Environmental Product Declaration

In accordance with ISO 14025 and EN 50693:2019 for:

Distribution transformers (630kVa) COD 111101 630I/36/25 B2-GST001 MINERAL rev.04

From ***Ormazabal Cotradis Transformadores SLU.***

Programme:	EPD Italy *www.epditaly.it*
Programme operator:	EPD Italy
EPD registration number:	EPD ITALY 0363
Declaration number	EPD 001: COD 111101 630I/36/25 B2-GST001 MINERAL rev.04
Manufacturing site	Loeches, Madrid - Spain
Issue date:	2022-11-11
Valid until:	2024-05-11

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.epditaly.it

General information

Programme information

Programme:	EPD Italy
Address:	EPD Italy Via Gaetano De Castilla, 10; 20124 - Milano Italy
Website:	www.epditaly.it
E-mail:	info@epditaly.it

EN standard 50693 is the framework reference for the Product Category Rules (PCR)
Regulations of the EPDItaly Programme Rev 5.2 Product category rules (PCR): Core PCR EPD Italy007:20 Electronic and Electrical Products and Systems, revision 2 Sub PCR EPD Italy018:21 Electronic and Electrical Products Systems – Power Transformers, version 3.5
PCR review was conducted by: ICMQ S.p.A – Certificazioni e controlli per le costruzioni Moderator: Eng. Vito D'Incognito, Take Care International Sub PCR review was conducted by: ENEL S.p.A.; Life Cycle Engineering. Moderator: Massimo De Pieri, Lyfe Cycle Engineering
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☒ External ☐ Internal
Third party verifier: ICMQ S.p.A https://www.icmq.it/ (Via Gaetano de Castillia, 10, 20124 Milano MI, Italia) Owner of the EPD: Ormazabal Cotradis Transformadores SLU, Velatia. Contact of the EPD: Oscar Castejón Pinilla (ocp@cotradis.com) UN CPC code:46121
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Scope of application: Distribution transformer oil immersed. Code: COD 111101 630I/36/25 B2-GST001 MINERAL rev.04

As IO-EPD-01 dictates "the database used is regarded as representative on the basis of a comparative study, which examined the data for a reference product of the EPD Owner".

EPDs within the same product category but belonging to different programmes may not be comparable. EPDs of electronic and electrical products may not be comparable if they do not comply with EN 50693. For further information about comparability, see EN 50693 and ISO 14025.

Company information

Owner of the EPD: Ormazabal Cotradis Transformadores SLU, Velatia.
Description of the organisation:
Ormazabal Cotradis is an industrial company in the electricity business (Ormazabal) of Velatia.
Velatia, before Ormazabal Group, is a business group that provides solutions, products and services for such diverse fields as: electric grids, communication networks, transportation, security and intelligent infrastructure management.
On the market since 1967, Ormazabal has a profound knowledge of the sector enabling it to meet the present and future needs of power and renewable grids and contribute to its development with innovative solutions and its own technology.

Ormazabal Cotradis, as part of Velatia, is a company highly committed to Social Responsibility. In this regard, since 2002, Velatia is a member of the Spanish Network of the United Nations Global Compact, making commitments to align strategies and operations with the ten universally accepted principles concerning some thematic areas: human rights, labor standards, environment and anti-corruption.

Velatia is committed to society as an essential basis for the sustainable development of the group. This philosophy is reflected in the commitments to our customers, our people, to excellence, good governance and transparency, and to the environment.

As a sign of that commitment, Ormazabal Cotradis has implemented an Integrated Management System according to the standards UNE-EN ISO 9001, UNE EN ISO 14001 and UNE-EN ISO 45001, in addition to the voluntary commitments that have been taken on over the years.

Figure1.ISO 9001, ISO 14001, ISO 45001 *Certifications.*

The objective is that all the companies of Velatia offer their customers a quality service in a responsible and efficient manner, boosting the professional development of our personnel, supporting the development of the communities in which we operate, developing responsible technologies and products, and promoting initiatives that favor environmental protection.

Name and location of production site(s):
Ormazabal Cotradis. Pol. Ind. El Caballo, Parcela 56. 28890 Loeches. Madrid, Spain.
Contact:
Oscar Castejon Pinilla. Email: ocp@cotradis.com
More information: www.ormazabal.com

Product information

Product name: Distribution transformers 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)
Product description: This EPD covers the life-cycle analysis carried out of ORMAZABAL COTRADIS 630 kVas distributions transformers products for the geographical scope of Spain. The operating primary voltage is 25 kV.

Distribution transformers of ORMAZABAL COTRADIS

The declared unit is the distribution transformer to which all the manufacturing and use data of the company are referenced, so it is used to normalize the considered inputs, outputs and environmental impacts of the studied product system.

The declared unit is:

- Distribution transformer 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)

The reference transformer for the geographical areas is underlined.

