RTI-ENVERTEC Ltd.

ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME:

Polymeric insulators

C3670EBAV_AR (TAM 300020)

36/70 EB A (TAM 300032)

PLANT:

Pol. Industrial La Fuente; Calle Huelva, Parcela 10, 18340 Fuente Vaqueros (Granada), Spain

in compliance with ISO 14025 and EN 50693

Program Operator	AENOR
Publisher	EPDItaly

Declaration Number	*Not present*
Registration Number	MR-EPDITALY0044
GlobalEPD registration code	GlobalEPD B62.12-001

Issue Date	2021 / 04/ 12
Valid to	2026 / 04/ 11

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

EPD ITALY

AENOR

Environmental Product Declaration

EN ISO 14025: 2010

EPDItaly 010

EN 50693: 2019

Polymeric insulators
C3670EBAV_AR (TAM 300020)
36/70 EB A (TAM 300032)

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EnverTec

RTI-ENVERTEC Ltd.

The EPD owner is solely responsible for its content, as well as for conserve the supporting documentation and justifies the data and statements included during the validity period.

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Life Cycle Analysis Report, November 2020, version 1.

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EPDItaly 010 EN 50693: 2019
Independent verification of the declaration and data, according to EN ISO 14025:2010 ☐ Internal ☒ External
Third party verifier AENOR

1. GENERAL INFORMATION

1.1. The company.

RTI-ENVERTEC Ltd. is a company with international presence, serious, socially responsible, dynamic and specialized in offering high quality and solvency products for Medium and High Voltage network.

With more than 25 years of experience in this field, RTI-ENVERTEC Ldt. is able to offer, from his Design and Technology Center in Granada -SPAIN-, specific engineering solutions for its three main product families:

- Polymeric insulators up to 400kV.
- Bird anti-electrocution protection.
- Medium voltage switchgear.

Following its philosophy of continuous quality improvement, coupled with commitment to launch effective solutions for High and Medium Voltage, RTI-ENVERTEC has its own research laboratory to carry out dielectric tests on its products, simulating actual service conditions, wich allows testing the behavior of future designs.

Currently, its products are exported and positively valued by its customers and distributors in Europe, South America and Africa.

1.2. Scope of EPD.

This environmental product declaration describes environmental information related to the life cycle of two types of polymeric insulators manufactured by RTI-ENVERTEC Ltd.:

- 36/70 EB A (TAM 300032)
- C3670EBAV_AR (TAM 300020)

The products studied accomplish their function as electronic devices capable of physically isolating the energy-carrying elements in high and medium voltage lines, avoiding power outages in the structure.

1.3. Life cycle and compliance.

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025: 2010, EN 50693: 2019 standards and the PCR indicated in table 1-1.

Table 1-1. PCR information.

Title	Electronic and electrical products and systems - insulators
Registration number	ItalyEPD 010
Issue Date	2020/03/16
Valid until	2025/03/15
Program administrator	EPDItaly

According to the PCR, the Life Cycle Analysis and the EPD document cover the following life cycle stages: manufacturing stage (upstream and core modules) A1-A3; distribution A4, use and maintenance B1-B7, and End of Life C1-C4 stages (downstream module).

Environmental statements published within the same product category, but from different programs, may not be comparable.

Environmental Declarations may not be comparable if data origin is different (e.g. databases), not all relevant information modules are included, or they are not based on the same scenarios.

Comparison of electrical and electronic products and systems should be done using the same functional unit.

2. PRODUCT.

2.1. Product description.

The products in this environmental declaration are the polymeric insulators manufactured by RTI-ENVERTEC S.L., C3670EBAV_AR (TAM 300020) and 36/70 EB A (TAM 300032), including its packaging.

The model 36/70 EB A (TAM 300032) is approved by ENEL according to the GSCC010 standard and the model C3670EBAV_AR (TAM 300020) is approved by EDISTRIBUCIÓN REDES DIGITALES in accordance with its GE AND012 standard.

Both insulators comply with the current national regulation for the protection against electrocution of birds (Royal Decree 1432/2008).

