

Environmental Product Declaration (EPD)

According to ISO 14025 and EN
15804+A2:2019

IWTM Protector™

Registration number:	EPD-Kiwa-EE-223317-EN
Issue date:	28-01-2026
Valid until:	28-01-2026
Declaration owner:	IWTM AS
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified



1 General information

1.1 PRODUCT

IWTM Protector™

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-223317-EN

1.3 VALIDITY

Issue date: 28-01-2026

Valid until: 28-01-2026

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE



Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: IWTM AS

Address: Eternitveien 34, 3470 Oslo, Norway

E-mail: Alexander.Irgens@kiwa.com

Website: <https://iwtm.com/nb>

Production location: Wonderfil

Address production location: Via Benvenuto Cellini 60, 47521 Cesena, Italy

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804+A2:2019 serves as the core PCR.

☐ Internal ☒ External



Anastasiia Huk, Kiwa GmbH

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

Kiwa-Ecobility Experts (2025). *General Programme Instructions "Product Level"*, SOP EE 1201_R.3.0 (03.06.2025).

Kiwa-Ecobility Experts (2025). *General Programme Instructions "Product Level" – Annex B1: Environmental Information Programme according to EN 15804 / ISO 21930*, SOP EE 1203_R.3.0 (03.06.2025).

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2:2019. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of

1 General information

the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2:2019 and ISO 14025.

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.6

Characterization method: RETHINK characterization method (see references for more

details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.20c (20260113)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'IWTM Protector™' with the calculation identifier ReTHiNK-123317.

2 Product

2.1 PRODUCT DESCRIPTION

International Water Treatment Maritime AS (IWTM), founded in 1992 and headquartered in Asker, Norway, is a leading provider of chemical-free water treatment solutions for fresh water systems. With the motto "*Water by Design*", IWTM delivers sustainable technologies that prevent corrosion and bacterial growth in heating, cooling, and steam-generating systems across industrial, residential, and maritime sectors.

The IWTM Protector™ series is designed to protect closed-loop systems using anodic/cathodic corrosion protection, eliminating the need for chemical additives. The system utilizes sacrificial magnesium anodes and integrated magnets to maintain water quality and extend system lifespan. A 40-micron basket filter ensures effective particle removal while maximizing contact between water and the protective elements.

This EPD represents a worst-case scenario for 1 kg of the largest and heaviest IWTM Protector™ product variant within the product range. All other variations of IWTM Protector™ that are smaller in size and weight and all produced at the same locations described in the production process, are also included within the scope of this declaration. The IWTM Protector™ variants are differentiated by weight, height and width.

A typical composition of the IWTM Protector™ covered in this EPD is as follows:

Raw Material	Value (m.%)
Steel	89.42
Rubber	7.32
Plastic	3.21
Copper	0.05

The main product components of the IWTM Protector™ covered in this EPD is as follows below. The components in the list amounts to 90 % of the product.

Part	Weight (kg)
Pipe	0.35
Domed bottom	0.09
Anode	0.08
Flange cover	0.06
Gasket	0.06
Edge protection profile	0.04

Base flange	0.04
CPR ring	0.03
Screen filter	0.03
Pressing tube	0.02
Deflector	0.02
Cartridge support	0.02
Isolating washer	0.02
Magnet	0.02
Tube	0.02
Insulation	0.02

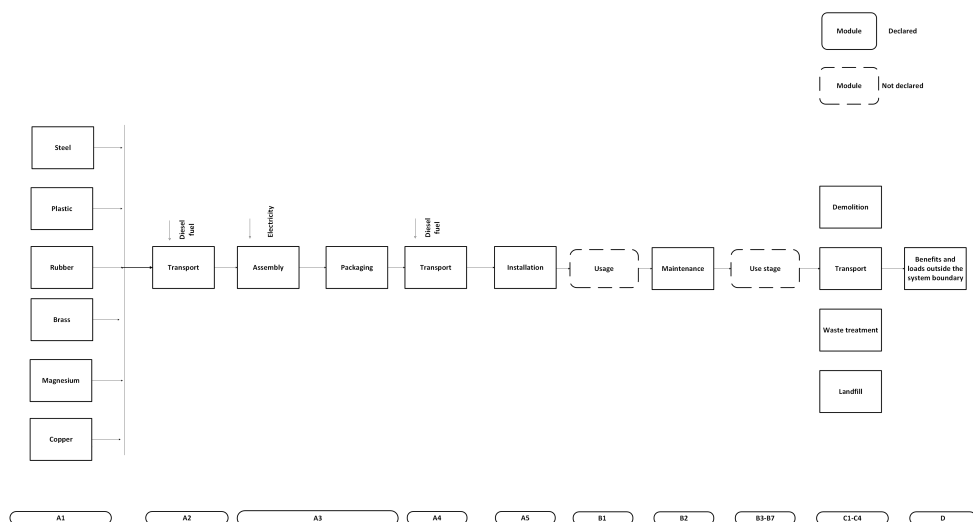
The composition of materials that are used for packaging of the IWTM Protector™, covered in this EPD are given below:

