



Bitron Electronics S.p.A
A Bitron Group Company



ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME

CERS3

SITEs

sp, ul. Jednosci 46, 41-218 Sosnowiec - Poland

Strada del Portone, 95 - 10095 Grugliasco (TO)- Italy

In accordance with ISO 14025 and EN 50693

| | |
|------------------|-----------|
| Program Operator | EPDIItaly |
| Publisher | EPDIItaly |

| | |
|---------------------|--------------|
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GENERAL INFORMATION

| EPD OWNER | |
|--|---|
| Name of the company | Bitron Electronics S.p.A |
| Registered office | Strada del Portone, 95 - 10095 Grugliasco (TO) |
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| PROGRAM OPERATOR | |
| EPDIItaly | Via Gaetano De Castillia n° 10 - 20124 Milano, Italy |
| INFORMATION ON THE EPD | |
| Product name | CERS3 |
| Site (s) | ul. Jednosci 46, 41-218 Sosnowiec – Poland Strada del Portone, 95 - 10095 Grugliasco (TO)- Italy |
| Short description and technical information of the product (s) | Multi-phase meter Cers 3 is a device for supply control of electrical energy, produced by Bitron Electronics S.p.A exclusively for Gridspertise S.r.l. and following Gridspertise technical specifications. |
| Field of application of the product | Measure of electric energy consumption. |
| CPC Code (number) https://unstats.un.org/unsd/classifications/Econ | 4621 « electricity distributor or control apparatus » |
| VERIFICATION INFORMATION | |
| PCR (title, version, date of publication or update) | Core-PCR: EPDITALY007 " Electronic and electrical product and systems" Rev. 3.1 del 12/11/2024 Sub-PCR: EPDITALY011 "Electronic and electrical product and systems -Meters" Rev. 0 del 16/03/2020 UNI EN 15804:2012+A1:2013+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products |
| EPDIItaly Regulation (version, date of publication or update) | Regolamento EPDITALY, Rev 6, del 31/10/2023 |
| Project Report LCA | LCA Report CERS 3 |
| Independent Verification Statement | The PCR review was performed by XXXX - info@epditaly.it. Independent verification of the declaration and data, carried out according to ISO 14025: 2010. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External Third party verification carried out by: ICMQ S.p.A., via Gaetano De Castillia n° 10 - 20124 Milan, Italy. Accredited by Accredia. |
| Comparability Statement | Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804: 2012 + A2: 2019. |
| Liability Statement | The EPD Owner releases EPDIItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDIItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment. |

Introduction

This document represents EPD report of product CERS3 produced by Bitron Electronics S.p.A in compliance with EPDItaly program and related regulation. This report is developed in compliance to ISO 14025 aimed to provide rules for development, verification, and publication of Environmental Product declarations.

This study is compliant with “PCR EPDItaly011 – Meters”, which identifies the goal, scope, application field of information rules for production of environmental information, life cycle phases to be included in the study, parameters considered, how to collect those parameters and how to perform communication on the report.

Organization

Bitron Group is an Italian international corporation that helps companies to design and realize innovative solutions by guiding them in research, development and production of mechatronic components and systems for automotive, home appliance, heating & ventilation, eV-charging, energy measurement and management.

Bitron Group's global presence extends with several plants located in Italy, China, Poland, Mexico, Turkey, and Spain, as well as commercial offices situated in France, Spain, Brazil, Germany, the United States, China, Turkey, and Mexico.

The company also has multiple technical research sites, located in Italy, Germany, and Romania, in addition to one after-market site in Italy.

Scope and goal of EPD

This is a specific product EPD of multi-phase meter CERS3: a device for supply control of electrical energy, produced by Bitron Electronics S.p.a exclusively for Gridspertise S.r.l. and following Gridspertise technical specifications.

The study includes all phases of life cycle from extraction of raw material to the disposal including recycling processes, reuse and/or recovery of materials at the end-of-life as secondary raw materials.