2.2. Product properties.

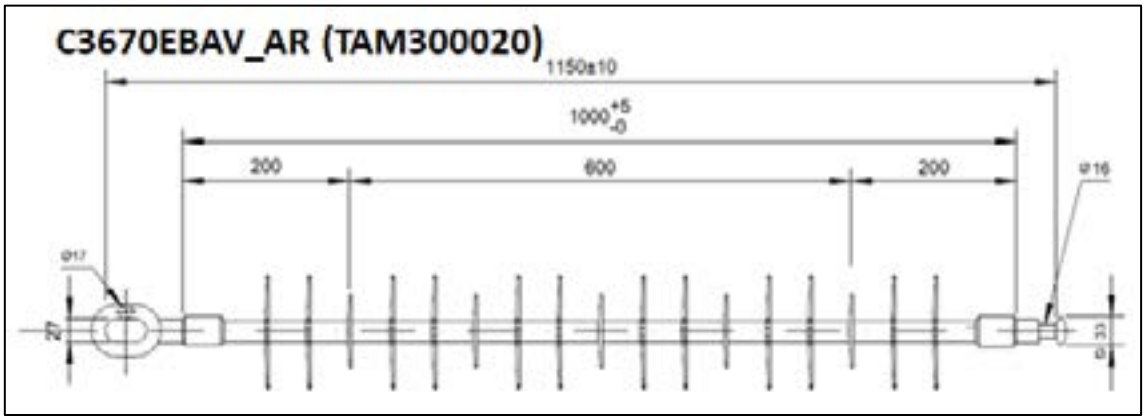
The manufacturer declares the following information on the technical specifications of the product:

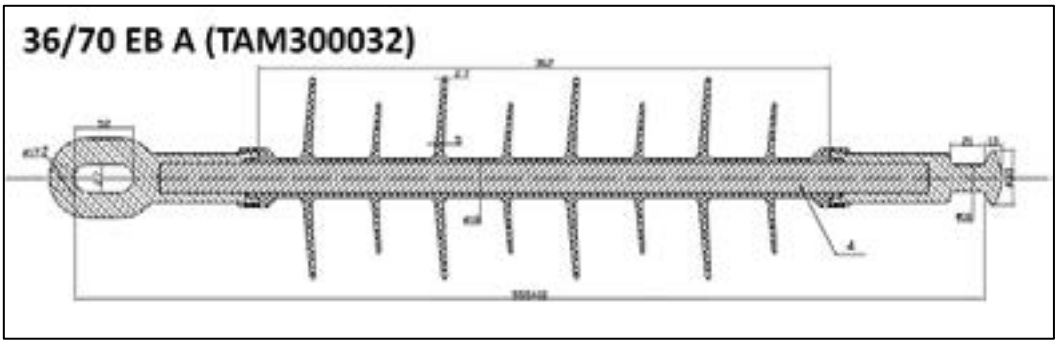
Table 2-1. Technical data.

		C3670EBAV_AR (TAM 300020)	36/70 EB A (TAM 300032)
Rated voltage (kV)		36	36
Minimum leakage distance (mm)		1350	980
Minimum protected leakage distance (mm)		1005	415
Mechanical load rating (kN)		70	70
Test voltages (kV)	1,2/50 BIL	200	170
	50 Hz/Wet	80	70

Table 2-2. Weight: insulators + packaging

	C3670EBAV_AR (TAM 300020)	36/70 EB A (TAM 300032)
Insulator weight (kg)	2,522	1,751
Packaging weight (kg)	0,44	0,523





2.3. Product composition.

Manufacturer's declared composition for each of the products is as follows:

Table 2.2 – Product composition.

Material	C3670EBAV_AR (TAM 300020)	36/70 EB A (TAM 300032)
Steel	35,69%	49,69%
Silicone	42,43%	35,41%
Fiberglass	17,61%	11,99%
Epoxy resin	2,38%	1,60%
Cured agent	1,90%	1,31%

2.4. Reference service life (RSL).

The Reference Service Life of the insulators is specified in the reference PCR: 20 years.