Raw Material	Value (%)
Wooden pallet	100

All types of IWTM Protector™ variants evaluated in this study are listed in the table below.

Model	Dry weight (kg)	Height (mm)	Width (mm)	Digital NRF-nr.
P5	12	540	184	8526076
P10	33	800	294	8526075
P25	50	1200	340	8525884
P40	59	1200	390	8526073
P70	88	1465	530	8526079
P200	160	1630	530	1401401

2 Product



2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The pressure vessel series is designed for use in closed heating and cooling systems to maintain stable pressure and compensate for thermal expansion. These vessels are essential for protecting system components and ensuring efficient operation in HVAC installations, district heating networks, and large-scale cooling systems.

The product range covers capacities from small residential systems to industrial applications with system volumes up to 200 000 liters. Typical installation environments include commercial buildings, hospitals, hotels, and industrial plants where reliable pressure control is critical for safety and performance.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The reference service life (RSL) is set to 25 years, as declared by the manufacturer based on product experience and operational practice.

USED RSL (YR) IN THIS LCA CALCULATION:

25

RSL PARTS

The reference service life (RSL) is set to 25 years, as declared by the manufacturer based on product experience and operational practice.

Module B2 is declared because the product requires replacement of specific internal parts during its service life. The other B-modules are excluded as the tank operates passively, has no additional maintenance, repair, replacement, or refurbishment needs, and does not generate emissions or resource use in those stages.

Description	Material	RSL [yr]
<i>Maintenance (B2)</i>		
Anode	(ei3.9.1) magnesium-alloy production, AZ91 {RER} Cut-off, U	3

2.4 TECHNICAL DATA

IWTM 's Protector™ is designed for heating and cooling systems and operates with water as the working medium. All models are rated for a maximum pressure of 10 bar and a maximum operating temperature of 95°C. Technical characteristics of the product range are given in the table below. The technical values are based on the largest IWTM 's Protector™ and represent the worst-case values.

Characteristics	Units	Value
Maximum pressure	bar	10
Maximum temperature	°C	95
Maximum system volume (cooling)	liters	200 000
Maximum system volume (heating)	liters	170 000

2 Product

Characteristics	Units	Value
Dry weight (largest model)	kg	160
Wet weight (largest model)	kg	400
Height (largest model)	mm	1630
Width (largest model)	mm	530

A conversion factor of 0.999528 is provided to scale the results for smaller product sizes. The reference unit is 1 kg.

Full information for the IWTM Protector™ are published in declaration of performances (DoP). The declared technical data in this EPD refers to the applicable standards DIN 53505, DIN 53479, DIN 53504, ISO 188 and ISO 1817. Full documentation of product performance can be provided upon request.

2.5 SUBSTANCES OF VERY HIGH CONCERN

No substance present in the product with a concentration exceeding 0.1% of the total weight is included on the "List of Substances of Very High Concern" (SVHC) for authorization under REACH legislation.

2.6 DESCRIPTION PRODUCTION PROCESS

The production process begins with the procurement of certified components from selected suppliers. The product is manufactured using a variety of raw materials, including steel , rubber, plastic , and copper.

Component production takes place at external suppliers through processes such as hot rolling of steel or injection molding of various types of plastics. These components are then transported to the assembly facility in Cesena, Italy, where the final product is assembled through mechanical operations such as welding.

