to provide the insulator with Type E24 Ring - Standard *GSCC010 ENEL*.

2.
20 lines with 4 bird perching deterrent elements each one. The deterrents have 51 mm minimun height and they are inscribed in a 130 mm circumference. The lines distance is 50mm as a máximun.
Standard GSCC010 ENEL

3.
Dielectric core, produced with Epoxy resin, reinforced by glass fibre and resistant to hydrolysis and acids. High electric insulated efficacy and 70 kN mechanical charge.

4. Ball Joint 16 Standard
(IEC60120 - 16) 120µm forged and galvanized Steel.

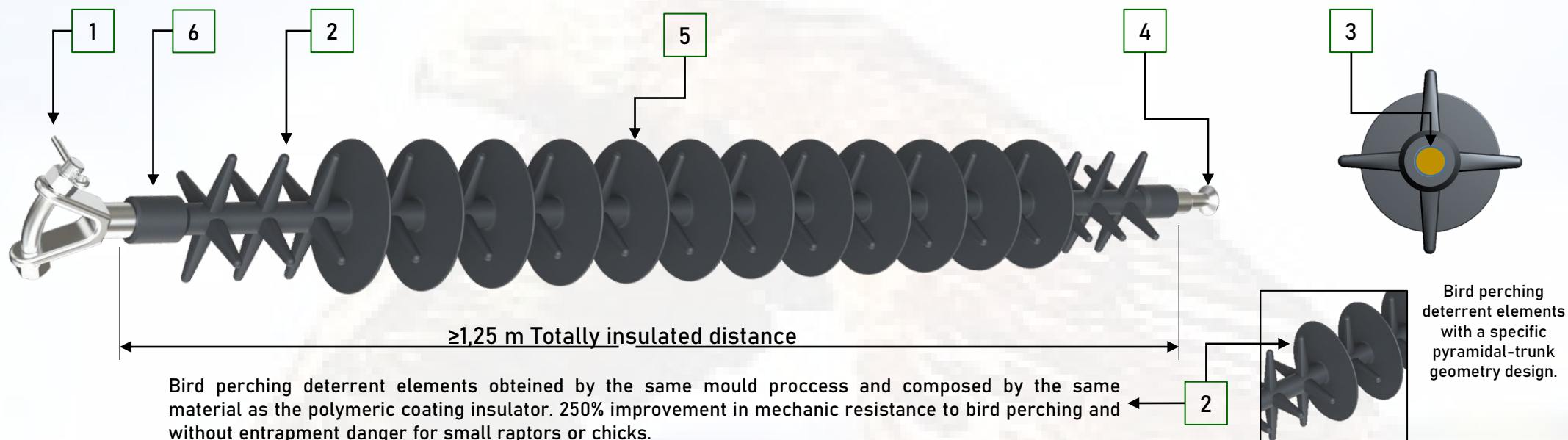
5. Circular Sheds (2units) Dielectrical Function-Standard N/ 48.08.03. I-DE.
The insulator design has been adjusted to offer type "e" level leakage- IEC 60815- Suitable for high pollution areas offering ≤ 1350 mm value -Standard *GSCC010 ENEL*.

6. POLYMERIC COATING TECHNICAL FEATURES	
Flammability	V0 (UNE 60695-11-10)
Density	>1,1 g/cm 3 (ISO-868)
Strength	>60 Shore A (ISO-868)
Tensile Strength	>4N/mm 2 (EN 60811-501)
Elasticity Modulus	>200% (EN 60811-501)
Tear Resistance	>12N/mm 2 (UNE-HD-605)
Dielectric Strenght	>18kV/mm (UNE 60243-1)
Ozone Resistance	250ppm (UNE 60811-403:2012)
Accelerated Weathering	1000h UNE 211605





MODEL U70YB66P_ALA INSULATED . DIMENSIONS , PARTS AND MATERIALS.



1.
Fork 16 Standard.
(IEC60120 - 16)
120µm hot galvanized forged Steel. Docking on support side.
It is posible to provide the insulator with S16 Coupling - Standard *GSCH004 ENEL*.

2.
17 lines with 4 bird perching deterrent elements each one. The deterrents have 51 mm minimun height and they are inscribed in a 130 mm circumference. The line distance is 50mm as a máximo.

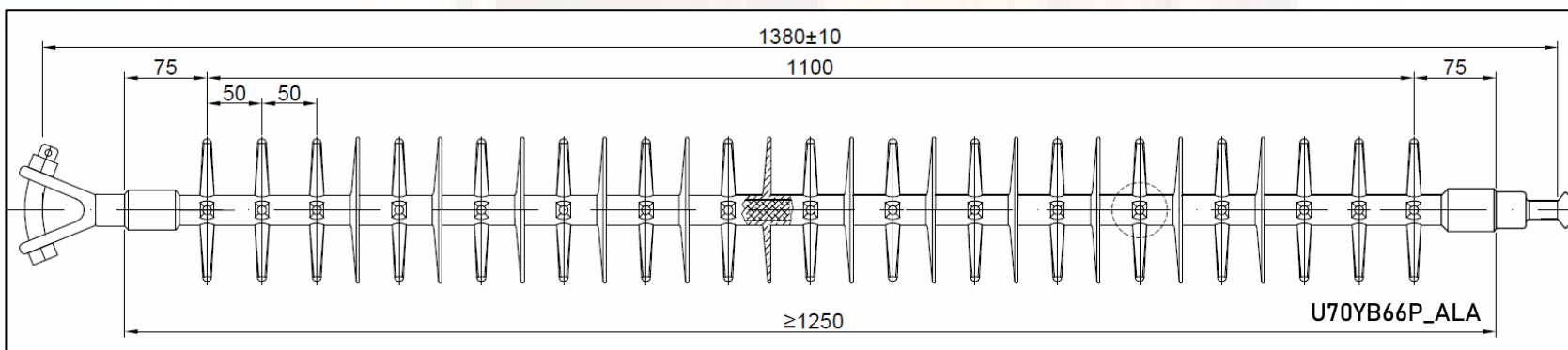
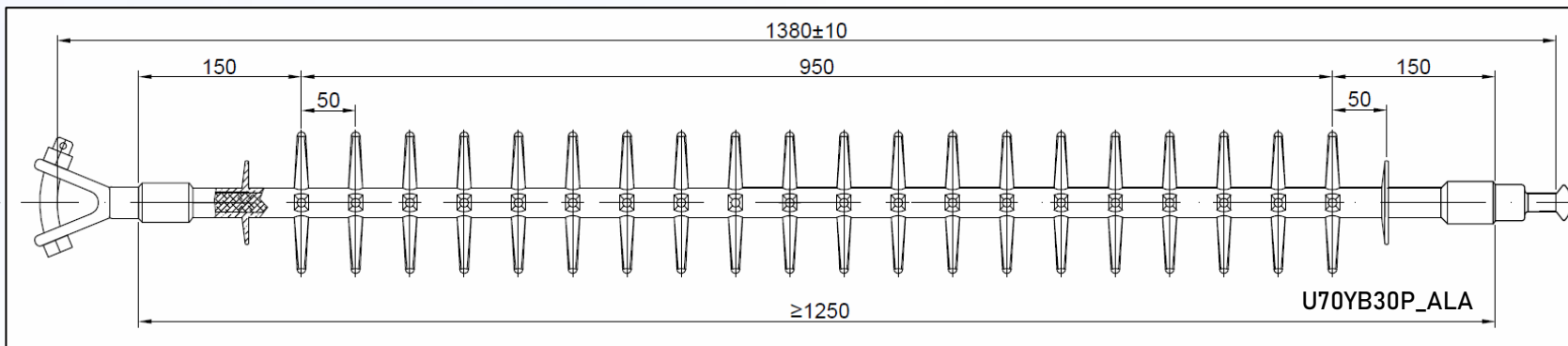
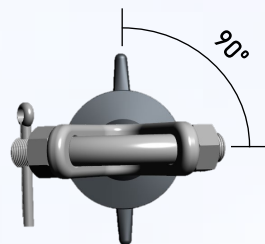
3.
Dielectric core, produced with Epoxy resin, reinforced by glass fibre and resistant to hydrolysis and acids. High electric insulated efficacy and 70 kN mechanical charge.

4. Ball Joint 16 Standard.
(IEC60120 - 16) forged and galvanized Steel 120µm.

5. Circular Sheds (12ud) Dielectrical Function. The insulator design has been adjusted to offer type "e" level leakage- IEC 60815- Suitable for high pollution áreas offering ≥ 2250 mm value -Standard *GSCH004 ENEL - Standard NI 48.08.03 I-DE*.

6. POLYMERIC COATING TECHNICAL FEATURES	
Flammability	V0 (UNE 60695-11-10)
Density	>1,1 g/cm 3 (ISO-868)
Strength	>60 Shore A (ISO-868)
Tensile Strength	>4N/mm 2 (EN 60811-501)
Elasticity Modulus	>200% (EN 60811-501)
Tear Resistance	>12N/mm 2 (UNE-HD-605)
Dielectric Strenght	>18kV/mm (UNE 60243-1)
Ozone Resistance	250ppm (UNE 60811-403:2012)
Accelerated Weathering	1000h UNE 211605





U70YB30P_ALA	COLOUR_COLOR	GRAY_GRIS
STANDARD_NORMA		IEC61109
DRY ARCING DISTANCE_DISTANCIA DE ARCO		1250mm
CREEPAGE DISTANCE_LINEA DE FUGA		1350mm
ROUTINE TEST LOAD (RTL)		35kN
CARGA MECANICA DE Rutina		35kN
SPECIFIED MECHANICAL LOAD(SML)		70kN
CARGA MECANICA ESPECIFICADA(CME)		70kN
TORSION STRENGTH _MOMENTO DE TORSION		6 daN.m
Ur / Umax.		30kV/36kV
BASIC IMPULSE LEVEL (BIL)		215kV
NIVEL BASICO DE IMPULSO(NBI)		215kV
POWER FREQUENCY WITHSTAND	DRY_SECO	110kV
TENSION ENSAYO A F.I.	WET_LLUVIA	95kV

U70YB66P_ALA	COLOUR_COLOR	GRAY_GRIS
STANDARD_NORMA		IEC61109
DRY ARCING DISTANCE_DISTANCIA DE ARCO		1250mm
CREEPAGE DISTANCE_LINEA DE FUGA		2425mm
ROUTINE TEST LOAD (RTL)		35kN
CARGA MECANICA DE Rutina		35kN
SPECIFIED MECHANICAL LOAD(SML)		70kN
CARGA MECANICA ESPECIFICADA(CME)		70kN
TORSION STRENGTH _MOMENTO DE TORSION		6 daN.m
Ur / Umax.		66kV/72,5kV
BASIC IMPULSE LEVEL (BIL)		380kV
NIVEL BASICO DE IMPULSO(NBI)		380kV
POWER FREQUENCY WITHSTAND	DRY_SECO	180kV
TENSION ENSAYO A F.I.	WET_LLUVIA	165kV



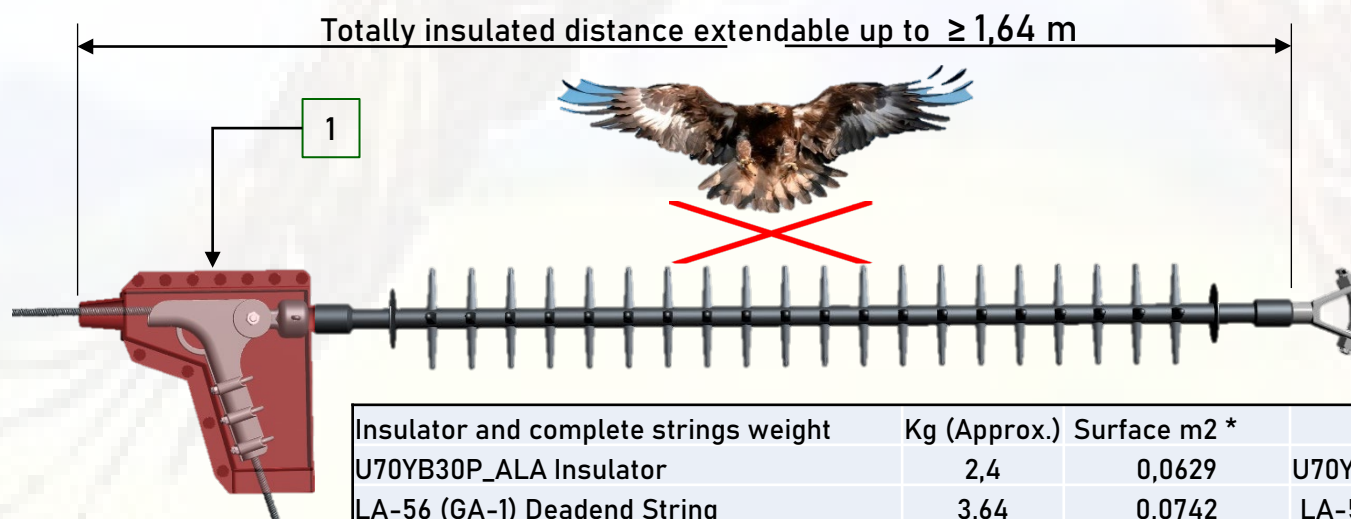


IMPROVED PERFORMANCE . REDUCTION IN ASSOCIATED COSTS

VERY EASY TO INSTALL AND REDUCTION IN MAINTENANCE COSTS

ONE- PIECE INSULATORS

- Don't need additional bird perching deterrent elements, which could be a hazard to birds or could reduce insulators performance because they are expose to the accelerating weathering or could be detached during its service life.
- Better performance under mechanical stress with less complete string weight, leading its easier transport and installation, vs. glass or polymeric strings fitted with metal core extensions.
- Better aerodynamic performance vs. articulated strings fitted with extensions accompanied by bird perching deterrent or bird perching deterrent spirals.
- HTV silicone continuous envelope with Hc2: owing to its composition and nature it repels the build-up of moisture (ice sleeve) registering lower leakage currents, with improved security over time, avoiding the risk of electrocution, thanks to the hydrophobic properties they transmit to the contaminant layer.
- The 5 000h weathering Tests, IEC 6119 at the STRI (Sweden), allow us to estimate the service life of our insulators at a minimun of 20 years.



PHASE-EARTH DISTANCE INCREASE IN AREAS THAT REQUIRES IT

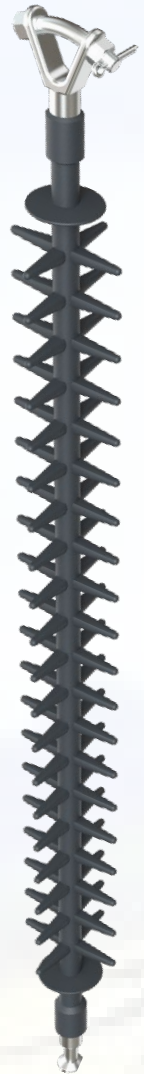
U70YB30P_ALA and U70YB66P_ALA insulators design allows the compabitibility with STSC (1) ENVERTEC®_CAON-KORWI® silicone covers, increasing the insulated distance until $\geq 1,64$ m, by covering the pin, the ball joint and the clamp.

(*) Use in wind resistance calculations

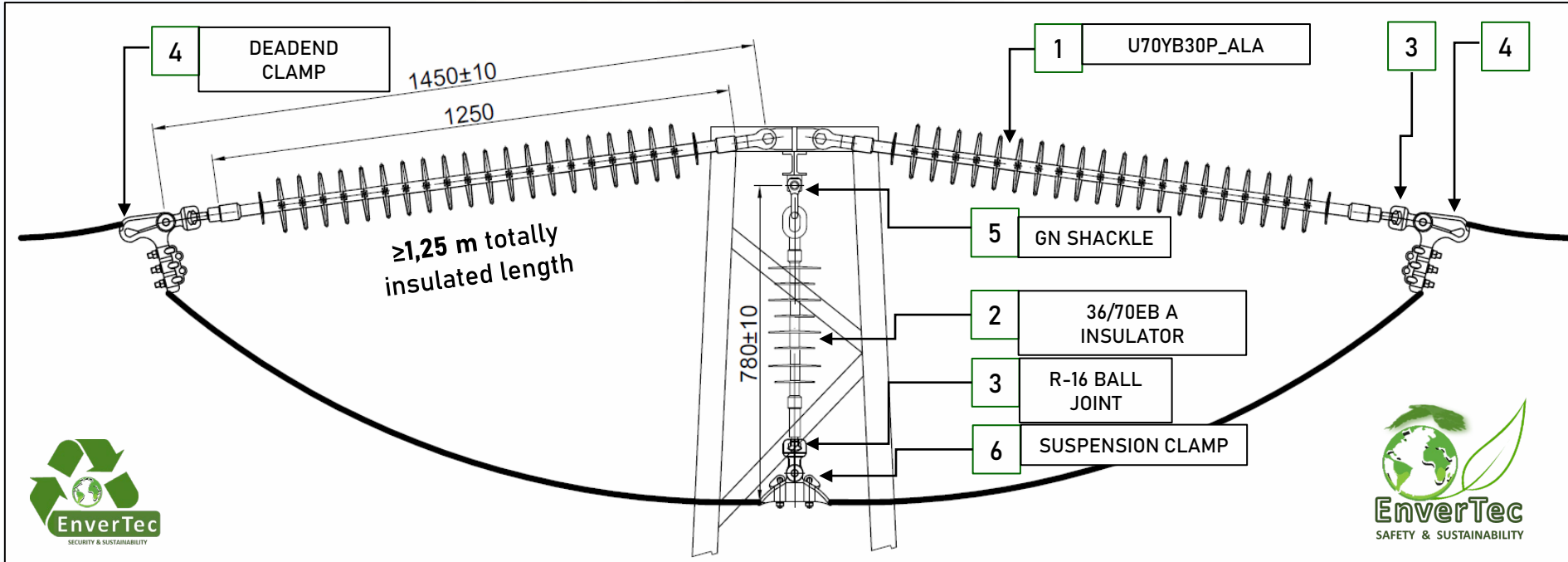
Insulator and complete strings weight	Kg (Approx.)	Surface m2 *	2nd Category lines	Kg (Approx.)	Surface m2 *
U70YB30P_ALA Insulator	2,4	0,0629	U70YB66P_ALA insulator	4,43	0,0670
LA-56 (GA-1) Deadend String	3,64	0,0742	LA-56 (GA-1) Deadend String	5,67	0,0783
LA-110 (GA-2) Deadend String	4,42	0,0814	LA-110 (GA-2) Deadend String	6,45	0,0855



U70YB30P_ALA MODEL INSULATOR . INSTALLATION AND MEASUREMENTS ON STRUCTURE.



U70YB30P_ALA



- 100 % ENVERTEC S.L. Design (Granada -Spain).
- Mechanical characteristics and monitoring of the insulators manufacturing process. Traceability Assurance.
- Indelible embossed marking with batch number and manufacturing date.
- Individual and sampling tests as per UNE-EN 61109:2008 and the criteria set out in the ISO 17025 Standard.

DESIGNED TO PROTECT DIFFERENT SIZES



- Bonelli's Eagle
- Golden Eagle
- Bearded vulture



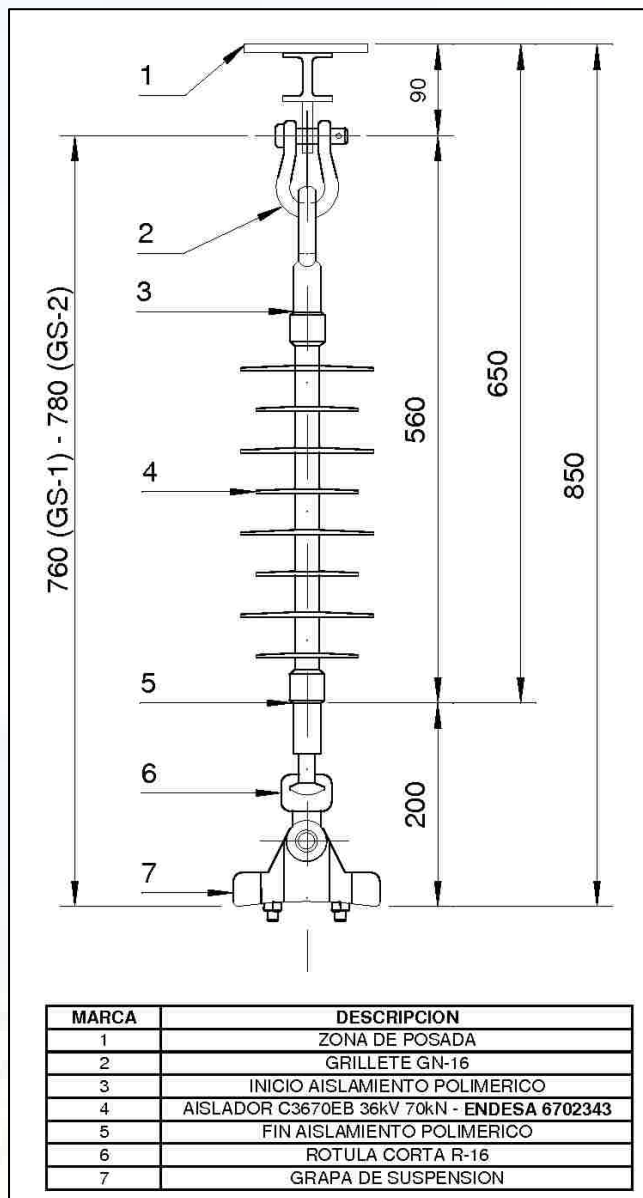
- Griffon vulture
- Black vulture
- Owls

Mark 2: The 36/70EBA insulator complies with the Minimum Clearance Requirement of 0.75m specified in the current Standards for Suspension/Tangent Strings.





24-36kV SUSPENSION-TANGENT STRINGS . CLEARANCE >0,75m



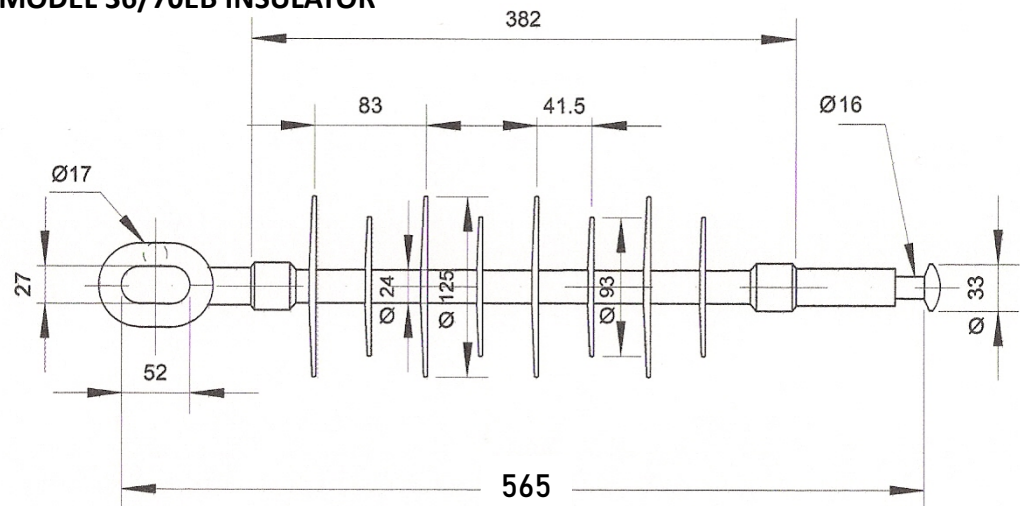
Complete String.
CAD36PGS
Tangent

CAD36PGS SUSPENSION STRING – WITH MODEL 36/70EB A INSULATOR- 36 kV 70kN

ENEL GSCC010/ Endesa Code 6702343 – TAM 300032

- The CAD36PGS insulator string provides a clearance in excess of 0.75 m between the conductor and the crossarm shackle, thereby assuring compliance with the requirements of the current Standard requirements for Suspension/Tangent Strings.

MODEL 36/70EB INSULATOR



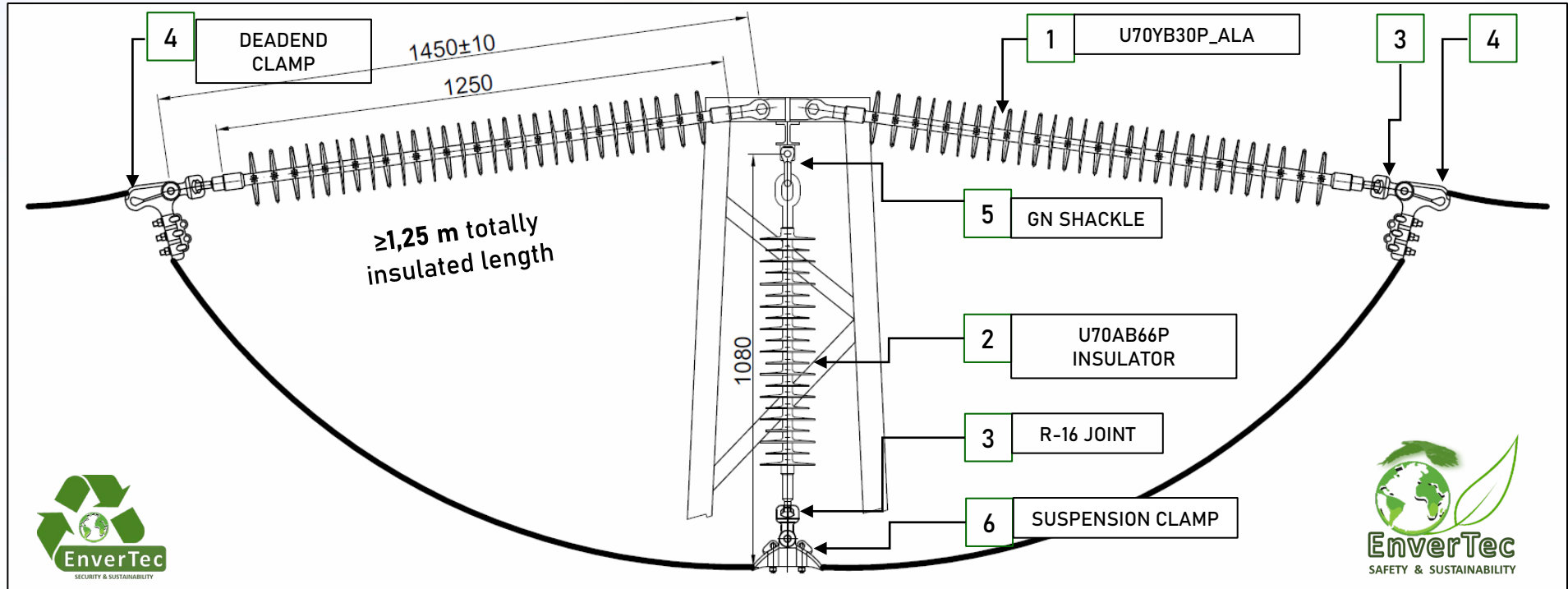
Type	Rated Voltage kV	Minimum Leakage Distance mm	Min. Protected Leakage Dist. mm	Mechanical Load kN	Test Voltages	
					1,2/50 BIL kV	50 Hz/Wet kV
C3670 EB A	36	980	415	70	170	70

STRINGS SURFACE m2 FOR WIND RESISTANCE CALCULATIONS

LA-56 (GS-1) SUSPENSION STRING	0,0311m2
LA-110 (GS-2) SUSPENSION STRING	0,0313m2

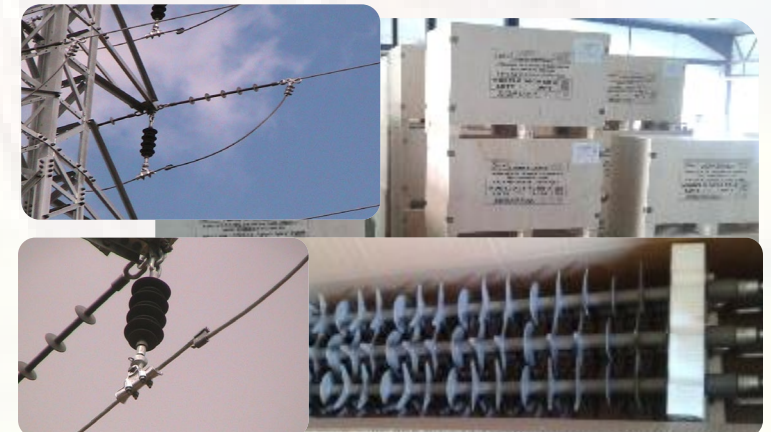


U70YB66P_ALA MODEL INSULATOR. INSTALLATION AND MEASUREMENTS ON SUPPORT.



