Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Water metering device

QALCOSONIC W1 DN15-20 A Design

from

UAB Axioma Metering

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products, based on the average results of the product group
EPD registration number:	EPD-IES-0026947:001
Version date:	2025-11-17
Validity date:	2030-11-17

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *PCR 2019:14 Construction products (EN 15804+A2) (version 2.0.1) (2.0.1), UN CPC code 48252 Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases, except navigational, hydrological or meteorological instruments and appliances, gas or liquid supply meters and automatic regulating or controlling instruments and apparatus*
PCR review was conducted by: *The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: C Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/contact.*
c-PCR: *not applicable*

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Mari Kirss, Meetripuu OÜ Approved by: International EPD System
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.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: UAB Axioma metering

Address: Veterinarų str. 52, Biruliskes, Kaunas district, Lithuania

Contact: metering@axioma.eu

Address and contact information of the LCA practitioner commissioned by the EPD owner: Urtė Valdavičė, UAB Vesta Consulting

Description of the organisation: UAB Axioma Metering develops and manufactures ultrasonic heat and water metering and data management devices. The company is one of the pioneers in the application of ultrasonic technology in the Baltic States. The company's specialists have been producing ultrasonic heat and water meters since 1992. Over 90 percent of the company's production is exported to more than 80 countries around the world. The meters are designed for monitoring industrial, commercial, and residential buildings.

Product-related or management system-related certifications: The company has implemented Quality management in accordance with the standard requirements of LST EN ISO 9001: 2015, Environmental management standards in accordance with the requirements of LST EN ISO 14001: 2015, Information Security, Cybersecurity and Privacy Protection Management System standard ISO/IEC 27001:2022 and Occupational health and safety management system standard ISO 45001:2018.

PRODUCT INFORMATION

Product name: Water metering devices QALCOSONIC W1 DN15-20 A Design

Visual representation (e.g., an image) of the product

UN CPC code: 48252 Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases, except navigational, hydrological or meteorological instruments and appliances, gas or liquid supply meters and automatic regulating or controlling instruments and apparatus.

Product group description: Ultrasonic water meter QALCOSONIC W1* is designed to accurately measure cold and hot water consumption in households, apartment buildings, and commercial premises.

* QALCOSONIC W1 modification for Belgium, Netherlands, France, Germany, Denmark, Norway, Finland, Poland, Sweden

Specification:

- Static method of water flow measurement, no moving parts
- Very high metering accuracy
- Eliminates measuring deviations caused by sand, suspended particles or air pockets
- Long-term measurement stability and reliability
- 9 digits, multi-line LCD. Total volume and instantaneous flow rate indication

Product application areas: Water metering devices QALCOSONIC W1 designed to accurately measure cold and hot water consumption in households, apartment buildings, and commercial premises.

Technical data: QALCOSONIC W1 DN15-20 A Design

Feature	**Specification**
Temperature class	T30, T50, T30/90, T90
Nominal flow	1.6 / 2.5 / 4.0 m³/h
Measurement range Q3/Q1	R 80/160/250/315/400/500/800 (optional)
Straight section requirement	No straight sections required
Installation position	Any position (vertical, horizontal, diagonal)
Air measurement	No measurement of air
Environment class	E2/M1
Protection class	IP68
Nominal pressure	PN16
Internal datalogger	Yes
Battery lifetime	10-16 years (depends on communication settings)
Flow measurement	Bi-directional
Flow direction indication	Yes
Parameterisation & reading	Via NFC or optical interface
Body material	Durable composite
Measurement units	m³, m³/h

The Metering devices are available in two types: DN15 and DN20. The main difference being the nominal diameter and size and dimensions (DN15 / L [mm]: 80, 105, 110, 115, 165, 170; connection: ¾ and DN20 / L [mm]: 105, 110, 130, 165, 190; connection: 1).

Name and location of production site(s): UAB Axioma Metering, Veterinarų str. 52, Biruliskes, Kaunas district, Lithuania

References to relevant website for more information: **https://www.axiomametering.com/lt/produktai**

CONTENT DECLARATION

The content declaration shows the weight of product per declared unit and the weight of product average packaging per declared unit.