Once assembled, the products are securely packaged on wooden pallets to ensure safe transport. They are then shipped to IWTM AS headquarters in Slemmestad, Norway for distribution to customers.

2.7 CONSTRUCTION DESCRIPTION

This module is declared to account for the environmental impacts associated with the end-of-life packaging.

3 Calculation rules

3.1 FUNCTIONAL UNIT

1 kg of IWTM Protector™

The declared unit is 1 kg of IWTM Protector™. All other variations of IWTM Protector™ that are smaller in size and weight are also included within the scope of this declaration.

Reference unit: kilogram (kg)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	kg
Conversion factor to 1 kg	0.999528	kg

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options, modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	X	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN 15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for IWTM Protector™, a product of IWTM AS. The results of this EPD are representative for Norway.

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

3 Calculation rules

Construction process stage (A4-A5)

All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use) of energy use for assembly, etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Use stage (B1-B3)

All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the building fabric are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

End of life stage (C1-C4)

All input flows (e.g. energy use for demolition or disassembly, transport to waste processing, etc.) and output flows (e.g. end-of-life waste processing of the product, etc.) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

Benefits and loads beyond the system boundary (Module D)

All benefits and loads beyond the system boundary resulting from reusable products, recyclable materials and/or useful energy carriers leaving the product system are considered in this LCA.

Excluded Elements from LCA Calculation

- The transport of personnel to the plant;
- The transportation of personnel within the plant
- Research and development activities;
- Long-term emissions.

3.6 ALLOCATION

The EPD adheres to the principles of "polluter pays", ensuring that environmental costs are borne by those responsible for emissions and resource use. Furthermore, the system design follows the principle of 'modularity', allowing for flexible integration and scalability.

3.7 DATA COLLECTION & REFERENCE PERIOD

All primary data were collected by the manufacturer, IWTM AS AS, for the reference year 2024, covering the period from January to December 2024

3.8 ESTIMATES AND ASSUMPTIONS

A payload factor of 50 percent was used for all truck transports, which in fact corresponds to a full delivery and empty return trip.

The product is assumed to have a lifespan of 25 years, based on IWTM 's experience and the lifespan of the components.

The customers are primarily located in Norway. The transport distance to these customers was estimated based on the average distance from IWTM's office to the central regions of each of the customers.

All scenarios included are currently in use and are representative for one of the most likely scenario alternatives. Office functions, production activities and warehouse operations are located at the same site, and the scenarios therefore reflect the actual operational setup.

The production waste amount of the metal parts is assumed to be 5 %

Waste generation during the production phase is assumed to be 5 % for the metal raw materials, and 2 % for plastic raw materials. This assumption is used to account for manufacturing losses, off-cuts, and process-related scrap in the life cycle assessment.

The total weight of the product is 152 kg; however, the EPD is modeled for 1 kg of the product, including packaging, maintenance, and other components. Although the declared unit is 1.0 kg, the material inputs may result in a slightly higher weight due to production waste, losses, replacement of parts, and additional elements.

The water filtration tank is assumed to be manually removed at the end of its 25-year service life. No cutting, dismantling tools, lifting equipment, or energy-consuming

3 Calculation rules

operations are required. The tank can be detached and transported as a single unit, meaning no emissions or material flows occur in this stage.

Waste scenarios used in this LCA are based on scenarios. These scenarios are the default scenarios available in Rethink, the software used for this calculation. They are considered representative of real-world conditions, and the percentages for each treatment method are similar to, or closely reflect, actual scenarios for raw materials.

Only module B2 is declared, as the remaining B-modules are not technically relevant for this product and generate no emissions or material flows. This assessment is based on the company's operational experience and knowledge of the product's use conditions.

Module B2 is the replacement of the part called "anode". The frequency is based on the customers operational experience for the product.

3.9 DATA QUALITY

All primary data were collected by the manufacturer, IWTM AS AS, for the reference year 2024, covering the period from January 1, 2024, to December 31, 2024. For the data required for modeling that was not provided by the manufacturer and could not be influenced by them, generic data was used. Secondary data were sourced from the

regularly updated Ecoinvent database (version 3.9.1), aligning with EN 15804 standards to ensure background data does not exceed 10 years.

