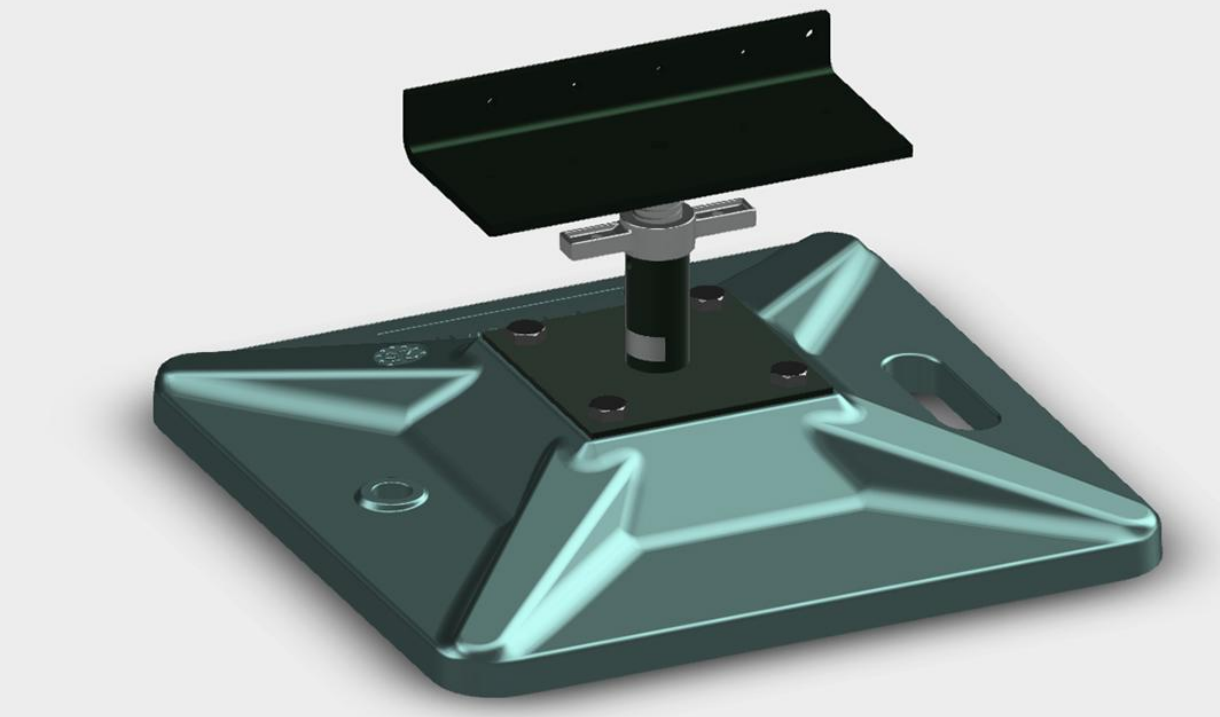
Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

S Base foundation for temporary buildings and constructions



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Issue date:	19-02-2025
Valid until:	19-02-2030
Declaration owner:	Solidum EST AS
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

S Base foundation for temporary buildings and constructions

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-191318-EN

1.3 VALIDITY

Issue date: 19-02-2025

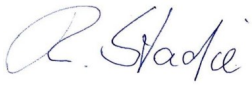
Valid until: 19-02-2030

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: Solidum EST AS

Address: Solidum EST AS, 5515 Haugesund, Norway

E-mail: post@s-base.no

Website: www.s-base.no

Production location: Schake Gmbh

Address production location: Volmarsteiner Straße 48, 58089 Hagen, Germany

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 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Kripanshi Gupta, 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 (Kiwa-EE) – General Product Category Rules (2022-02-14)

EPD Norway Product Category Rules (NPCR 013) B construction steel products (2024-12-31)

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. 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 the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the

1 General information

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 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

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

LCA software*: Simapro 9.1

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: EcoInvent version 3.6

Version database: v3.17 (2024-05-22)