2.5. LCA study

This EPD is based on a “cradle to grave” Life Cycle Analysis, in accordance with the recommendations and requirements of the international standards ISO 14040: 2006 and ISO 14044: 2006. This EPD is developed under the criteria of the following PCR documents:

- PCR: EPDItaly 010. Electronic and electrical products and systems – Insulators. Issue date: 16/03/2020. Valid until 15/03/2025.
- PCR: EPDItaly 007. Electronic and electrical products and systems. Issue date: 20/01/2020. Valid until 19/01/2025.
- EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems.

3. LCA INFORMATION.

The LCA study for the EPD of polymeric insulators of RTI-ENVERTEC S.L., has been developed by the company Abaleo S.L. in 2020, with the databases and the most updated software version available at that time.

Production data from the production center ZHEJIANG GAONENG ELECTRIC INSTALLATION CO LTD., located in Jiedai Insutrial Park, Yueqing (China), were used to carry out the study. This data was provided by the distribution plant of RTI-ENVERTEC S.L. in Spain, located in the Polígono Industrial La Fuente, Calle Huelva, parcela 10, 18340 Fuente Vaqueros (Granada).

3.1. Life Cycle Analisis scope.

The scope of this EPD is the production, from cradle to grave, of the two bird protection insulators C3670EBAV_AR (TAM 300020) and 36/70 EB A (TAM 300032) for use in medium and high voltage networks and installations.

In the production of the polymeric insulators of Envertec S.L, the following stages have been studied:

Manufacturing stage (upstream and core modules) A1 – A3:

- Extraction and production of raw and auxiliary materials used in the production of insulators.
- Raw materials transportation to the production site.
- Energy consumption during the production process.
- Production of the finished product´s packaging.
- Management of waste from the entire insulators manufacturing process, including its transport to the disposal site.

Distribution stage (downstream module) A4: This module includes impacts related to:

• Transportation of the finished product from the production center in the People's Republic of China to the distribution center in Granada, Spain (Transport A).
• The transport of the finished product and its packaging from the distribution center in Granada to the place of use of the insulator (Transport B).

Installation stage (downstream module) A5: according to the PCR recommendations, the impacts related to the installation of the insulators are not relevant.

Use and maintenance stage (downstream module) B1-B7: the insulator is a passive component. Consequently, according to the PCR recommendations, the impacts related to the product's use stage of the insulators are not relevant. As far as maintenance is concerned, it can be assumed that there are no scheduled interventions during the product's service life.

End-of-life stage (downstream module) C1–C4:

- Disassembling/uncoupling operations on the insulator components. C1
- Transportation of the insulator to the collection site, distribution and destination of the various material flows to be sent for recycling or disposal. C2-C4.

The LCA has not included:

- The production of auxiliary materials used in the plant that represent between 0,004%

and 0,006% of the total weight of each insulator.

- The disassembly or uncoupling operations of the insulator components at the end of their service life.
- Infrastructure, nor other capital goods (service life is greater than 3 years).
- Staff work trips; or staff travels to work or from work.

3.2. Declared unit.

For the production of the polymer insulators of RTI-ENVERTEC Ltd. the declared unit is the production of one unit of insulator, including its packaging.

3.3. Allocation criteria.

In accordance with the criteria of the reference standard:

- Whenever possible, the product system has been expanded to avoid assigning environmental impacts to the co-products of multi-output unit processes, within the production process.
- When assignment was impossible to avoid, an assignment of the inputs and outputs of the system, based on mass, has been made. This criterion has been applied to estimate electricity consumption.

There are no by-products in the production process. It has not been necessary to apply economic allocation criteria.

3.4. Cut-off rule.

The LCA has included the gross weight/volume of all materials used in the polymeric insulator production process of RTI-ENVERTEC Ltd. except auxiliary materials representing between 0.004% and 0.006% by total weight of the functional unit. Consequently, the criterion of including at least 99% of the total weight of the products used for the declared unit is met.

Disassembly operations of insulator components at the end of their service life have not been considered.

There has been no exclusion of energy consumption.

3.5. Representativeness, quality and selection of data.

Production data from the RTI-ENVERTEC Ltd. factory in Yueqing (China) for 2019 (considered a period with representative data of the activity), have been used to modelize the manufacturing process of the two insulators. Data have been obtained from this plant on: consumption of materials and energy; transportation and waste generation and treatment. With this information, the LCA of the insulators production has been developed, differentiating the phases indicated in table 3-1:

Table 3-1. Life cycle stages.