The declared unit is 1 unit that weights 0,226 kg.

Product content	Mass, %	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C / declared unit
Meter body (PPS GF40)	59,92	-	-	-
Battery (Lithium batteries)	15,49	-	-	-
Top and bottom PCB board, antenna	14,43	-	-	-
Meter body (PC)	6,86	-	-	-
Accessories	1,65	-	-	-
Polymeric adsorbent (SiO_2)	0,89	-	-	-
Ceramics	0,53	-	-	-
Glue and varnish	0,23	-	-	-
TOTAL	**100,00**	**-**	**-**	**-**

The product is first packaged in a cardboard box with plastic filler (EPS). This box is then placed inside a larger cardboard box and wrapped in plastic film. Finally, the packaged boxes are stacked on EUR-pallets for distribution. EUR-pallets are excluded from the LCA study, as they are considered reusable transport items and not part of the product system under assessment.

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C / declared unit
[1] Cardboard	6,79E-02	30,05	5,20E-03
Expandable polystyrene (EPS)	9,42E-06	0,00	-
Plastic film	7,00E-06	0,00	-
TOTAL	**6,79E-02**	**30,05**	**5,20E-03**

[1]Global Warming Potential biogenic: -0,281 kg CO_2e / kg

Note. 1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Products does not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm).

LCA INFORMATION

Declared unit: 1 unit. The weight per DU is 0,226 kg.

Product lifespan: 16 years

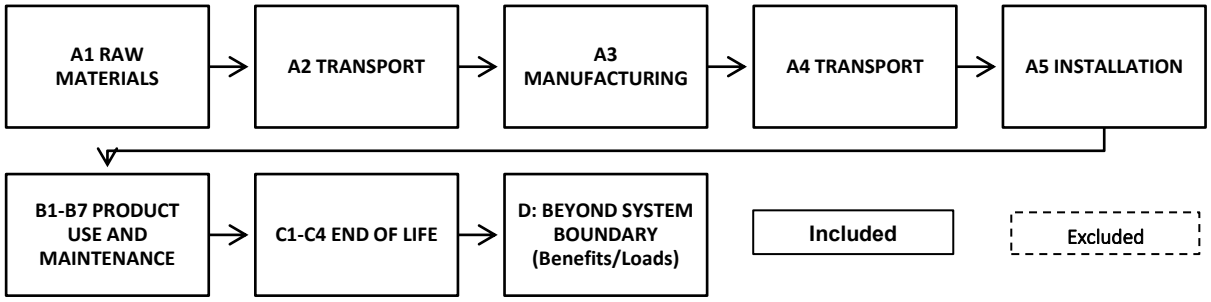
Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2024 (January 2024 – December 2024).

Geographical scope: The geographical scope for module A1-A2 is Global, for A3 is Europe and for A4, A5, B1-B7, C1-C4 and module D is Global.

Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.11, One Click LCA v.7.6., and IDEMAT. The LCA software used is One Click LCA v.0.44.0

Description of system boundaries: Cradle to gate with options, modules A4-A5, modules B, modules C1–C4, and module D.

Process flow diagram:



Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	GLO	GLO	EU	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Primary data used	25,92%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	2,16%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	ND			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA; ND = Module Not declared)

Data quality: The EPD covers products manufactured in one factory in Kaunas (Lithuania) which provided data for the period January – December 2024. The data collection has been done internally and thoroughly. The data is based on yearly production amounts and extrapolations of measurements on specific machines and plants. The EPD covers raw material supply and transport in Global scale, product production in Europe scale, product transportation to customers, product installation, use stage and end-of-life in Global scale. The production process includes casting the body and covers, assembling and testing the electronics, integrating all components, and finally labelling, packaging, and preparing the product for shipment, with strict quality control applied throughout. The site is powered by residual mix and renewable energy from the grid, as well as solar energy sourced from on-site and off-site solar panels. Background data was sourced from the ecoinvent v.3.11, One Click LCA and IDEMAT databases. No poor or very poor data was found during the assessment of relevant data using PEF method (EN 15804:2012+A2:2019, Annex E, only E.2). The data quality assessment is done in accordance with EN 15941:2024. Overall, the data quality can be described as good. The EN 15804 reference package used is based on EF 3.1.