- 100 % ENVERTEC S.L. Design (Granada –Spain).
- Mechanical characteristics and monitoring of the insulators manufacturing process. Traceability Assurance.
- Indelible embossed marking with batch number and manufacturing date.
- Individual and sampling tests as per UNE-EN 61109:2008 and the criteria set out in the ISO 17025 Standard.

U70YB66P_ALA

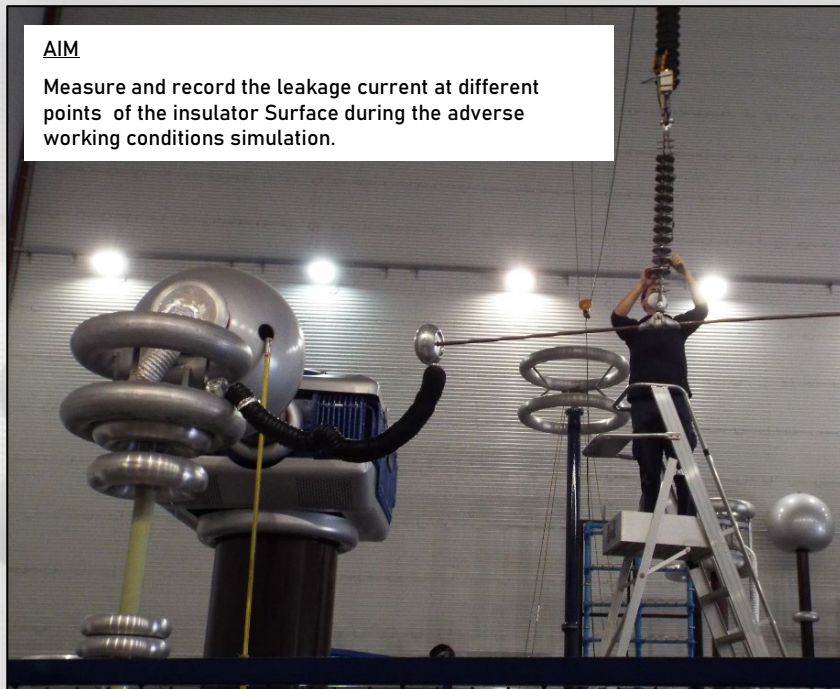




U70YB30P_ALA & U70YB66P_ALA MODEL INSULATORS . *SPECIAL TESTS.*

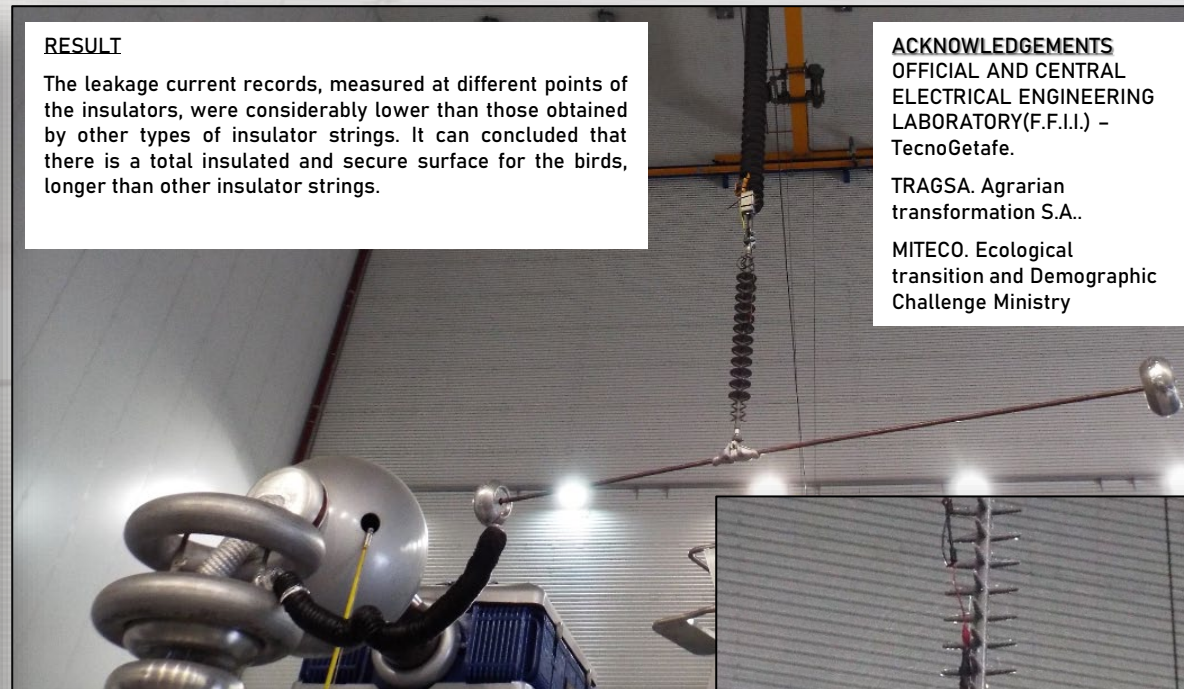
AIM

Measure and record the leakage current at different points of the insulator Surface during the adverse working conditions simulation.



RESULT

The leakage current records, measured at different points of the insulators, were considerably lower than those obtained by other types of insulator strings. It can be concluded that there is a total insulated and secure surface for the birds, longer than other insulator strings.



ACKNOWLEDGEMENTS
OFFICIAL AND CENTRAL
ELECTRICAL ENGINEERING
LABORATORY(F.F.I.I.) -
TecnoGetafe.

TRAGSA. Agrarian
transformation S.A..

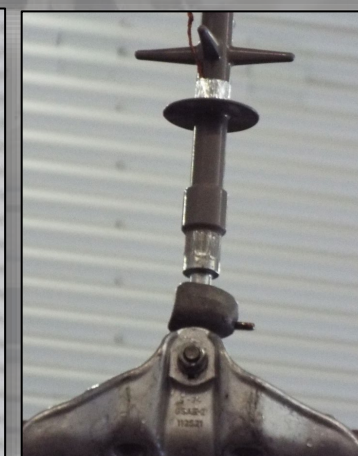
MITECO. Ecological
transition and Demographic
Challenge Ministry

SCOPE

Dielectric test at industrial frequency
under rain for 36Kv and 72 Kv tensions.

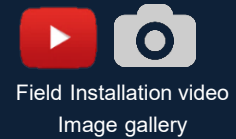
DATE AND PLACE

Getafe, Madrid, Spain. November 2020.





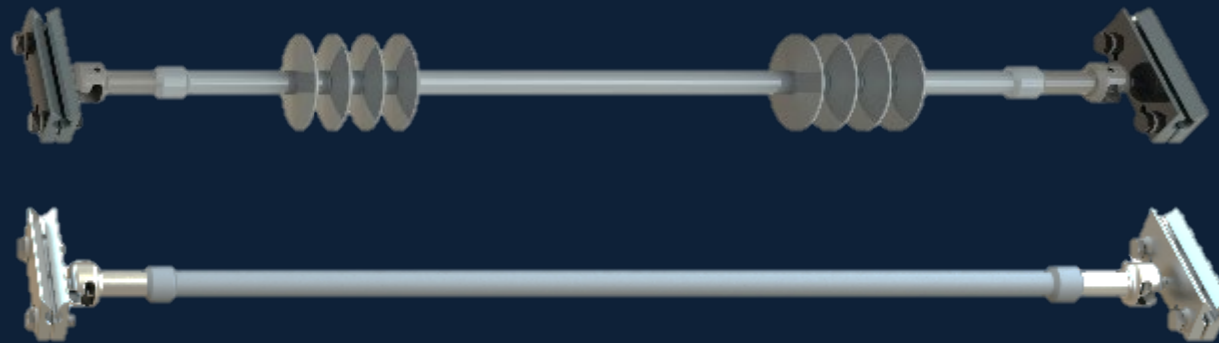
BIRD-PROTECTION AND POWER SUPPLY CONTINUITY SYSTEMS FOR 15kV – 132kV MV / HV NETWORKS



CAON®-KORWI® POLYMER PHASE SPACERS _ Models DP - DPS .

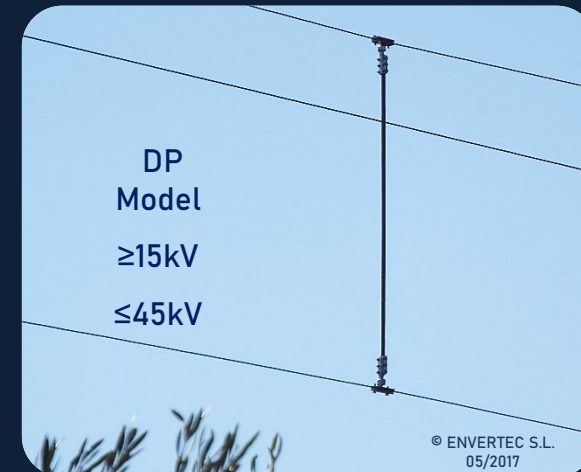
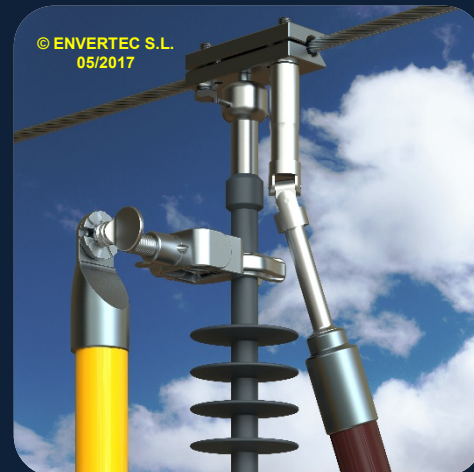
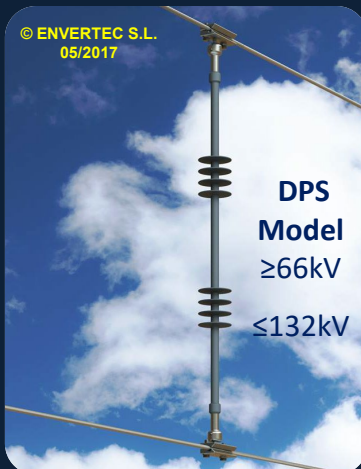
INNOVATIVE SOLUTIONS FOR EXISTING LINES _ 15 - 132kV

Lengths ≤ 3,000mm – Conductor size range Ø6 – Ø28mm



EXCLUSIVE LIVE INSTALLATION SYSTEM USING HOTSTICKS

Patente en Trámite - Patent Pending



POLYMER PHASE SPACERS





FEATURES AND PERFORMANCE.

A SOLUTION TO THE ISSUE OF COLLISIONS BETWEEN CONDUCTORS.



AIM.

The aim of the present product development is to present a device combining the result of the design and development work carried out by the ENVERTEC S.L. Line Engineering Department for Inter-phase Spacers for Medium and High Voltage Overhead Lines ($\leq 132\text{kV}$).

SCOPE.

The scope of the present development is to provide a technical solution to the power outage and system fault problems arising from collisions between bare overhead conductors between $\varnothing 6$ and $\varnothing 28$ types LA-31 / LA-455 and ACSR 1/0 - 3/0, due (among other factors) to:

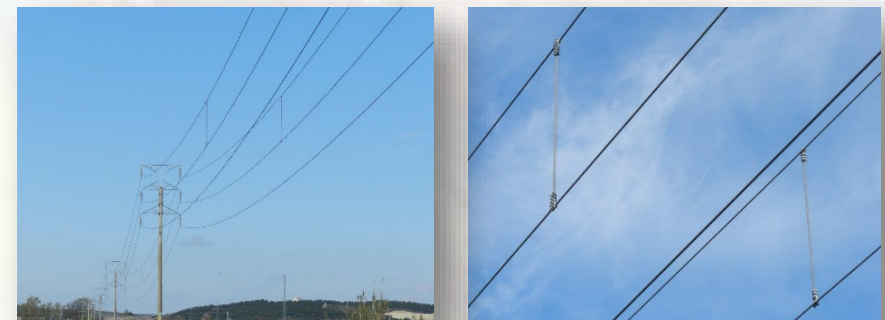
- Loss of line conductor tension.
- Conductor vibrations caused by earth tremors.
- Intense conductor oscillations caused by weather phenomena, simultaneous take-off by multiple birds, etcetera...



APPLICATION.

The range of application of the CAON®-KORWI® polymer spacers includes bare conductor overhead lines with rated voltages between 15kV and 132kV .

The use of these Spacers, installed on cable spans between adjacent structures, allows the minimum safety clearances between phases specified for each voltage level to be maintained, i.e. between 1,000 and 3,000mm respectively. Our Polymer Spacers provide major Effective Cost Savings for Utilities by preventing repeated line outages.



North Spain Installations- July/2016 _ 45/52kV Line Total distance between the phases 1.400mm.

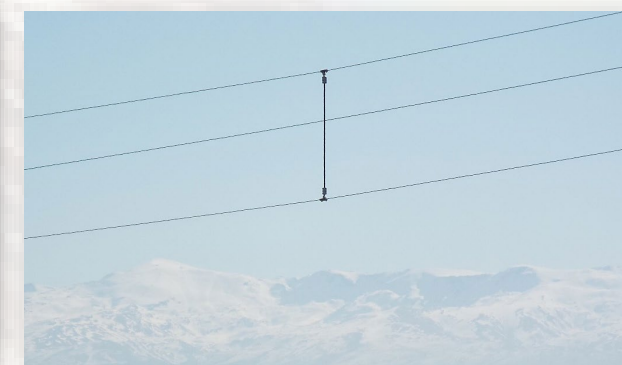




FEATURES AND PERFORMANCE. *PREVENTING POWER OUTAGES.*

MOST RELEVANT DESIGN FEATURES

- INSTALLATION IN ENERGISED CONDITION USING HOTSTICKS.
- Our specific clamp, by means of an exclusive system, stays open until it is installed and secured onto the conductor using insulated hotsticks. The coupling system between the Fixing Clamp and the Spacer fittings is based on the Ball and Socket system, in accordance with the IEC60120-11(B) Standard. This system allows simple installation and/or easy replacement of the Spacer Fixing Clamp.
- The articulation allowed by this coupling system is limited to 5° in all directions, which is ideal for attenuating the effects on the Spacer of sudden, whiplash type movements, and other oscillations experienced by conductors due to several causes:
 - ✓ Weather conditions: wind, storms...
 - ✓ Loss of line conductor tension and earth tremors.
 - ✓ Simultaneous take-off by multiple birds.
- The main purpose of the Spacers is to maintain a minimum safety clearance between phases, therefore the rated tensile stress of between 45kN and 70kN is enough to fulfil their intended purpose, and adhere to one of the basic precepts of design: devices with the lightest possible weight. This aspect becomes more important as the diameter of the conductor on which they are installed decreases.



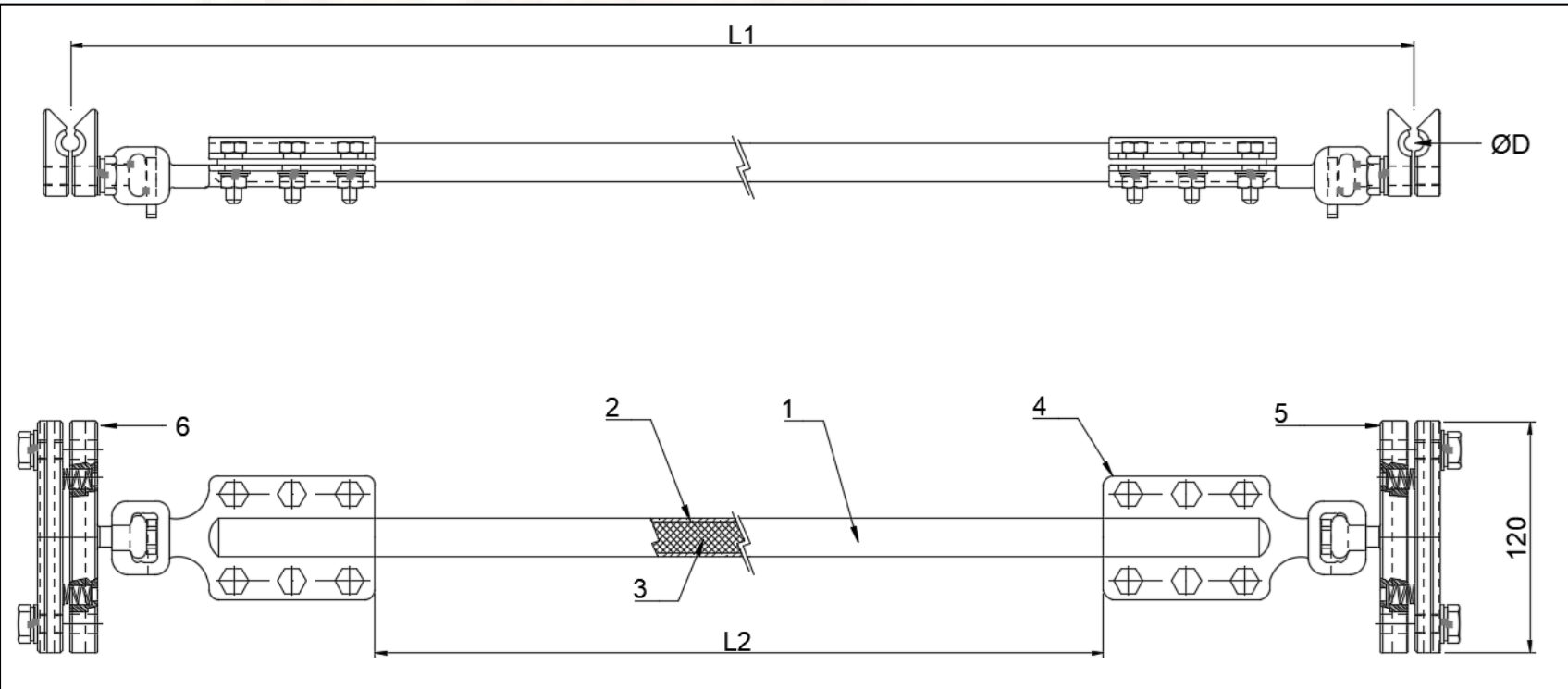
South Spain Installations - 2017-2020 _ 15/36kV line . Total distance between the phases 1,5m. - 2,8m.





**POLYMER PHASE SPACERS PREVENTING POWER OUTAGES.
A SOLUTION TO THE ISSUE OF COLLISIONS BETWEEN CONDUCTORS**

MAIN FEATURES _ DP SERIE _ RECOMMENDED TRIMMING LENGTHS PER VOLTAGE



RATED VOLTAGE(kV)	L1	L2	Test Voltage(kV)	
	(mm)	(mm)	1,2/50 BIL	50Hz/Hum.
≤15	≥655	≥355	140	65
≤20	≥850	≥550	165	70
≤30	≥1280	≥980	215	95
45≤n≤66	≥2550	≥2250	380	165

ITEM	DESCRIPTION	Number	MATERIAL / COLOUR / RANGE
1	3M20 COMPOSITE BAR	1	COMPOSITE – GREY – D20mm – 3m
2	SILICONE COATING	N/A	HTV - Hc2
3	ACIDS RESISTANT CORE	N/A	FIBREGLASS REINFORCED EPOXY RESIN– 45kN
4	CPSET-DPF COUPLING	2	HDG FORGED STEEL
5	DP-DCLAMP ARTICULATED CLAMP	1	HDG FORGED STEEL
6	DP-UCLAMP ARTICULATED CLAMP	1	HDG FORGED STEEL
D	CONDUCTOR DIAMETER	N/A	Ø7,5 UNTIL 16mm





DPF TYPE POLYMER SPACERS



AIM OF PROCEDURE:
Prevent electrocution of local bird species by maintaining minimum phase-phase distances, on MV overhead lines experiencing incidents due to massive bird presence and their simultaneous take-off, thereby assuring continuous power supply.

LOCATION:
Mancha Real (Jaén-Spain).
La Pagoda - Arroyo Vil
Altitude 770m above sea level.

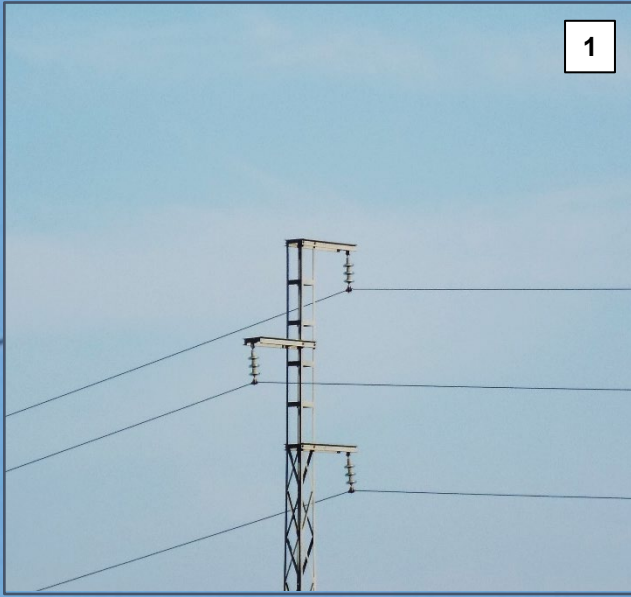
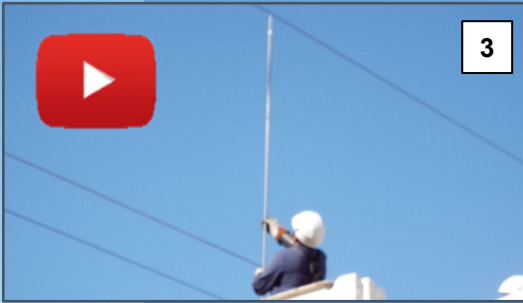
INSTALLATION CONDITIONS:
LIVE LINE WORK_
ENERGISED LINE

CONDUCTOR: LA-56
(54.6mm²) - Vr. 20kV.

DATE AND TIME:
06/09/2017_10h/12h.

WEATHER CONDITIONS:
DRY AND SUNNY
+20°C.

Acknowledgements:
ENDESA DAOR JAEN
JUAN GALINDO S.L..



> 1.200 UNITS OPERATING

- 1.- Retrofitting 2.40m. Herringbone line with loss of conductor tension.
 - 2.- Locating DP Spacer at lowest point in mid span.
 - 3.- Measuring spacing distance required.
 - 4.- Trimming the spacer to the required length.
 - 5.- Attaching the DP spacer by means of specific ties.
- ACTUAL INSTALLATION TIME: 9 minutes.

CATAVIF_022021
<https://envertec.eu>
+ info : nacrec@envertec.eu





BIRD PROTECTION SYSTEMS FOR 15kV - 66kV MV / HV NETWORKS

CAON®-KORWI® SILICONE COVERS



TECHNICAL SPECIFICATIONS AND GUARANTEE

Pg 32



SELF-VULCANISING TAPE.

Pg 41

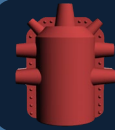
CAON-KORWI®



36-45-66kV SWP

Pg 33 & 34

PROTECTIVE COVER FOR CONDUCTORS.



SPSF6

Pg 43

MULTI-OUTLET PROTECTIVE COVER OCR - SF6 - SUBSTATION.



STSC (13)

Pg 35 & 36

PROTECTIVE COVER FOR DEADEND AND COMPRESSION CLAMPS.



SPPMX336

Pg 44

PROTECTIVE COVER FOR RIGID POLYMER INSULATOR WITH 2 OUTLETS.



STY300D

Pg 37

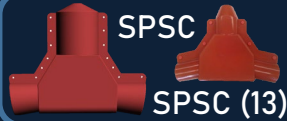
PROTECTIVE COVER FOR DOUBLE PLATE YOKE 300x85.



SPAV SPPL

Pg 45 & 46

PROTECTIVE COVER FOR GLASS PIN-TYPE INSULATOR ARVI STYLE.



SPSC (13)

Pg 38 & 39

PROTECTIVE COVER FOR SUSPENSION AND REINFORCED CLAMPS.



SPSA SPEB

Pg 47 & 48

PROTECTIVE COVER FOR SURGE ARRESTERS AND CABLE TERMINATIONS



SPGSA

Pg 40

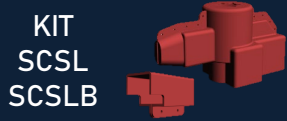
PROTECTIVE COVER FOR REINFORCED SUSPENSION CLAMPS 45kV.



KIT SCUP SCDW

Pg 49

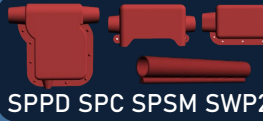
PROTECTOR KIT FOR CERAMIC AND POLYMERIC CUT-OUTS IN XS LINES.



KIT SCSL SCSLB

Pg 50

PROTECTOR KIT FOR POLYMERIC AND CERAMIC SWITCH UNIPOLAR DISCONNECTOR.



SPPD SPC SPSM SWP28

Pg 52

COVERS FOR RAILWAY CATENARY. AVE_ADIF LINES.



SPB SPP

Pg 41 & 42

PROTECTIVE COVER FOR TRANSFORMER BUSHINGS.



SAP SAP-110

Pg 51

PROTECTIVE COVER FOR AMPACT/GRIMPI SPLICES

RETROFITTING OF EXISTING LINES USING DEVICES OF PROVEN EFFECTIVENESS





BIRD PROTECTION SYSTEMS FOR 15kV – 66kV MV / HV NETWORKS



Specific solutions for Electrical System Protection and ensure continuous Power Supply

HIGH PERFORMANCE MATERIALS - APPLIED R&D&I FOR RESPONSIBLE INSTALLATIONS.

INTRODUCTION.