Manufacturing stage A1-A3	Upstream module	Evaluated
	Core module	Evaluated
Distribution stage A4	Downstream module	Evaluated
Instalation stage A5		Not relevant
Use and maintenance stage B1-B7		Not relevant
End-of-life stage C1 –C4		Evaluated

When necessary, the Ecoinvent 3.6 (December 2019) and Environmental Footprint (EF) 2.0 databases were used, which are the most up-to-date versions available at the time of the LCA.

All the data used in the LCA, related to the production of the polymeric insulators in the Yueqing production site (China), have been

supplied through RTI-ENVERTEC S.L. plant in Fuente Vaqueros (Granada, Spain).

For the LCA inventory data, to model the LCA and to calculate the environmental impact categories requested by the Product Category Rule, SimaPro 9.1.1.1 software has been used, which is the most updated version available at the time of perform the LCA.

To assess the quality of the primary data used, a semi-quantitative data quality assessment criterion has been applied, as it is proposed by the European Union in its Product and Organisation Environmental Footprint Guide (PEF-OEF). The results obtained are shown below:

- Integrity – very good. 1 point.
- Methodological appropriateness and consistency (M) - good. 2 points.
- Time-related representativeness (TiR) - very good. 1 point.
- Technological representativeness (TeR) - good. 2 points.
- Geographical representativeness (GR) - good.2 points.
- Parameter uncertainty (P) - very good. 1 point

In accordance with this evaluation, the Data Quality Rating (DQR) of the dataset is: 9/6= 1,67, corresponding to an overall "excellent quality".

The quality rating is based on scoring from 1 to 5 each of the six criteria (lower punctuation means the best quality); and the final overall is obtained according to the following table:

Overall data quality level according to the achieved data quality rating

Overall data quality rating (DQR)	Overall data quality level
≤1.6	"Excellent quality"
>1.6 to≤ 2.0	"Very good quality"
>2.0 to ≤3.0[71]	"Good quality"
>3 to ≤4.0	"Fair quality"
>4	"Poor quality"

4. SYSTEM BOUNDARIES, SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION.

The scope of the study has been defined from cradle to grave, including the upstream, core process, and downstream modules.

4.1. Upstream processes.

The upstream module involves the extraction and production of raw materials, including waste management and the production of auxiliary materials, as well as their packaging, and the transport from suppliers to the production site.

4.2. Core process.

The core process considers the energy consumption associated with the insulators production process, the production of packaging and the generation of waste and its transport to the management site.

- Management of waste from the entire insulators manufacturing process, including its transport to the disposal site.

After a first evaluation and an exhaustive quality control of the materials received at the plant, the manufacturing process begins, which consists of the following stages:

- Manufacture of the insulator core. After selecting and adjusting the appropriate molds and the required amount of glass fibers, these are properly prepared into the mold and unified into into a single bundle. At the same time, the liquid mixture of epoxy resin and curing agent is made and, once these two elements are ready, the resin mixture is added to the mold with the fiber.
- Manufacture of silicone envelope. Through a high-temperature vulcanization process, the rubber, black smoke, aluminum gel and a small amount of vulcanizing agent are mixed. After mixing the components at the set temperature, they are left to rest for a defined minimum time, resulting in the raw silicone that is then cut for later use in the insulator coverings.

Tabla 4-1. Diagrama de proceso del ciclo de vida de los aisladores

INPUTS		OUTPUTS
• Steel. • Fiberglass. • Epoxy resin. • Cured agent. • Aluminum gel. • Black smoke. • Vulcanizing agent. • Pigment. • Fixing agent. • Electricity.	**Product stage A1-A3:** raw materials production; packaging production; transportation to the production center; production process; waste treatment. ↓ **Distribution stage A4:** transport A to logistic center; transport B to site of use. ↓ **Installation A5; use and maintenance B1-B7.** Not relevant ↓ **End-of-Life stage C1-C4.**	• C3670EBAV_AR (TAM 300020). • 36/70 EB A (TAM 300032). • Waste transportation to the point of management. • Waste management.