Share of primary data used: The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories. Declaration of data sources, reference years, data categories, and share of primary data is presented below.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1–A3
Production of meter body (A1)	Database	Ecoinvent v. 3.11	1993-2024	Secondary data	0,00%
Production of batteries (A1)	Databases	Ecoinvent v. 3.11 / IDEMAT (2023)	2017-2024	Secondary data	0,00%
Production of PCB boards and electronics (A1)	Databases	Ecoinvent v 3.11, IDEMAT (2023), One Click LCA (2025)	1994-2024	Secondary / proxy data	0,00%
Production of glue and varnish (A1)	Database	Ecoinvent v. 3.11	2011-2024	Proxy data	0,00%
Transport of raw materials to manufacturing site (A2)	Database	Ecoinvent v. 3.11	2009-2024	Primary data	1,53%
Production of packaging (A3)	Databases	Ecoinvent v. 3.11 / IDEMAT (2023)	1993-2024	Secondary data	0,00%
Production ancillary materials (A3)	Database	Ecoinvent v. 3.11	1997-2024	Secondary / proxy data	0,00%
Energy used in manufacturing of product (A3)	Database	Ecoinvent v. 3.11	2008-2024	Primary data	24,39%
Waste and wastewater treatment (A3)	Database	Ecoinvent v. 3.11	1997-2024	Secondary / proxy data	0,00%
Total share of primary data, of GWP-GHG results for A1-A3					25,92%

Note. Ecoinvent datapoints are based on older background flows, but updated in 2024 (v.3)

Allocation, estimates and assumptions: Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804:2012+A2:2019, allocation is conducted in the following order:

1. Allocation should be avoided
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small
3. Allocation should be based on economic values

The allocations used in this study follow the system model ‘Allocation, cut-off, 15804:2012+A2:2019’.

The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

Cut off criteria: The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

Calculation rules for averaging data: The EPD is an EPD of multiple products, based on the average results of the product. Average product calculations were chosen because the products in the group share common characteristics in their manufacturing process and material composition. The metering devices are available in two types: DN15 and DN20, the main difference being the nominal diameter, size and dimensions. The difference (in %) between the product GWP-GHG results for modules A1-A3 are below 10%, since the variations in diameter and size have a minor impact on the raw material demand and associated emissions during production. Using an average product value allows for streamlined analysis and decision-making while maintaining a fair representation of the group as a whole. The average was calculated based on the production volume.

Product life cycle

Product stage (A1-A3)

A1: This module considers the extraction and processing of raw materials.

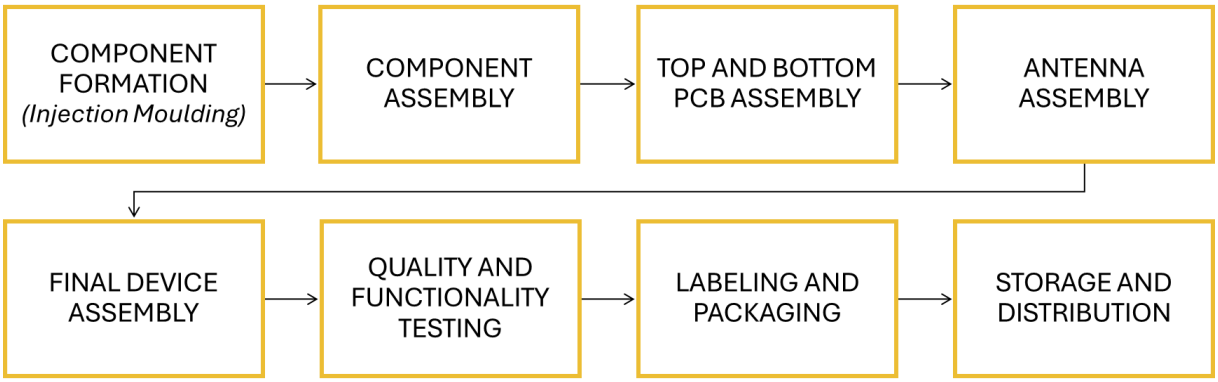
A2: The raw materials are transported to the manufacturing plant. In this case the model includes road transportation of each raw material.