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

1.11 LCA BACKGROUND REPORT

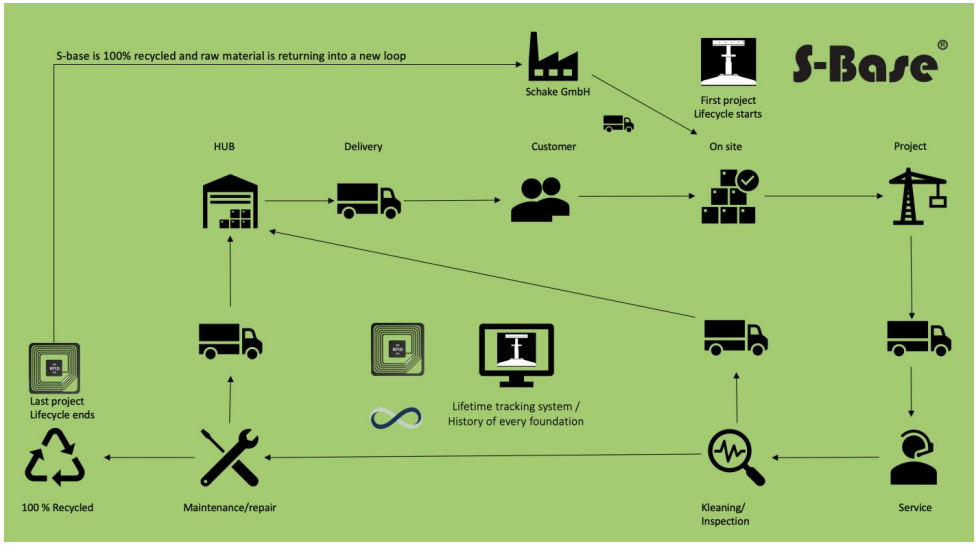
This EPD is generated on the basis of the LCA background report 'S Base foundation for temporary buildings and constructions ' with the calculation identifier ReTHiNK-91318.

2 Product

2.1 PRODUCT DESCRIPTION

The S-Base™ is a foundation system developed by Solidum EST in Norway and is manufactured under license by Schake GmbH in Germany. Market for the product is EU and Nordic countries. The business model is based on rental or subscription solutions.

All components are equipped with unique serial numbers, ensuring traceability. Each foundation is fitted with QR codes and RFID technology connected to quality system, providing a comprehensive view of where the foundations are used and where they have been used throughout their entire lifecycle.



2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

S Base is developed especially for temporary buildings such as living quarters, porta cabins, canteens, office buildings, preschools or school buildings. There is also a special application to be used under steel containers.

After 6-180 months of use, the S Bases will be removed by crane truck, sent to a local hub for inspection and maintenance and then reused for the next project.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

As the entire life cycle of the product is not considered in the scope of the study, the specification of the reference service life (RSL) is voluntary. According to the information from the manufacturer, the RSL of the product is 80 years.

The lifetime is estimated by the manufacturer using the formula LT = K(LZn + LM). Here, LZn refers to the estimated lifespan of the zinc plating in the specific environment, and LM is the estimated lifespan of the lacquer coating if directly applied to steel. The K factor is an environmental synergy factor, set at 1.5 for the C5 environment, as per EN ISO 12944 standard.

USED RSL (YR) IN THIS LCA CALCULATION:

80

2.4 TECHNICAL DATA

S-Base is designed to meet permanent action (G), Variable action (Q) and Geotechnical action. Load case or compatible load arrangements, sets of deformations and imperfections considered simultaneously with fixed variable actions and permanent actions for a particular verification comply to the EUROCODE 0 - EN 1990.

The product consists primarily of PVC (360 PVC soft), which is made from 100% recycled raw materials and complies with the REACH regulations in Europe.

A typical composition of the S Base, covered by this EPD is as follows:

Raw Material	Value (%)
PVC (360 PVC soft)	69.47
Steel(Steel S235 JR,Steel S235 JRH,Steel S355 J2H, Steel S235, Steel G3Si1)	30.19
Welding consumable and coating materials	0.33

Product dimension is given in the below table:

Length	600 mm
Width	600 mm
Height	292 mm
Weight	37.445 kg

2 Product

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 authorisation under REACH legislation.

2.6 DESCRIPTION PRODUCTION PROCESS

Individual components such as Steel (Steel S235 JR,Steel S235 JRH,Steel S355 J2H, Steel S235, Steel G3Si1), 360 PVC soft, welding consumables, coating materials , and other ancillary materials are delivered to the production facility. All the raw materials are mainly delivered by truck . Until the materials are actually used in production, they are stored in the warehouse.