CAON®-KORWI® Silicone Covers have been developed as a protective measure against bird electrocution on overhead electric distribution and transport lines with a maximum voltage U_m between 15kV and up to 66kV (depending on the model), offering a Phase-Earth dielectric rigidity value of $U_m/\sqrt{3}$.

These devices are designed to be installed on existing lines and on those in which our Bird Protection Insulators models *C3670EBAV_AR*, *4803214* and *4803223* cannot be installed.

The aim of these devices is to protect birds from electrocution caused by the bird contacting a conductor and support at the same time, and by the bird contacting two conductors at the same time. These devices are equally effective at protecting overhead lines against other causes of short circuits, such as those caused by tree branches, vandalism, etcetera, avoiding the risk of a fire and electrical service interruptions.

NOMINAL MATERIAL CHARACTERISTICS COMMON TO ALL COVERS

MANUFACTURED WITH [» SPECIFIC ADVANCED FORMULATION SILICONE \(Pg. 75\)](#) WITH A HYDROPHOBICITY LEVEL of Hc2. Due to their composition and nature they repel the build-up of moisture and are permeable to Oxygen. These devices have a minimum silicone thickness of 3 to 3.5mm (depending on the model), ensuring excellent performance under exposure to *UV radiation*, with no colour degradation or crystallisation, and they are effective even in areas with extremely high saline pollution. Thanks to their advanced technology, our covers show *Lower Leakage Currents*, thanks to the hydrophobic properties they transmit to the contaminant layer.

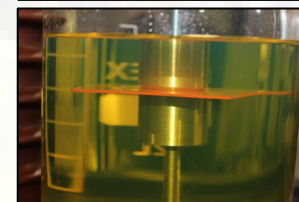
- **GUARANTEE:** Our Silicone is Ozone Resistant (UNE EN 60811-403) and thanks to its advanced formulation [it can improve its dielectric strength \(Pg. 75\)](#) after passing the 1000h Weathering Test - UNE EN 60243-1. In addition, the 5 000h Weathering Tests, -IEC 6119 Annex C-, performed at the STRI (Sweden) Laboratory - which include the harmful effects of Saline Fog - allow us to estimate the service life of our covers at a minimum of 20 years.

- **ENVIRONMENT FRIENDLY AND SUSTAINABLE:** The material used to manufacture the covers is a safe inert material, containing no microbial agents and giving off no contaminants to the surrounding environment. It can be easily recycled at the nearest waste collection point. The packaging is made with recycled carton sealed with organic paper adhesive tape.

NOMINAL MATERIAL CHARACTERISTICS	
Name	Silicone Rubber (White carbon black)
Type	HTV. High temperature vulcanised (180°) silicone rubber component
Model	110-2 (60W molecular film at 65W)
Hydrophobic coating	Water permeability level Hc2 - WC2

MECHANICAL CHARACTERISTICS	
Flammability	650°C (EN 60695-2-11) CLASS V0 (EN 60695-11-10)
Density	>1.1 g/cm ³ (ISO-868)
Strength	>50 Shore A (ISO-868)
Tensile Strength	>4N/mm ² (EN 60811-501)
Elasticity Modulus	>200% (EN 60811-501)
Tear Resistance	>10N/mm ² (UNE-HD-605)
Dielectric Strength	>18kV/mm (UNE 60243-1)
Ozone Resistance	250ppm (UNE 60811-403:2012)

Test Laboratories **CAON Ltd. & ENVERTEC S.L.**





BIRD PROTECTION SYSTEMS FOR 15kV – 45kV MV / HV NETWORKS



PROTECTIVE CONDUCTOR COVER. SWP FAMILY

Models *SWP-12_SWP-16_SWP-22_SWP38*

> 304.000m Installed
2014 - 2020



Models:

Conductor covers are available in four different reference numbers with internal diameters of 12, 16, 22 mm and 38 mm respectively, to cover the range of conductors from LA-31 to LA-280/HAWK.

Installation:

Installation of the SWP covers is carried out by hand, requiring no tools, following a simple procedure, thanks to the properties of the silicone material they are made of.

The tongue and groove locking design allows a quick, but secure and enduring installation,.

Fitting of the cover is performed by means of AISI-316 STAINLESS STEEL ties, or alternatively using Self-vulcanising Silicone tape, depending on the criteria followed by the local utility. To ensure proper locking of the cover on long sections, self-vulcanising silicone tape must be applied at regular intervals and on the end points.

Advantages:

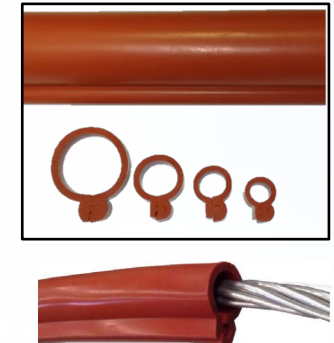
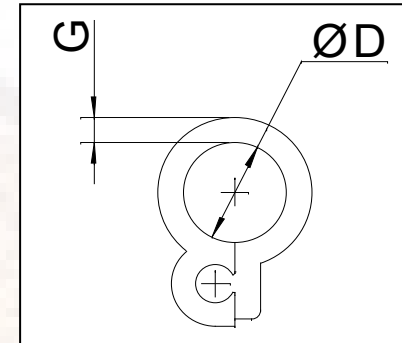
- The properties and flexibility of the cover's silicone material makes it very easy to work with, easily adapting to the installation requirements of each specific application, including small radius curves (Fig A-B). Another advantage is that it allows fast and easy trimming to the required length.
- The shape and size of the SWP hose, considerably smaller than other models on the market, ensures better performance under wind conditions (the "snaking" effect causes slipping along the span when the cover detaches from its fixing point), and an exceptional response to the effects caused by snow and ice, thanks to its hydrophobic properties.

Standard Format and Packaging:

The SWP conductor cover is supplied in 20 m long coils in RAL 3031 colour, packed in recyclable cardboard boxes.

Each package is clearly marked with the cover model it contains, as well as information on the month/year of manufacture, Batch No, and handling and storage instructions. It includes a QR Code providing access to the field installation video.

Inside the carton is a detailed Instruction Manual, in A4 size, double-side printed in colour, for proper installation of the cover and its fixing and lock securing accessories.



Ref.	D	G	Format	Range
Model	D (mm)	G (mm)	Coils/m	Um (kV) / Ø Conductor
SWP-12	12 +1/-0	3 +0.1/-0	20m	36 / ≤ 12
SWP-16	16 +1/-0	3 +0.1/-0	20m	36 / ≤ 16
SWP-22	22 + 1/-0	3.5+0.1/-0	20m	36 / ≤ 18
SWP-38	38 + 2/-0	4.0+0.1/-0	20m	36kV/≤32.8 45kV/≤21.8



AISI-316 Stainless Steel Ties
4.6x0.25x200mm



MOCAP X-TREME
Self-Vulcanising
Silicone Tape

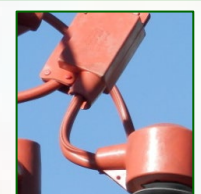
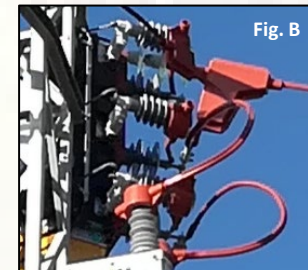
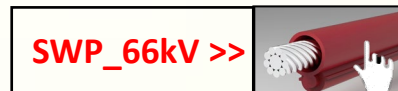


Fig. A: Effectiveness of SWP Device to cover small radius curves.

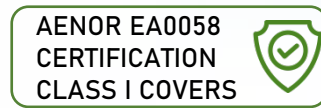


Standard format: 20m coils packed in cartons





BIRD PROTECTION SYSTEMS FOR 45-66kV HV NETWORKS.



3D Video



PROTECTIVE CONDUCTOR COVER **SWP** FAMILY Set of *SWP-38* & *SWP-38/2* models.

References for the models in the set:

An assembly or *set* has been designed which is made up of the following cover models - SWP-38 and SWP-38/2, and can jointly operate in networks with a maximum operating voltage (U_m) of 66kV (*), offering a Phase-Earth protection value on bare conductors of $U_m/\sqrt{3}$.

Installation:

Once the SWP-38 cover has been cut to the desired length, it is installed on the conductor by hand, requiring no tools, following a simple procedure, thanks to the properties of the silicone material they are made of. The tongue and groove locking design allows a quick, but secure and enduring installation. (Fig.A).

Next, the dielectric enhancer model SWP-38/2 is placed on the closure of the SWP-38 profile. (Fig. B).

The entire set formed by both models is secured using Self-vulcanising tape at one end to fasten the set to the conductor, which is then applied to the set at regulator intervals of $\leq 40\text{cm}$ in length and at the final end, as indicated in the Instruction Manual.

Advantages:

- The properties and flexibility of the cover's silicone material makes it very easy to work with, easily adapting to the installation requirements of each specific application. Another advantage is that it allows fast and easy trimming to the required length.
- This material also has an exceptional response to the effects caused by snow and ice, thanks to its hydrophobic properties - it repels the accumulation of water - which mitigates the appearance of the "ice sleeve" phenomenon.

Standard Format and Packaging:

The SWP-38 protective cover is supplied in 20m long coils (the dielectric enhancer model SWP-38/2 is also supplied in 20m coils), packed in recyclable cardboard boxes, both in red RAL 3031 colour.

Each package is clearly marked with the cover model it contains, as well as information on the month/year of manufacture, Batch No, and handling and storage instructions. It includes a QR Code to access the installation video.

Inside the package is a detailed Instruction Manual, in A4 size, double-side printed in colour, for proper installation of the cover and its fixing and lock securing accessories.

(*) The purpose of these covers is to prevent accidental and non-continuous direct electrical contact between birds and the live parts protected by the cover. There may be some risk of electrocution at the ends of the cover caused by the arc distances that can reach $\geq 45\text{kV}$ in some networks due to the high nominal/singular network voltage of the network and potential creepage.

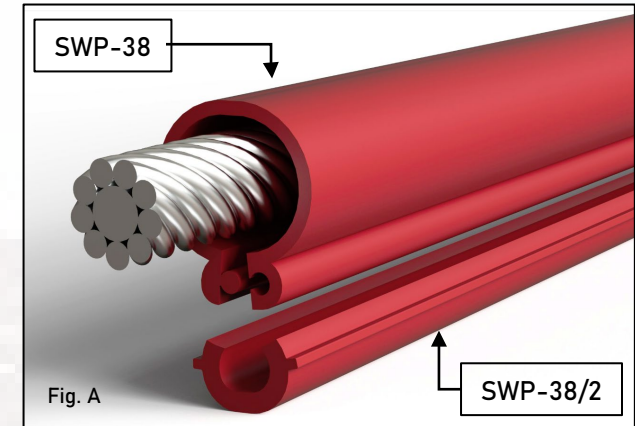


Fig. A

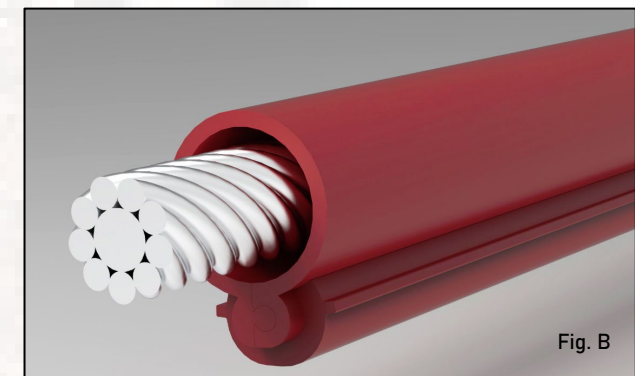
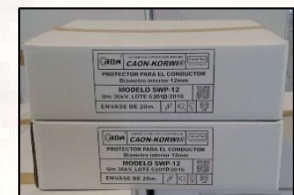


Fig. B

Fig. B: Image of the Set installed on a conductor.



Red self-vulcanising silicone tape is included in the package as an installation accessory.

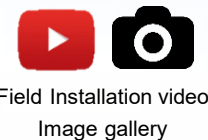


Recyclable cardboard packaging closed with ecological paper tape and without using metal staples.





BIRD PROTECTION SYSTEMS FOR 15kV – 36kV MV / HV NETWORKS



DEADEND CLAMP COVER. MODEL **STSC**
USE ON *GA-1/GA-2 DEADEND CLAMP*STAM 300100.

> 84.100pcs
Installed
2014 - 2020



Design Features:

The STSC protective cover is designed to cover the GA-1 and GA-2 type ball joints and deadend clamps for a conductor size range of 6 to 16mm diameter, on distribution lines up to 36kV.

With a silicone thickness of 3.5 mm, this device has the required and adequate dielectric strength to ensure satisfactory performance throughout its entire service life.

Installation:

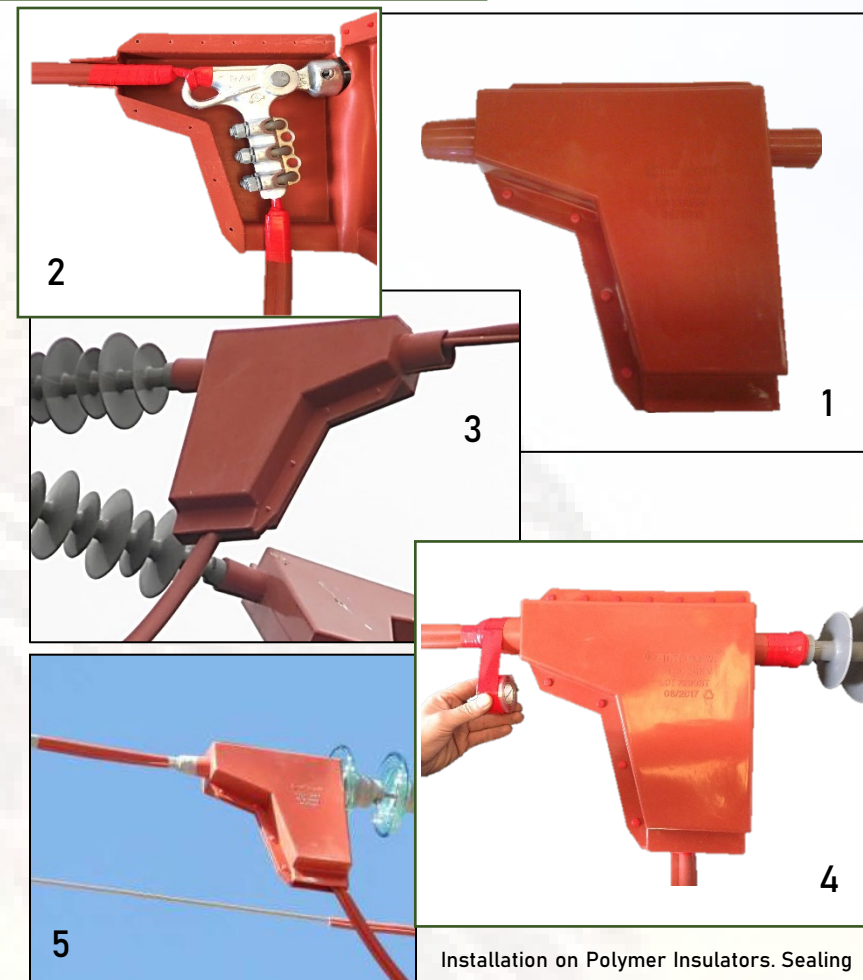
Its clamshell opening design, with 11 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. (Figs. 1 & 2).

Advantages: Its design includes features to prevent moisture condensation and rainwater ingress; in addition to the lower rectangular opening, its design includes two sections, a cylinder-shaped and a cone-shaped one, which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow fitting over the metal ball joint of the insulator on one side and the conductor cover on the other, performing a twofold function: on the one hand hindering water ingress and on the other providing an additional fixing for the SWP conductor cover, securing it to prevent it from slipping along the conductor. The inherent flexibility and nature of the material allows the device to be easily adapted to the specific needs of each application and to trim off excess portions (cylindrical section) depending on the type of insulator installed on the line: Polymer (Figs. 3-4), or Glass (Fig. 5). For the latter, the cover's "hinge-less" design allows perfect insulation of the metal ball joint, as the glass insulator is "flush" against the STSC device.

Standard Format and Packaging:

Model STSC clamp covers are supplied in recyclable cartons holding 6 RAL 3031 red units each.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.



Installation on U-40, U-70, U-100 glass insulators. Sealing of cone-shaped section.

Installation on Polymer Insulators. Sealing of cone-shaped section and cylinder-shaped section.





BIRD PROTECTION SYSTEMS FOR 15kV – 52kV MV / HV NETWORKS

AENOR EA0058
CERTIFICATION
CLASS I COVERS



DEADEND CLAMP COVER. MODEL **STSC13**

USE ON GA-3 DEADEND CLAMPS and COMPRESSION CLAMPS. TAM 300023.

Design Features:

The STSC13 protective cover is designed to cover the metal ball joint and GA-3 type deadend clamps. (Figs. 1 & 2). Its design also allows its use to cover Compression Clamps, on a conductor size range up to LA-180, on distribution lines from 15 to 52kV. (Fig. 3).

With a silicone thickness of 3.5 mm, this device has the required and adequate dielectric strength to ensure satisfactory performance throughout its entire service life.

Installation:

Its clamshell opening design, with 13 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. (Fig. 1).

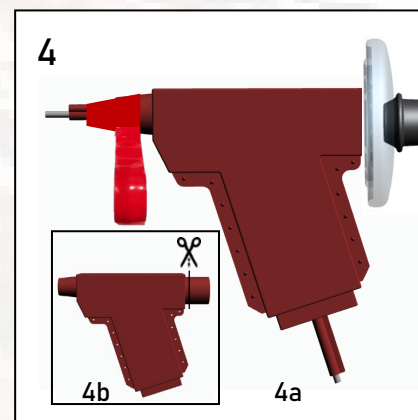
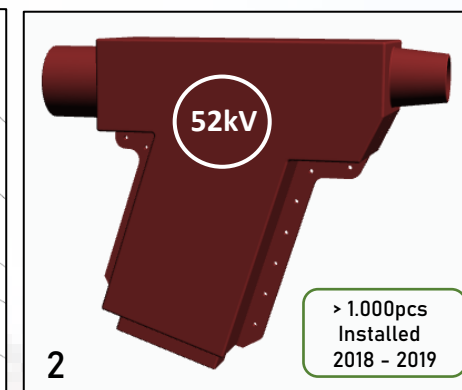
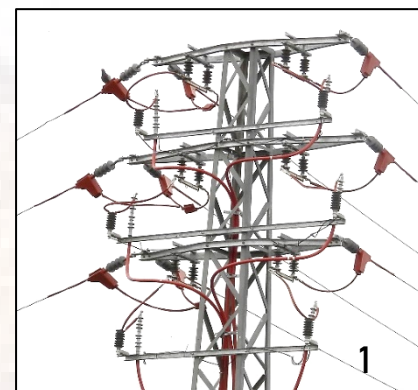
Advantages: Its design includes features to prevent moisture condensation and rainwater ingress; in addition to the lower rectangular opening, its design includes two sections, a cylinder-shaped and a cone-shaped one, which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow fitting over the metal ball joint of the insulator on one side and the conductor cover on the other, performing a twofold function: on the one hand hindering water ingress and on the other providing an additional fixing for the SWP conductor cover, securing it to prevent it from slipping along the conductor.

The inherent flexibility and nature of the material allows the device to be easily adapted to the specific needs of each application and to trim excess portions (cylinder-shaped section) depending on the type of insulator installed on the line: Polymer (Figs. 5a-5b), or Glass (Figs. 4a-4b). For the latter, the cover's design allows perfect insulation of the metal ball joint, as the glass insulator is "flush" against the STSC13 device.

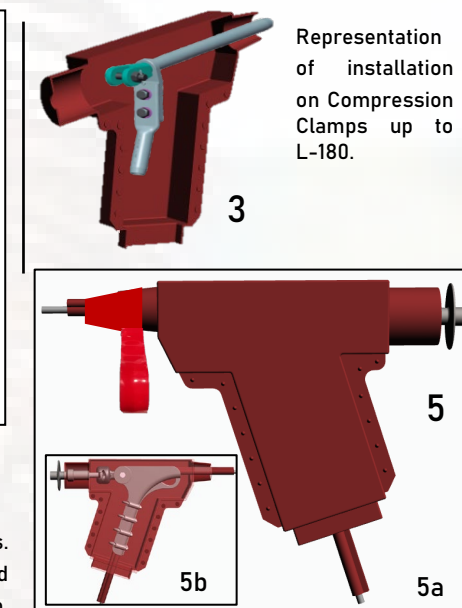
Standard Format and Packaging:

Model STSC13 clamp covers are supplied in recyclable cartons holding 2 RAL 3031 red units each.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.

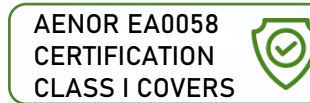


Installation on U-70, U100,U-120 glass insulators. Sealing of cone-shaped section.
Installation on Polymer Insulators. Sealing of cone-shaped section and cylinder-shaped section.





BIRD PROTECTION SYSTEMS FOR 15kV - 45kV MV / HV NETWORKS



COVER FOR DUAL DEADEND STRINGS. MODEL **STY300D** *PROTECTIVE COVER FOR DOUBLE PLATE YOKE 300x85 - SIE CODE 6700751.*

Design features:

The CAON®-KORWI® STY300D (1) model silicone cover is designed to cover the 300x85mm galvanised double plate yokes, as well as all other metallic parts present: Ball joints, standardised Glass (4) and Polymer (3) Insulator Pins, and the dual deadend string clamp joint on distribution lines from 15 to 45kV (2).

With a silicone thickness of 3.5 mm, this device has the required and adequate dielectric strength to ensure satisfactory performance throughout its entire service life.

Installation:

One-piece cover, equipped with perimeter radii to improve its aerodynamics and a clamshell opening system. It has a closing system with 18 pre-installed pins, which allows it to be installed easily by hand, without the need for tools. These pins have a double-cone system allowing repeated closing and opening without affecting the effectiveness of the lock or damaging the cover.

Advantages:

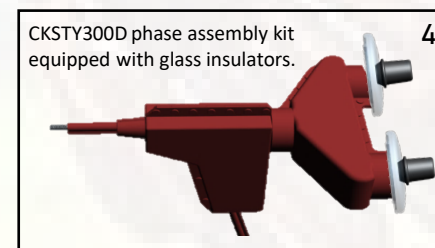
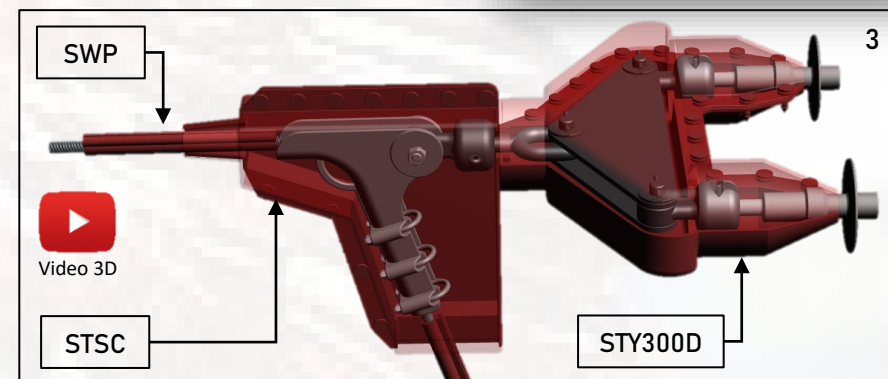
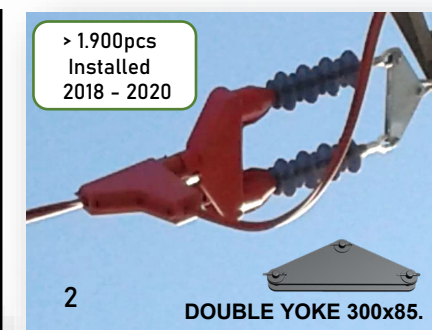
The cover has a double-cone so it can be correctly adjusted to fit long polymer insulator pins (3), and thanks to the material characteristics it can be easily adapted to glass insulators (4). This system makes it difficult for rain to enter and prevents water accumulating inside the cover.

The cylindrical centre section is designed to fit our clamp-cover STSC model, and it is able to cover the existing connection between the Yoke and the deadend clamp ball joint. It also has a lower rectangular opening to drain any water ingress and reduce condensation. The flexibility and nature of the material means that it is easy to adapt the device to the needs of each installation and to remove excess sections.

Standard Format and Packaging:

Model STY300D Yoke covers are supplied in recyclable cardboard packages containing 6 RAL 3031 red units each.

Each package includes information on the month and year of manufacture, Batch No., as well as handling, storage and recycling instructions. Inside the package is a detailed Instruction Manual, for proper installation of the cover. It includes a QR Code providing access to the field installation video.



Recyclable cardboard packages, closed with ecological paper and including instruction manual and QR code to access the installation video.





SUSPENSION CLAMP COVER MODEL **SPSC**

Design Features:

The SPSC protective cover is designed to effectively cover the GS-1 and GS-2 type ball joints and suspension clamps for a conductor size range of 5 to 17 mm diameter, on distribution lines up to 36kV. (Fig.2)

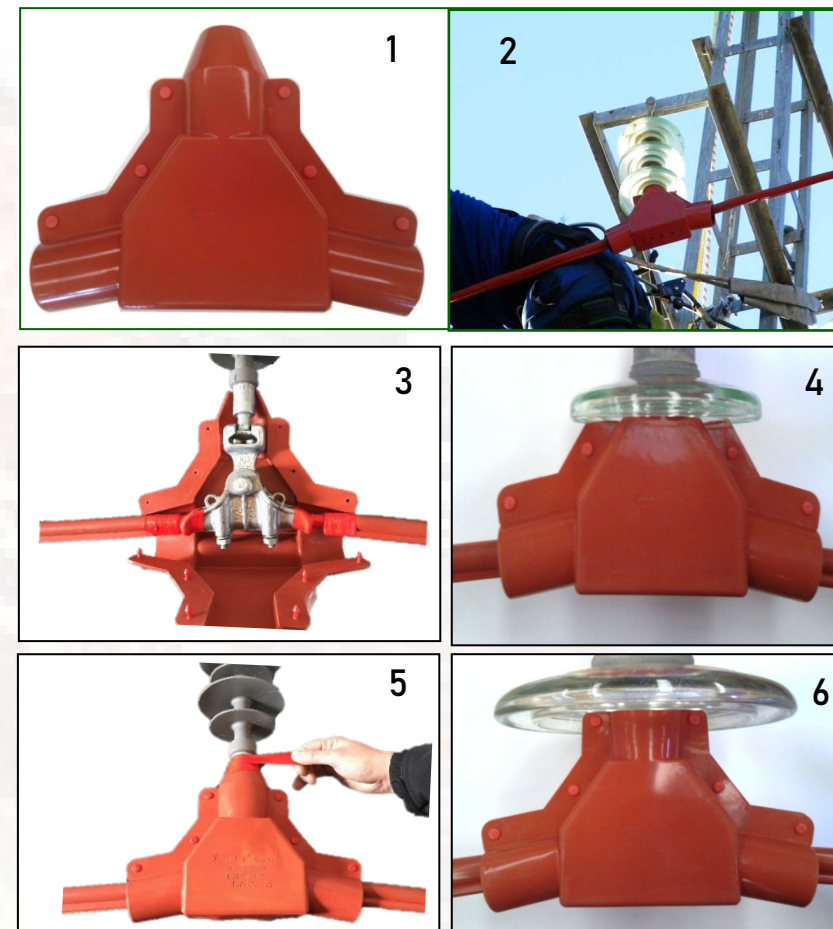
The silicone thickness used is 3.5 mm, conferring the device the necessary dielectric strength and ensuring its enduring effective performance.