It was adopted a “cradle to grave” approach and calculation was performed with software OpenLCA v2.2 with database Ecoinvent 3.10. To enhance the accuracy of the model, the Ecoinvent database has been enriched with

new datasets/processes related to purchasing components/goods that are part of the beat_database (bitron eco assessment tool) supplementary to Ecoinvent v.3.10.



The modules included into evaluation are defined in accordance with PCR011 and are shown in Table 1.

Table 1. System boundaries in accordance with PCR011

| Manufacturing STAGE | | DISTRIBUTION STAGE | INSTALLATION STAGE | USE & MAINTENANCE STAGE | END OF LIFE STAGE |
|---|---|-----------------------------|--------------------|-------------------------|-------------------|
| UPSTREAM MODULE | CORE MODULE | DOWNSTREAM | | | |
| Extraction of raw materials, including waste recycling processes and the production of semi-finished and ancillary products | Manufacturing of the product constituents, including all the stages | IN ACCORDANCE WITH EN 50693 | | | |
| Transportation of raw materials to the manufacturing company | Product assembly | | | | |
| | Packaging ¹ | | | | |
| | Waste recycling processes | | | | |

Functional unit

The functional unit object of the study is 1 single device designed for the monitoring of electric energy consumption from first measure to 20 years of life.

Product and processes description

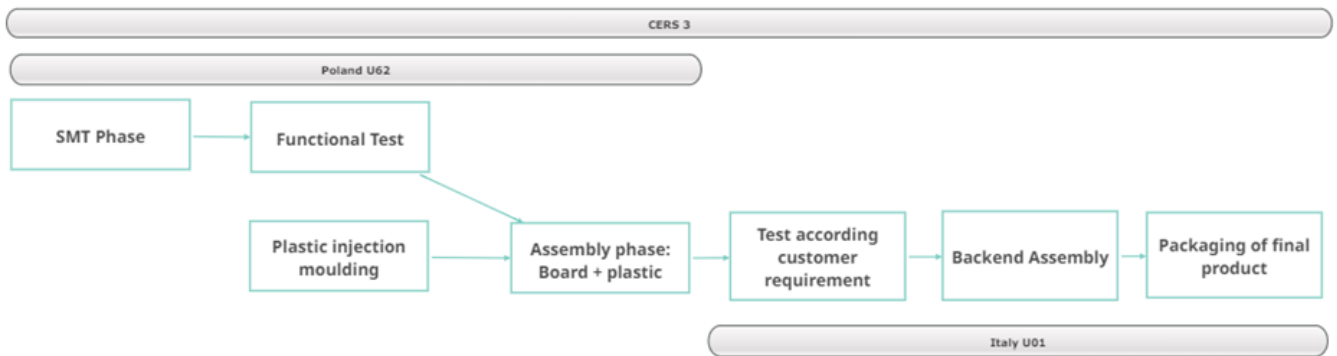
Meter Cers3 is a device for supply control of electrical energy. The meter allows detailed access to consumption information, in particular: it checks how much electricity has been consumed, divided into various time slots and it examines the trend of daily consumption in detail.

Production of meter consist of 3 main processes due to complexity of components that compose the meter itself:

1. The process involving the assembly of electronic parts on printed circuit board (PCB), called SMT phase, takes place at the plant in Poland (U62). In this plant components are assembled and soldered on the electronic boards. The line is completely automatic and provides full traceability and MLS automatic control (Moisture sensitivity level refers to packaging and handling precaution of some semiconductor), 3D inspection of soldering paste, test in-line ICT e AOI (2D/3D), X-ray test.

¹ Only Boxing, while raw material is considered upstream.

2. The moulding process of the plastic components is carried out at the plant in Poland (U62) with injection presses and all moulded parts are subjected to dimensional and aesthetic checks, if applicable.
3. Plastic and electronic components are assembled at Poland plant (U62). The assembly line is semi-automatic. Semifinished product is packed and sent to Italy plant (U01). At Italy plant the meter is tested according to customer specification in order to obtain certifications as required by the legal requirements. Finally, the meter is closed, packed in containers and sent to the customer sorting centre or customer warehouse.