The processes that are performed at the production facility are: cutting of profiles and plates, assembly, welding, sand blasting, priming and painting of structures (paint layer depends on customer's requirements) and packing for a delivery.

All inputs, including raw materials, primary products, energy, and auxiliary materials as well as the accumulated waste are considered in the assessment.

Production stage

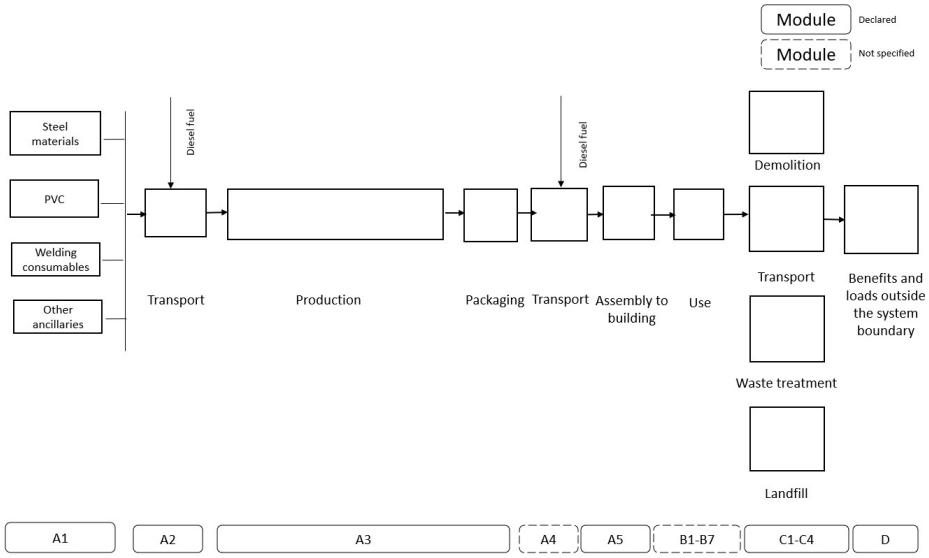
There are two production locations for S Base. The primary production occurs at Schake GmbH's facility at Volmarsteiner Straße 48, Hagen, while the powder coating process is conducted at the second location at Eckeseyer Straße 195, Hagen.

The manufacturing process for the S-Base™ foundation system begins with the selection of German steel (3-10 mm thick), recycled PVC base plates (360 PVC soft).

Steel sheets and tubes are precision cut using CNC-controlled lasers for optimal resource efficiency. After cutting, components are assembled through a combination of manual and robotic welding to ensure strength and durability.

Prior to coating, the steel undergoes multiple cleaning steps to enhance adhesion. The components are then hot-dip galvanized at 450 °C using renewable energy and finished with a green powder coating that meets C5 corrosion standards.

The 360 PVC soft base plates are crafted from recycled materials,. Final assembly utilizes stainless or acid-resistant fasteners, and each foundation is scanned via RFID for quality control before packaging.



2.7 CONSTRUCTION DESCRIPTION

-

3 Calculation rules

3.1 DECLARED UNIT

1 piece

Declared unit is 1 piece S Base

Reference unit: piece (p)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	p
Weight per reference unit	37.445	kg
Conversion factor to 1 kg	0.026706	p

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with options 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	ND	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN15804 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 S Base foundation for temporary buildings and constructions , a product of Solidum EST AS. The results of this EPD are representative for European Union.

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)

3 Calculation rules

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.

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

Allocations were avoided as far as possible. No by-products or co-products are produced during the manufacture of the analysed product. The energy requirements of production were allocated to the individual products on the basis of energy consumption measurements. Specific information on the allocations within the background data can be found in the documentation of the Ecoinvent datasets.

3.7 DATA COLLECTION & REFERENCE PERIOD

All primary data were collected by manufacture of product Schake GmbH for the reference year of 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. A data set for a non-specific truck was used.

- Consumption of 0.043 MJ diesel per kilogram of the products is assumed for the demolition of end-of-life products.

- There are 2 End of life waste scenario for this LCA were determined.

  - Steel : NMD ID 70, According to this standard, the waste treatment process comprises 94 % recycling, 5 % re-use and 1 % landfill.
  - PVC: NMD ID 63, According to this standard, the waste treatment process comprises 80 % recycling, 10 % incineration and 10 % landfill.