Country	Code	Name/Ref	Power
Spain	111101	630I/36/25 B2-GST001 rev.04 (111101 T)	630kvas

UN CPC code: 46121

LCA information

Declared unit: The declared unit is the baseline reference for which all information is collected. In this study, the declared unit is **"1 unit of distribution transformer 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)".** Its weight is **2181,61kg**
Reference service life: The lifetime of 35 years has been considered for these products.
Geographical scope: The geographical scope of this EPD is **Spain**.
Time representativeness: The data collection from factory (primary data) and electricity mix are from 2021/01/01 to 2021/12/31. In this study, no datasets older than 10 years were used.

Database(s) and LCA software used: All the data used to model the process and obtain the Life Cycle Inventory are specific data and have been obtained by measurements made during the period from 2021/01/01 to 2021/12/31. They are representative of the different processes implemented during the manufacturing process. The data has been measured directly at the company's own premises. In addition, the most complete and highest quality European life cycle inventory database, Ecoinvent 3.8, has been used, as this database contains the most extensive and updated information and its scope coincides with the geographical, technological and temporal area of the project. The LCA was modelled with Simapro 9.3.0.3.

Description of system boundaries: The limits of the system have been defined following the indications of the PCR EPDItaly007 – PCR for electronic and electrical product and systems. This PCR refers to the-EN 50693 standard which defines the limits as various scopes in terms of the selected system limits depending on the declared unit.

System diagram:

Manufacturing stage		Distribution stage	Installation stage	Use & Maintenance stage	De-installation / End-of-life stage
Upstream module	Core module	Downstream module			
X	X	X	X	X	X

X: Module included
MND: Module Not Declared

Manufacturing process:
The manufacturing process is divided into the following stages:
Raw materials are transported to the ORMAZABAL factory where they are stored. Raw materials are stored in its packaging.
Once the material required for the manufacture of the distribution transformers is available at the plants, the first process is carried out in parallel. At the same time as the aforementioned sheet metal cutting, the high-voltage and low-voltage windings are wound so that they can be joined together in a subsequent process.
The low-voltage winding is done with the MMPP from the warehouse, and each of these coils is created from layers of conductors and insulating paper. The structure of each of the transformers is product-specific, i.e. they can have more or less layers of conductors and paper.

The high-voltage winding is made from the low-voltage winding. Once the low-voltage winding is made, the low-voltage winding is taken and different layers of conductors and paper insulation are added to create the high-voltage winding.

Once you have the different parts (cut magnetic sheet core and coils) you start to assemble them. The core is put inside the different coils and the butt, the cover and the different necessary accessories are closed.
Once this process has been completed, the transformer is placed in curing process to cure so that the active part of the paper heats up.
After the curing process, it is encased and placed in the vacuum hood. A vacuum is created by means of pumps and when it reaches the necessary pressure, without breaking the vacuum, the dielectric oil is added.
It is left to rest and 100% of the transformers manufactured are subjected to various quality tests, which, once passed, the final product is packaged, accessories are fitted and the distribution transformer is finished.
The finished product is sent to a logistics centre for distribution.

On the other hand, the tank is welded and painted. The tank is purchased spot-welded (with only a few welding spots) and the cover is made by laser cutting. At Ormazabal factory, the tank and its accessories are fully welded to make it absolutely watertight. To check the integrity of the weld, a fluorescent liquid is added and the tank is inspected for leaks. In addition, a shot blasting process based on micro metals is carried out to make it ready for painting.
The painting is done in two phases: a primer phase and a final immersion finishing phase (the interior is not painted)
For this painting process, layers of paint are added and dried in the oven.

Author of the Life Cycle Assessment:
IK ingenieria
Av. Cervantes 51,Edif. 10, panta 5, dpto.
48970 Basauri, Bizkaia (Spain)

Data quality
The environmental impact of the decorative renders has been calculated. It is based on the international standards established for the development of environmental product declarations, such as ISO 14025 for the preparation of the environmental product declaration, ISO 14040 and ISO 14044 for the preparation of the life cycle analysis, -EN 50693 and the Product Category Rules PCR - Core PCR EPD Italy007:20 Electronic and Electrical Products and Systems, revision 2.

Data has been collected from 2021/01/01 to 2021/12/31 and is representative of that year. Data for raw material supply, transport to fabrication plant and production is based on specific consumption data for the factory at Loeches. Generic background datasets were used for the downstream processes. SimaPro v9.3.0.3. software was used to prepare the life cycle analysis together with the Ecoinvent 3.8 database. Characterization factors from -EN 50693.

The geographical coverage is **Spain**. Technological coverage is typical or average.