A3: This module includes the manufacture of products and packaging. It has considered all the energy consumption and waste generated in the production plant.

Manufacturing process

The production process begins with the formation of components - casting the meter body, covers, and inserts. Then, electronics assembly takes place: PCB soldering, antenna mounting, and testing. All components are combined into the final device, and quality and functionality tests are performed. Finally, the product is labelled, packaged, and prepared for storage and shipment. Strict quality control is applied throughout the process - defective products are removed or recycled.

See the manufacturing diagram below.



Construction process stage (A4-A5)

A4: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small and so the variety in load is assumed to be negligible. Empty returns are not considered as it is assumed that the return trip is used by the transportation company to serve the needs of other clients.

A5: Environmental impacts from installation into the building (A5) include the product installation losses, emissions of energy use in installation and generation of waste at the construction site. Installation is carried out manually or with low-energy lifting equipment – the meter is screwed onto the pipeline using a wrench; therefore, energy use is assumed negligible. No treatment is required for the product itself during installation. Metering devices are delivered in ready-to-install form, and the use of additional auxiliary materials are assumed negligible. After installation, the meter must be sealed to ensure protection against unauthorized tampering. Waste from raw material packaging (cardboard, plastic, wood, hazardous waste packaging) is collected and treated in recycling or incineration plants or disposed of in landfills.

Use stage (B1-B7)

Use or application of the installed product - B1: There is no impact during the use of product.

Maintenance - B2: No maintenance is required.

Repair - B3: No repair is required.

Replacement – B4: No replacement is required.

Refurbishment - B5: No refurbishment is required.

Operational energy use - B6: The Metering device uses energy from AA-batteries. The batteries are non-replaceable.

Operational water use – B7: Product do not use water during the operation.

Product end of life (C1-C4, D)

C1: Deconstruction, dismantling, demolition

At the end-of-life, demounting is assumed to be done manually and require no energy. Since the meter is sealed after installation to prevent unauthorized tampering, its removal must be carried out by an authorized person.

C2: Transport of the discarded product to the processing site

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest waste treatment facilities. Transportation distance to the closest disposal area is estimated as 80 km based on PCR 2019:14 v.2.0.1 Table 4. The transportation method is assumed as lorry which is the most common option.

C3: Waste processing for reuse, recovery, and/or recycling

In accordance with the WEEE Directive (2012/19/EU) and ISO 14040/14044, the water meter is treated as electronic waste at end of life. During mechanical pre-treatment, the device is shredded and separated into metal, plastic and fines fractions. Embedded Li-ion batteries are removed during sorting and sent to specialised pyrometallurgical recycling, where cobalt, nickel, manganese and lithium are recovered as secondary materials. Printed circuit boards and electronic components are routed to WEEE metal-recovery processes, recovering copper, gold, silver and palladium. These recovered metals are included in Module D. The main plastic components (PPS GF40 and PC), as well as mixed engineering plastics and minor components, are assumed to be non-recyclable and are sent to municipal solid waste incineration with energy recovery (R1 > 60 %).

C4: Discharge (disposal)

Material fractions that do not reach end-of-waste status after C3 are disposed of in controlled sanitary landfills. This includes non-recoverable residues from WEEE processing, inert materials, fines, and a conservative share of mixed plastics that cannot be recovered or incinerated with energy recovery.