- S Base production is primarily done at Schake GmbH's facility located at Volmarsteiner Straße 48, Hagen, which accounts for approximately 95% of the workload. The remaining 5%, specifically the powder coating process, is conducted at Eckeseyer Straße 195, Hagen. The distance between these two locations is 4 km,. All calculations have been made based on Volmarsteiner Straße 48, Hagen, as the main production site.

- For the waste scenario, the closest profile to the actual geographical location should be selected. However, due to limited data, Rethink has proposed using EU and CH profiles.

3 Calculation rules

- The Assembly stage (A5) is declared to account for the environmental impacts associated with the end-of-life of packaging.

3.9 DATA QUALITY

All primary data were collected by manufacture of product Schake GmbH for the reference year of 2024 covering the period from January to December 2024.

For the data, which was needed for modelling but was not provided by the manufacturer and could not be influenced by dem, generic data was used. Secondary data were sourced from the regularly updated Ecoinvent database (version 3.6), aligning with EN 15804 standards to ensure background data not exceeding 10 years.

ReTHINK EPD web application was used to model the life cycle for the production and disposal of the declared product systems. To ensure that the results are comparable, consistent background data from the international database Ecoinvent 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 for 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

In general, a market-based approach was used for the electricity consumption in production (A3). Since no purchased electricity mix could be provided, the national residual grid mix of Germany was utilized. This mix has a total Global Warming Potential (GWP) of 0.74 kg CO2 eq. per kWh.

4 Scenarios and additional technical information

4.1 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	2.850	kg

4.2 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

Description	Amount	Unit
Diesel, burned in machine (incl. emissions)	0.041	l

4.3 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]
PVC, frame profiles (NMD ID 63)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Steel, construction profiles (NMD ID 70)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

4 Scenarios and additional technical information

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	Lorry (Truck), unspecified (default) | market group for (GLO)
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

4.4 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 [%]
PVC, frame profiles (NMD ID 63)	NL	0	10	10	80	0
Steel, construction profiles (NMD ID 70)	NL	0	1	0	94	5
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
PVC, frame profiles (NMD ID 63)	0.000	2.600	2.600	20.800	0.000
Steel, construction profiles (NMD ID 70)	0.000	0.114	0.000	10.735	0.571
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.003	0.021	0.001	0.000
Total	**0.000**	**2.717**	**2.621**	**31.536**	**0.571**

4.5 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.

4 Scenarios and additional technical information

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
PVC, frame profiles (NMD ID 63)	-5.200	0.000
Steel, construction profiles (NMD ID 70)	9.254	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.001	0.654
Total	**4.056**	**0.654**

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. 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 PIECE

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	4.07E+1	6.59E-1	-2.75E+0	3.87E+1	4.68E+0	1.35E-1	3.03E-1	1.22E+1	2.20E-1	-1.35E+1
GWP-f	kg CO_2 eq.	3.92E+1	6.59E-1	1.82E+0	4.16E+1	7.74E-2	1.35E-1	3.03E-1	1.38E+1	2.20E-1	-1.36E+1
GWP-b	kg CO_2 eq.	1.57E+0	3.04E-4	-4.57E+0	-3.00E+0	4.61E+0	3.75E-5	1.40E-4	-1.57E+0	2.98E-4	1.37E-1
GWP-luluc	kg CO_2 eq.	2.45E-2	2.41E-4	3.81E-3	2.86E-2	2.91E-5	1.06E-5	1.11E-4	6.87E-3	1.34E-5	7.55E-3
ODP	kg CFC 11 eq.	2.86E-6	1.45E-7	1.62E-7	3.16E-6	1.53E-8	2.91E-8	6.68E-8	1.54E-6	8.78E-9	-3.91E-7
AP	mol H+ eq.	1.74E-1	3.82E-3	8.58E-3	1.86E-1	1.07E-3	1.41E-3	1.75E-3	3.25E-2	2.48E-4	-5.72E-2
EP-fw	kg P eq.	2.11E-3	6.65E-6	8.36E-5	2.20E-3	1.16E-6	4.91E-7	3.05E-6	2.18E-4	4.91E-7	-4.99E-4
EP-m	kg N eq.	3.47E-2	1.35E-3	2.12E-3	3.82E-2	4.64E-4	6.22E-4	6.18E-4	8.23E-3	1.35E-4	-1.11E-2
EP-T	mol N eq.	3.60E-1	1.48E-2	2.38E-2	3.99E-1	5.18E-3	6.83E-3	6.82E-3	9.06E-2	9.04E-4	-1.35E-1
POCP	kg NMVOC eq.	1.57E-1	4.24E-3	9.47E-3	1.70E-1	1.39E-3	1.88E-3	1.95E-3	2.80E-2	3.06E-4	-8.00E-2
ADP-mm	kg Sb-eq.	6.58E-4	1.67E-5	2.51E-5	7.00E-4	1.47E-6	2.07E-7	7.66E-6	1.32E-4	3.00E-7	-1.09E-5
ADP-f	MJ	4.75E+2	9.94E+0	2.91E+1	5.14E+2	1.10E+0	1.86E+0	4.56E+0	9.71E+1	6.67E-1	-9.88E+1
WDP	m3 world eq.	8.45E+0	3.56E-2	4.06E-1	8.89E+0	1.38E-2	2.49E-3	1.63E-2	3.07E+0	2.87E-2	-2.49E+0