- Assembling the core with metal couplings. Steel parts are attached to both sides of the fiberglass and resin core, following the work instructions applicable to this phase of the insulator production process. Once assembled, it is cleaned and examined to verify that the dimensions meet the specification of the insulator to be manufactured and the established quality control instructions are applied. In this stage of insulator production, the traceability of the process is ensured through the identification (internal reference) assigned to each manufacturing batch of assembled cores.
- Silicone covering assembly. Through a vulcanization process, the cover is mounted on the pre-assembled core to the metallic couplings, obtaining at this stage the complete insulator. At the same time in this part of the process, an embossed marking is performed on the chosen area of the insulator.
- Packing. Insulators are packed in cardboard boxes separated by cork sheets, and the boxes are packed in plywood boxes. Once packed, the insulators are transported from the Yueqing production center in China to the Fuente Vaqueros distribution plant in Granada. In this plant, no additional conditioning or repackaging for the distribution of the product is made.

4.3. Downstream processes.

The downstream module includes the inputs and outputs associated with:

- Distribution:
  - Transportation from the production center in Yueqing, China, to the distribution center in Granada, Spain, considering the type of transport used: ship and truck.
  - Transport B: from the distribution center in Granada to the use site of the insulator, considering EURO5 truck transport an average distance of 300 km as indicated in the PCR.

- End of life:
  - Transportation of the insulators at the end of their servicel life to the collection site. A EURO5 truck transport has been considered at 50 km.
  - Transportation of the different materials to the waste manager and their treatment as waste: steel is sent for recycling and the rest of the components for final disposal. A EURO5 truck transport has been considered at a distance of 50 km.

5. ENVIRONMENTAL PARAMETERS DECLARATION OF LCA AND LCI.

The tables below show the results of the insulators LCA (Life Cycle Assessment) for each product.

5.1. C3670EBAV_AR (TAM 300020).

Tabla 5-1. Potential impacts to produce 1 unit of the C3670EBAV_AR (TAM 300020) insulator

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
GWP - TOTAL	kg CO_2 eq	15,32	11,85	1,11	3,87
GWP - fossil	kg CO_2 eq	15,24	11,84	1,11	3,87
GWP - biogenic	kg CO_2 eq	6,67E-02	5,82E-03	7,47E-05	7,08E-05
GWP - luluc	kg CO_2 eq	8,30E-03	2,67E-03	1,11E-05	1,20E-05
ODP	kg CFC-11 eq	5,72E-04	9,85E-08	2,39E-07	1,59E-08
AP	Mol de H+ eq	8,26E-02	5,97E-02	2,80E-02	9,36E-04
EP	kg PO_4 eq	1,34E-02	1,10E-02	2,47E-03	4,36E-04
POFP	kg NMVOC eq	4,86E-02	3,58E-02	1,98E-02	1,09E-03
ADPE	kg Sb eq	3,34E-04	7,21E-06	7,42E-08	1,64E-07
ADPF	MJ	147,24	100,84	14,65	9,32E-01
WSF	m^3 eq	43,20	1,52	-1,36E-03	1,94E-02

GWP - total: Global warming potential; **GWP - fossil**: Global warming potential - fossil fuels; **GWP - biogenic**: Global warming potential - biogenic; **GWP - luluc**: Global warming potential of land use and land use changes; **ODP**: Ozone depletion potential; **AP**: Acidification potential; **EP**: Eutrophication potential; **POFP**: Photochemical oxidant formation potential; **ADPE**: Abiotic depletion potential (ADP-elements); **APDF**: Abiotic depletio potential (ADP- fossil fuels); **WSF**: Water scarcity footprint.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

Tabla 5-2. Use of resources to produce 1 unit of the C3670EBAV_AR (TAM 300020) insulator

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
PERE	MJ, p.c.n.	15,23	28,31	1,96E-02	2,57E-02
PERM	MJ, p.c.n.	0,00	0,00	0,00	0,00
PERT	MJ, p.c.n.	15,23	28,31	1,96E-02	2,57E-02
PENRE	MJ, p.c.n.	161,41	103,89	14,68	9,60E-01
PENRM	MJ, p.c.n.	0,00	0,00	0,00	0,00
PENRT	MJ, p.c.n.	161,41	103,89	14,68	9,60E-01
SM	kg	0,00	0,00	0,00	0,00
RSF	MJ, p.c.n.	0,00	0,00	0,00	0,00
NRSF	MJ, p.c.n.	0,00	0,00	0,00	0,00
FW	m^3	1,74E-01	4,41E-02	6,92E-04	6,27E-03

