

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



Steel fiber: waved(undulated), with hooked ends, with flattened ends.



Registration number:	EPD-Kiwa-EE-169636-EN
Issue date:	23-06-2024
Valid until:	23-06-2029
Declaration owner:	PJSC "STALKANAT"
Publisher:	Kiwa-Ecobility Experts
Program operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Steel fiber: waved(undulated), with hooked ends, with flattened ends.

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-169636-EN

1.3 VALIDITY

Issue date: 23-06-2024

Valid until: 23-06-2029

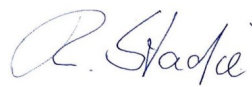
1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
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DE



Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: PJSC "STALKANAT"

Address: str. Vodoprovivna 16,, 65007 Odesa, UA

E-mail: secretary@stalkanat.com.ua

Website: <https://stalkanat.com.ua/>

Production location: PJSC " Stalkanat"

Address production location: Vapnyana St, 52A, 65006 Odesa, UA

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



Elisabeth Amat Guasch, Greenize

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

PCR A

PCR A – General Program Category Rules for Construction Products from the EPD programme of Kiwa-Ecobility Experts; Version 2.1 (2022)

PCR B

Kiwa-Ecobility Experts, Berlin, 2020: PCR B – Product Category Rules for steel construction products, Requirements on the Environmental Product Declarations for steel construction products; Version 2020-03-13 (draft)

1 General information

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 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 'Steel fiber: waved(undulated), with hooked ends, with flattened ends.' with the calculation identifier ReTHiNK-69636.

2 Product

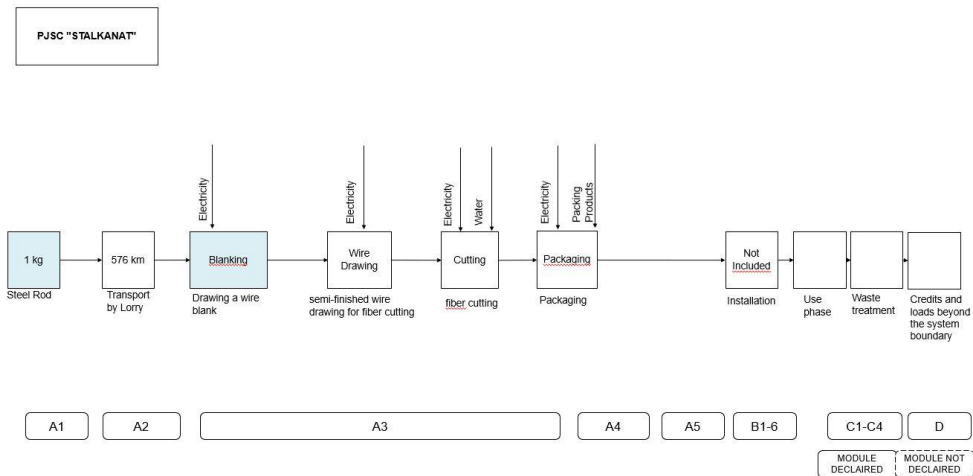
2.1 PRODUCT DESCRIPTION

This EPD applies to steel fiber manufactured in accordance with EN 14889-1:2006, wavy, with curved ends, with flattened ends with the Nominal Tensile Strength from 1150 to 2150 N/mm², length 35-60 mm, diameter 0.7-1.20 mm, produced by PJSC "STALKANAT".

Steel fiber is used for structural reinforcement of concrete throughout the entire volume. It has the property of increasing the rigidity and strength of a concrete monolith. Steel fiber is intended for industrial floors of industrial buildings, road and airfield pavements, coatings for the mining industry, wall structures, road base reinforcement, underwater concrete structures, and slope strengthening.

Steel fiber, compared to conventional reinforcement, eliminates the appearance of cracks during the period when reinforced concrete sets. This is possible due to the fact that steel fiber concrete is a uniformly distributed reinforcement inside a concrete structure.

As a result, steel fiber concrete has a significantly longer maintenance-free service life.



2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The use of steel fiber in a number of cases has certain advantages over traditionally reinforced concrete. A certain amount of steel fiber (19-35 kg/m³) is evenly distributed in the concrete mixture, resulting in a three-dimensional structure. This steel fiber structure

withstands tensile forces and prevents the opening of microcracks that often form from exposure to moisture or stress.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

Since the service life of steel fiber is not considered, there is no need to specify a reference service life. The generic life cycle of product can be considered as 100 years for any calculations basics.

USED RSL (YR) IN THIS LCA CALCULATION:

100

2.4 TECHNICAL DATA

In particular, the manufacturer declares the following information about the technical characteristics of the product:

Product type according to REACH No. 1907/2006 – construction product. Fiber is not classified as a hazardous substance. Conditions for safe storage:

Avoid moisture, acids and other factors that can cause metal corrosion. When storing and storing, keep the original packaging.

Information on toxicological effects: the product does not have toxicological effects.