Benefits and loads beyond the system boundary (D):

Module D reports the benefits of secondary materials and exported energy. Metals recovered from Li-ion battery recycling (cobalt, nickel, manganese, lithium) and from PCB recycling (copper, gold, silver, palladium) are modelled as substitution of corresponding primary metal production using ecoinvent market datasets. Energy exported from municipal waste incineration of mixed plastics is credited as substituted heat and electricity.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) – main environmental performance results

The results are presented for 1 unit of Water metering device. Product weight per unit is 0,226 kg.

Core environmental impact indicators – EN 15804:2012+A2:2019, EF 3.1

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	8,17E+00	4,31E-02	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,55E-03	3,42E-01	4,33E-03	-4,69E-01
GWP – fossil	kg CO_2e	8,18E+00	4,30E-02	2,27E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,54E-03	3,42E-01	4,33E-03	-4,68E-01
GWP – biogenic	kg CO_2e	-1,91E-02	0,00E+00	1,91E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	1,30E-02	1,91E-05	1,32E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,59E-06	1,27E-04	3,16E-07	-1,08E-03
Ozone depletion pot.	kg CFC_{-11}e	3,73E-07	6,35E-10	1,72E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,23E-11	2,37E-09	1,30E-11	-7,10E-09
Acidification potential	mol H^+e	6,48E-02	1,47E-04	7,59E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,21E-05	4,36E-04	3,73E-06	-1,23E-02
EP-freshwater	kg Pe	6,64E-01	3,33E-06	5,28E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,76E-07	3,10E-05	5,43E-08	-3,37E-02
EP-marine	kg Ne	1,01E-02	4,84E-05	2,79E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,97E-06	1,22E-04	9,64E-05	-8,79E-04
EP-terrestrial	mol Ne	1,00E-01	5,27E-04	2,08E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,32E-05	1,09E-03	1,52E-05	-9,42E-03
POCP (“smog”)	kg NMVOCe	3,28E-02	2,17E-04	6,97E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,78E-05	3,12E-04	6,25E-06	-3,17E-03
ADP-minerals & metals*	kg Sbe	1,57E-03	1,19E-07	1,78E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,89E-09	5,76E-07	9,79E-10	-2,41E-04
ADP-fossil resources	MJ	1,20E+02	6,24E-01	1,98E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,14E-02	9,41E-01	1,15E-02	-7,12E+00
Water use	m^3e depr.	3,55E+00	3,07E-03	4,25E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,54E-04	3,97E-02	5,03E-04	-1,03E+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 on these results are high or as there is limited experienced with the indicator.*

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Additional (optional) environmental impact indicators – EN 15804:2012+A2:2019, EF 3.1

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,89E-07	4,28E-09	1,21E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,55E-10	7,62E-09	8,32E-11	-3,87E-08
Ionizing radiation*	kBq U235e	8,56E-01	5,41E-04	1,61E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,48E-05	7,93E-03	9,69E-06	-7,10E-02
Ecotoxicity (freshwater)	CTUe	7,76E+02	8,96E-02	9,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,28E-03	3,62E+00	1,85E-01	-9,79E+01
Human toxicity, cancer	CTUh	1,20E-08	7,07E-12	1,16E-12	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,85E-13	1,25E-09	2,90E-13	-5,69E-10
Human tox. non-cancer	CTUh	2,64E-07	4,05E-10	4,01E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,33E-11	1,98E-09	5,04E-11	-1,81E-08
SQP (Land use related impacts/soil quality)	-	4,39E+01	6,25E-01	1,64E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,18E-02	2,36E-01	2,70E-02	-2,65E+00

** Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator*

Resource use indicators

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1,41E+01	8,51E-03	-9,56E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,05E-04	1,12E-01	1,58E-04	-3,12E+00
Renew. PER as material	MJ	8,70E-01	0,00E+00	-8,70E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,56E-07	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,50E+01	8,51E-03	-1,83E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,05E-04	1,12E-01	1,58E-04	-3,12E+00
Non-re. PER as energy	MJ	1,13E+02	6,24E-01	1,91E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,14E-02	-3,04E+00	-1,70E+00	-7,10E+00
Non-re. PER as material	MJ	5,49E+00	0,00E+00	-3,49E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,85E+00	-1,63E+00	0,00E+00
Total use of non-re. PER	MJ	1,18E+02	6,24E-01	1,56E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,14E-02	-6,89E+00	-3,33E+00	-7,10E+00
Secondary materials	kg	1,00E-01	2,64E-04	3,98E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,19E-05	2,71E-04	3,93E-06	8,03E-03
Renew. secondary fuels	MJ	1,03E-02	3,35E-06	2,05E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,78E-07	9,82E-06	7,89E-08	-3,50E-05
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	6,37E-02	9,18E-05	7,40E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,61E-06	8,40E-04	-1,74E-04	-2,21E-02
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															

Note: Option A was chosen for the calculations of the primary energy indicators. according to on Annex 3 of PCR 2019:14

Waste indicators

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,17E+00	1,05E-03	1,81E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,72E-05	2,89E-02	1,91E-05	-8,80E-02
Non-hazardous waste	kg	3,06E+01	1,95E-02	5,25E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,61E-03	3,05E-01	4,70E-02	-2,97E+00
Radioactive waste	kg	2,54E-04	1,32E-07	4,11E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,10E-08	1,98E-06	2,37E-09	-2,40E-05

Output flow indicators

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	4,97E-02	0,00E+00	6,79E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,94E-02	0,00E+00	0,00E+00
Materials for energy rec	kg	5,54E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,88E-01	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,57E-01	0,00E+00	0,00E+00

Additional indicator – GWP-GHG

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[2]	kg CO_2e	8,19E+00	4,31E-02	2,27E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,55E-03	3,42E-01	4,33E-03	-4,69E-01

[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Additional LCA results (other environmental performance results) of the product(s)

Additional results for end-of-life 100% scenarios for modules C1-C4, D

End-of-life scenario documentation (corresponding scenarios)

Scenario parameter	Value (100% recycling)	Value (100% incineration)	Value (100% disposal)
Collection process – kg collected separately	0,226	0,226	0,226
Collection process – kg collected with mixed waste	-	-	-
Recovery process – kg for re-use	-	-	-
Recovery process – kg for recycling	0,226	-	-
Recovery process – kg for energy recovery	-	0,226	-
Disposal (total) – kg for final deposition	-	-	0,226
Scenario assumptions e.g. transportation	80 km	80 km	80 km

Mandatory impact category indicators according to EN 15804 (corresponding scenario 100% recycling)

Results per declared unit						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	0,00E+00	3,55E-03	2,38E-01	0,00E+00	-3,70E-01
GWP-fossil	kg CO_2 eq.	0,00E+00	3,54E-03	2,38E-01	0,00E+00	-3,69E-01
GWP-biogenic	kg CO_2 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP- luluc	kg CO_2 eq.	0,00E+00	1,59E-06	1,66E-04	0,00E+00	-1,07E-03
ODP	kg CFC 11 eq.	0,00E+00	5,23E-11	2,64E-09	0,00E+00	-4,67E-09
AP	mol H+ eq.	0,00E+00	1,21E-05	5,06E-04	0,00E+00	-1,22E-02
EP-freshwater	kg P eq.	0,00E+00	2,76E-07	4,35E-05	0,00E+00	-3,37E-02
EP- marine	kg N eq.	0,00E+00	3,97E-06	1,86E-04	0,00E+00	-8,40E-04
EP-terrestrial	mol N eq.	0,00E+00	4,32E-05	1,16E-03	0,00E+00	-9,00E-03
POCP	kg NMVOC eq.	0,00E+00	1,78E-05	3,45E-04	0,00E+00	-2,90E-03
ADP-minerals & metals*	kg Sb eq.	0,00E+00	9,89E-09	7,77E-07	0,00E+00	-2,41E-04
ADP-fossil*	MJ	0,00E+00	5,14E-02	1,26E+00	0,00E+00	-5,51E+00
WDP*	m^3	0,00E+00	2,54E-04	4,04E-02	0,00E+00	-1,03E+00