PERE: Use of renewable primary energy excluding primary renewable energy resources used as feedstock; **PERM**: Use of renewable primary energy used as raw material; **PERT**: Total use of renewable primary energy; **PENRE**: Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM**: Use of non-renewable primary energy used as raw material; **PENRT**: Total use of non-renewable primary energy; **SM**: Use of secondary materials; **RSF**: Use of renewable secondary fuels; **NRSF**: Use of non-renewable secondary fuels; **FW**: Use of net fresh water

Tabla 5-3. Waste generated and output flows to produce 1 unit of C3670EBAV_AR (TAM 300020) insulator

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
HWD	kg	9,30E-05	1,23E-05	1,81E-05	9,30E-06
NHWD	kg	3,90	7,77E-01	1,24E-03	9,04E-02
RWD	kg	2,06E-04	5,88E-05	1,06E-04	4,90E-06
CRU	kg	0,00	0,00	0,00	0,00
MFR	kg	0,00	0,55	0,00	0,90
MER	kg	0,00	0,00	0,00	0,00
EEE	MJ	0,00	0,00	0,00	0,00

HWD: Hazardous waste disposed; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed; **CRU**: Components for re-use; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EEE**: Exported electrical energy; **EET**: Exported thermal energy.

5.2. 36/70 EB A (TAM 300032).

Tabla 5-4. Potential impacts to produce 1 unit of the 36/70 EB A (TAM 300032) insulator

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
GWP - TOTAL	kg CO_2 eq	10,34	6,63	8,51E-01	2,11
GWP - fossil	kg CO_2 eq	10,30	6,62	8,51E-01	2,11
GWP - biogenic	kg CO_2 eq	3,77E-02	6,31E-03	5,74E-05	3,88E-05
GWP - luluc	kg CO_2 eq	5,04E-03	2,60E-03	8,51E-06	6,54E-06
ODP	kg CFC-11 eq	3,26E-04	7,79E-08	1,84E-07	9,88E-09
AP	Mol de H+ eq	5,34E-02	3,38E-02	2,15E-02	5,27E-04
EP	kg PO_4 eq	7,89E-03	6,37E-03	1,90E-03	2,39E-04
POFP	kg NMVOC eq	3,14E-02	2,06E-02	1,52E-02	6,10E-04
ADPE	kg Sb eq	2,64E-04	4,68E-06	5,70E-08	8,94E-08
ADPF	MJ	96,53	57,96	11,25	5,81E-01
WSF	m^3 eq	38,33	1,05	-1,05E-03	1,05E-02

GWP - total: Global warming potential; **GWP - fossil**: Global warming potential - fossil fuels; **GWP - biogenic**: Global warming potential - biogenic; **GWP - luluc**: Global warming potential of land use and land use changes; **ODP**: Ozone depletion potential; **AP**: Acidification potential; **EP**: Eutrophication potential; **POFP**: Photochemical oxidant formation potential; **ADPE**: Abiotic depletion potential (ADP-elements); **APDF**: Abiotic depletio potential (ADP- fossil fuels); **WSF**: Water scarcity footprint.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

Tabla 5-5. Use of resources to produce 1 unit of the 36/70 EB A (TAM 300032) insulator.