Component and characteristics of product

The characteristic data of the meter are:

| Technical specification | Value |
|---|--|
| Nominal voltage | 3x230/400V |
| Frequency | 50 Hz |
| Performance class according to reference standard | Class C, Class 2 |
| Current intensity | $I(\min) = 0.05A$, $I_b (I_{ref}) = 5A$, $I(\max) = 20A$ |

Based on our current knowledge and verification:

- We have detected a presence greater than 0.1% wt/wt of substances included in "Candidate List of SVHC" (number of Substances on list: 241, last updated: June 27, 2024) (see Table 2).
- The listed groups of restricted substances in the current version of the European Directive 2011/65/UE (RoHS II) (and last updating 2015/863/UE) and 2011/37/UE (ELV) and their implementations, are not contained or are contained only in homogeneous proportions below the tolerance/exemption values.

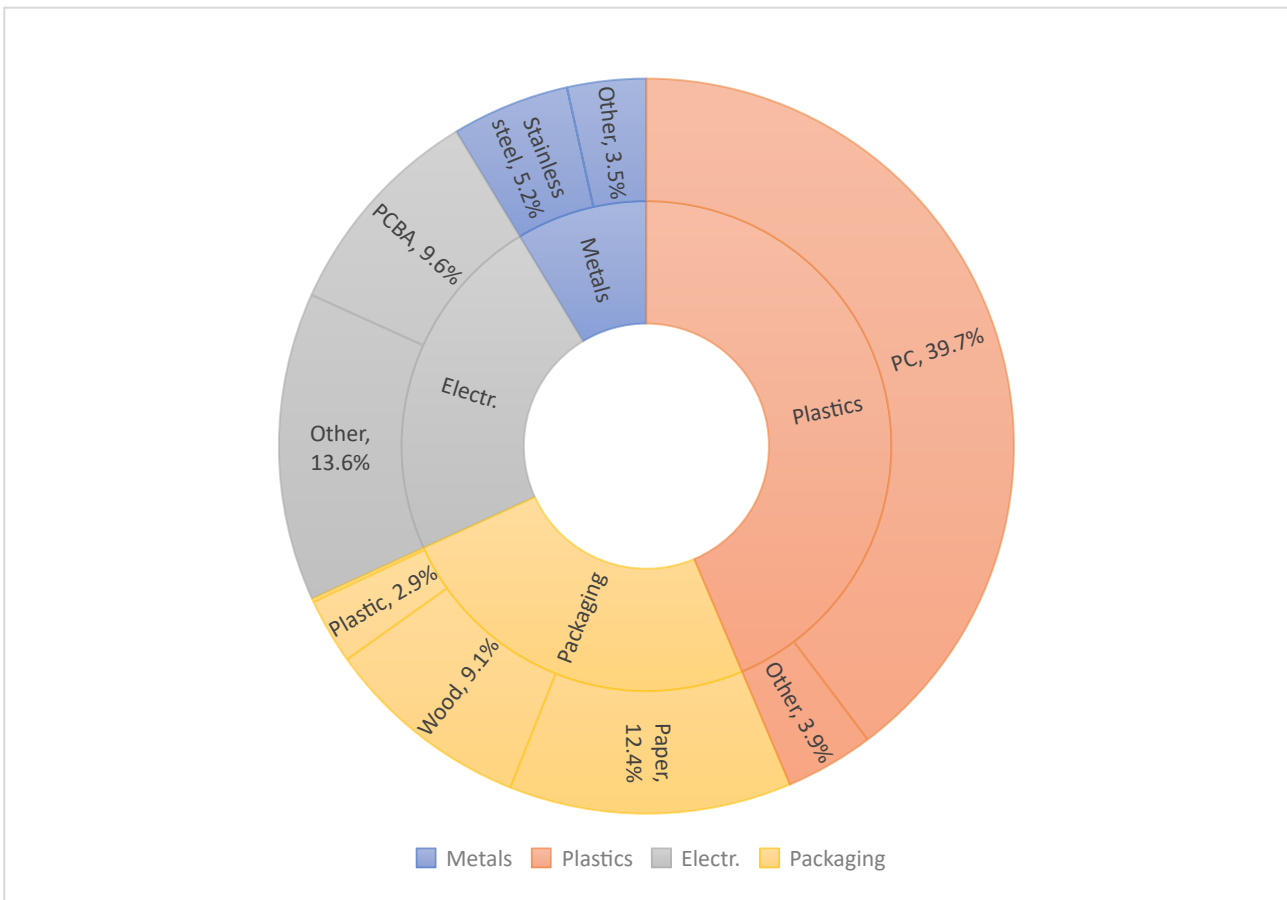
Table 2. Presence of SVHCs and RoHS exemptions