Mandatory impact category indicators according to EN 15804 (corresponding scenario 100% incineration)

Results per declared unit						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	0,00E+00	3,55E-03	5,37E-01	0,00E+00	-2,05E-01
GWP-fossil	kg CO_2 eq.	0,00E+00	3,54E-03	5,37E-01	0,00E+00	-2,05E-01
GWP-biogenic	kg CO_2 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP- luluc	kg CO_2 eq.	0,00E+00	1,59E-06	4,22E-06	0,00E+00	-1,30E-05
ODP	kg CFC 11 eq.	0,00E+00	5,23E-11	1,70E-10	0,00E+00	-5,02E-09
AP	mol H+ eq.	0,00E+00	1,21E-05	1,23E-04	0,00E+00	-2,26E-04
EP-freshwater	kg P eq.	0,00E+00	2,76E-07	1,77E-06	0,00E+00	-3,66E-06
EP- marine	kg N eq.	0,00E+00	3,97E-06	6,98E-05	0,00E+00	-7,98E-05
EP-terrestrial	mol N eq.	0,00E+00	4,32E-05	5,95E-04	0,00E+00	-8,49E-04
POCP	kg NMVOC eq.	0,00E+00	1,78E-05	1,49E-04	0,00E+00	-5,38E-04
ADP-minerals & metals*	kg Sb eq.	0,00E+00	9,89E-09	3,75E-08	0,00E+00	-1,53E-07
ADP-fossil*	MJ	0,00E+00	5,14E-02	1,01E-01	0,00E+00	-3,33E+00
WDP*	m^3	0,00E+00	2,54E-04	3,57E-02	0,00E+00	-1,58E-02

Mandatory impact category indicators according to EN 15804 (corresponding scenario 100% disposal)

Results per declared unit						
Indicator	**Unit**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	kg CO_2 eq.	0,00E+00	3,55E-03	0,00E+00	2,08E-02	0,00E+00
GWP-fossil	kg CO_2 eq.	0,00E+00	3,54E-03	0,00E+00	2,08E-02	0,00E+00
GWP-biogenic	kg CO_2 eq.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP- luluc	kg CO_2 eq.	0,00E+00	1,59E-06	0,00E+00	1,52E-06	0,00E+00
ODP	kg CFC 11 eq.	0,00E+00	5,23E-11	0,00E+00	6,23E-11	0,00E+00
AP	mol H+ eq.	0,00E+00	1,21E-05	0,00E+00	1,79E-05	0,00E+00
EP-freshwater	kg P eq.	0,00E+00	2,76E-07	0,00E+00	2,61E-07	0,00E+00
EP- marine	kg N eq.	0,00E+00	3,97E-06	0,00E+00	4,64E-04	0,00E+00
EP-terrestrial	mol N eq.	0,00E+00	4,32E-05	0,00E+00	7,30E-05	0,00E+00
POCP	kg NMVOC eq.	0,00E+00	1,78E-05	0,00E+00	3,01E-05	0,00E+00
ADP-minerals & metals*	kg Sb eq.	0,00E+00	9,89E-09	0,00E+00	4,71E-09	0,00E+00
ADP-fossil*	MJ	0,00E+00	5,14E-02	0,00E+00	5,51E-02	0,00E+00
WDP*	m^3	0,00E+00	2,54E-04	0,00E+00	2,42E-03	0,00E+00