Assumptions

The modularity principle, as well as the polluter-payer principle have been followed. The following assumptionshave been made in this EPD:

- ✓ It does not include the manufacturing processes of the capital goods or spare parts and/or maintenance with a life of more than three years.
- ✓ An allocation has been made for energy and waste, based on kVa of total company production.
- ✓ The impact caused by people (common activities, travel for work...) will not be considered.
- ✓ It does not include the consumption of natural gas for sanitary hot water from showers and heating system for the comfort of people.
- ✓ The processes associated with fuel production are intrinsically included in the indicators in ECOINVENT's database used in carrying out the LCA.
- ✓ The environmental impact of external transport has been calculated using lorries from the ECOINVENT 3.8 database, EURO 5. These lorries have been selected to reflect the most realistic scenario possible.

Cut-off rules

The ISO 14025 standard and the PCR 2020 EPD Italy 007 Electronic and electrical products systems indicate that the life cycle inventory data must include a minimum of 95% of the total inputs (material and energy). In this study, no such cut-off criteria has been taken into account.

Allocation

It has not been necessary to make any load allocation between products and co-products. Where necessary the consumption of materials and energy, as well as machine maintenance and auxiliary materials, have been allocated for each of the transformers produced.

Greenhous gas emission from the use of electricity in the manufacturing phase

Specific electricity mix, medium voltage (direct emissions and losses in grid) electricity is considered for the manufacturing process. 100% of the energy consumed in the installations is of renewable origin.

The impact of the electricity consumed is electricity from the supplier that Ormazabal Cotradis uses. An ad hoc indicator has been created to show its environmental profile.

The table below shows the impact associated with 1 kWh from this electricity supplier.

Electricity mix	Amount	Units
Specific electricity mix	0,0449	Kg CO2-eqv/kWh

LCA Scenarios and additional technical information

Distribution and use phase:

All transformers sold by Ormazabal are distributed through the logistics centre located in Alovera. From this point the product is dispatched to the end customer.

Installation phase:
For this reason, in this stage of the life cycle, only the waste treatment for packaging will be considered. It is estimated that the end-of-life treatment percentages for packaging are as follows:

Polystirene foam: 6,7% recycling and 93,3% landfill.

Palet (wood): 30% recycling and 70% landfill.

Use phase:
In this phase only electricity losses occur, no maintenance, replacements or operational energy use is applicable for this transformer as the transformers are designed to operate 35 years without replacement of parts. In case of the unlikely event of failure, the transformer is replaced completely. Electricity consumption is calculated according to the formula from the PCR EPD Italy – Power Transformers.

End of life:
For the end of life, Ormazabal provides an extensive disassembly manual in which the guidelines to be taken for each of the end of life stages are given.
** For more detailed information on this life cycle concept, please contact the person in charge of this EPD.*

Dismantling/demolition:
Since the main part of the dismantling is handmade, the energy consumption of this phase is considered not relevant.

Transport:
With a 100% collection rate and in order to create a conservative and realistic end-of-life scenario, the transport of end-of-life product to the final handler by truck over a distance of 100 km has been simulated. Transports are carried out by truck (EURO 5).

Waste processing:
Ormazabal Cotradis attaches an additional circularity obligation file to all its transformer sales. This study includes a complete and extensive manual on the necessary management to be carried out once the equipment has reached its end of life. This study concludes in several results for transformers of different kva. Assuming that the percentage that is not recycled ends up in landfill the values obtained for the end-of-life scenarios are as follows

Management	Percentage (%)
Recycling	77,27
Landfill	22,73

Content information

Component	Material	ID of IEC62464	111101. 630I/36/25 B2-GST001 rev.04 (111101 T)	Weight (kg)
Chapa magnética de grano orientado	Grain oriented steel	M-100	44,83%	9,78E+02
Banda de aluminio	Aluminium	M-120	6,56%	1,43E+02
Hilo de aluminio esmaltado	Aluminium	M-120	8,67%	1,89E+02
Conductores de cobre trenzado	Copper	M-121	0,24%	5,20E+00
Papel diamantado	Paper	M-341	2,98%	6,50E+01
Cartón Pressphan	Carboard	M-399	0,78%	1,70E+01
Madera prensada	Wood	M-340	0,14%	3,00E+00
Chapa de acero	Steel	M-119	12,70%	2,77E+02
Resina epoxy	Epoxy resin	M-302	0,28%	6,20E+00
Poliamida	Polyamide	M-208	0,27%	5,96E+00
Cobre	Copper	M-121	0,05%	1,00E+00
Aceite vegetal	Oil (vegetal/mineral)	M-410	19,29%	4,21E+02
Elementos de acero	Steel	M-119	1,50%	3,28E+01
Elementos de poliamida	Polyamide	M-208	0,17%	3,60E+00
Ruedas de acero	Steel	M-119	0,70%	1,52E+01
Placa característica de acero inoxidable	Stainless steel	M-100	0,01%	2,00E-01
Soporte placa característica de acero inoxidable	Stainless steel	M-100	0,05%	1,00E+00
Others (consumibles)	Adittives, Paint	M-449	0,78%	1,81E+01

Packaging: The product is transported to the customers packed, in pallets protected with foam.