| SVHCs | RoHS exemptions |
|----------------|-----------------|
| 7439-92-1 LEAD | 7A |
| 110-71-4 EGDME | 7C1 |
| | 6C |

Materials contents by weight are listed in Table 3.

Table 3. Materials contents by weight

| Total weight [kg] | Material cluster | Materials | Quantity |
|-------------------|------------------|-----------------|----------|
| 2.059 | Metals | Stainless steel | 5.2% |
| | | Other | 3.5% |
| | Plastics | PC | 39.7% |
| | | Other | 3.9% |
| | Electronics | PCBA | 9.6% |
| | | Other | 13.6% |
| | Packaging | Paper | 12.4% |
| | | Wood | 9.1% |
| | | Plastic | 2.9% |
| | | Other | 0.1% |



Reference service life (RSL)

According to PCR EPDIItaly, the reference life service (RLS) 20 years. The following formula show the calculation for electric energy consumption of the device during use phase according to PCR EPDIItaly 011.

$$E_{use} = \frac{P(\text{use}) * 8760 * RLS}{1000}$$

LCA results

This section shows the LCA results calculated according to EN15804 methodologies.

Table 4. Results of LCA study for impact EPD impact categories.

| Impact categories | Unit | Total | Manufacturing Stage | Distribution stage | Installation Stage | Use and Maintenance stage | End of Life |
|---|-----------------------|----------|---------------------|--------------------|--------------------|---------------------------|-------------|
| Climate Change - Total | kg CO ₂ eq | 9.60E+01 | 2.68E+01 | 4.55E-01 | 6.71E-01 | 6.39E+01 | 4.13E+00 |
| Climate change - fossil | kg CO ₂ eq | 7.64E+01 | 2.61E+01 | 4.54E-01 | 5.01E-02 | 4.57E+01 | 4.12E+00 |
| Climate change - biogenic | kg CO ₂ eq | 1.48E+01 | 7.21E-01 | 3.57E-05 | 6.21E-01 | 1.34E+01 | 7.94E-03 |
| Climate change - land use and change in land use | kg CO ₂ eq | 4.81E+00 | 3.24E-02 | 2.08E-04 | 5.17E-06 | 4.77E+00 | 4.33E-03 |
| Ozone Depletion | kgCFC-11eq | 1.95E-06 | 6.31E-07 | 6.96E-09 | 7.70E-10 | 1.28E-06 | 3.08E-08 |
| Acidification | moli H+eq | 6.84E-01 | 2.92E-01 | 7.82E-03 | 2.65E-04 | 3.66E-01 | 1.86E-02 |
| Eutrophication aquatic freshwater | kgP eq | 3.90E-02 | 2.51E-02 | 2.37E-05 | 1.35E-06 | 1.29E-02 | 9.59E-04 |
| Eutrophication aquatic marine | kg N eq | 8.65E-02 | 3.73E-02 | 2.02E-03 | 1.15E-04 | 4.30E-02 | 4.09E-03 |
| Eutrophication terrestrial | molc N eq | 9.13E-01 | 3.89E-01 | 2.23E-02 | 1.26E-03 | 4.55E-01 | 4.60E-02 |
| Photochemical ozone formation | kg NMVOCeq | 3.21E-01 | 1.41E-01 | 6.37E-03 | 4.99E-04 | 1.58E-01 | 1.51E-02 |
| Depletion of abiotic resources – minerals and metals ² | kg Sb eq | 5.18E-03 | 4.15E-03 | 9.46E-07 | 3.37E-08 | 1.01E-03 | 2.09E-05 |
| Depletion of abiotic resources – fossil fuels ² | MJ | 1.01E+03 | 3.83E+02 | 5.96E+00 | 6.48E-01 | 5.88E+02 | 3.69E+01 |
| Water use ² | m ³ eq | 2.34E+02 | 8.54E+00 | 2.20E-02 | 1.59E-03 | 2.25E+02 | 8.42E-01 |