ADDITIONAL INFORMATION

Manufacturing energy scenario documentation

Scenario parameter	Value	Source
Electricity, medium voltage, residual mix	0,7300 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: Lithuania
Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted	0,0947 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: Lithuania
Electricity production, photovoltaic, 570kWp open ground installation, multi-Si	0,0798 kg CO_2e / kWh	Data sources: ecoinvent 3.11 Country: World
Renewable energy mix (Lithuania):	0,0322 kg CO_2e / kWh	The Renewable energy mix is modelled according to LITGRID AB[3] (2025-09-01) data on RES guarantees of origin from Lithuania and other EU States.
Electricity production, hydro, run-of-river)	*0,0043 kg CO_2e / kWh*	*Data sources: ecoinvent 3.11* *Country: Lithuania*
Electricity production, wind, >3MW turbine, onshore	*0,022 kg CO_2e / kWh*	*Data sources: ecoinvent 3.11* *Country: Lithuania*
Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted	*0,0947 kg CO_2e / kWh*	*Data sources: ecoinvent 3.11* *Country: Lithuania*
Heat and power co-generation, wood chips, 6667 kW	*0.0505 kg CO_2e / kWh*	*Data sources: ecoinvent 3.11* *Country: Lithuania*
District Heat, Lithuania, 2022	0,0498 kg CO_2e / kWh	Data sources: One Click LCA Country: Lithuania

Transportation scenario documentation (most probable scenario)

Scenario parameter	Value
Vehicle type used for transport	EURO 5 truck with a trailer with an average load of >32t Aircraft, unspecified

[3] AB LITGRID (2025) The statistic data of guarantees of origin. Source https://www.litgrid.eu/index.php/services/certification-of-origin/the-statistic-data-of-guarantees-of-origin/583

Scenario parameter	Value
	Container ship
Distance	Lorry – 1496 km Ship – 22 km Airplane – 20 km
Capacity utilization (inc. empty return)	100 %
Bulk density of transported products	0,294 kg/unit

Note. The product is distributed mainly in Europe (~90%) through various logistics chains. The transport distances and modes may vary significantly depending on the customer and project location.

Installation of the product in the building scenario documentation (most probable scenario)

Scenario parameter	Value
Ancillary materials for installation, kg	-
Water use, m^3	-
Other resource use, kg	-
Quantitative description of energy type (regional mix) and consumption during the installation process, kWh	-
Waste materials on the building site before waste processing, generated by the product's installation, kg	-
Packaging (total)	*6,79E-02 kg*
Output materials as result of waste processing at the building site, kg	
EPS filler (packaging)	*9,42E-06 kg*
Cardboard (packaging)	*6,79E-02 kg*
Plastic film (packaging)	*6,85E-06 kg*
Direct emissions to ambient air, soil, and water, kg	-

Use stage scenario documentation (most probable scenario)

Use stage (B1-B7) is considered, however as there are no inputs, the scenario documentation is not declared.

End-of-life scenario documentation (most probable scenario)

Scenario parameter	Value
Collection process – kg collected separately	2,26E-01
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	6,94E-02
Recovery process – kg for energy recovery	1,10E-01
Disposal (total) – kg for final deposition	4,70E-02
Scenario assumptions e.g. transportation	80 km

Note. An energy recovery yield of 0.9 is applied, metal recovery yields range from 0.5 to 0.95 depending on the specific metal.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply

Abbreviation	Definition
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared
REACH	Registration, Evaluation, Authorisation, and Restriction of Chemicals
ppm	Parts per million
PEF	Product Environmental Footprint
PPP	Polluter pays principle
EU	Europe
GLO	Global

REFERENCES

a) ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
b) ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
c) ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
d) ISO 14021:2021: Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling).
e) General Programme Instructions for the International EPD System version 5.0.1 (2025-02-07)
f) EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
g) PCR 2019:14 Construction Products (EN 15804:2012+A2:2019) version 2.0.1 (2025-06-05)
h) European Parliament and Council. (2012). Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE). Official Journal of the European Union, L 197, 38–71.
i) EN 15941:2024. Sustainability of construction works – Data quality for environmental assessment of products and construction works – Selection and use of data.
j) UAB Axioma Metering LCA background report.
k) Ecoinvent v3.11 (2024), IDEMAT (2023), and One Click LCA (2025) databases.

VERSION HISTORY

Original Version of the EPD, 2025-11-17

INTERNATIONAL EPD SYSTEM

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