Installation:

Its clamshell opening design, with 6 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. Two water draining holes with a 12° depression have been incorporated to minimise potential water ingress. (Fig. 1) .

Advantages:

The design features to avoid moisture condensation and prevent rainwater ingress caused by the vertical installation of these clamp covers are reinforced by the cone-shaped design of the top part of the device (Fig.1), which can be sealed, depending on the type of insulator present on the line, using silicone tape. The inherent properties of the material allow the device to be easily adapted to the specific needs of each application, covering up all the metal parts and allowing easy trimming of excess portions of this cone when performing its installation on some of the existing insulator types: Polymer (Figs. 3 & 4) , or Glass (Figs. 5 & 6).



Installation on Polymer Insulators and sealing of upper cone.

Installation on U-40 Glass Insulators (Fig. 6) , and U-70, U-100 , U-120 (Fig.7).

Standard Format and Packaging:

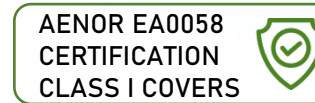
Model SPSC clamp covers are supplied in recyclable cartons holding 6 RAL 3031 red units each.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.





BIRD PROTECTION SYSTEMS FOR 15kV – 52kV MV / HV NETWORKS



SUSPENSION CLAMP COVER. MODEL **SPSC13** USE ON *GS-3 / GS-4* SUSPENSION CLAMPS. TAM 300025.

Design Features:

The SPSC13 protective cover is designed to effectively cover effectively cover the GS-3 and GS-4 type ball joints and suspension clamps for a conductor size range of up to 28 mm, on lines up to U_m 52kV.

The silicone thickness used is 3.5 mm, conferring the device the necessary dielectric strength and ensuring its enduring effective performance .

Installation:

Its clamshell opening design, with 14 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. Two water draining holes with an angular depression have been incorporated to minimise potential water ingress. (Fig. 1) .

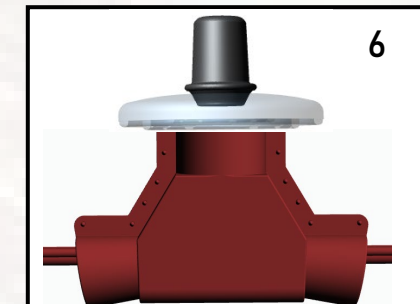
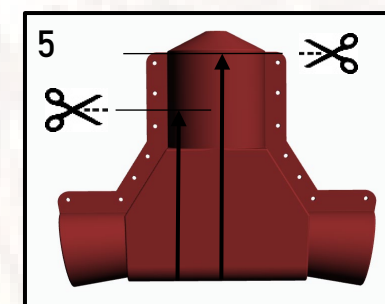
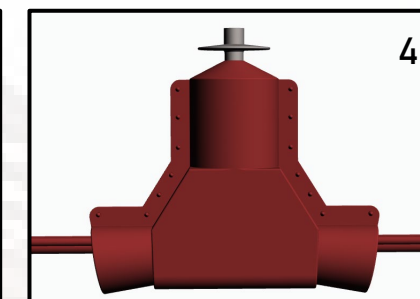
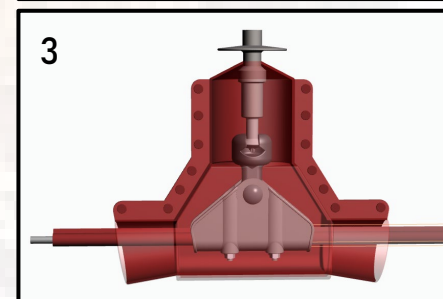
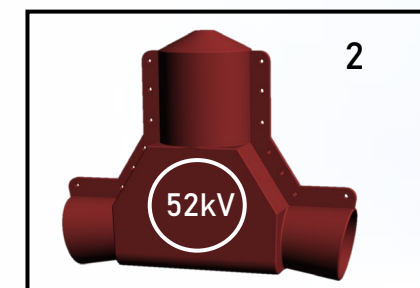
Advantages: The design features to avoid moisture condensation and prevent rainwater ingress caused by the vertical installation of these clamp covers are reinforced by the cone-shaped design of the top part of the device (Fig.2), which can be sealed, depending on the type of insulator present on the line, using silicone tape. The inherent properties of the material allow the device to be easily adapted to the specific needs of each application, covering up all the metal parts and allowing easy trimming of excess portions of this cone when performing its installation on some of the existing insulator types: Polymer (Figs. 3 & 4), or Glass (Figs. 5 & 6).

The design and dimensions of the SPSC13 protective cover allow its installation on glass insulators with either long or short ball joints; the length of the section required to be trimmed off is specified in the Manual.

Standard Format and Packaging:

Model SPSC13 clamp covers are supplied in recyclable cartons holding 3 RAL 3031 red units each.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual , for proper installation of the cover. Includes a QR Code providing access to the field installation video.



Installation on Polymer Insulators

Adjustment for Installation on U-70 , U-100 , and U-120 (Fig.5-6) Glass Insulators.



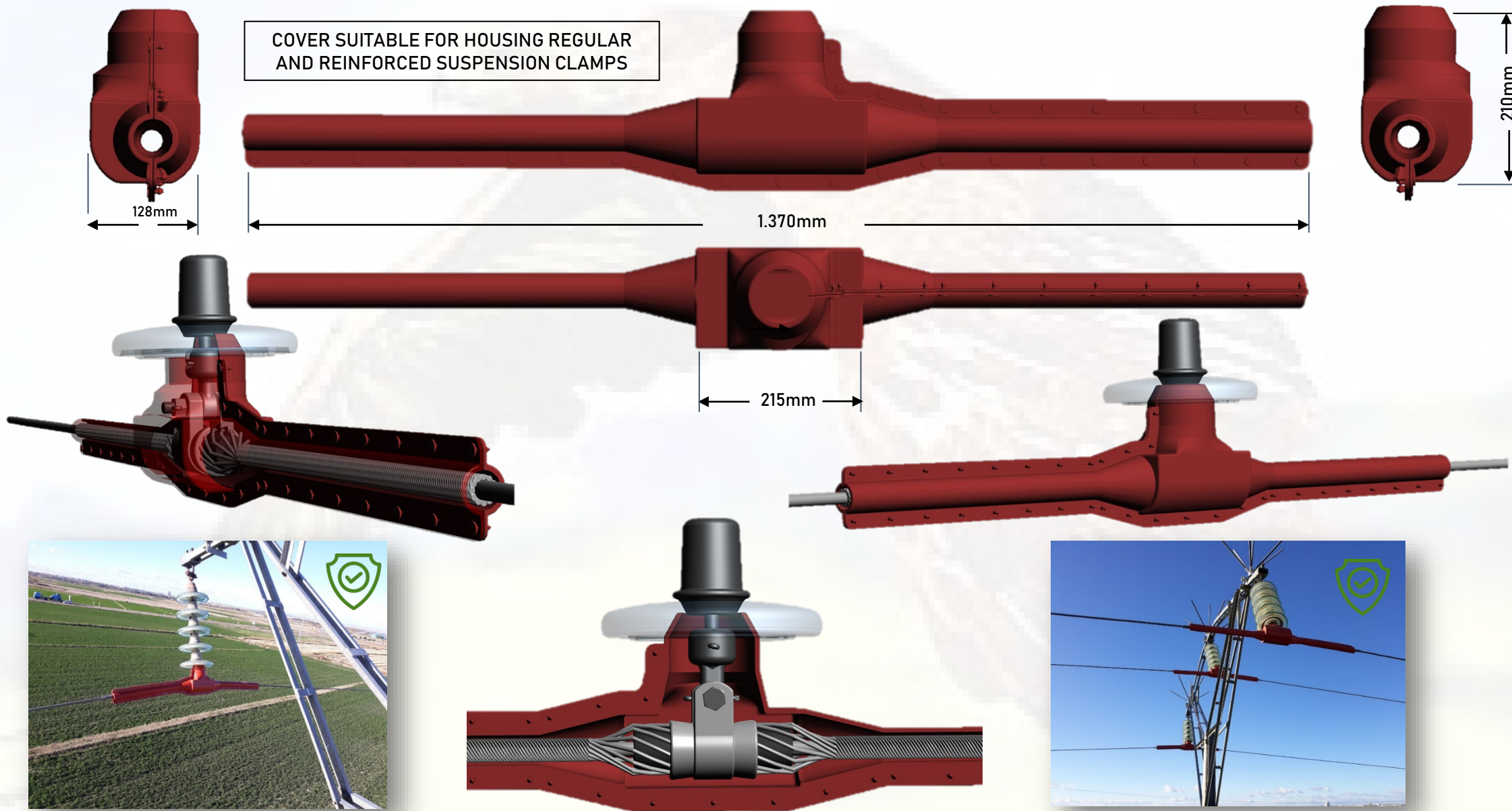


BIRD PROTECTION SYSTEMS FOR 15kV - 45kV MV / HV NETWORKS

> 1.750 pcs
Installed
2017 - 2020



SPGSA4A MODEL SILICONE COVER FOR GS-4 / GSA-4 SUSPENSION CLAMPS
CONDUCTOR SIZE RANGE UP TO CONDOR / Ø28mm . Vr 45kV / Vc 25,98kV.





COVER FOR TRANSFORMER BUSHINGS. MODEL SPB

Design Features: The SPB protective cover is designed to cover live parts in High Voltage transformer bushings, that either have vertical or horizontal conductor outputs, on distribution lines of up to 36kV. With a silicone thickness of 3.5 mm, this device has the required dielectric strength to ensure effective performance over time.

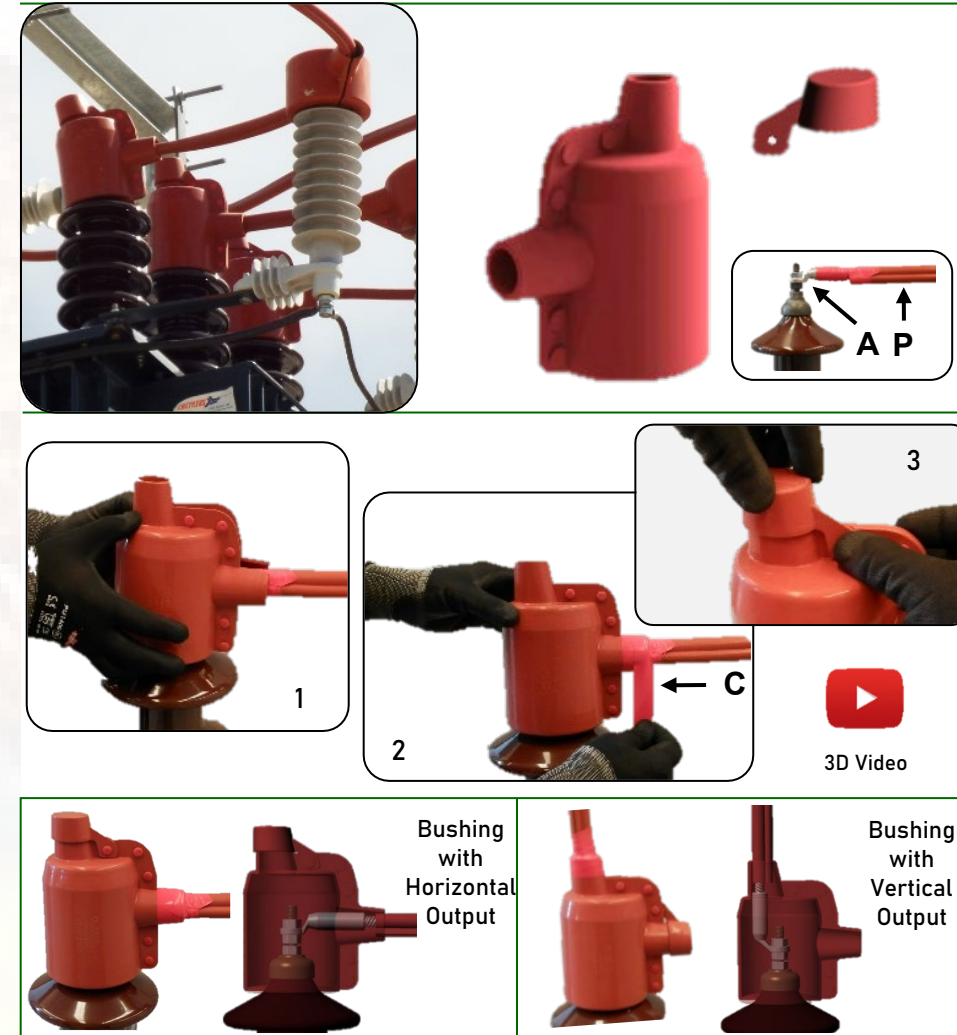
Installation: One-piece cover, equipped with perimeter radii to improve its aerodynamics and a clamshell opening system. It has a closing system with 5 pre-installed pins, which allows it to be installed easily by hand, without the need for tools. These pins have a double-cone system allowing repeated closing and opening without affecting the effectiveness of the lock or damaging the cover.

Advantages: Measures have been taken to avoid moisture condensation by designing an exclusive star-shaped drainage system for the lower part of device which prevents moisture from accumulating.

In addition, the design incorporates two conical sections, meaning the device can be adapted to the conductor using silicone tapes and by taking advantage of the inherent properties of the silicone, thereby performing a twofold function: on the one hand it makes water entry difficult, and on the other hand, additional fastening is provided for the cover, reinforcing the connection between the conductor and the SPB cover (P) (Fig. 2).

The design provides excellent functionality for both horizontal and vertical conductor outputs. It also has a plug to seal the unused output and improve the performance of the device over its lifetime by preventing dirt from accumulating.

The flexibility and nature of the materials used make it easy to adapt the device to the needs of each installation, adapting to any type of conductor cover. The double cone PIN closure system allows subsequent inspections to be carried out without damaging the SPB. This model can be installed cold and on live equipment.



Standard Format and Packaging: SPB model bushing covers are supplied in recyclable cardboard packages containing 6 red RAL3031 units each.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. There is a detailed Instruction Manual inside the package for proper installation of the cover. It includes a QR Code providing access to the field installation video.





COVER FOR POLYMER POST INSULATORS. MODEL **SPP**

COVER FOR POLYMER SUPPORT INSULATORS AND *TRANSFORMER BUSHINGS*.

Design Features:

The SPP protective cover is designed to cover up the upper metal fitting of different elements.:

- Post insulators, **ARSI-30E** type or similar covered by ENDESA ET 6704113 standard, used as support insulators for conductors with 7mm to 16mm diameter, on distribution lines up to 36kV with central conductor exit. (Fig. 3)
- Outdoor distribution Transformer Bushings. (Figs. 3b & 4b).
- Connection bushings of some Polymer Surge Arrester models .

The silicone thickness used is 3.5 mm, conferring the device the necessary dielectric strength and ensuring its enduring effective performance.

Installation

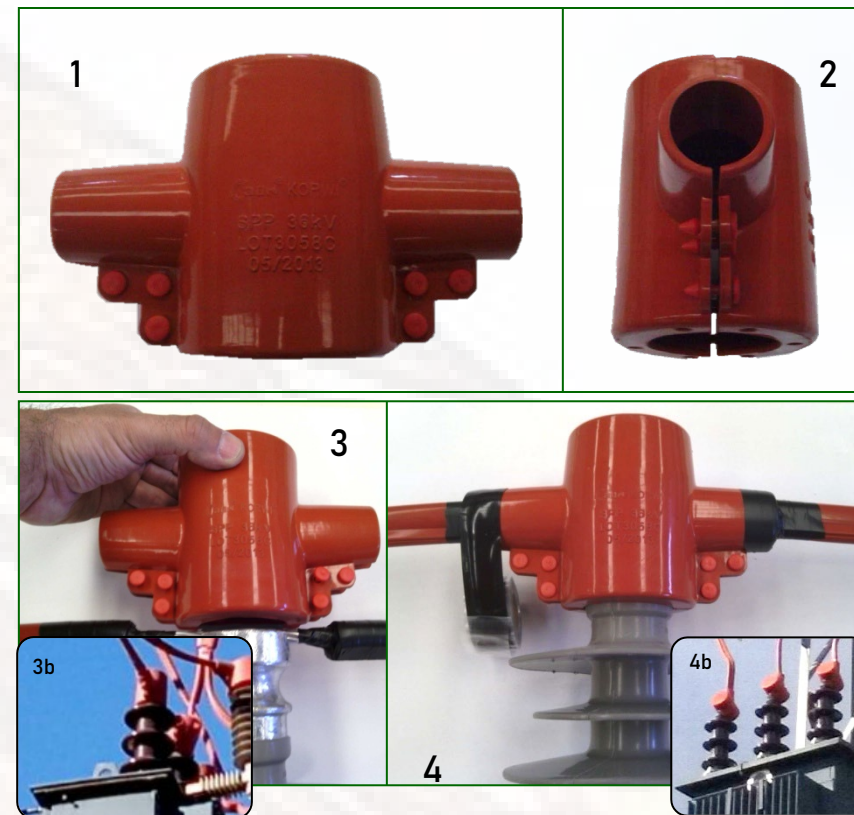
Its clamshell opening design, with 6 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. (Fig. 1).

Advantages: The design features to avoid moisture condensation and prevent rainwater ingress include: draining holes on the bottom part (Fig. 2), to prevent any possibility of moisture build-up; in addition, the design incorporates two cone-shaped sections, which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow fitting over the conductor cover performing a twofold function: on the one hand hindering water ingress, and on the other providing an additional fixing for the SWP conductor cover (Figs. 3 & 4) , securing it to prevent it from slipping along the conductor. The flexibility and nature of the material allow the device to be easily adapted to the specific needs of each application, allowing easy trimming of excess portions (cone-shaped section) to adapt it to any type of conductor cover.

Standard Format and Packaging:

Model SPP covers for polymer post insulators are supplied in recyclable cartons holding 6 units.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual , for proper installation of the cover. Includes a QR Code providing access to the field installation video.



Installation on Polymer Support Post Insulators , ARSI-30E type (ENDESA ET6704113) and sealing (OPTIONAL) of cone-shaped when used in combination with the model SWP conductor cover. / Installation of SPP device as a MV Transformer Bushing Cover. (Figs. 3b & 4b).

> 9.700pcs
Installed
2014-2020





BIRD PROTECTION SYSTEMS FOR 15kV - 52kV MV / HV NETWORKS

AENOR EA0058
CERTIFICATION
CLASS I COVERS



> 1.100pcs
Installed
2019-2020



COVER FOR BUSHINGS OCR / SWITCHES SF6 SUBSTATION TRANSFORMERS.

COVER MODEL **SPSF6** BUSBAR SUPPOT INSULATORS/ SURGE ARRESTERS

Design features

The SPSF6 (1) cover is a multifunction device that is designed to cover the live parts of SF6/OCR switches (2), Surge Arresters and Substation Busbar Support Insulators -among others-, that either have horizontal (3) or perpendicular (4) conductor outputs with an angular deviation between them of 90° or even 135°, in networks of up to 52kV. With a silicone thickness of 3.5 mm, this device has the required dielectric strength to ensure effective performance over time.

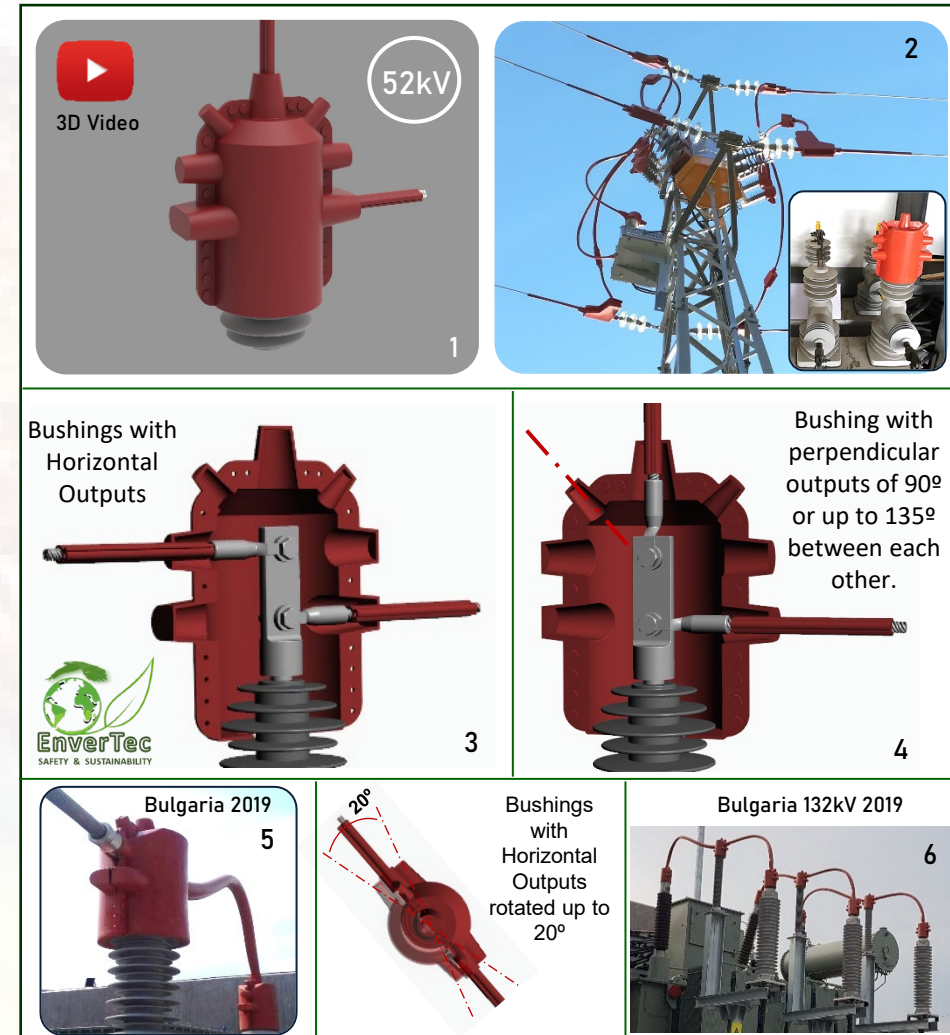
Installation: The SPSF6 cover has 7 outputs arranged at different heights and forming angles of 90° - 135° and 180° between them, allowing it to be installed on virtually any existing assembly (3), (4). Its design with 16 locking points per pin, (pre-installed in each device), allows it to be installed easily by hand, without the need for tools

Advantages: Measures have been taken to avoid moisture condensation by designing an exclusive star-shaped drainage system for the lower part of the device to prevent water from accumulating. In addition, the seven outputs have been designed with a conical section, meaning they can be adapted to the conductor cover using silicone tapes and by taking advantage of the morphology of the SPSF6 cover, thereby performing a twofold function: on the one hand it makes water entry difficult, and on the other hand additional fastening to the assembly (5) is provided, guaranteeing that it remains in the chosen location even under severe adverse weather conditions.

The different SPSF6 conical outputs are blinded at the factory, so that only those that are going to be used are enabled, improving the performance of the device over its lifetime and preventing dirt and insect nests from accumulating. The flexibility and nature of the material means that it is easy to adapt the device to the needs of each installation. Its double cone PIN closure system allows subsequent inspections to be carried out without damaging the SPSF6. The SPSF6 can also be used for other non-dielectric uses, such as preserving the most exposed parts of substation equipment from bird droppings (7).

- This model can be installed cold and on live equipment -

Standard Format and Packaging: Model SPSF6 bushing covers are supplied in recyclable cardboard packages containing 4 RAL 3031 red units each. Each package includes information on the month and year of manufacture, Batch No., as well as handling, storage and recycling instructions. A detailed Instruction Manual is included in the package for proper installation of the cover. It includes a QR Code providing access to the installation video.





COVER FOR COMBINATION OF 57-2/ 57-3/PD TYPE POST INSULATOR + ACSR CONDUCTOR 1/0_3/0_336. COVER FOR USE ON MV LINE POST INSULATORS. MODEL **SPPMX336**

Design Features: The SPPMX336 cover has been specifically designed to address the bird electrocution issues and constant outages on the MV overhead lines (13<34.5kV) of the C.F.E. power grid in Mexico. These covers are suitable for simultaneously covering up the PD type post insulators and the ACSR type conductor. The main feature of the SPPMX336 cover is that it is a one-piece device (Fig.1) consisting of:

- A cylinder-shaped middle section whose purpose is to cover a ceramic (Fig.2) or polymer (Fig. 1) insulator with sheds up to 120mm in diameter, intended to cover up both the top of the insulator and the tied conductor section.
- Two cylindrical sections with tapered fitting ends on either side (Fig.4), intended to cover up a total length of 1,050mm . The cylinder has an inner capacity of 39mm , allowing it to insulate the ACSR 1/0_3/0_336 conductor range, together with its metal ties. The silicone thickness used is 3,5 mm, conferring the device the necessary dielectric strength and ensuring its enduring effective performance.

Installation: Its clamshell opening design, with 14 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines. (Fig. 3).

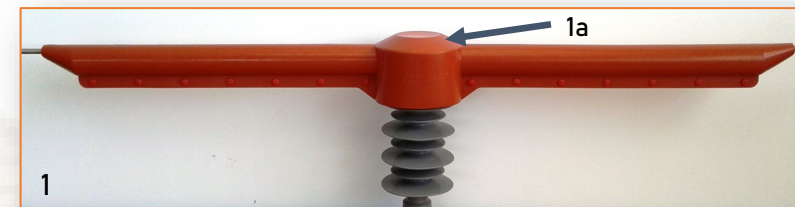
Advantages: Design features have been incorporated to avoid moisture condensation and for draining rainwater, providing the device with a non-watertight longitudinal locking system.

- The tapered top part of the central cylinder-shaped body (Fig.1 a), prevents water build-up and protects the insulator from the harmful effects of bird droppings.
- The tapered sections on either end (Fig.4), fit tightly onto the conductor, keeping it free from contamination, dirt and potential nesting.

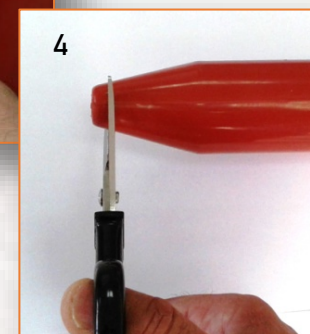
Standard Format and Packaging:

Model SPPMX336 covers for rigid polymer insulators are supplied in recyclable cartons holding 3 or 6 RAL 3031 red units.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual , for proper installation of the cover. Includes a QR Code providing access to the field installation video.



> 2.700pcs
Installed
2014-2020



The inherent flexibility and properties of the material allow the **device to be easily installed and** adapted to the specific needs of each individual application. The tapered ends on either side can be adapted to the conductor diameter, only leaving the recommended gap for proper water drainage.