* The results of this environmental impact indicator should be used with caution as uncertainties about these results are high or due to limited experience with this indicator.

Table 5. Results of use of resource.

| Impact categories | Unit | Total | Manufacturing stage | Distribution stage | Installation stage | Use and Maintenance stage | End of Life |
|-------------------|----------------|----------|---------------------|--------------------|--------------------|---------------------------|-------------|
| PENRE | MJ | 9.61E+02 | 3.64E+02 | 5.39E+00 | 5.83E-01 | 5.55E+02 | 3.51E+01 |
| PERE | MJ | 1.13E+03 | 4.25E+01 | 6.52E-02 | 2.88E-03 | 1.09E+03 | 3.38E+00 |
| PENRM | MJ | 5.41E+01 | 1.86E+01 | 5.69E-01 | 6.52E-02 | 3.31E+01 | 1.86E+00 |
| PERM | MJ | 3.00E+00 | 3.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT | MJ | 1.01E+03 | 3.83E+02 | 5.96E+00 | 6.48E-01 | 5.88E+02 | 3.69E+01 |
| PERT | MJ | 1.14E+03 | 4.25E+01 | 6.52E-02 | 2.88E-03 | 1.09E+03 | 3.38E+00 |
| FW | m ³ | 5.53E+00 | 2.41E-01 | 5.97E-04 | 4.03E-05 | 5.27E+00 | 2.29E-02 |
| SM | kg | 9.96E+00 | 1.67E+00 | 4.54E-03 | 1.72E-04 | 8.21E+00 | 7.09E-02 |
| RSF | MJ | 2.10E+00 | 4.16E-01 | 6.86E-04 | 2.65E-05 | 1.65E+00 | 3.44E-02 |
| NRSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Legenda:

- PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials.
- PERE = Use of renewable primary energy resources excluding renewable primary energy resources used as raw materials.
- PENRM = Use of non-renewable primary energy resources used as raw materials.
- PERM = Use of renewable primary energy resources used as raw materials.
- PENRT = Total use of non-renewable primary energy resources.
- PERT = Total use of renewable primary energy resources.
- FW = Use of fresh water.
- SM = Use of secondary materials.
- RSF = Use of secondary renewable fuels.
- NRSF = Use of secondary non-renewable fuels.

**Considering impact category SM, RSF, NRSF for the use of secondary materials, we do not have specific secondary raw material usage in the BoM. All the value calculated are totally reasonable but are related to specific Ecoinvent datasets used for the model.*

Table 6. Results for waste production and output flux.

| Impact categories | Unit | Total | Manufacturing stage | Distribution stage | Installation stage | Use and Maintenance stage | End of Life |
|-------------------|--------|----------|---------------------|--------------------|--------------------|---------------------------|-------------|
| HWD | kgHW | 4.33E+00 | 2.60E+00 | 6.49E-03 | 6.75E-04 | 1.58E+00 | 1.50E-01 |
| NHWD | kgW | 4.98E+01 | 3.88E+01 | 5.21E-02 | 1.16E-02 | 1.00E+01 | 8.87E-01 |
| RWD | kgRW | 1.33E-03 | 5.91E-04 | 1.04E-06 | 4.98E-08 | 6.72E-04 | 6.15E-05 |
| MER | kg MER | 9.44E-04 | 1.87E-04 | 3.08E-07 | 1.19E-08 | 7.42E-04 | 1.54E-05 |
| MFR | kg MFR | 8.18E+00 | 1.47E+00 | 4.25E-03 | 1.43E-04 | 6.64E+00 | 6.46E-02 |
| CRU | kg CRU | 6.80E-05 | 6.80E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| ETE | MJ ET | 2.05E-01 | 1.50E-01 | 6.16E-04 | 1.96E-05 | 5.06E-02 | 3.34E-03 |
| EEE | MJ EE | 2.79E-01 | 2.36E-01 | 4.40E-04 | 1.82E-05 | 3.96E-02 | 3.23E-03 |