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
PERE	MJ, p.c.n.	9,11	27,72	1,50E-02	1,40E-02
PERM	MJ, p.c.n.	0,00	0,00	0,00	0,00
PERT	MJ, p.c.n.	9,11	27,72	1,50E-02	1,40E-02
PENRE	MJ, p.c.n.	104,98	59,84	11,27	5,96E-01
PENRM	MJ, p.c.n.	0,00	0,00	0,00	0,00
PENRT	MJ, p.c.n.	104,98	59,84	11,27	5,96E-01
SM	kg	0,00	0,00	0,00	0,00
RSF	MJ, p.c.n.	0,00	0,00	0,00	0,00
NRSF	MJ, p.c.n.	0,00	0,00	0,00	0,00
FW	m^3	1,39E-01	2,83E-02	5,31E-04	3,41E-03

PERE: Use of renewable primary energy excluding primary renewable energy resources used as feedstock; **PERM**: Use of renewable primary energy used as raw material; **PERT**: Total use of renewable primary energy; **PENRE**: Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM**: Use of non-renewable primary energy used as raw material; **PENRT**: Total use of non-renewable primary energy; **SM**: Use of secondary materials; **RSF**: Use of renewable secondary fuels; **NRSF**: Use of non-renewable secondary fuels; **FW**: Use of net fresh water

Tabla 5-6. Waste generated and output flows to produce of 1 unit of the 36/70 EB A (TAM 300032) insulator

Indicator	Unit	Upstream module	Core module	Distribution module	End-of-life
HWD	kg	4,75E-05	9,85E-06	1,39E-05	5,25E-06
NHWD	kg	2,21	4,25E-01	9,52E-04	4,91E-02
RWD	kg	1,15E-04	4,10E-05	8,12E-05	3,20E-06
CRU	kg	0,00	0,00	0,00	0,00
MFR	kg	0,00	0,45	0,00	0,87
MER	kg	0,00	0,00	0,00	0,00
EEE	MJ	0,00	0,00	0,00	0,00

HWD: Hazardous waste disposed; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed; **CRU**: Components for re-use; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EEE**: Exported electrical energy; **EET**: Exported thermal energy.

6. ADDITIONAL ENVIRONMENTAL INFORMATION.

6.1. Amount and composition of packaging.

The composition and amount of packaging used in the distribution of the insulators is detailed below:

Tabla 6-1. Packaging composition - C3670EBAV_AR (TAM 300020)

Material	Type	Total (kg)	Number of insulators contained in the packaging	Quantity of packaging per insulator (kg/ud)
Plastic (EPS)	Primario	0,24	12	0,02
Board	Primario	1,44	12	0,12
Wood	Secundario	21,6	72	0,3

Tabla 6-2. Packaging composition - 36/70 EB A (TAM 300032)

Material	Type	Total (kg)	Number of insulators contained in the packaging	Quantity of packaging per insulator (kg/ud)
Plastic (EPS)	Primario	0,138	6	0,023
Board	Primario	1,02	6	0,17
Wood	Secundario	19,8	60	0,33

6.2. Results of ILCD 2011 Midpoint+ methodology.

As an additional environmental information of the product, the values obtained with the application of the environmental impact assessment methodology ILCD 2011 Midpoint+ are shown below. This methodology is proposed in the *Commission Recommendation 2013/179/EU of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations*.

The calculation of these indicators, which are shown in the following tables, is not part of the conformity with the European Standard UNE-EN 50693: 2019.

Values for the environmental impact categories considered in the applied methodology are shown in the following tables for the functional unit.

Tabla 6-3. Potential impacts to produce 1 unit of the C3670EBAV_AR (TAM 300020) insulator

Impact category	Unit	Upstream module	Core module	Distribution module	End-of-life
Climate change	kg CO2 eq	14,84	9,88	1,10	3,87
Ozone depletion	kg CFC-11 eq	7,63E-04	9,52E-08	1,89E-07	1,37E-08
Human toxicity, non-cancer effects	CTUh	2,48E-06	1,64E-06	6,34E-08	7,50E-07
Human toxicity, cancer effects	CTUh	1,17E-06	4,15E-07	1,49E-09	5,02E-08
Particulate matter	kg PM2.5 eq	1,30E-02	1,42E-02	1,05E-03	4,33E-05
Ionizing radiation HH	kBq U235 eq	6,03E-01	1,73E-01	6,50E-02	4,41E-03
Ionizing radiation E (interim)	CTUe	2,45E-06	4,74E-07	4,55E-07	2,42E-08
Photochemical ozone formation	kg NMVOC eq	4,65E-02	3,56E-02	1,97E-02	1,08E-03