COVER FOR POLYMER POST INSULATORS.

CONDUCTOR *CENTRAL AND SIDE EXIT*. MODEL **SPPL**

Design Features:

The SPPL protective cover is designed to cover the upper metal fitting of different elements:

- **ARSI-30E** type or similar post insulators covered by ENDESA Standard ET 6704113, used as support insulators for conductors between 7mm and 16mm in diameter, on distribution lines up to 36kV with conductor central or side exit.
- Outdoor distribution Transformer Bushings.
- Connection bushings of some Polymer Surge Arrester models.

The silicone thickness used is 3,5 mm, conferring the device the necessary dielectric strength and ensuring its enduring effective performance.

Installation:

Once the conductor (A) has been covered up with a suitable protective cover for the conductor diameter, this is fitted to ensure the conductor is protected as close as possible to the neck of the insulator. Then open the SPPL device and fit it over the insulator's metal neck, so as to cover it up completely, and secure it by means of the 4 preinstalled pins provided. The images show our Mod. SWP silicone conductor cover (B), secured by means of self-welding silicone tape (C)

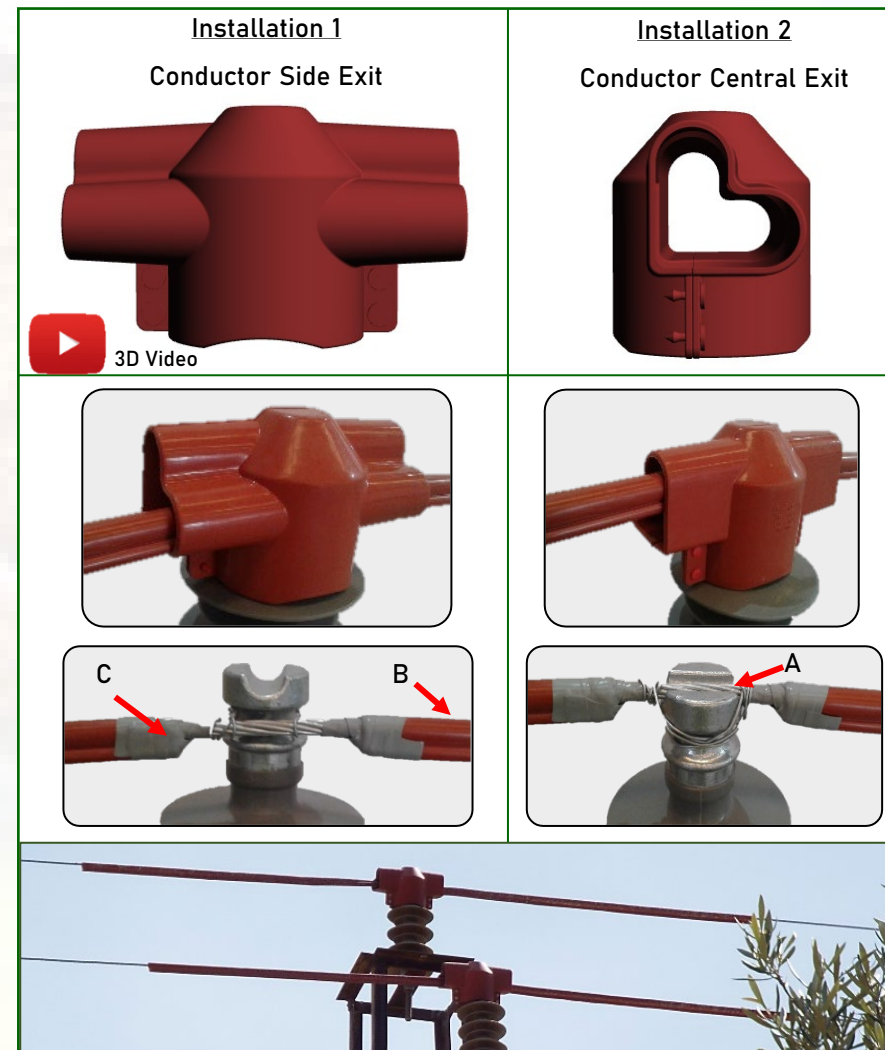
Advantages:

The design features to avoid moisture condensation and prevent rainwater ingress include: draining holes on the bottom part (Fig. 2), to prevent any possibility of moisture build-up. The inherent properties and flexibility of the material allow the device to be easily adapted to the specific needs of each individual application, and trimming of excess portions, to allow fitting it to any type of conductor cover.

Standard Format and Packaging:

Model SPPL covers for polymer post insulators are supplied in recyclable cartons holding 6 RAL 3031 red units.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.



COVER FOR ARVI-32 TYPE GLASS PIN INSULATORS.

CONDUCTOR *CENTRAL AND SIDE* EXIT. MODEL **SPAV**

> 3.300pcs
Installed
2016 - 2020



Design Features:

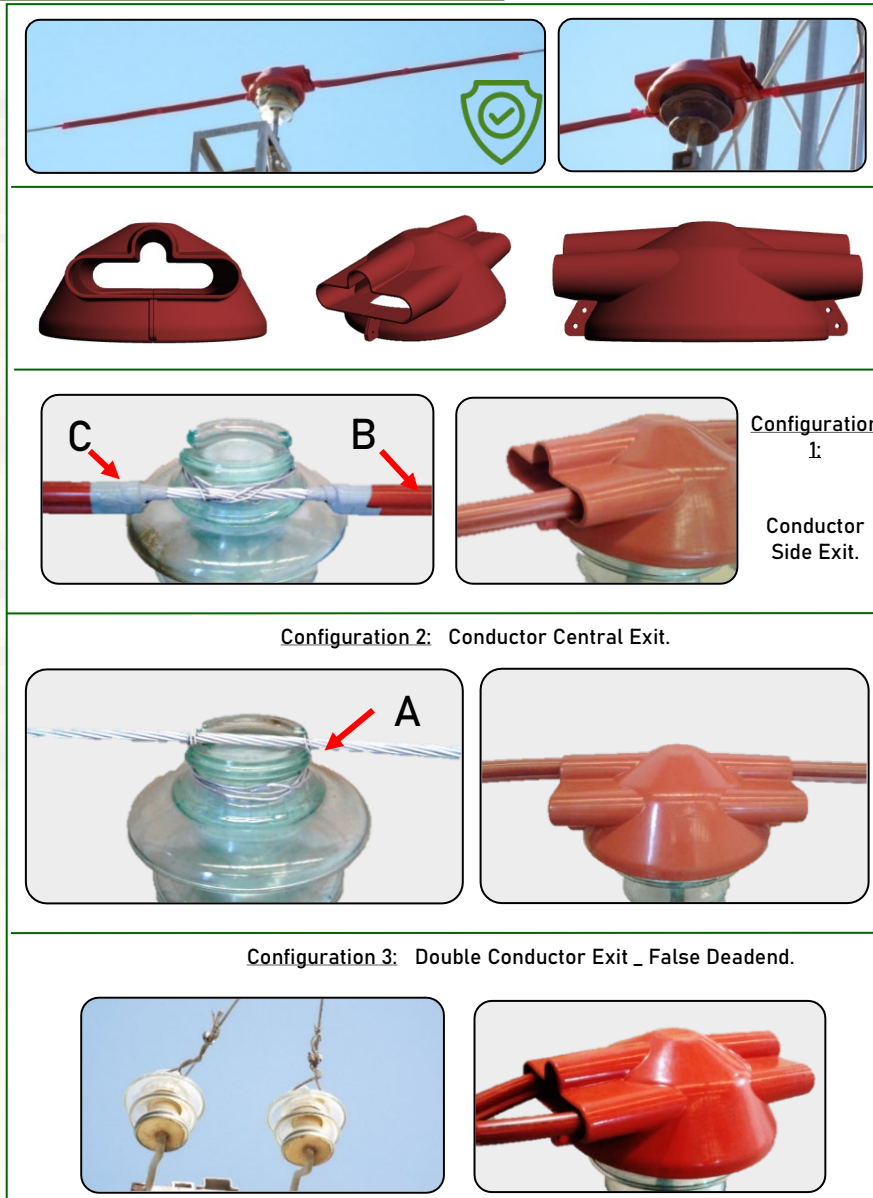
The SPAV cover is designed for installation on ARVI-32 type pin insulators; optionally, it can be used on , ARVI-42 and on ceramic pin type insulators on distribution lines up to 36kV. Its design allows it to fit onto and cover the first shed of the ARVI-32 type insulator so that both the conductor and the ties are fully protected. This fixing is reinforced by the presence of a lower rim that effectively secures it to the insulator shed. Its design has taken into account its volume, which has been adjusted as much as possible to achieve a streamlined shape that is not affected by the wind and prevents water build-up, while protecting the insulator form the harmful effects of bird droppings. The silicone thickness used is 3.5 mm, conferring the device the necessary dielectric strength and ensuring its consistent enduring effective performance.

Installation: Once the conductor (A) has been covered up with a suitable protective cover for the conductor diameter, this is fitted to ensure the conductor is protected as close as possible to the neck of the insulator. Then the SPAV device is fitted over the first shed of the insulator, so as to cover it completely, and secured by means of the 4 preinstalled pins provided. The images show our Mod. SWP silicone conductor cover (B), secured by means of self-welding silicone tape (C) .

Advantages: The SPAV ,model's versatility allows it to be used for retrofitting structures with mixed pin-type insulators, both glass and ceramic. Easily installed on the structure, it is fitted over the insulator without requiring any tools, as it is assembled by means of the preinstalled cone-shaped pins provided. The inherent properties and flexibility of the Silicone material it is made of make this device very easy to work with and to adapt to the specific requirements of each individual installation.

Standard Format and Packaging:

Model SPAV covers for rigid polymer insulators are supplied in recyclable cartons holding 6 RAL 3031 red units. Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual , for proper installation of the cover. Includes a QR Code providing access to the field installation video.





BIRD PROTECTION SYSTEMS FOR 15kV – 36kV MV / HV NETWORKS



COVER FOR USE ON MV VALVE TYPE SURGE ARRESTERS.

COVER. MODEL **SPSA**

> 23.000pcs
Installed
2015 - 2020



Design Features: The SPSA cover is designed as a universal device for covering up the upper metal hardware and fittings of most types of MV Polymer and Ceramic Surge Arresters available on the market (Fig. 5) . Its inner diameter allows it to house sheds of up to 120mm diameter. In addition to its main intended purpose, this device, given its adaptability and dimensions, can also be used in the following applications:

- Its design and inner capacity (Figs. 1 & 2) allow it to cover up the upper hardware of some types of Post Insulators and Substation Busbar Support Insulators (Fig.5b). Its cones (Fig. 3) are of sufficient diameter to house busbars of up to 34mm diameter.
- The SPSA can be optionally used to cover up distribution Transformer Bushings. The silicone thickness used is ≥ 3.5 mm, conferring the device the necessary dielectric strength ($<36kV$) and ensuring its enduring effective performance.

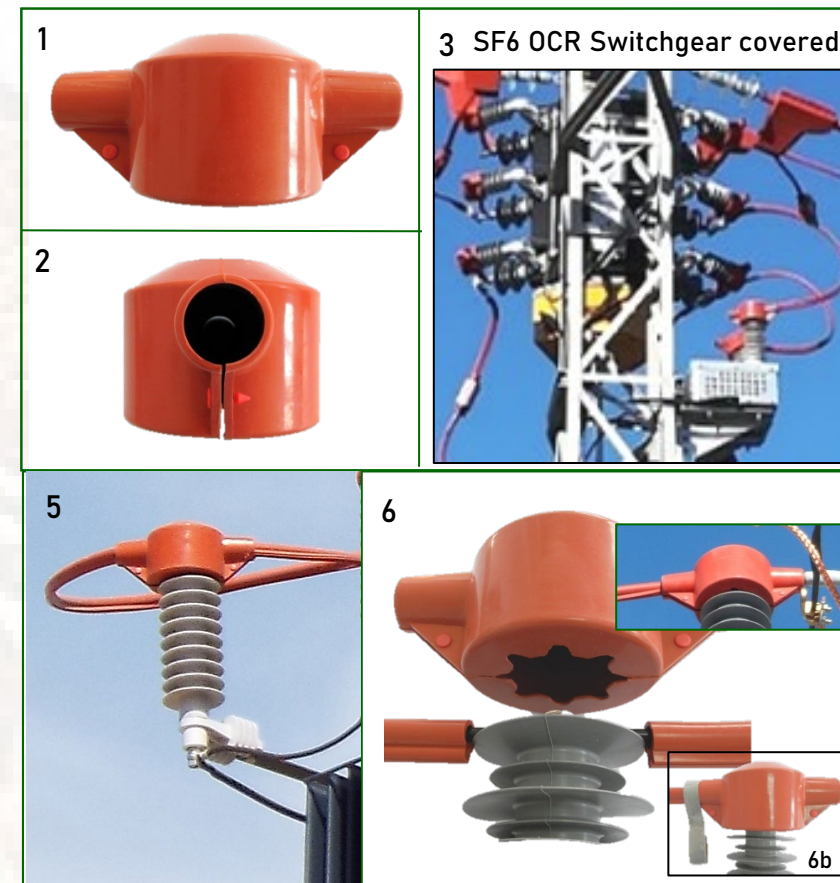
Installation: Its clamshell opening design, with 2 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools on existing lines (Fig.6).

Advantages: The design features to avoid moisture condensation and prevent rainwater ingress include: an exclusive drainage system has been designed on its bottom part (Fig. 4) to prevent any possibility of moisture build-up. In addition, it incorporates two cone-shaped sections which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow fitting over the conductor cover, performing a twofold function: on the one hand hindering water ingress, and on the other providing an additional fixing for the SWP conductor cover, (Fig. 6b), securing it to prevent it from slipping along the conductor. The inherent flexibility and nature of the material allow the device to be easily adapted to the specific needs of each application, allowing easy trimming of excess portions (cone-shaped section) to adapt it to any type of conductor cover.

Standard Format and Packaging:

Model SPSA covers for polymer post insulators are supplied in recyclable cartons holding 6 RAL 3031 red units.

Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual , for proper installation of the cover. Includes a QR Code providing access to the field installation video.



Installation on Surge Arresters and Support Insulators. The cones incorporated in the device can be sealed **OPTIONALLY**, and secured to the conductor cover, providing an additional anti-slipping protection for the mod. SWP cover.





BIRD PROTECTION SYSTEMS FOR 15kV – 36kV MV / HV NETWORKS



COVER FOR MV CABLE TERMINATIONS.

COVER MODEL **SPEB**

> 5.100pcs Installed 2017 - 2020



Design Features:

The SPEB cover is designed for covering up the energised parts of Overhead/Underground Cable Sealing Ends (Terminations) with vertical, horizontal and even double conductor exit or Bypass (Fig. 2), on distribution lines up to 36kV. The silicone thickness used is 3.5 mm, conferring the device the necessary dielectric strength and ensuring its consistent enduring effective performance.

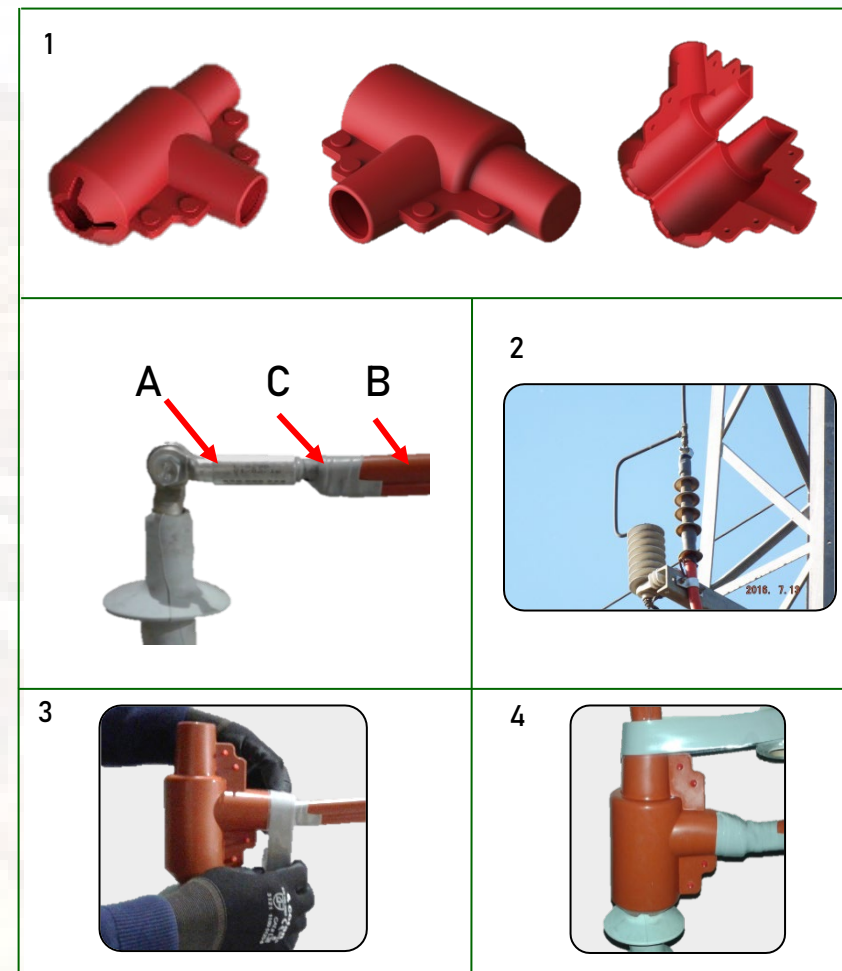
Installation: Once the conductor has been covered up with a suitable protective cover (B), this is fitted to ensure the conductor is protected as close as possible to the terminal (A). Then the SPEB device is opened and fitted over the termination neck, so that it fully covers the energised parts, and fixed in place by means of the 4 preinstalled pins provided. Then the conductor cover (B) is secured to the SPEB device by means of self-welding silicone tape (C). For configurations where the initially sealed cone-shaped exit is also used, this must be cut open. Once the device has been installed, secure the conductor cover to the cone(s) using tape.

The images show our Mod. SWP silicone conductor cover (B), secured by means of self-fusing silicone tape (C).

Advantages: The design features to avoid moisture condensation and prevent rainwater ingress include: an exclusive drainage system has been designed on its bottom part (Fig. 1) to prevent any possibility of moisture build-up. In addition, it incorporates two cone-shaped sections which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow fitting over the conductor cover performing a twofold function: on the one hand hindering water ingress, and on the other providing an additional fixing for the SWP conductor cover, (B), (Figs. 3 & 4) securing it to prevent it from slipping along the conductor. The inherent flexibility and properties of the material allow the device to be easily adapted to the specific needs of each application, allowing easy trimming of excess portions (cone-shaped section) to adapt it to any type of conductor cover.

Standard Format and Packaging:

Model SPEB covers for rigid polymer insulators are supplied in recyclable cartons holding 6 RAL 3031 red units. Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.





BIRD PROTECTION SYSTEMS FOR 15kV – 36kV MV / HV NETWORKS

> 800pcs
Installed
2020



COVER FOR FUSE CUT-OUTS BUSHINGS IN XS LINES PROTECTOR KIT **SCUP-SCDW** MODEL

Design Features: The SCUP-SCDW protector Kit is designed to cover both upper bushing (1a_input voltage) and lower bushing (1b_input voltage) in cut- outs of ceramic or polymeric lines (Fig.2) Its inner diameter allows to house insulator sheds up to 135 mm (Ø5.3”).

The silicone thickness used is $\geq 3.5\text{mm}$, conferring the device the necessary dielectric strength ($\geq 36\text{kV}$) and ensuring its consistent enduring effective performance.

Installation: its clamshell opening design, with 10 (Fig.3) and 6 (Fig.4) locking points per pin (pre-installed in each protector), allows it to be installed easily by hand, without the need for tools.

The double cone PIN closure system allows to put the protector easily- could be open and close without damage to the protector- until has the definitive position, guaranteeing that the remain and the effective protection over time (Fig.5)

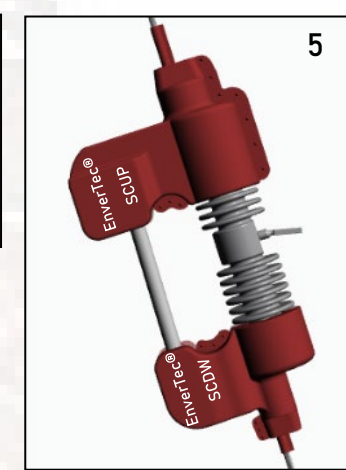
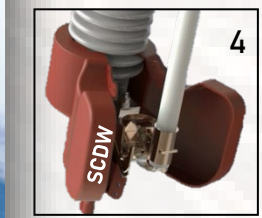
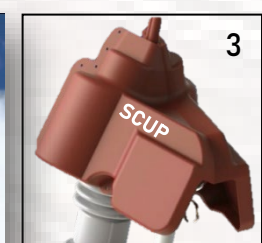
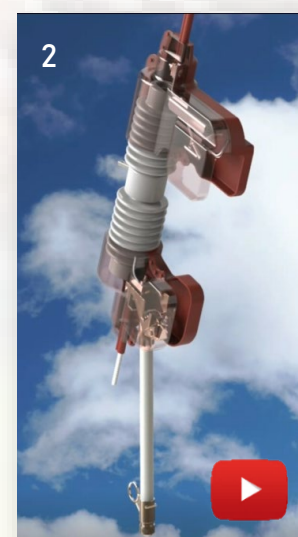
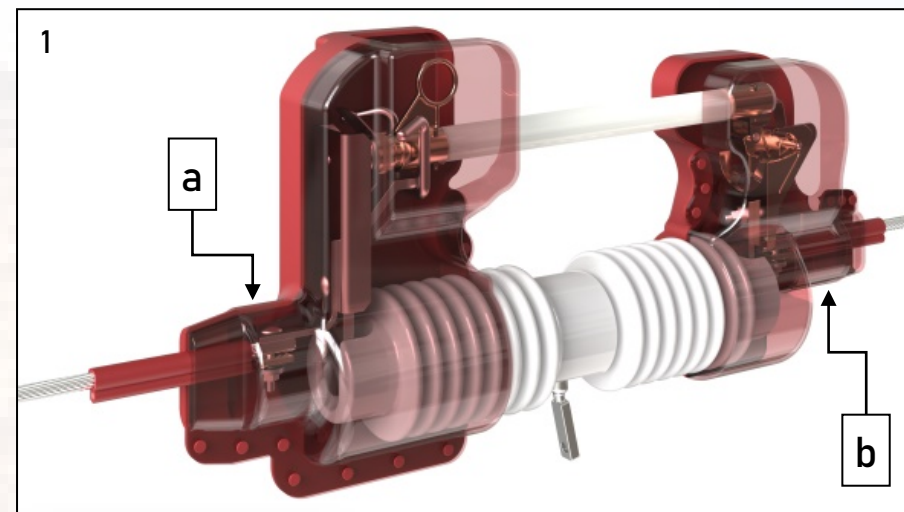
Advantages:

Both upper busing SCUP (Fig 3) and lower bushing SCDW (Fig 4) has taken into account for, once installed, guarantee the total effectiveness and the normal functioning of the XS Cut-Out. The SCUP protector upper opening allows the easy access with hotsticks for operating the fuse tube, and even use at the same time a LOADBUSTER® load break hotstick on the XS hooks.

The longitudinal sliding opening of the SCDW protector allows the fuse tube freely spin on the lower bushing and does not interfere with the disconnection manoeuvre when the merger of fuse link takes place. The flexibility of the silicone material plays a key role making possible the easy extraction of the fuse tube for the damage fuse link replacement.

Standard Format and Packaging:

Model SCUP-SCDW cut-out protector kit are supplied in recyclable cartons holding 3 RAL 3031 red units. Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.





COVER FOR DISCONNECTOR BUSHING IN SELA OVERHEAD LINE

KSELA PROTECTOR KIT

Design Features: The KSELA protector kit, which is made up of SCL-SCSLB covers, is designed to cover input voltage bushings (1a), output voltage (1b) and blades (1c) present in the overhead lines disconnectors, both ceramic and polymeric (2) The inner SCSL cover diameter allows to house insulator sheds up to 150 mm ($\phi 6.0$ ").

The silicone thickness used is ≥ 3.5 mm, conferring the device the necessary dielectric strength (≥ 36 kv) and ensuring its consistent enduring effective performance.

Installation: its clamshell opening design, with 10 (Fig.3) and 2 (Fig.6) locking points per pin (pre-installed in each protector), allows it to be installed easily by hand, without the need for tools.

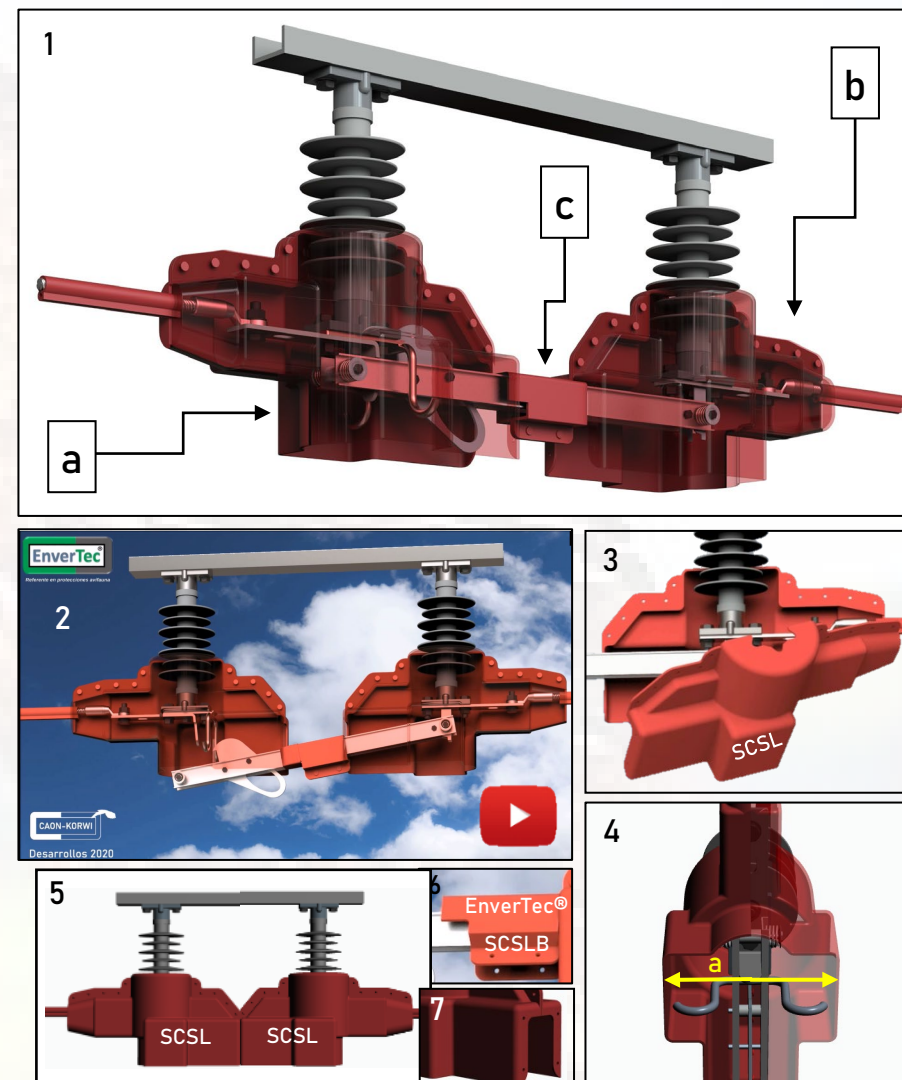
The double cone PIN closure system allows to put the protector easily- could be open and close without damage to the protector- until has the definitive position, guaranteeing that the remain and the effective protection over time (Fig.2)

Advantages: Both the protector for the two bushings SCSL (Fig. 3) and the protector for the SCSLB blade (Fig. 6) has taken into account for, once installed, guarantee the total effectiveness and the normal functioning of the disconnector. The 185 mm rectangular opening of the SCSL (4a) protector allows the easy acces with hotstick to operate the latch and even use at the same time a LOADBUSTER® load break hotstick on the disconnector hooks.