Legenda:

- HWD = Hazardous waste disposal
- NHWD = Non-hazardous waste disposal
- RWD = Radioactive waste disposal
- MER = Materials for energy recovering
- MFR = Materials for recycling
- CRU = Components for reuse
- ETE = Thermal energy exported
- EEE = Electric energy exported

Calculation rules

The evaluation was carried out in accordance with the reference standard for life cycle analysis (UNI EN ISO 14040:2021 e UNI EN ISO 14044:2021) and others reference documents previously mentioned (PCR EPDItaly011 – Meters).

Data quality

In this study, almost all data related to core activities are primary data and documented through appropriate reference documentation (e.g., energy consumption records, bill of materials, etc).

Secondary data are referred to specific datasets or technical documentation, to ensure a good level of reliability.

Cut-off

In this study impact related to production of buildings, machineries, and equipment (except for dataset already available on Ecoinvent 3.10), packaging wastes of purchased electronic components, device for installation, extraordinary maintenance of product, energy and materials used for disposal of meter are not considered. There are no specific cut-off criteria applied for inventory data.

Allocation

Main primary data are Bitron data and directly referred to U.F.. Some production data were allocated to the U.F. based on volumes. Allocation methods are applied to following processes related to production phase of meter: Energy consumption for the production, Primary packaging of product, Waste/scraps, Auxiliaries materials.

Development of scenarios

All life cycle stages are considered, as shown in Table 1, according to EN 50693. Specifically, the activities included in production stage (Upstream and core modules) are:

- Extraction of raw materials and production of materials/semi-finished/ancillary products (UPSTREAM)
- Transport of materials/semi-finished/ancillary products to manufacturing company (UPSTREAM)
- Intercompany transport and package (CORE)
- Manufacturing of the product constituents, including all stages (CORE)
- Production and assembly of product (CORE)
- Packaging ³(CORE)
- Waste recycling and disposal (CORE)

In downstream are considered:

- Transport of complete product in its packaging from manufacturer to final customer and from manufacturer to installation site
- Disposal of packaging and scraps due to installation stage
- Energy consumption of the product during its use and over the RLS
- De-installation and final disposal of product

Reference period

The reference period for LCA study is from April 2024 to September 2024. It should be noted that the activity data collected can be considered representative thanks to the absence of consistent variability.

³ Only Boxing, while raw material is considered upstream.

Reference documents

- » UNI EN ISO 14040:2021 Environmental management - Life cycle assessment - Principles and framework
- » UNI EN ISO 14044:2021 Environmental management - Life cycle assessment - Requirements and guidelines
- » ISO 14020:2000 Environmental labels and declarations -- General principles
- » UNI EN ISO 14025:2010, Etichette e dichiarazioni ambientali - Dichiarazioni ambientali di Tipo III - Principi e procedure
- » EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- » Regolamento EPDItaly rev. 6 del 30/10/2023
- » Core-PCR: EPDITALY007 " Electronic and electrical product and systems" Rev. 3.1 del 12/11/2024
- » Sub-PCR: EPDITALY011 "Electronic and electrical product and systems -Meters" Rev. 0 del 16/03/2020
- » Ecoinvent, 2018. The Swiss Centre for Life Cycle Inventories. Ecoinvent v3.10
- » Report LCA: 2024_12_13 LCA REPORT CERS3