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 stratosperic ozon 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 minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	A5	C1	C2	C3	C4	D
PM	disease incidence	2.55E-6	5.93E-8	1.62E-7	2.77E-6	1.11E-8	3.74E-8	2.72E-8	4.60E-7	4.64E-9	-8.64E-7
IR	kBq U235 eq.	1.77E+0	4.16E-2	7.90E-2	1.89E+0	4.35E-3	7.95E-3	1.91E-2	3.21E-1	2.61E-3	2.00E-1
ETP-fw	CTUe	1.16E+3	8.86E+0	3.60E+1	1.20E+3	1.30E+0	1.12E+0	4.07E+0	4.91E+2	1.01E+1	-4.93E+2
HTP-c	CTUh	1.56E-7	2.87E-10	4.36E-9	1.60E-7	7.15E-10	3.91E-11	1.32E-10	1.02E-8	1.96E-11	-6.59E-9
HTP-nc	CTUh	1.37E-6	9.69E-9	3.84E-8	1.42E-6	3.04E-9	9.60E-10	4.45E-9	2.13E-7	2.00E-9	2.44E-6
SQP	Pt	1.81E+2	8.62E+0	5.63E+2	7.52E+2	9.30E-1	2.37E-1	3.96E+0	6.71E+1	1.58E+0	-1.98E+2

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 idex (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
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2

5 Results

ILCD classification	Indicator	Disclaimer
	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
	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	A5	C1	C2	C3	C4	D
PERE	MJ	4.04E+1	1.24E-1	4.32E+1	8.38E+1	2.57E-2	1.00E-2	5.71E-2	6.14E+0	1.14E-2	-3.42E+1
PERM	MJ	0.00E+0	0.00E+0	3.85E+1	3.85E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	4.04E+1	1.24E-1	8.17E+1	1.22E+2	2.57E-2	1.00E-2	5.71E-2	6.14E+0	1.14E-2	-3.42E+1
PENRE	MJ	5.02E+2	1.06E+1	3.10E+1	5.44E+2	1.17E+0	1.97E+0	4.84E+0	1.03E+2	7.09E-1	-1.03E+2
PENRM	MJ	7.70E-1	0.00E+0	7.34E-5	7.70E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.56E-2
PENRT	MJ	5.03E+2	1.06E+1	3.10E+1	5.45E+2	1.17E+0	1.97E+0	4.84E+0	1.03E+2	7.09E-1	-1.03E+2
SM	Kg	2.81E+1	0.00E+0	2.08E-2	2.81E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
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
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
FW	m^3	2.95E-1	1.21E-3	1.55E-2	3.12E-1	1.33E-3	9.55E-5	5.56E-4	8.41E-2	6.97E-4	-4.79E-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	A5	C1	C2	C3	C4	D
HWD	Kg	2.43E-3	2.52E-5	7.28E-5	2.53E-3	2.68E-6	5.05E-6	1.16E-5	1.55E-4	1.02E-6	-1.61E-3
NHWD	Kg	7.33E+0	6.30E-1	3.51E-1	8.31E+0	3.42E-1	2.20E-3	2.89E-1	3.99E+0	2.72E+0	-1.34E+0
RWD	Kg	1.72E-3	6.53E-5	9.15E-5	1.88E-3	6.45E-6	1.29E-5	3.00E-5	3.67E-4	3.99E-6	5.25E-5