The SCSL protector is fitted with 4 additional attachment PIN's (Fig.7) in order to join the covers of both bushings of the KIT, in cases in which the blade length (Fig.5) doesn't make necessary the use of the SCSLB cover, for wich it has been designed an effective attachment system, guaranteeing the remain of its location on the blades.

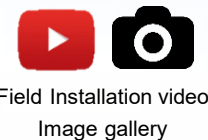
Standard Format and Packaging:

Model SCUP-SCDW disconnector protector kit are supplied in recyclable cartons holding 3 RAL 3031 red kits. Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.





BIRD PROTECTION SYSTEMS FOR 15kV – 52kV MV / HV NETWORKS



CONNECTOR COVER.

MODEL **SAP** AMPACT / GRIMPI Ø7 – Ø18. TAM 300002.

> 37.600pcs
Installed
2013 - 2020



Design Features:

The SAP protective cover is designed for covering up splices performed using AMPACT, GRIMPI or similar connectors, on conductors ranging from 7mm to 14mm (SAP110-fig.1), and from 15 to 18mm (fig.2), on distribution lines up to U_m 36kV and 52kV, respectively.

With a silicone thickness of 3.5 mm, this device has the required and adequate dielectric strength to ensure satisfactory performance throughout its entire service life.

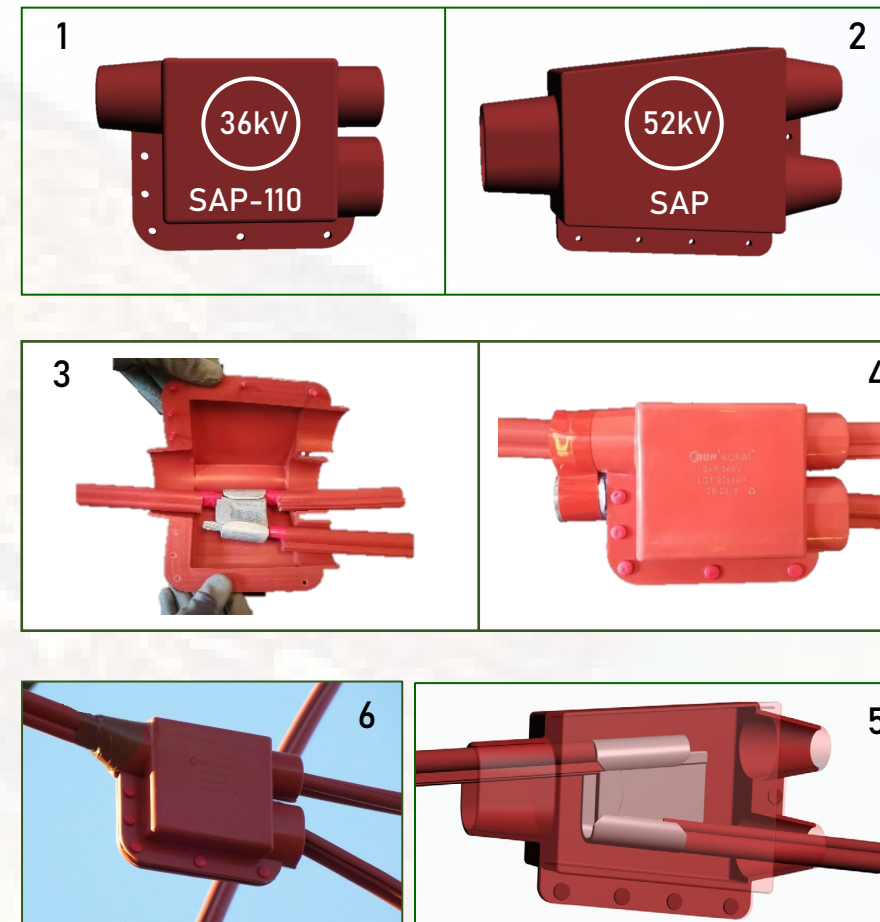
Installation:

Its clamshell opening design, with 5 locking points by means of pins, (preinstalled on each device), allows easy installation by hand with no tools required to cover up existing splices. (Figs. 1 & 2).

Advantages: The design features to avoid moisture condensation and prevent rainwater ingress include: when properly installed, the flap fitted with 3-4 pins is facing down, allowing the evacuation of any moisture as it is not watertight. In addition, the SAP protective cover incorporates two cone-shaped sections which, by means of silicone tape or UV resistant plastic ties and thanks to the inherent properties of the silicone material, allow OPTIONAL fitting over the conductor cover, performing a twofold function: on the one hand hindering water ingress, and on the other providing an additional fixing for the SWP conductor cover, (Figs. 3 & 4) securing it to prevent it from slipping along the conductor. The flexibility and nature of the material allow the device to be easily adapted to the specific needs of each application, allowing easy trimming of excess portions (cone-shaped section) to adapt it to any type of conductor cover as well as to tap splices. (Figs. 5 & 6).

Standard Format and Packaging:

Model SAP covers for rigid polymer insulators are supplied in recyclable cartons holding 6 RAL 3031 red units. Each package includes information on the month and year of manufacture, Batch No, as well as handling, storage and recycling instructions. Inside the carton is a detailed Instruction Manual, for proper installation of the cover. Includes a QR Code providing access to the field installation video.



Example of use for covering up GRIMPI or AMPACT type connectors (Figs.4-5) and OPTIONAL sealing of cone-shaped section when used in combination with the SWP model conductor cover SWP, (Fig.3). Example of adaptation to tap splice (Fig.6).

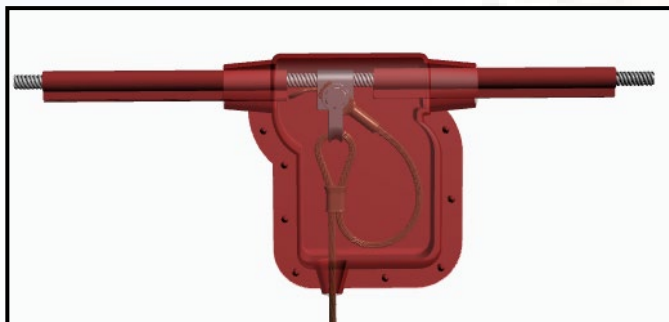




COVERS FAMILY FOR AVE-ADIF LINES

SPPD-SPSM-SPC-SWP28 PROTECTORS

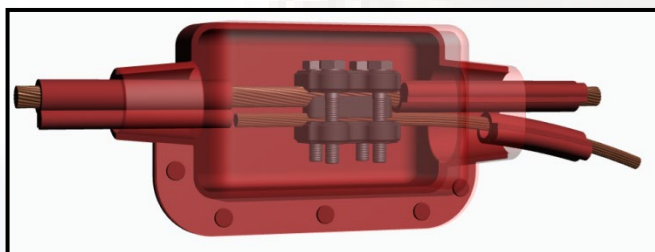
New protectors family developed for prevent electrocution of birds, and guarantee the railway service continuity in AVE catenaries, belonging to ADIF network.



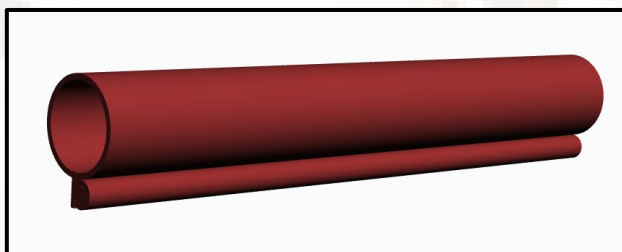
SPPD. Use in Droppers. SPPD-SWP12-SWP28 covers assembly.



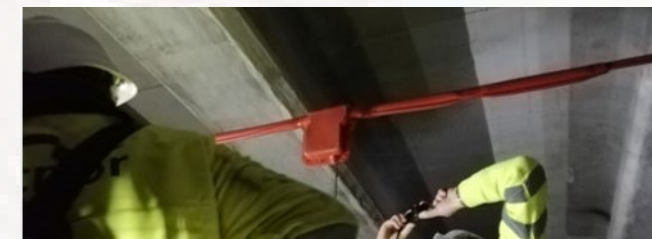
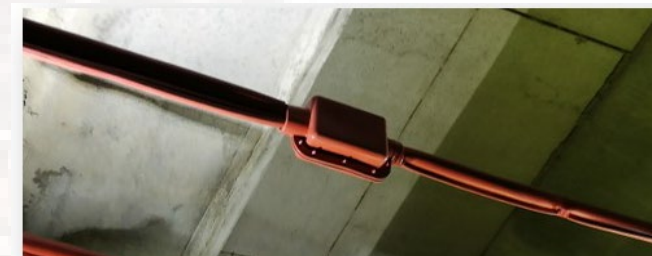
SPSM. Use in Cantilever Suspender. SPSM-SWP12-SWP28 covers assembly



SPC. Use in False Suspension Connections. SPC-SWP12-SWP28 covers assembly.



SWP-28. Dielectric enhancer for use in ensembles fitted with cover for the SWP-12 conductor.



Installation in MORA DE TOLEDO AVE Catenary. (Spain), October 2020. Acknowledgements ADIF and ELECNOR

The covers are made of our silicone with its unique formulation, which allows the easy installation thanks to its flexibility, and they have the hydrobicity advantages. With the silicone thickness enough, this device has the required and adequate dielectric strength to operate in $U_m \leq 47,63kV$ ($U_c \leq 27,50kV$) lines and ensures optimum performance of the installation, enduring over time.





BIRD PROTECTION SYSTEMS FOR 15kV - 52kV MV / HV NETWORKS



SILICONE TAPES SERIES **ENV-25/50/75**
APPLIED R&D+i FOR LONG-LASTING INSTALLATIONS.

> 10.200pcs
supplied
2016 - 2020



Design and Installation Features:

Our silicone self-vulcanising tape with its unique formulation is capable of offering a phase to earth insulation level of up to 15 kV, with a 66% overlap between turns and 10% elongation.

If this level of insulation needs to be increased, a second layer (1.0mm thick tapes), with an overlap of 66% between each turn and in the opposite direction allows a level of insulation between phase and earth of up to 35 kV.

The self-adhesive characteristics of self-vulcanising tapes allow them to be applied without tools or heat on bare rigid or flexible cables, and on asymmetrically shaped live elements in a simple way, providing excellent dielectric insulation even under the most severe conditions. They weld in 1 minute and are fully effective after 24 hours since application.

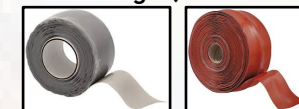
Their exclusive formulation makes them resistant to high temperatures (passing flammability tests at over 650°C), contact with high ozone concentration levels, and they are resistant to UV radiation - passing the 1000h Weather Test (UNE EN 60243-1); they do not suffer from colour degradation or crystallisation and they repel moisture build-up and are permeable to oxygen.

Given the nature of them, they are effective even in areas with extremely high saline pollution and with their advanced technology they display **Lower Leakage Currents** thanks to the hydrophobic properties they transmit to the contaminant layer.

They can be removed much easier than other materials available on the market, which require significant manpower and damage the covered item when removed.

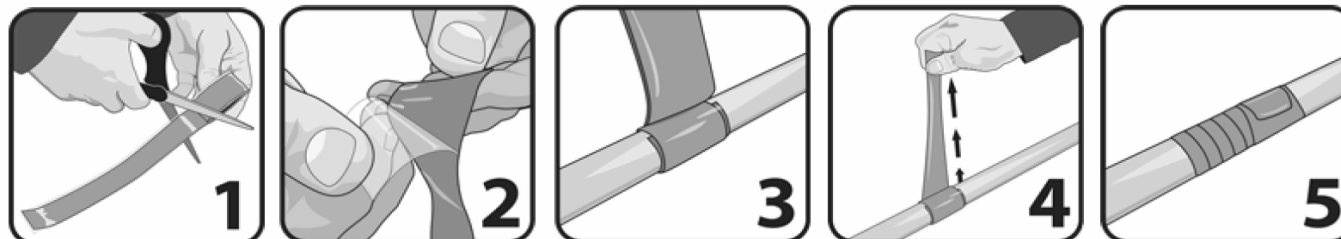
Our tapes are mainly available in 2 standard formats, and can be manufactured in different sizes, according to demand (Width x Thickness x Roll Length):

• **ENV-25/05** : 25mm x 0.5mm x 3m _ **ENV-50/10** : 50mm x 1.0mm x 11m _ **ENV-75/10** : 75mm x 1.0mm x 11m - Available in GREY or RED.



• **GUARANTEE:**

Thanks to its advanced formulation, our Silicone can improve its dielectric strength after passing the 1000h Weathering Test (UNE EN 60243-1). In addition, the 5000h Weathering Tests (IEC 6119 Annex C) performed at the STRI Laboratory in Sweden, which include the harmful effects of Saline Fog, allow us to estimate the service life of our products at a minimum of 20 years.



APPLICATION INSTRUCTIONS

1. Once the surface has been degreased, cut appropriate lengths for the sections to be covered.
2. Peel off the plastic separator layer and start winding the tape with a full turn on itself.
3. Stretch the tape moderately (10%) to ensure effective tensioning.
4. Tape in a helix shape so that each layer overlaps 66% of the preceding layer.



INNOVATION AND ADVANTAGES. **GUARANTEED TRACEABILITY.**



DESIGN innovation:

- Design of one-piece covers with clamshell opening design.
- Easy trimming of excess portions using simple tools.
- Access openings and spaces provided to facilitate installation and adaptation.
- Simple, secure locking system using double-cone pins allowing repeated closing and opening for subsequent inspections or maintenance, without impairing the effectiveness of the locking system.
- Indelible marking, visible and with fuller information, on each device and its packaging, including QR CODES allowing access to specific information.

PROCESS innovation:

IDENTIFICATION AND TRACEABILITY.

- Own design (Spain).
- Specific production plan at our Authorised Production Facility.
- Qualification of suppliers, raw materials, equipment and systems.
- Traceability of each Device by means of Individual Marking:

Each **CAON-KORWI**® device is marked indelibly, in an outer, visible place, with the brand, model reference, Batch No, year and month of manufacture, and the rated voltage.

For each application it is possible to request (*) a QUALITY, TRACEABILITY AND RECYCLING REPORT for the batch involved, which provides us with essential data (such as the silicone batch numbers involved in the manufacturing process), to control the Traceability of these devices and instructions for their proper Recycling at the end of their service life.

(*) Please contact our Quality Dept. to request such reports.



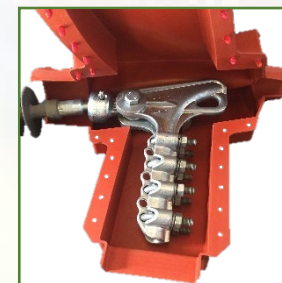
Supplied with **PREINSTALLED** locking pins, designed for secure locking and enabling disassembly **without damaging** the device. Easy installation **without tooling or special tools.**



Installation Video



Easy to cut using common utensils, (scissors, stanley knife), to trim off excess portions and adapt the devices for the specific application. Indelible, Individual Physical marking for TRACEABILITY monitoring purposes. Includes a QR Code providing access to the field installation video.

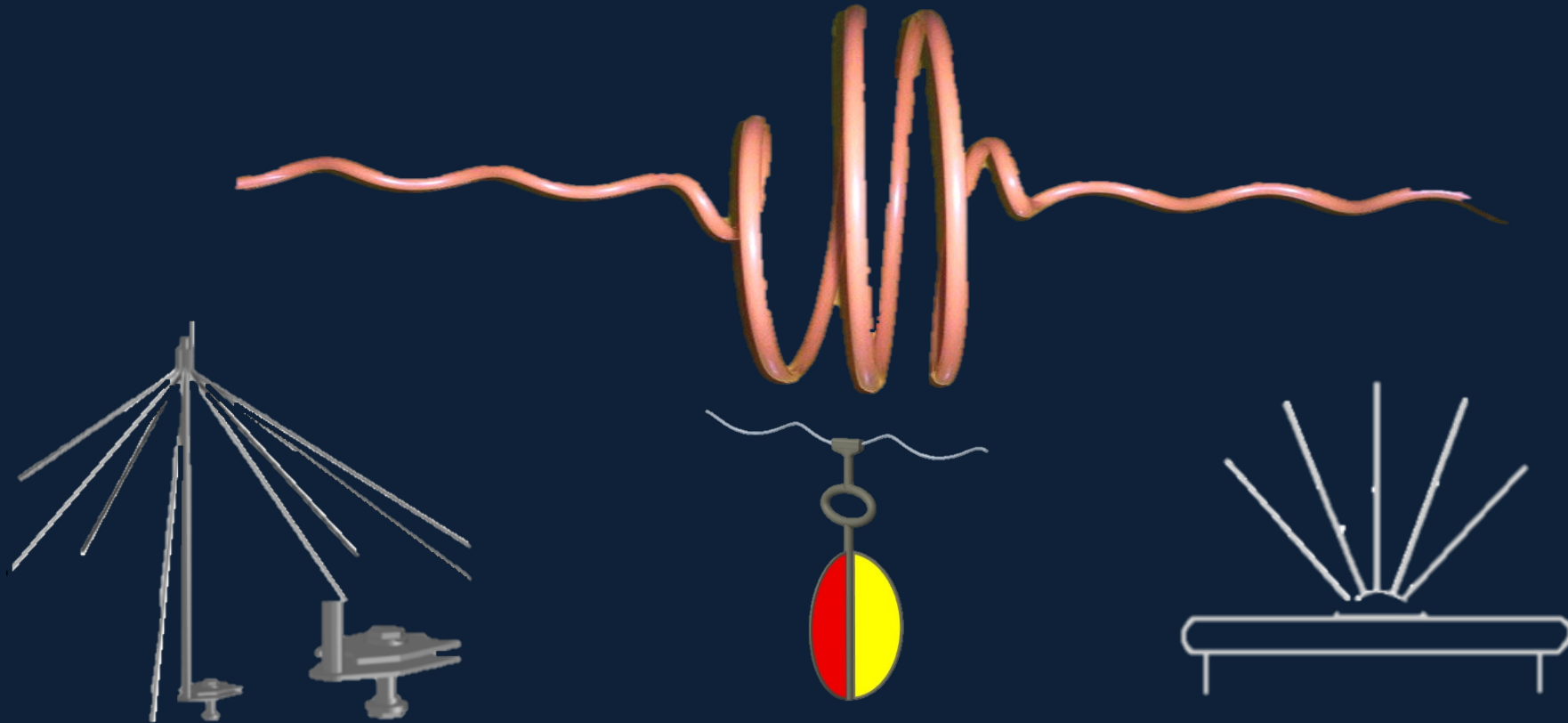


The Devices are provided with open sections to allow easy installation over clamps, ball joints and insulators. They have been designed eliminating any rims preventing the perfect fit of the devices on glass insulators. The Flexibility of the silicone material allows the material to adjust to the demands of the energised parts, absorbing cotter pins, ball joints, clamps... allowing their closure in situations that would not allow other types of device to be closed..

ANTI-COLLISION DEVICES

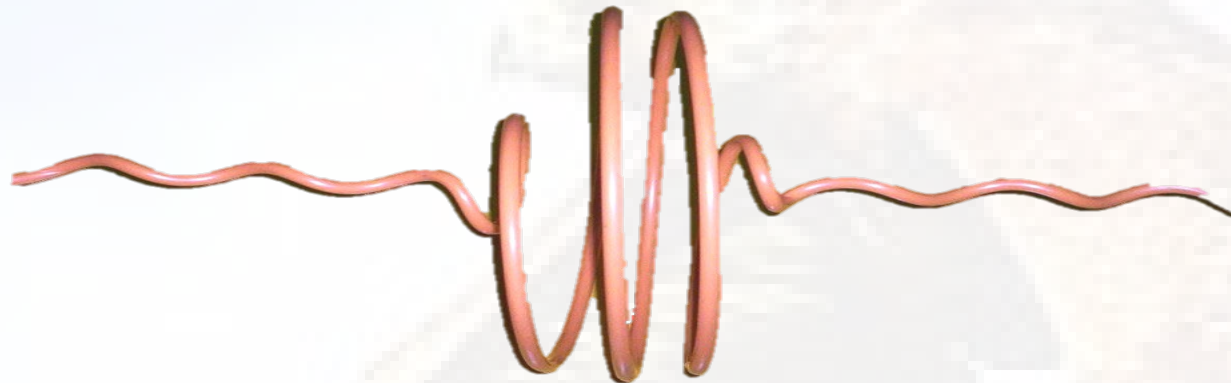
ANTI-PERCHING DEVICES

APPLICABLE REGULATIONS ON ANTI-ELECTROCUTION BIRD PROTECTION.
ANTI-COLLISION- ANTI-PERCHING DEVICES FOR USE ON 15-36kV MEDIUM
VOLTAGE DISTRIBUTION OVERHEAD LINES.



ANTI-COLLISION DEVICES

Item Currently under Distribution

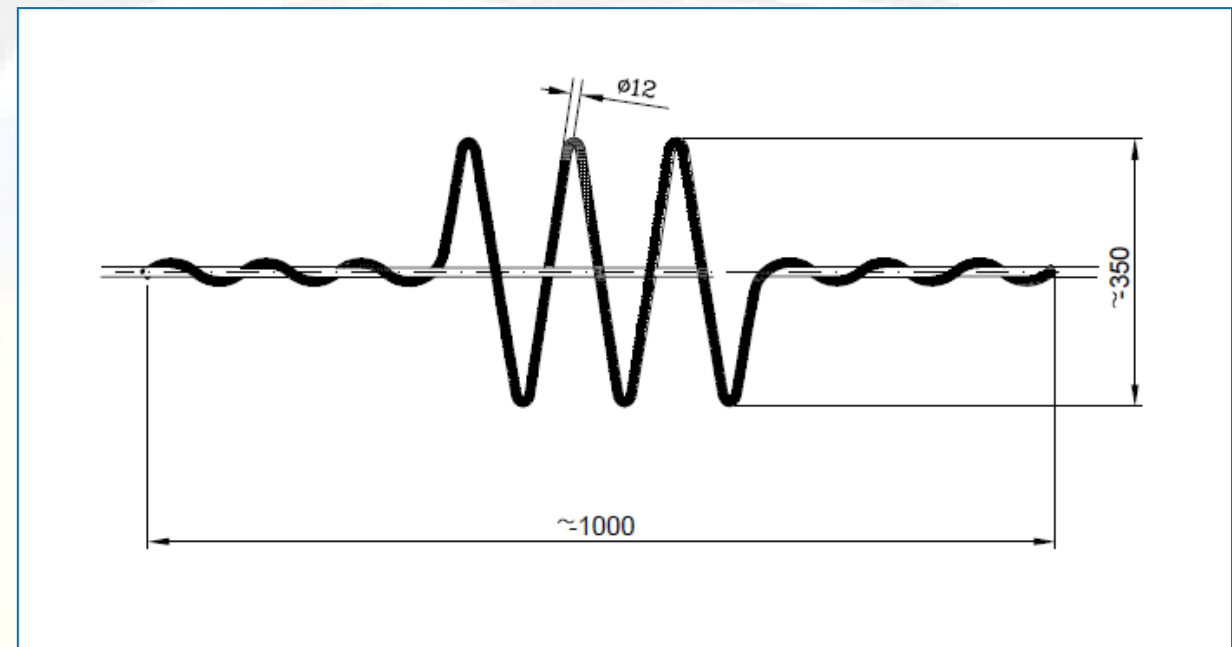


Material: Polyvinyl Chloride (PVC) with UV impact modifier.

Ends: Tapered

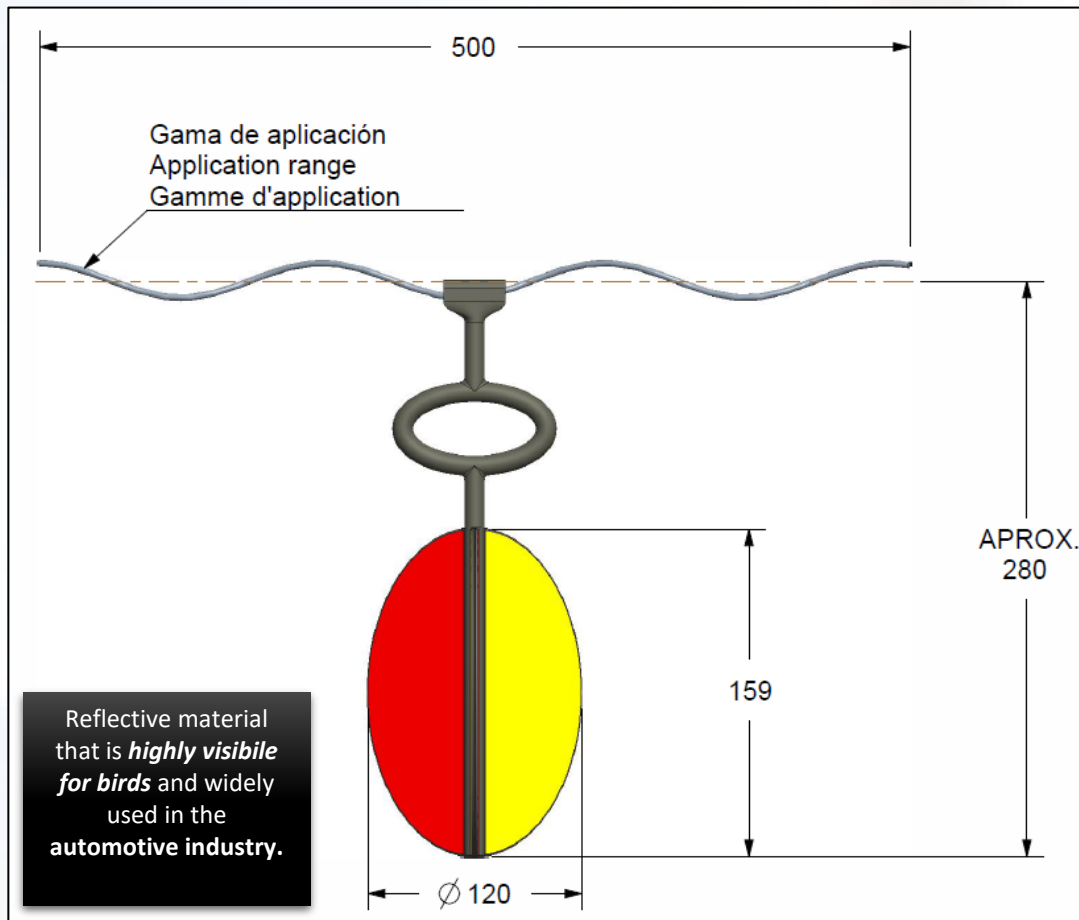
Colours: Red Similar to RAL 3031 / Other options available upon request.