Impact category	Unit	Upstream module	Core module	Distribution module	End-of-life
Acidification	molc H+ eq	8,26E-02	5,97E-02	2,80E-02	9,36E-04
Terrestrial eutrophication	molc N eq	1,62E-01	1,39E-01	7,76E-02	4,51E-03
Freshwater eutrophication	kg P eq	2,50E-03	2,09E-03	7,89E-06	6,10E-06
Marine eutrophication	kg N eq	1,53E-02	1,29E-02	6,98E-03	5,22E-04
Freshwater ecotoxicity	CTUe	62,76	39,45	1,19	64,38
Land use	kg C deficit	4,60	10,40	9,71E-03	7,03E-03
Water resource depletion	m3 water eq	1,48	2,03E-02	8,04E-05	2,08E-04
Mineral, fossil & ren resource depletion	kg Sb eq	8,71E-04	8,64E-06	3,13E-07	9,75E-07

Tabla 6-4. Potential impacts to produce 1 unit of the 36/70 EB A (TAM 300032) insulator

Impact category	Unit	Upstream module	Core module	Distribution module	End-of-life
Climate change	kg CO2 eq	10,04	4,83	8,46E-01	2,11
Ozone depletion	kg CFC-11 eq	4,35E-04	7,24E-08	1,45E-07	8,38E-09
Human toxicity, non-cancer effects	CTUh	1,45E-06	9,64E-07	4,87E-08	4,08E-07
Human toxicity, cancer effects	CTUh	6,63E-07	2,31E-07	1,14E-09	2,73E-08
Particulate matter	kg PM2.5 eq	8,42E-03	8,58E-03	8,04E-04	2,52E-05
Ionizing radiation HH	kBq U235 eq	3,52E-01	1,09E-01	4,99E-02	2,73E-03
Ionizing radiation E (interim)	CTUe	1,51E-06	3,25E-07	3,49E-07	1,55E-08
Photochemical ozone formation	kg NMVOC eq	2,96E-02	2,04E-02	1,52E-02	6,04E-04
Acidification	molc H+ eq	5,34E-02	3,37E-02	2,15E-02	5,27E-04
Terrestrial eutrophication	molc N eq	1,04E-01	8,01E-02	5,96E-02	2,51E-03
Freshwater eutrophication	kg P eq	1,38E-03	1,22E-03	6,06E-06	3,34E-06
Marine eutrophication	kg N eq	9,82E-03	7,34E-03	5,36E-03	2,89E-04
Freshwater ecotoxicity	CTUe	34,82	22,36	9,10E-01	34,99
Land use	kg C deficit	2,93	9,93	7,46E-03	3,87E-03
Water resource depletion	m3 water eq	1,34	1,12E-02	6,17E-05	1,13E-04
Mineral, fossil & ren resource depletion	kg Sb eq	7,43E-04	5,56E-06	2,40E-07	5,31E-07

7. REFERENCIAS

[1] PCR EPDItaly 010. Electronic and electrical products and systems - insulators. CPC 4621 “Electricity distribution or control apparatus”. Issue date: 16/03/2020. Valid until: 15/03/2025.

[2] PCR EPDItaly 007. Electronic and electrical products and systems, version 1.A. CPC 46 “Electrical machinery and apparatus”. Issue date: 20/01/2020. Valid until: 19/01/2025.

[3] General Instructions of the GlobalEPD Programme, 2nd revision. AENOR. February de 2016

[4] Regulations of the EPDItaly programme, v 4.0. Issue date 03/06/2019

[5] UNE-EN ISO 14025: 2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006)

[6] Norma UNE-EN ISO 14040: 2006. Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006).

[7] Norma UNE-EN ISO 14044: 2006. Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006).

[8] Life Cycle Analysis Report for EPD of insulators C3670EBAV_AR (TAM 300020) and 36/70 EB A (TAM 300032) for RTI-ENVERTEC Ltd. By Abaleo S.L. 2020.

[9] Commission Recommendation of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations (2013/179/EU).

[10] ILCD handbook (International Reference Life Cycle Data System). 2011

[11] Databases: Ecoinvent 3.6 (December 2019) and Environmental Footprint database 2.0.

[12] Environmental impact assessment methodologies applied through SimaPro 9.1.1.1

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