The ReTHINK EPD web application was used to model the life cycle for the production and disposal of the declared product systems. To ensure the results are comparable, consistent background data from the international Ecoinvent database was used in the LCA (e.g., data records on energy, transport, auxiliary materials, and suppliers). Almost all consistent data sets contained in the Ecoinvent database are documented and can be viewed online.

The scenarios included are currently in use and are representative of one of the most likely scenario alternatives. According to the criteria of the "UN Environmental Global Guidance on LCA database development" mentioned in EN 15804+A2, the data quality for all three representativeness categories (geographical, technical, and time) can be described as good.

3.10 POWER MIX

The energy used for assembling the components is included in the environmental profiles and is modelled using a market-based approach. IWTM receives a fully processed product and does not modify it in any way before delivering it to their customer.

4 Scenarios and additional technical information

4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

	Value and unit
Vehicle type used for transport	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)
Fuel type and consumption of vehicle	not available
Distance	37 km
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.

FLOWS ENTERING THE SYSTEM

There are no significant environment impacts as a result of materials or energy used in the construction stage (A5).

FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

Description	Value	Unit
Output materials as result of loss during construction	0	%
Output materials as result of waste processing of materials used for installation/assembly at the building site	0.000	kg
Output materials as result of waste processing of used packaging	0.289	kg

4.3 MAINTENANCE (B2)

Technical maintenance is needed during Use Stage. For maintenance the scenario(s) as mentioned below are included in this EPD.

Description	Service cycle (yr)	Number of cycles (n)	Amount per cycle	Total Amount	Unit
Anode	3	7.333	0.0116	0.0850628	kg

4 Scenarios and additional technical information

4.4 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.5 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
(ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) Metals, mixed (via residue (NMD ID 49)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) PVC, pipes (NMD ID 64)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) plastics, via residue (NMD ID 43)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) steel, fasteners (NMD ID 69)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50
(ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	50

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

Value and unit	
Vehicle type used for transport	(ei3.9.1) Lorry (Truck), unspecified (default) market group for (GLO)

4 Scenarios and additional technical information

Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.6 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
(ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41)	NL	0	5	0	95	0
(ei3.9.1) Metals, mixed (via residue (NMD ID 49)	NL	0	5	5	90	0
(ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0
(ei3.9.1) PVC, pipes (NMD ID 64)	NL	0	10	20	70	0
(ei3.9.1) plastics, via residue (NMD ID 43)	NL	0	20	80	0	0
(ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50)	NL	0	5	5	90	0
(ei3.9.1) steel, fasteners (NMD ID 69)	NL	0	1	0	99	0
(ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	NL	0	10	85	5	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
(ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41)	0.000	0.000	0.000	0.003	0.000
(ei3.9.1) Metals, mixed (via residue (NMD ID 49)	0.000	0.004	0.004	0.076	0.000
(ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.000	0.002	0.000	0.000
(ei3.9.1) PVC, pipes (NMD ID 64)	0.000	0.005	0.010	0.036	0.000
(ei3.9.1) plastics, via residue (NMD ID 43)	0.000	0.007	0.026	0.000	0.000
(ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50)	0.000	0.037	0.037	0.672	0.000
(ei3.9.1) steel, fasteners (NMD ID 69)	0.000	0.000	0.000	0.017	0.000
(ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.000	0.006	0.054	0.003	0.000
Total	0.000	0.060	0.134	0.807	0.000

4 Scenarios and additional technical information

4.7 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
(ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41)	0.002	0.000
(ei3.9.1) Metals, mixed (via residue (NMD ID 49)	0.076	0.000
(ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.053
(ei3.9.1) PVC, pipes (NMD ID 64)	0.036	0.214
(ei3.9.1) plastics, via residue (NMD ID 43)	0.000	0.336
(ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50)	0.331	0.000
(ei3.9.1) steel, fasteners (NMD ID 69)	0.011	0.000
(ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20)	0.003	1.462
Total	0.459	2.065

5 Results

For the impact assessment long-term emissions (>100 years) are not considered. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER KILOGRAM