CODIGO	DIAMETRO MIN. CABLE (mm:)	DIAMETRO MAX. CABLE (mm:)	CONDUCTOR	MATERIAL
57750513	9,51	13,40	LA 78	PVC
57750528	13,41	17,50	LA 110, LA 145 LA 180	PVC
57750530	17,51	21,80	LA 280	PVC
57750506	7,00	9,50	LA 30 LA 56	PVC
57750504	9,51	13,40	LA 78	PVC
57750508	13,41	17,50	LA 110, LA 145 LA 180	PVC
57750510	17,51	21,80	LA 280	PVC

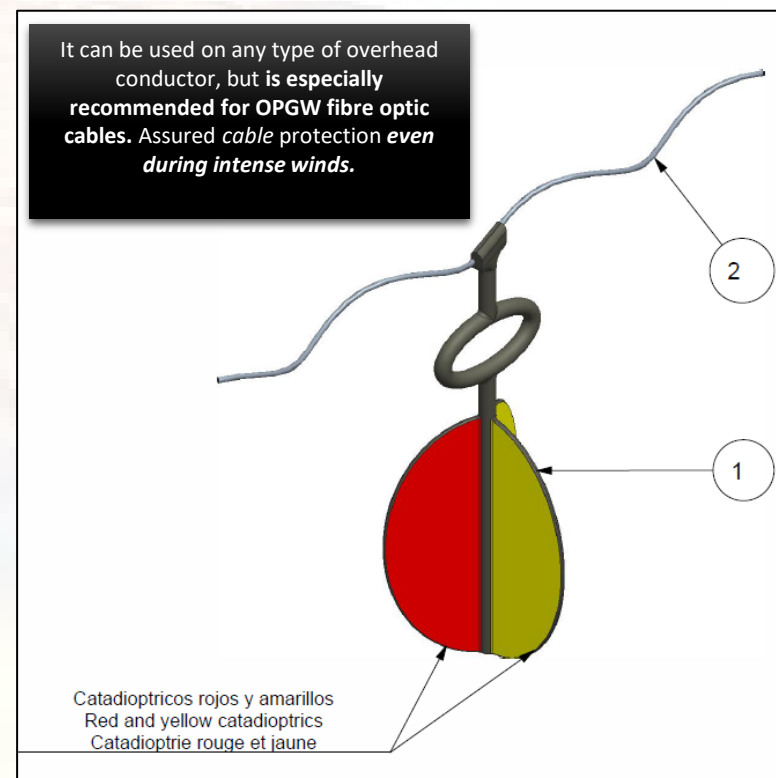


ANTI-COLLISION DEVICES: Reflective Blades Ref ASP3C._ OPGW - AL/AC.

Item Currently under Distribution



BILL OF MATERIAL			
SYM	DESCRIPTION	QTY	MATERIAL
1	CUERPO SALVAPAJAROS BIRDFLIGHT DIVERTER BODY CORPS DISPOSITIF POUR LES OISEAUX	1	SANTOPRENO
2	VARILLA PREFORMADA PREFORMED ROD FIL PRÉFORMÉ	1	ALUMOWELD



- EASY INSTALLATION _ No tools required and it is not possible to install it incorrectly.
- SERVICE LIFE: Designed as a single piece made in Santoprene allows it to withstand Wind Vibrations of more than 10 million cycles at a frequency of 30Hz. REFLECTIVE STRIPS: Highly adhesive yellow and red strips that have passed weathering tests.
- ABSENCE OF MULTIPLE PARTS: Designed to withstand strong wind impacts without damaging the conductor _ A single body with no detachable components.
- LINE MAINTENANCE: It allows the maintenance cart to pass over the device without having to dismantle it. This facilitates further maintenance work along the entire span.



ANTI-PERCHING DEVICES

Item Currently under Distribution



BBG 2.000™ SPIKE SYSTEM

INDUSTRY-LEADING PRODUCT, ECONOMICAL AND LONG-LASTING

Number 1 – the most recommended by Architects and Public Administrations

The Bird-B-Gone 2.000™ spikes are made of polycarbonate resin with ultraviolet (UV) radiation inhibitors, showing the same durability and strength as steel.

They represent the best solution in terms of cost-effectiveness / permanent protection to prevent perching or nesting by birds. The spikes can be easily installed on ledges, cornices, signs, advertising billboards, electricity poles, roofs, eaves and building perimeters, water drainpipes and any other place where birds are a nuisance.

Once installed, the BBG 2.000™ spikes are virtually invisible to passers-by

BBG 2.000™ requires no assembly, take it out of its box and install it!!!

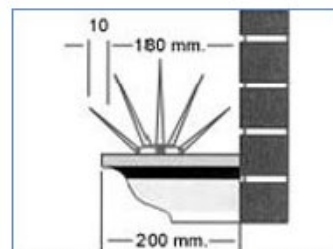
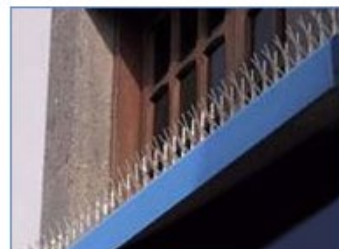


The BIRD-B-GONE 2.000™ spikes are not electrically conductive and do not interfere with electrical safety systems, radio frequencies or electronic transmissions. It is the spike system with the widest physical coverage in the market (20cm) but it can be adapted to cover surfaces from 3 cm. One row of BBG 2.000™ spikes will cover an area twice as large as any other spike system.

BBG 2.000™ is available in cartons containing 10 units of one metre length each.



Bird-B-Gone

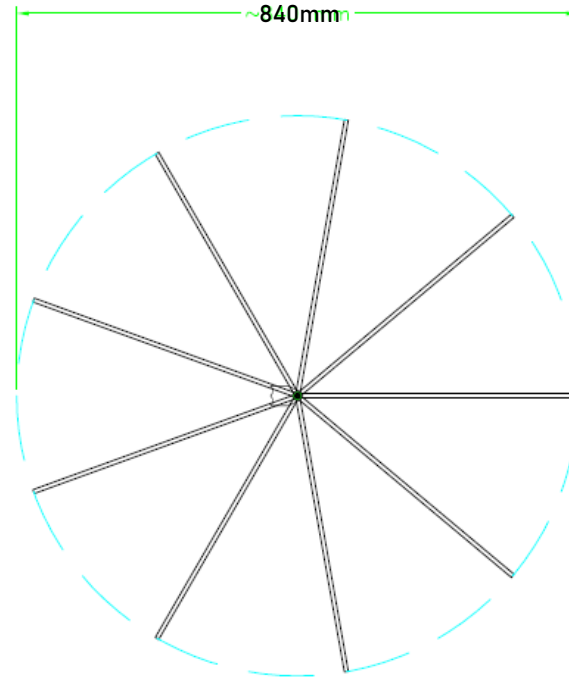


- » Permanent, economical and maintenance-free method
- » Wider physical coverage - 20cm.!
- » Causes no harm to birds
- EASY SAFE, FAST INSTALLATION
- » It is not electrically conductive
- » Protected with ultraviolet radiation inhibitors
- » Available in several colours including white, grey, tile red, brown and clear!!
- » Low installation cost
- » Cuts down labour time and costs
- » VIRTUALLY INVISIBLE

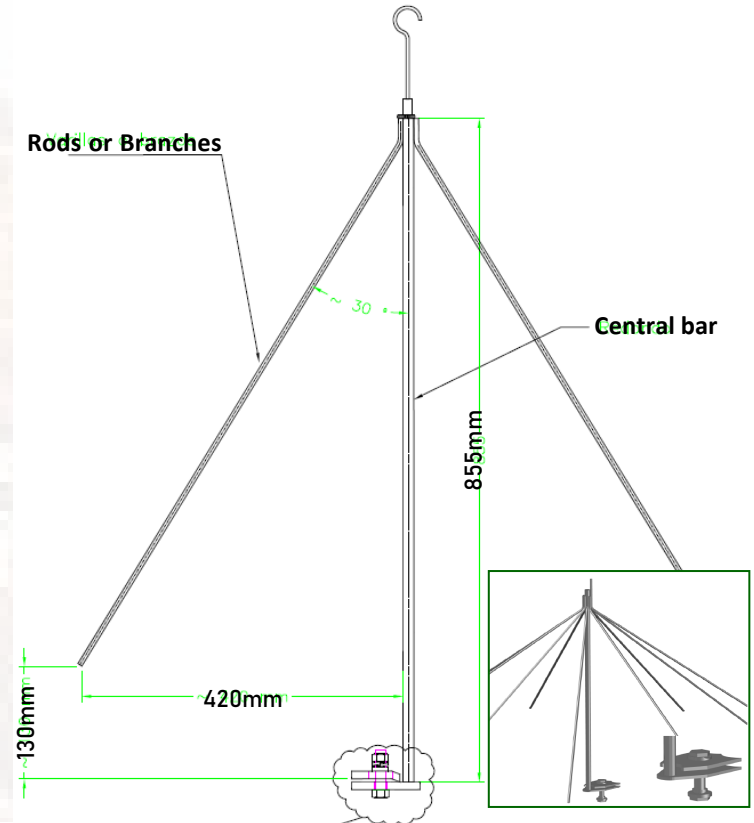


ANTI-PERCHING DEVICES

Item Currently under Distribution

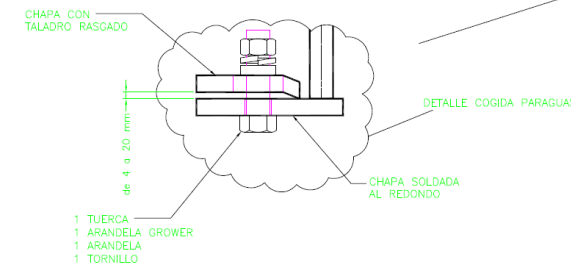


AGUILA Model -HDG Steel- Height 855mm - Weight 4.5 kg - Includes universal mounting device.



The AGUILA Model can be installed on metal structures – Substations and MV and HV line structures with a linear or herringbone configuration.

Minimum safety clearances must be observed in the installation to prevent arcing to ground due to insufficient distance from energised parts. RD. 223/2008



INSTALLATION IMAGE GALLERY AND SALES DATA SHEETS



APPLICABLE LEGISLATION ON ANTI-ELECTROCUTION BIRD PROTECTION.

CAON-KORWI® FOR USE ON OVERHEAD ELECTRIC NETWORKS



INSTALLATION IMAGE GALLERY
PRODUCT SUPPLY HIGHLIGHTS





UTILITY:
 • ENDESA DISTRIBUCION
 INSTALLER COMPANY:
 • ELECNOR S.A. – JAEN



LOCATION:
 • Mancha Real_JAEN_Altitude 759 m
 TYPE OF APPLICATION _ (Image1):
 • HERRINGBONE TANGENT STRUCTURE, LA-30 CONDUCTOR

DATE AND TIME:
 • Nov. 2013 – 09.00h to 11.00h
 WEATHER CONDITIONS:
 • DRY AND SUNNY_ +1°C / +4°C

MATERIALS USED:

- SWP-12 _ 9 m
- SPSC _ 3PC.
- STAINLESS TIES_ 12UD.
- SILICONE TAPE_ 9m

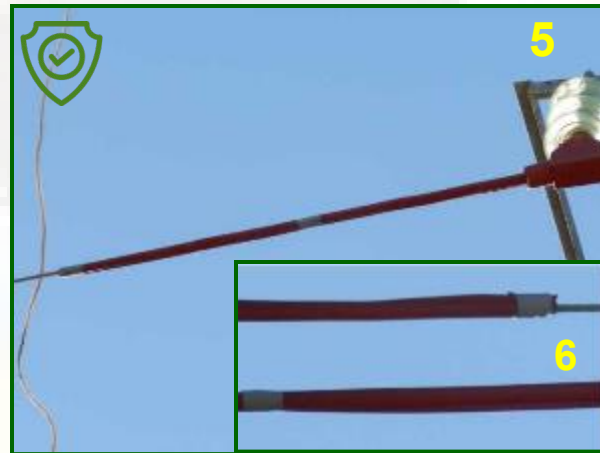


Image 2: Easy trimming, installation and closing of Mod. SWP-12 conductor cover, even at low temperatures.

Image 3: Secure attachment of SWP-12 cover to the clamp by means of two (2) stainless steel ties.

Image 4: Easy trimming, installation and adaptation of SPSC device to the specific application requirements. Full insulation of Ball joint and Suspension clamp.

Image 5: Securing cover closure using cold vulcanising silicone tape, Mod. X-TREME by MOCAP®

Image 6: Close-up view of taping on far end of clamp, without covering the SWP cover outlet to allow drainage.

Image 7: Structure elements insulated in accordance with RD-1432/2008_BOJA 209.





UTILITY: ENDESA DISTRIBUCION
CONTRACTOR: ELECINOR S.A.
LOCATION: JAEN_PERIURBAN AREA Altitude 603 m
APPLICATION TYPE _ (Image.1):
• HERRINGBONE DEADEND/BRANCH TOWER _ LA-56
DATE AND TIME: Nov. 2013 – 09.00h at 12h
WEATHER CONDITIONS: DRY AND SUNNY_ +3°C / +7°C

MATERIALS
USED:



Image 2: Easy trimming, installation and closing of Mod. SWP-12 conductor cover, even at low temperatures
Trimming is performed working from the structure itself, quickly and to the lengths required by the jumper.



Image 3: Secure attachment of SWP-12 cover to the clamp by means of two (2) stainless steel ties.



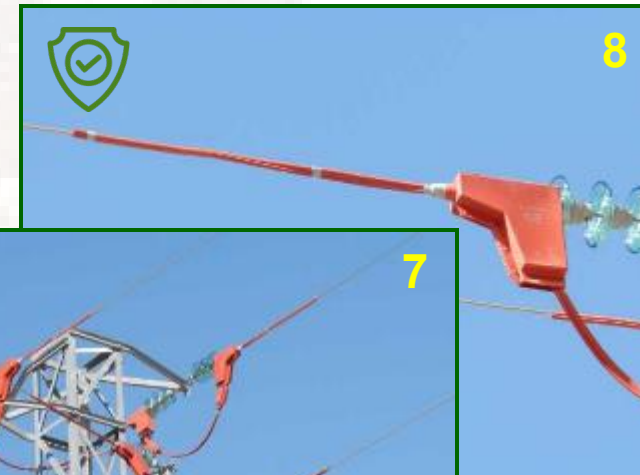
Images 4 & 5: Easy trimming, installation and adaptation of STSC clamp cover to the specific application requirements. Full insulation of Ball joint and Deadend clamp. Interaction with SAP device to cover up existing connectors and splices, even hard-to cover ones due to their proximity to the deadend clamp.

Images 6 & 7: Structure elements insulated in accordance with RD-1432/2008_BOJA 209.



Image 8: Securing SWP cover closure using cold vulcanising silicone tape, Mod. X-TREME by MOCAP®, showing view of taping on cone – extra safety measure – to prevent slipping of SWP cover along conductor, and view of far end of clamp, without covering the SWP cover outlet to allow drainage.

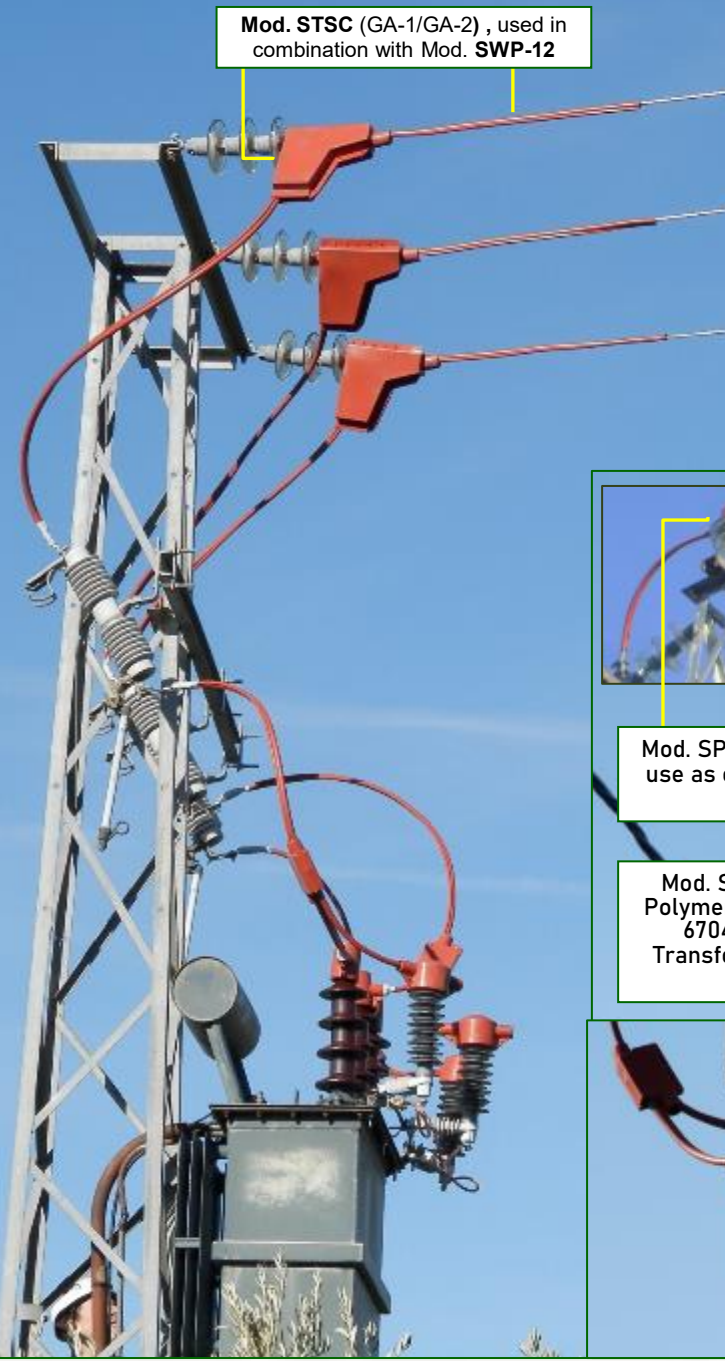
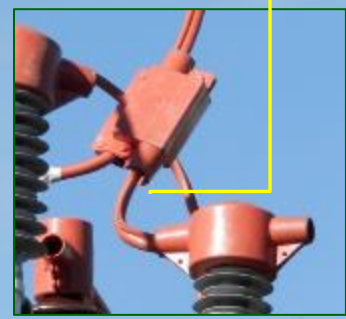
Image 9: Close-up view of “flush” fit against glass insulator disc.





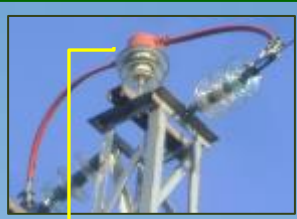
Mod. SPSA: Surge Arrester Cover with conductor entry/exit protected with Mod. SWP.

Mod. SWP: Capacity of conductor cover to adapt to small radius curves



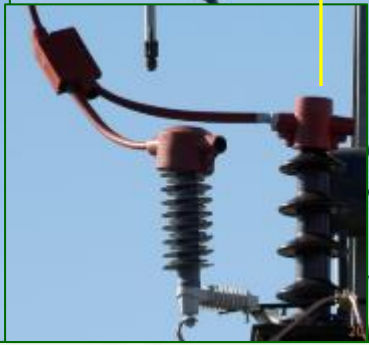
Mod. STSC (GA-1/GA-2) , used in combination with Mod. SWP-12

LOCATION:
Ubeda_PERIURBAN AREA _Altitude 748 m
TYPE OF APPLICATION:
36kV TRANSFORMER STATION_ LA-56
DATE AND TIME: Dec. 2014 - 09.00h to 12h
WEATHER CONDITIONS:
DRY AND SUNNY_ +5°C / +7°C



Mod. SPSA: Alternative use as cover for ARVI-32.

Mod. SPP: Cover for Polymer Post Insulator 6704113 used as Transformer Bushing cover.



Installation without tools of the various CAON-KORWI Silicone devices. Easy to install working from the tower.

Mod. SAP: Cover for AMPACT-GRIMPI. Easily adaptable on site for use on Bypass - shunt line. Used in combination with Mod. SWP.





LOCATION:
HINOJOSA DEL DUQUE (CORDOBA)
PERIURBAN AREA _ Altitude 545 m.
TYPE OF APPLICATION:
LIVE LINE WORK _ TOWERS WITH ARVI-32 _ ARVI-42
PIN TYPE INSULATORS
CONDUCTOR: LA-56.
DATE AND TIME: November 2016 - 12h.
WEATHER CONDITIONS:
DRY_SUNNY_ +5°C / +9°C.



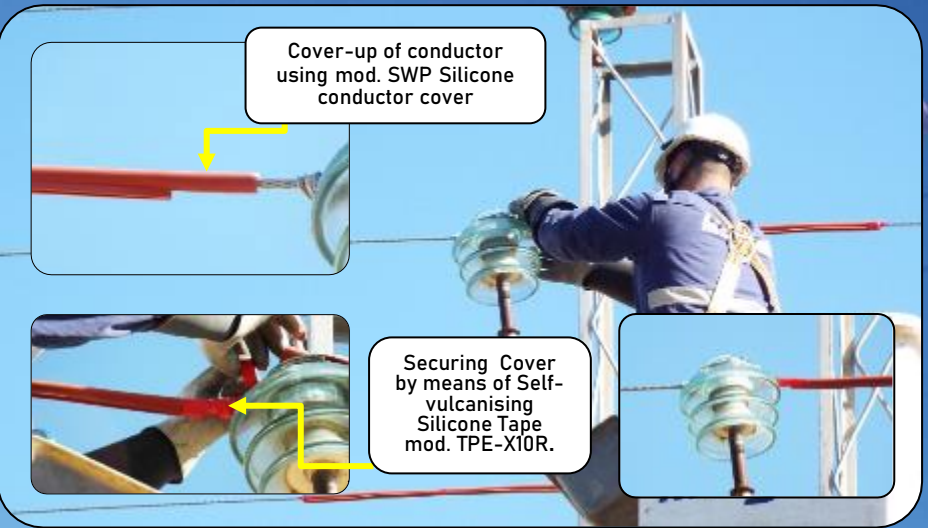
Middle phase ARVI-32 fully covered up with conductor length >1m on either side by means of CAON-KORWI® Silicone covers models SWP - SPAV.



Installation of SPAV Cover on Ceramic Pin Type Insulators.



Installation of mod. SPAV Silicone Cover on ARVI-42 pin type glass insulators



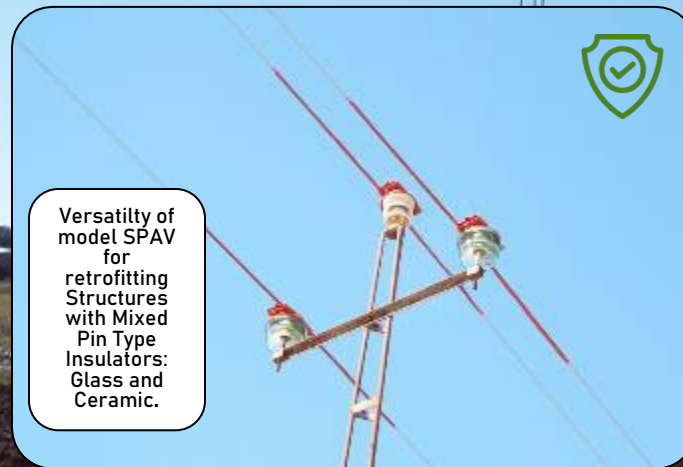
Cover-up of conductor using mod. SWP Silicone conductor cover



Securing Cover by means of Self-vulcanising Silicone Tape mod. TPE-X10R.



Close-up view of fit of model SPAV Cover over model ARVI-32 glass pin-type insulator.
Fitting onto insulator without tools by means of preinstalled pins.



Versatility of model SPAV for retrofitting Structures with Mixed Pin Type Insulators: Glass and Ceramic.



Installation of the various CAON-KORWI® Silicone Devices without using tools. Easy to adapt working from the Structure.