There is no substance affected by REGULATION (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

Environmental Information

Potential environmental impact – mandatory indicators according to EN 50693:

Results per declared unit							
***Distribution transformer* 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)**							
Category	**Unit**	**TOTAL**	**Manufacturing**	**Distribution**	**Installation**	**Use**	**End of life**
GWP - Fossil	kg CO2 eq.	3,08E+05	1,18E+04	2,10E+02	1,13E-01	2,96E+05	4,15E+01
GWP-biogenic	kg CO2 eq.	1,29E+03	5,73E+01	1,51E-01	8,69E-04	1,23E+03	7,11E-02
GWP-luluc	kg CO2 eq.	2,40E+03	1,80E+01	9,25E-02	1,14E-04	2,38E+03	1,95E-02
GWP-total	kg CO2 eq.	3,11E+05	1,19E+04	2,11E+02	1,14E-01	2,99E+05	4,16E+01
ODP	kg CFC 11 eq.	1,95E-02	1,02E-03	4,77E-05	3,44E-08	1,84E-02	9,98E-06
AP	mol H+ eq.	2,60E+03	7,25E+01	1,69E+00	9,54E-04	2,53E+03	1,91E-01
EP-freshwater	kg P eq.	1,12E+02	4,11E+00	1,26E-02	3,28E-05	1,08E+02	3,85E-03
POCP	kg NMVOC eq.	1,18E+03	5,39E+01	1,42E+00	1,03E-03	1,12E+03	1,96E-01
ADP-minerals&metals*	kg Sb eq.	6,01E-01	2,55E-01	6,70E-04	3,69E-07	3,45E-01	1,43E-04
ADP-fossil*	MJ	7,14E+06	1,55E+05	3,11E+03	2,65E+00	6,98E+06	6,71E+02
WDP	m3 deprive	2,00E+05	3,99E+03	8,84E+00	1,16E-01	1,96E+05	6,99E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Use of resources

Results per declared unit							
Distribution transformer 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)							
Category	**Unit**	**TOTAL**	**Manufacturing**	**Distribution**	**Installation**	**Use**	**End of life**
PERE	MJ	1,59E+06	5,22E+03	4,11E+01	4,54E-02	1,58E+06	9,82E+00
PERM	MJ	1,91E+04	1,91E+04	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,60E+06	2,43E+04	4,11E+01	4,54E-02	1,58E+06	9,82E+00
PENRE	MJ	7,14E+06	1,55E+05	3,11E+03	2,66E+00	6,98E+06	6,71E+02
PENRM	MJ.	3,16E+02	3,16E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	7,14E+06	1,55E+05	3,11E+03	2,66E+00	6,98E+06	6,71E+02
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,99E+03	1,14E+02	3,27E-01	2,81E-03	2,88E+03	1,91E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

Waste production

Results per declared unit							
Distribution transformer 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)							
Category	**Unit**	**TOTAL**	**Manufacturing**	**Distribution**	**Installation**	**Use**	**End of life**
Hazardous waste disposed	kg	6,60E+00	4,11E+00	7,50E-03	4,11E-06	2,48E+00	1,62E-03
Non-hazardous waste disposed	kg	3,47E+04	7,39E+03	1,42E+02	1,08E+01	2,66E+04	5,25E+02
Radioactive waste disposed	kg	5,45E+01	5,23E-01	2,11E-02	1,59E-05	5,40E+01	4,44E-03

Output flows

Results per declared unit							
Distribution transformer 111101. 630I/36/25 B2-GST001 rev.04 (111101 T)							
Category	**Unit**	**TOTAL**	**Manufacturing**	**Distribution**	**Installation**	**Use**	**End of life**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,85E+03	1,54E+02	0,00E+00	4,52E+00	0,00E+00	1,69E+03
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

References

- EPDItaly, 2022/02/16. Regulations of the EPDItaly Programme. Revision 5.2.
- EPDItaly007, 2020/10/21. Electronic and Electrical Products and Systems. Rev 2. core-PCR.
- EPDItaly018, 2021/12/13. Electronic and Electrical Products and Systems – Power Transformers. revision v. 3.5. sub-PCR.
- ISO 14020:2000 Environmental labels and declarations-General principles.
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures.
- ISO 14040:2006 Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006 Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- UNE-EN 50963. Product category rules for life cycle assessments of electronic and electrical products and systems
- LIFE CYCLE ANALYSIS. Distribution Transformers, produced at the Loeches plant, according to ISO 14040 and ISO 14044. Oct 2022
- Operating instructions – IO -EPD – 01. 2022/07/20

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