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1.12E+1	6.45E-1	1.98E-1	1.20E+1	7.11E-3	4.92E-1	2.89E+0	0.00E+0	9.89E-3	2.92E-1	2.38E-3	-5.88E-1
GWP-f	kg CO ₂ eq.	1.11E+1	6.45E-1	6.78E-1	1.24E+1	7.08E-3	8.69E-3	2.89E+0	0.00E+0	9.85E-3	2.91E-1	2.38E-3	-5.89E-1
GWP-b	kg CO ₂ eq.	5.87E-2	4.38E-4	-4.81E-1	-4.22E-1	2.31E-6	4.84E-1	1.75E-3	0.00E+0	3.21E-6	1.05E-3	1.86E-6	6.73E-4
GWP-luluc	kg CO ₂ eq.	8.20E-3	4.56E-4	9.40E-4	9.59E-3	2.52E-5	2.26E-5	1.79E-3	0.00E+0	3.51E-5	4.64E-5	2.73E-7	-3.59E-5
ODP	kg CFC 11 eq.	6.95E-5	1.05E-8	1.80E-6	7.13E-5	1.26E-10	3.17E-10	7.40E-8	0.00E+0	1.75E-10	6.05E-9	1.80E-11	-4.84E-8
AP	mol H ⁺ eq.	4.62E-2	3.15E-3	3.14E-3	5.25E-2	3.39E-5	1.08E-4	1.18E-2	0.00E+0	4.72E-5	1.78E-4	4.47E-6	-3.65E-3
EP-fw	kg P eq.	4.16E-4	9.00E-6	2.83E-5	4.54E-4	7.04E-8	1.23E-7	1.18E-4	0.00E+0	9.80E-8	1.55E-6	7.05E-9	2.79E-5
EP-m	kg N eq.	2.00E-2	1.02E-3	1.38E-3	2.24E-2	1.29E-5	4.84E-5	2.87E-3	0.00E+0	1.79E-5	4.57E-5	2.35E-6	-4.57E-4
EP-T	mol N eq.	8.63E-2	1.11E-2	8.51E-3	1.06E-1	1.37E-4	5.36E-4	3.20E-2	0.00E+0	1.91E-4	4.93E-4	1.94E-5	-7.72E-3
POCP	kg NMVOC eq.	3.36E-2	4.21E-3	3.31E-3	4.11E-2	4.69E-5	1.52E-4	1.49E-2	0.00E+0	6.53E-5	1.54E-4	7.47E-6	-3.92E-3
ADP-mm	kg Sb-eq.	1.97E-4	5.05E-6	8.31E-6	2.11E-4	2.22E-8	2.49E-8	1.02E-5	0.00E+0	3.09E-8	2.49E-7	1.54E-9	-2.43E-5
ADP-f	MJ	1.11E+2	8.91E+0	8.20E+0	1.28E+2	1.01E-1	1.19E-1	3.68E+1	0.00E+0	1.41E-1	4.72E-1	1.49E-2	-6.66E+0
WDP	m ³ world eq.	1.78E+0	4.67E-2	1.59E-1	1.98E+0	5.54E-4	1.46E-3	2.33E-1	0.00E+0	7.71E-4	1.39E-2	2.44E-4	-7.17E-1

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprivation potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
PM	disease incidence	2.03E-6	6.36E-8	1.26E-7	2.22E-6	6.99E-10	1.26E-9	1.75E-6	0.00E+0	9.73E-10	2.05E-9	1.04E-10	-5.22E-8
IR	kBq U235 eq.	5.27E-1	6.58E-3	2.60E-2	5.60E-1	3.96E-5	1.09E-4	4.13E-2	0.00E+0	5.51E-5	2.02E-3	1.71E-5	4.06E-3
ETP-fw	CTUe	8.89E+1	4.69E+0	6.22E+0	9.99E+1	7.49E-2	9.80E-2	1.14E+1	0.00E+0	1.04E-1	2.70E+0	3.83E-1	2.43E+0
HTP-c	CTUh	4.58E-8	9.33E-10	3.09E-9	4.99E-8	3.75E-12	7.59E-11	1.29E-8	0.00E+0	5.22E-12	4.41E-11	5.93E-13	4.66E-9
HTP-nc	CTUh	2.01E-7	7.21E-9	1.12E-8	2.19E-7	8.15E-11	2.17E-10	2.30E-8	0.00E+0	1.13E-10	6.41E-10	3.93E-11	1.32E-8
SQP	Pt	5.25E+1	3.67E+0	4.47E+1	1.01E+2	8.01E-2	9.24E-2	8.45E+0	0.00E+0	1.11E-1	2.26E-1	3.47E-2	-1.10E+1

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality index (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
ILCD type / level 3	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Soil quality index (SQP)	2
Disclaimer 1 – 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.		
Disclaimer 2 – 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.		