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	A5	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	5.71E-5	5.71E-5	5.00E-3	0.00E+0	0.00E+0	5.71E-1	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	3.15E-3	3.15E-3	2.32E-1	0.00E+0	0.00E+0	3.15E+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
EET	MJ	0.00E+0	0.00E+0	-2.03E-5	-2.03E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.03E+1
EEE	MJ	0.00E+0	0.00E+0	-1.18E-5	-1.18E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-6.00E+0

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 PIECE

BIOGENIC CARBON CONTENT

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

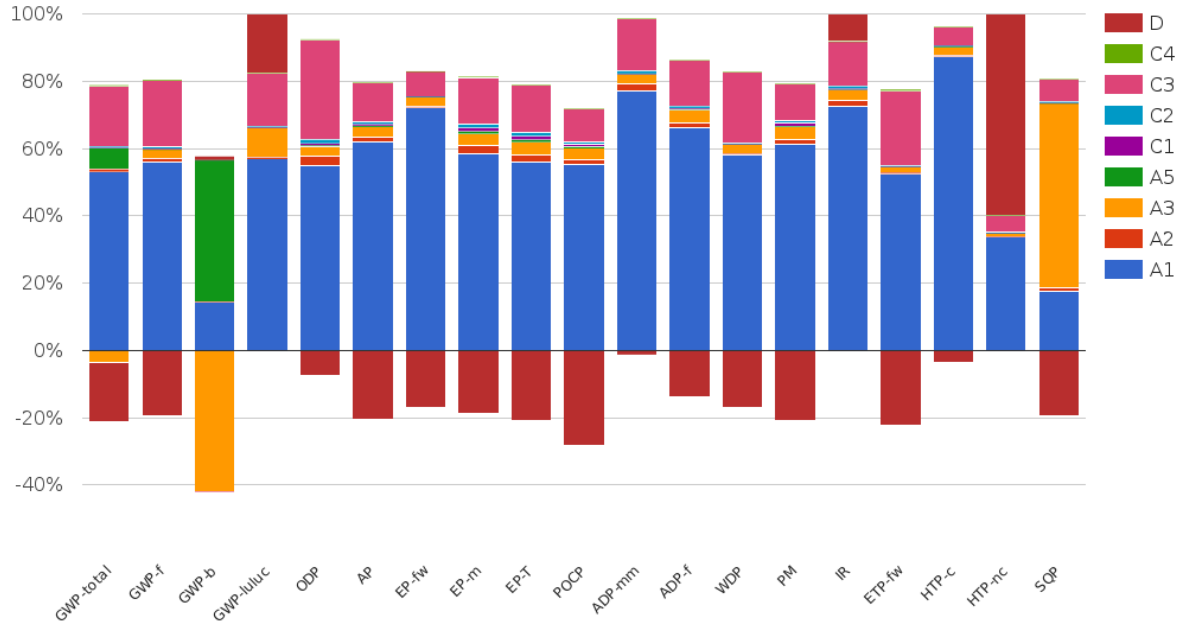
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	1.25	kg C

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	4.583	kg CO2 (biogenic)

6 Interpretation of results



The figure illustrates the impact categories for 1 piece of product (S Base).
As depicted, Modules A1, A3, and D emerge as the most significant contributors to all assessed indicators. The contribution of raw materials (A1) is notably higher, whereas transportation (A2 and C2) exhibits a comparatively minor impact. For most indicators, Module D indicates environmental benefits or credits.

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+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

General PCR Ecobility Experts
Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

PCR B

EPD Norway Product Category Rules (NPCR 013) B construction steel products (2024-12-31)

NMD

NMD 2019 NATIONAL ENVIRONMENTAL DATABASE: Environmental Performance Assessment Method for Construction; 1.1 (March 2022)

8 Contact information

Publisher	Operator	Owner of declaration

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin, DE

E-mail:
DE.Ecobility.Experts@kiwa.com
Website:
https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin, DE

E-mail:
DE.Ecobility.Experts@kiwa.com
Website:
https://www.kiwa.com/de/en/themes/ecobility-experts/ecobility-experts-epd-program/

Solidum EST AS
Solidum EST AS
5515 Haugesund, NO

E-mail:
post@s-base.no
Website:
www.s-base.no

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