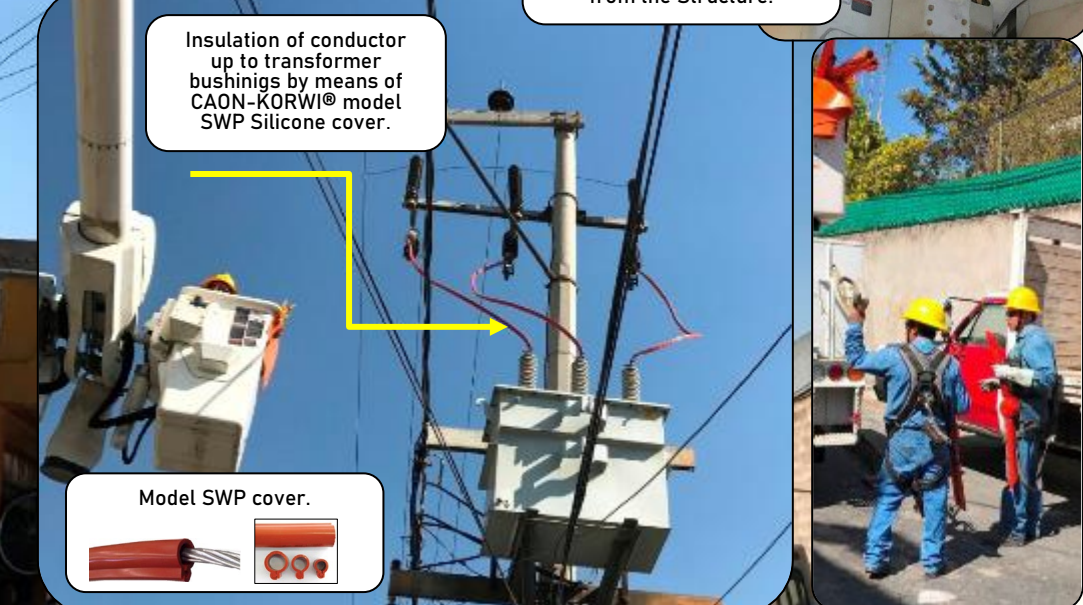
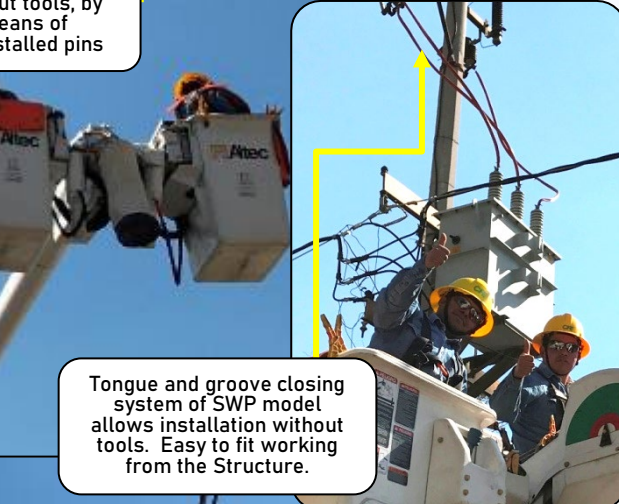
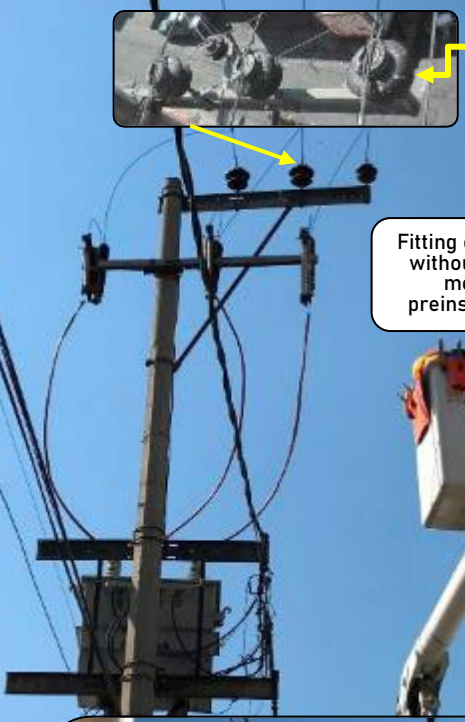
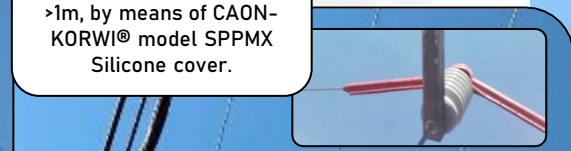
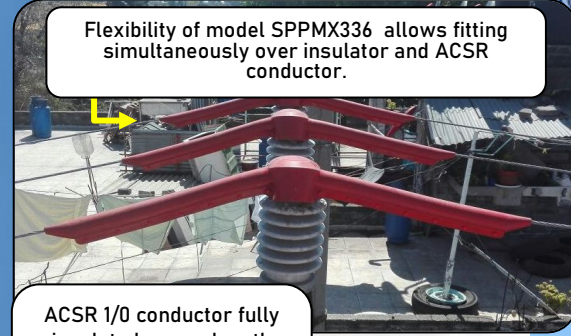




LOCATION:
 MEXICO D.F. - MEXICO
 PERIURBAN AREA _ Altitude 2,250 m.
INSTALLATION CONDITIONS:
 HOTLINE WORK_ LIVE LINE
 LINE POST INSULATORS PD
CONDUCTOR: ACSR 1/0.
DATE AND TIME: January 2017 - 12h.
WEATHER CONDITIONS:
 DRY_SUNNY_ +9°C / +19°C.
 Images provided by courtesy of:
 - C.F.E. _ MEXICO DF
 - HV TEST S.A. DE C.V.



PURPOSE OF WORK:
 Solve the constant power outages caused by electrocution of local wildlife.



Versatility of Mod. SPPMX336 allowing use on different insulator types

Fitting on insulator without tools, by means of preinstalled pins

Flexibility of model SPPMX336 allows fitting simultaneously over insulator and ACSR conductor.

ACSR 1/0 conductor fully insulated over a length >1m, by means of CAON-KORWI® model SPPMX Silicone cover.

Tongue and groove closing system of SWP model allows installation without tools. Easy to fit working from the Structure.

Insulation of conductor up to transformer bushings by means of CAON-KORWI® model SWP Silicone cover.





LOCATION AND DATE:
 AGUASCALIENTES - MEXICO - February, 2017 .
 ZEPA - Special bird protection area.
PROGRAMME: PRESERVATION- GPS MONITORING OF
 IMPERIAL EAGLE.
SCOPE OF APPLICATION:
 Retrofitting of ANTI-ELECTROCUTION devices on lines
 with PD LINE POST insulators and ACSR conductors.



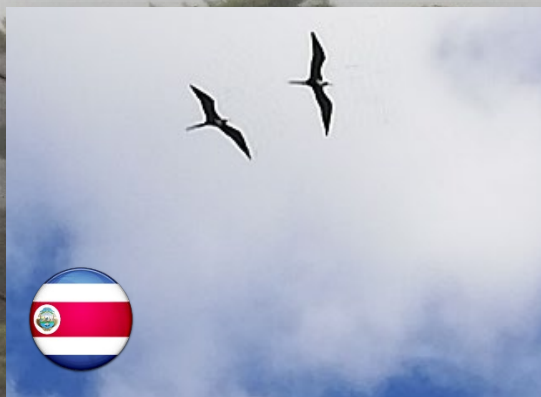
Images provided by courtesy of:
 HV TEST S.A. DE C.V.
 Programme sponsored by:
 HV TEST S.A. DE C.V.

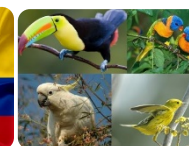




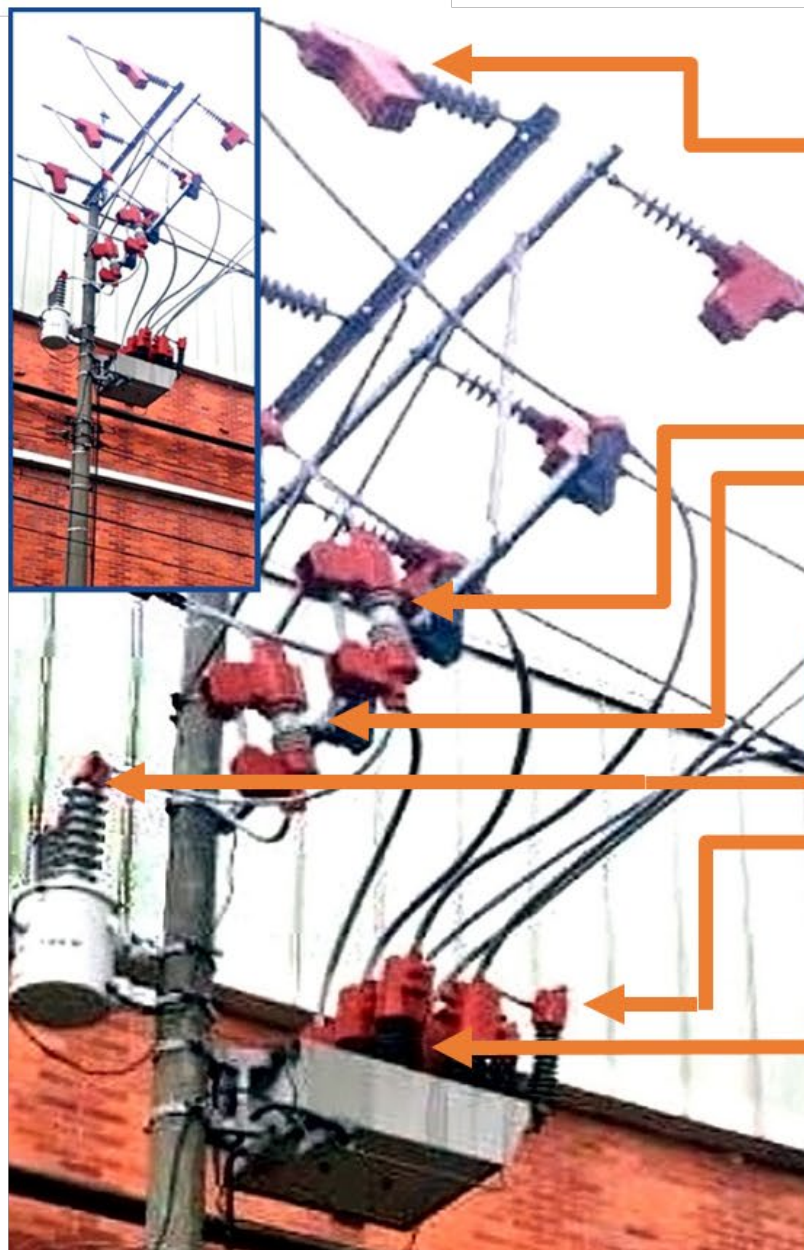
Installations using CAON-KORWI® Bird Protection Devices
SPAV - SWP - SPSF6 _ 36kV

LOCATION AND DATE:
SAN JOSÉ, GUANACASTE and CARTAGO. December 2019.
SCOPE OF APPLICATION:
Retrofitting of ANTI-ELECTROCUTION devices on lines with ANSI 52-3 LINE POST insulators and reclosers.





Montajes con Cobertores de Protección Antifauna de Silicona CAON-KORWI®



STSC-13

FORRO PARA USO EN GRAPAS DE AMARRE TIPO PISTOLA.



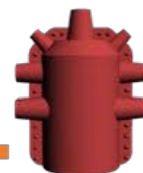
KIT SCUP-SCDW

FORRO PARA USO EN BORNES DE CORTACIRCUITOS FUSIBLES EN LÍNEAS-XS.



SPB

FORRO PARA BORNES DE ALTA TENSIÓN DE TRAFOS.



SPSF6

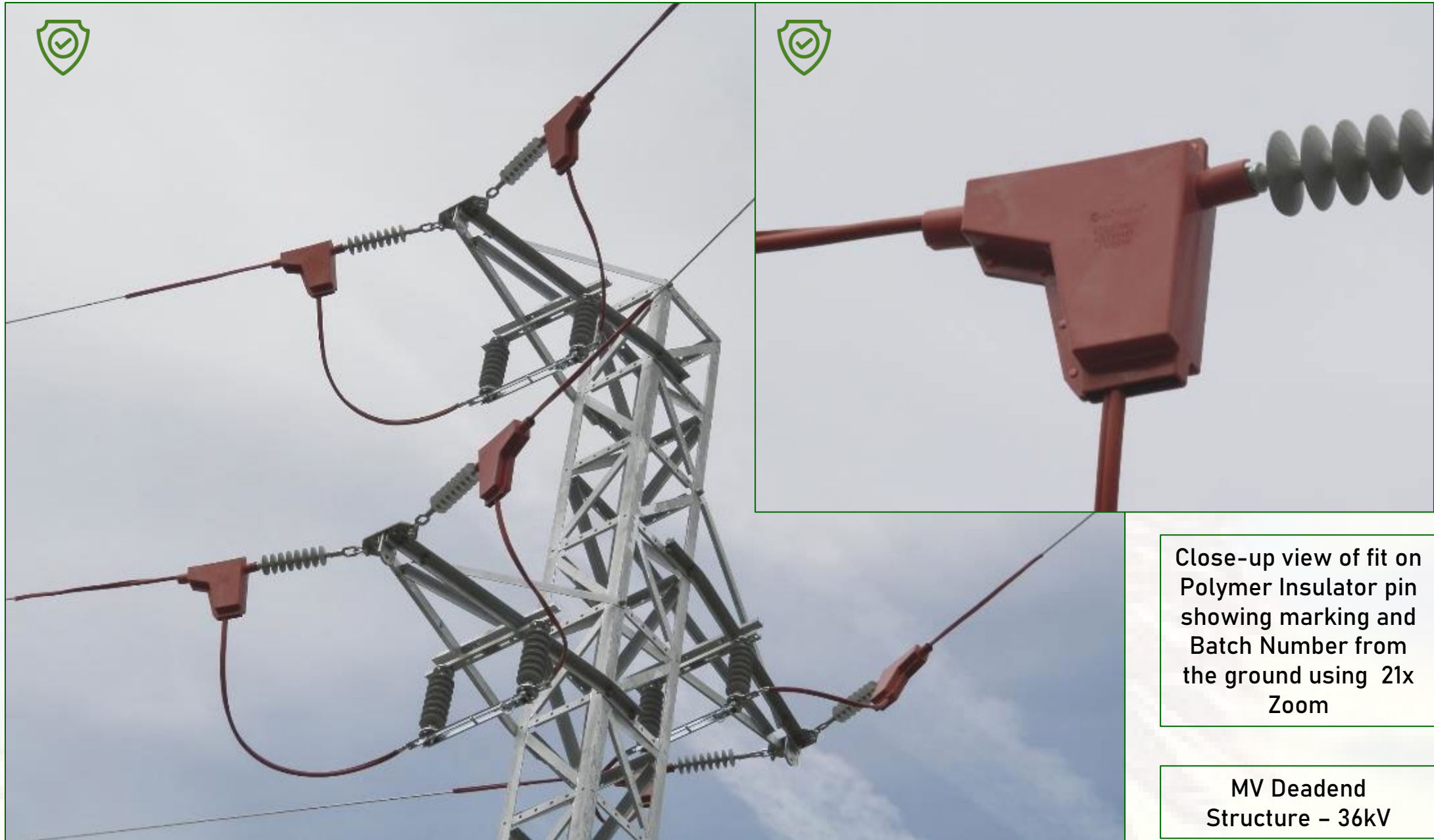
FORRO PARA BORNES OCR/INTERRUPTORES RECLOSERS-TRANSFORMADORES SUBESTACIÓN. SOPORTE DE BARRAS / PARARRAYOS.

<https://envertec.eu>

nacrec@envertec.eu

Tlfnº: +34 958 511 669





Close-up view of fit on
Polymer Insulator pin
showing marking and
Batch Number from
the ground using 21x
Zoom

MV Deadend
Structure - 36kV



SUPPLY HISTORY HIGHLIGHTS. ESTABLISHED PRODUCT.



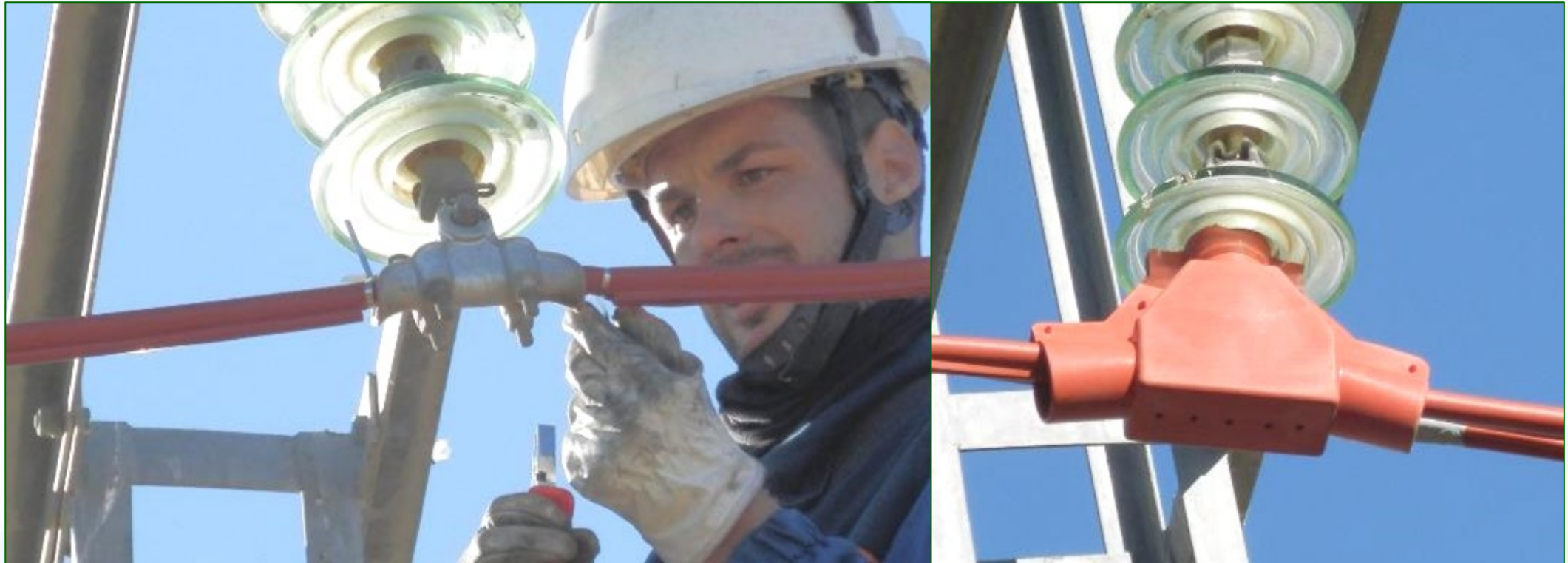
More than 14,500
deadend structures
protected with our
STSC – SWP covers



CAON®-KORWI® Silicone Covers
Perfect balance between
CONSISTENCY and FLEXIBILITY



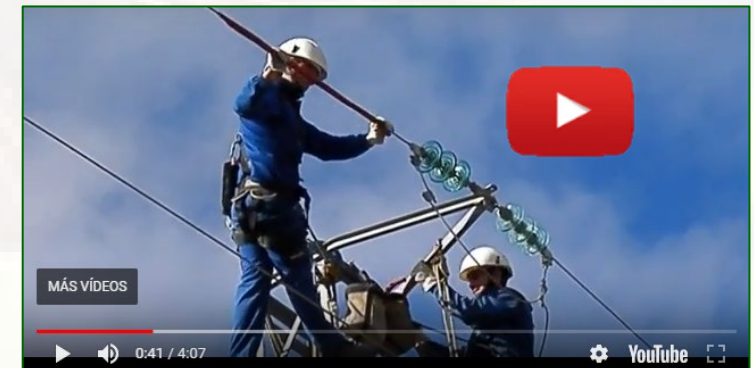
SUPPLY HISTORY HIGHLIGHTS. RESPONSIBLE MATERIAL.



More than 7,700
Tangent/Suspension
structures protected
with our SPSC –
SWP covers



CAON®-KORWI® Covers
SIMPLE RETROFITTING
ON SITE



SUPPLY HISTORY HIGHLIGHTS. ASSURED TRACEABILITY.

SWP Cover

Easy to trim and adapt straight on conductor even at low temperatures.

Secure and fast closing with no tools required

More than 304,000 metres of conductor protected with our SWP cover

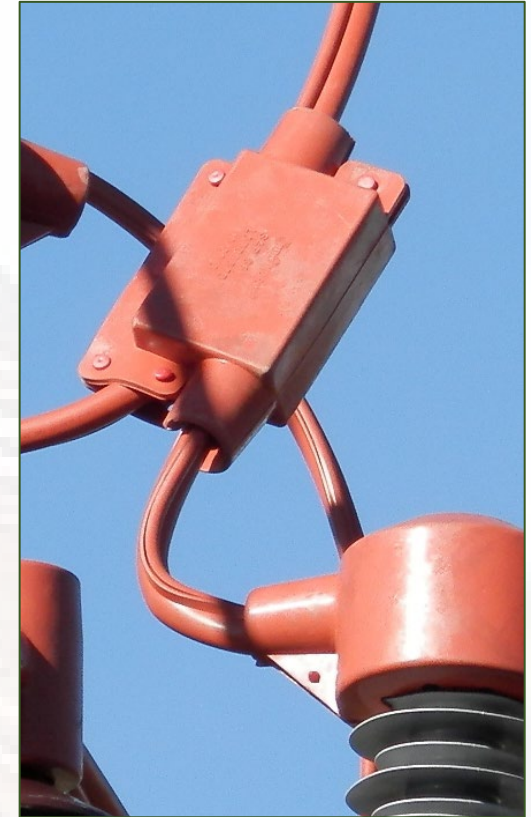
The *most sought-after* conductor cover due to its Safety, Flexibility, Swift Installation and Performance on Small Radius Curves

Contained dimensions and Streamlined Geometry to ensure they Remain in original location.



SUPPLY HISTORY HIGHLIGHTS. INNOVATION ON HIGH PERFORMANCE COVERS

More than 37,600
AMPACT type splices
protected with our
SAP covers



Highly flexible
covers, easy to
adapt on site

More than 23,000 medium
voltage valve surge
arresters protected with
our SPSA covers



SUPPLY HISTORY HIGHLIGHTS. SIMPLE AND SECURE CLOSURE SYSTEMS.

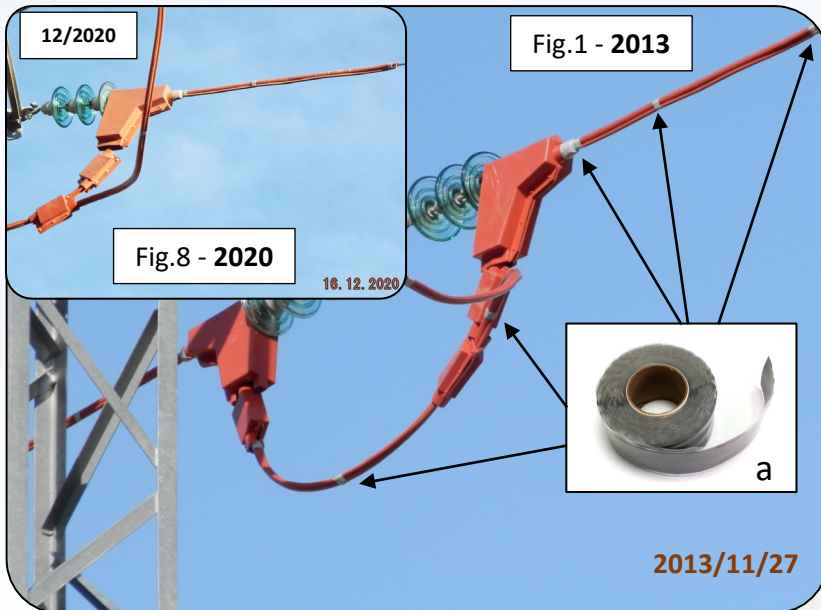


More than 3,200 MV Transformers protected with our SPP device



More than 1,100 High Danger Structures protected with our SPAV covers





SPECIFIC ADVANCED FORMULATION SILICONE.

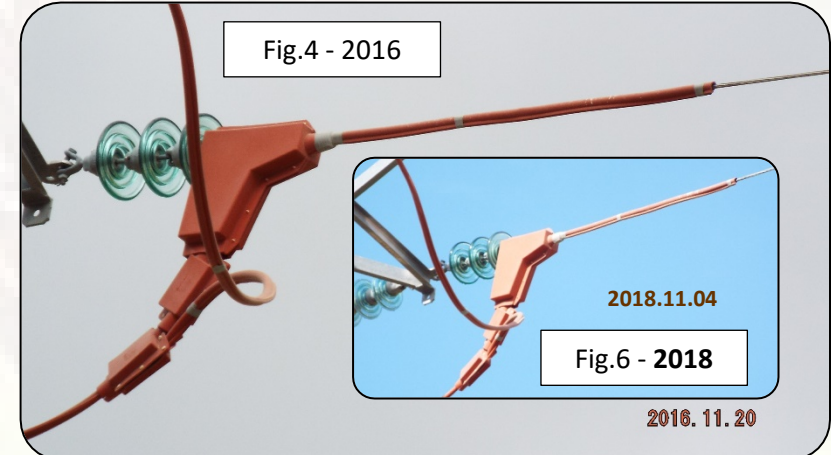
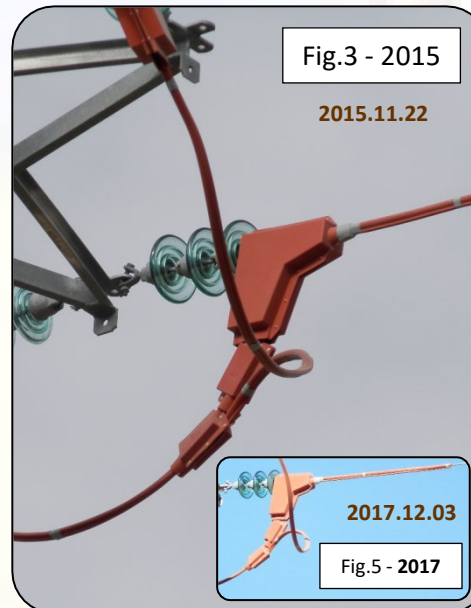
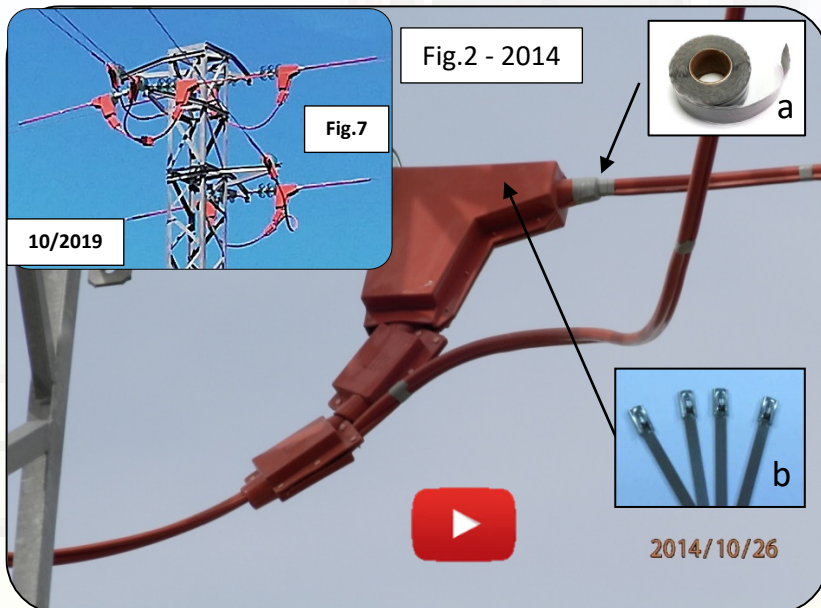
“ [...] the dielectric strength improves with ageing.“ (*)

The Ongoing Field Installation Performance Monitoring carried out by us over the past 8 years on our CAON®-KORWI® brand Silicone covers, together with the positive results in the recently carried out OZONE RESISTANCE tests according to IEC EN 60811-403:2012, as well as the remarkable Shore A Hardness and Dielectric Strength measurements obtained after passing the 1000h ACCELERATED WEATHERING test as per IEC EN 60243-1:2013(*) allow us to assure a **Unique and Outstanding Enduring Performance of our Covers.**

(*) The initial Dielectric Strength value of our silicone is 20kV/mm, which improves up to 23.14kV/mm after the test.

The initial Shore A hardness value is 69, which improves up to a Shore A value of 71 after passing the test. Source: Report dated April 2018 - CENTRO DE ENSAYOS INNOVACIÓN Y SERVICIOS - CEIS.

The use of utility approved fixing and closure securing elements in combination with the Mod. SWP Silicone protective cover ensures optimum performance of the installation, enduring over time. - Fig. 1: Use of self-welding silicone tape (a) on deadend phase. The application points are specified in the installation manual provided with each device. Fig. 2: Securing of SWP cover to the cone forming part of the Mod.STC clamp cover (a). Fig. 2: Use of self-welding silicone tape (a) and stainless steel fixing ties (b). The application points are specified in the installation manual provided with each device.



Figs. 1, 2, 3, 4, 5 & Fig. 6: Photos taken at one-year intervals of the same deadend phase: 2013 - 2014 - 2015-2016-2017-18-19-2020

Total absence of incidents or signs of weather degradation.





BIRD PROTECTION SYSTEMS FOR 15kV – 132kV MV / HV NETWORKS



THANK YOU

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Achilles Repto Registrado

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