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1- A3	A4	A5	B2	C1	C2	C3	C4	D
PERE	MJ	1.76E+1	2.23E-1	4.32E+0	2.21E+1	1.43E-3	2.96E-3	1.70E+0	0.00E+0	2.00E-3	5.78E-2	7.63E-4	-2.23E+0
PERM	MJ	0.00E+0	0.00E+0	4.04E+0	4.04E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.76E+1	2.23E-1	8.36E+0	2.62E+1	1.43E-3	2.96E-3	1.70E+0	0.00E+0	2.00E-3	5.78E-2	7.63E-4	-2.23E+0
PENRE	MJ	1.07E+2	8.91E+0	8.13E+0	1.24E+2	1.02E-1	1.19E-1	3.68E+1	0.00E+0	1.41E-1	4.72E-1	1.49E-2	-6.05E+0
PENRM	MJ	3.27E+0	0.00E+0	6.77E-2	3.34E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-6.07E-1
PENRT	MJ	1.11E+2	8.91E+0	8.20E+0	1.28E+2	1.02E-1	1.19E-1	3.68E+1	0.00E+0	1.41E-1	4.72E-1	1.49E-2	-6.66E+0
SM	Kg	3.48E-1	0.00E+0	1.74E-2	3.65E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.54E-4
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m ³	6.02E-2	1.64E-3	4.91E-3	6.68E-2	2.45E-5	1.48E-4	8.19E-3	0.00E+0	3.41E-5	6.32E-4	1.75E-5	-1.34E-2

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 resources | **SM**=Use of secondary material | **RSF**=Use of renewable secondary fuels | **NRSF**=Use of non-renewable secondary fuels | **FW**=Net use of fresh water

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
HWD	Kg	3.30E-4	1.95E-4	9.44E-5	6.19E-4	6.47E-7	6.80E-7	2.25E-4	0.00E+0	9.00E-7	1.55E-6	7.03E-8	-8.79E-5
NHWD	Kg	5.26E+0	2.79E-1	3.44E-1	5.89E+0	6.70E-3	2.82E-1	4.43E-1	0.00E+0	9.33E-3	1.49E-1	6.03E-2	7.93E-2
RWD	Kg	6.03E-4	4.37E-6	2.97E-5	6.37E-4	2.32E-8	9.73E-8	2.85E-5	0.00E+0	3.23E-8	1.56E-6	9.56E-9	2.40E-6

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	4.01E-2	4.01E-2	0.00E+0	1.44E-2	8.04E-2	0.00E+0	0.00E+0	8.07E-1	0.00E+0	0.00E+0
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	1.46E-2	1.46E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.71E+0
EEE	MJ	0.00E+0	0.00E+0	8.49E-3	8.49E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.90E-1

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy, Thermic | **EEE**=Exported Energy, Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER KILOGRAM

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per kilogram:

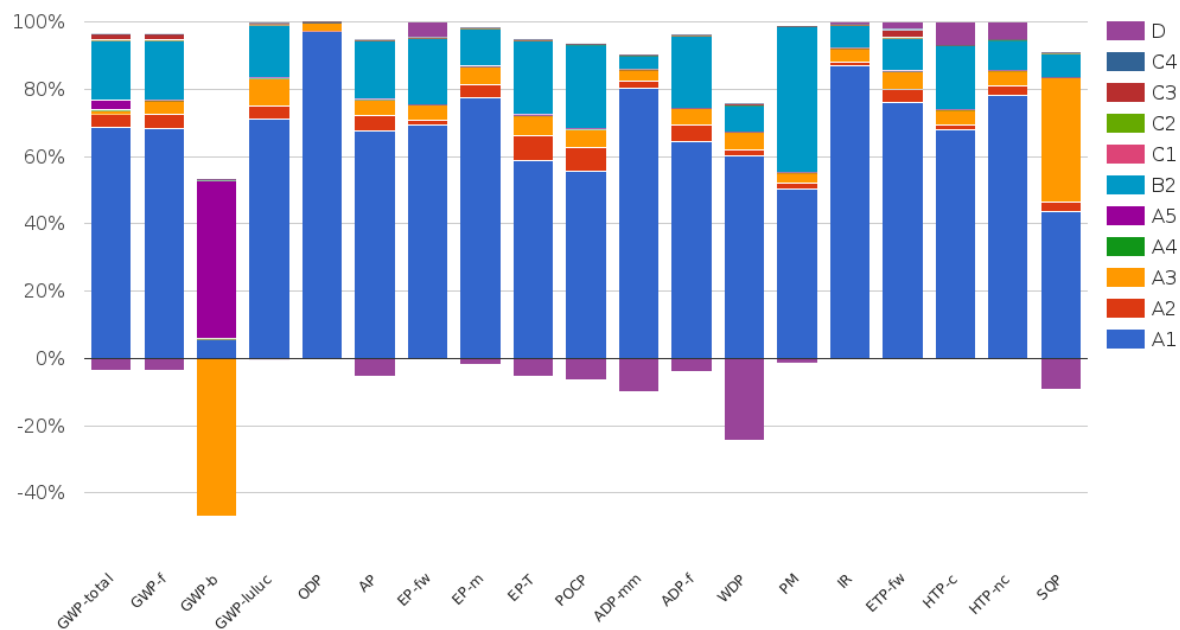
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.1314	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.4817	kg CO2 (biogenic)

6 Interpretation of results



Module A1 is by far the dominant contributor across nearly all impact categories, highlighting that the environmental performance of the product is largely driven by raw material production. This reflects the energy- and resource-intensive nature of upstream material extraction and processing. In particular, the production of multiple metals used in the product, such as magnesium and chromium steel, is highly energy-intensive and therefore contributes significantly to the overall environmental impacts.

Module A3 has a minor contribution to several impact categories, with the most notable effect observed in GWP-B, reflecting emissions related to biogenic carbon associated with the wooden packaging.

Module B2, contributes substantially to indicators such as GWP-total, ODP, AP, and EP, associated with the maintenance of replacing Anodes every third year.

6 Interpretation of results

Other modules like A5, C2, C3 and C4 show relatively minor impacts contributions in most categories.

The disposal stage (D) accounts for the environmental benefits and burdens from the reuse, recycling, or energy recovery of materials at the end of the product's life cycle.

7 References

ISO 14040

ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044

ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14044:2006

ISO 14025

ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A2

EN 15804:2012+A2:2019/AC:2021, Sustainability of Buildings - Environmental Product Declarations - Framework Development Rules by Product Category

Kiwa-Ecobility Experts (2025).

General Programme Instructions

“Product Level”, SOP EE 1201_R.3.0 (03.06.2025).

Kiwa-Ecobility Experts (2025).

General Programme Instructions “Product Level”

– Annex B1: Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R.3.0 (03.06.2025).

Ecoinvent

ecoinvent Version 3.9.1 (December 2022)

R<THINK characterization method

ecoinvent 3.9.1: EN 15804+A1 indicators (CML-IA Baseline v3.09), EN 15804+A2 indicators (EF 3.1)

8 Contact information

Publisher	Operator	Owner of declaration
		
Kiwa-Ecobility Experts Wattstraße 11-13 13355 Berlin, DE	Kiwa-Ecobility Experts Wattstraße 11-13 13355 Berlin, DE	IWTM AS Eternitveien 34 3470 Oslo, Norway, NO
E-mail: DE.Ecobility.Experts@kiwa.com Website: https://www.kiwa.com/de/en-de/areas-of-expertise/sustainable-solutions/ecobility-experts-epd-program/	E-mail: DE.Ecobility.Experts@kiwa.com Website: https://www.kiwa.com/de/en-de/areas-of-expertise/sustainable-solutions/ecobility-experts-epd-program/	E-mail: Alexander.Irgens@kiwa.com Website: https://iwtm.com/nb

Kiwa-Ecobility Experts is established member of the 