Fiber type		Nominal Tensile Strength N/mm ²	Nominal Length mm	Nominal equivalent diameter, mm
With hooked ends	HE 35/0,75	from 1150 to 2150	35	0,75
With hooked ends	HE 50/0,70	from 1150 to 2150	50	0,7
With hooked ends	HE 50/0,75	from 1150 to 2150	50	0,75
With hooked ends	HE 50/0,80	from 1150 to 2150	50	0,8
With hooked ends	HE 50/0,90	from 1150 to 2150	50	0,9
With hooked ends	HE 50/0,95	from 1150 to 2150	50	0,95
With hooked ends	HE 50/1,0	from 1150 to 2150	50	1

2 Product

Fiber type		Nominal Tensile Strength N/mm ²	Nominal Length mm	Nominal equivalent diameter, mm
With hooked ends	HE 50/1,05	from 1150 to 2150	50	1,05
With hooked ends	HE 50/1,2	from 1150 to 2150	50	1,2
With hooked ends	HE 60/0,70	from 1150 to 2150	60	0,7
With hooked ends	HE 60/0,75	from 1150 to 2150	60	0,75
With hooked ends	HE 60/0,80	from 1150 to 2150	60	0,8
With hooked ends	HE 60/0,85	from 1150 to 2150	60	0,85
With hooked ends	HE 60/0,90	from 1150 to 2150	60	0,9
With hooked ends	HE 60/0,95	from 1150 to 2150	60	0,95
With hooked ends	HE 60/1,0	from 1150 to 2150	60	1
With hooked ends	HE 60/1,05	from 1150 to 2150	60	1,05
With hooked ends	HE 60/1,20	from 1150 to 2150	60	1,2
With flattened ends	FE 50/0,8	from 1150 to 2150	50	0,8
With flattened ends	FE 50/1,0	from 1150 to 2150	50	1
With flattened ends	FE 50/1,2	from 1150 to 2150	50	1,2
Waved (undulated)	URW 50/1,0	from 1150 to 2150	50	1
Waved (undulated)	URW 80/1,0	from 1150 to 2150	55	0,8
Waved (undulated)	URW 60/1,0	from 1150 to 2150	60	1
Waved (undulated)	URW 60/1,2	from 1150 to 2150	60	1,2

2.5 DESCRIPTION PRODUCTION PROCESS

The technological process diagram for manufacturing fiber includes the following operations:

- **removal of scale by mechanical means from the surface of steel wire rod:** hot-rolled steel has a layer of iron oxides on the surface, which must be removed before drawing. This process is carried out on a surface preparation line installed in front of the straight-through drawing machine. The wire rod passes through steel rollers, bends on them, and scale falls off the surface of the wire rod. After descaling in the rollers, the surface of the wire rod is treated with rotating steel brushes to remove any remaining scale. Then the wire rod is washed with water (water circulates in a closed cycle), coated in a borax solution in order to apply a lubricating layer at the drawing stage, then the wire rod is dried with hot air using an electric hair dryer;
- **first wire drawing on a straight-through drawing machine:** the wire rod is passed through several successive dies installed on the drawing machine, which leads to a reduction in the cross-section of the wire and its strengthening. To facilitate passage through the dies, powdered lubricants are used to reduce friction of the wire in the dies;
- **finishing wire drawing on a drawing machine:** when the wire passes through successive dies, the cross-section is reduced to a given size, the material is strengthened;
- **cutting wire into fiber with placing the fiber in cardboard boxes or polypropylene big bags:** fiber is cut from wire on cutting machines and placing it in cardboard boxes or polypropylene big bags;

packaging of boxes or polypropylene big bags with fiber on wooden pallets:

boxes with fiber are placed on a pallet, wrapped with stretch film, pulled together using polypropylene tape and metal corners / polypropylene big bags are placed on a wooden pallet and secured with polypropylene tape to the pallet

3 Calculation rules

3.1 DECLARED UNIT

Kg

The declared functional unit is 1 kg.

Reference unit: kilogram (kg)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	kg
Conversion factor to 1 kg	1.000000	kg

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with modules C1-C4 and module D LCA. 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	ND	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 Steel fiber: waved(undulated), with hooked ends, with flattened ends., a product of PJSC "STALKANAT". The results of this EPD are representative for European Union.

3.5 CUT-OFF CRITERIA

Product Stage (A1-A3)

The production stage encompasses the transportation of raw materials, the conversion of these raw materials(steel Purchased from the steel supplier) into the end product. This

3 Calculation rules

phase accounts for the energy necessary for production, supplementary materials, packaging materials, and the associated emissions. It's important to note that certain processes, such as wire drawing, and emissions generated therein, are excluded from consideration, as their impact is minimal, constituting less than 1% of the overall steel impact. Therefore, the analysis primarily focuses on electricity consumption and input materials.

End of life stage (C1-C4)

When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D.

The prescribed waste scenarios from the NMD Determination method v1.1 have been used for the various materials in the product.

Benefits and Loads beyond the system boundary (Module D)

This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-waste-point up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage.

The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent.

In addition, the benefits of energy recovery are granted at this stage are focused only on the packaging material. The amount of avoid energy is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the NMD Determination method v1.0 or Ecolnvent 3.6 (2019)

In accordance with the criteria of the reference standard, the system has been extended as far as possible to avoid attributing environmental impacts to by-products of multi-unit processes within the manufacturing process.

If necessary, distribution was applied to the inputs and outputs of the system based on physical properties (mass or volume).

There was no need to apply economic criteria.

3.6 ALLOCATION

In accordance with the criteria of the reference standard, the system has been extended as far as possible to avoid attributing environmental impacts to by-products of multi-unit processes within the manufacturing process.

For determining the energy of a product, the plant's total annual energy consumption is allocated across the entire production output.

3.7 DATA COLLECTION & REFERENCE TIME PERIOD

01.01.2022-01.01.2023

3.8 ESTIMATES AND ASSUMPTIONS

The Purchase of Steel is 20% from Arcelor Mittal and 80% from Kamet Steel.

Electricity Mix is used according to the general low voltage electricity mix of Ukraine (location based approach).

To ensure the comprehensive assessment of the product's environmental impact across Europe, including Ukraine, the utilization of NMD scenarios from the Netherlands in the LCA background report and EPD is justified, as these scenarios are applicable and relevant within the declared geographical scope.

3.9 DATA QUALITY

In accordance with the criteria outlined in the "UN Environmental Global Guidance on LCA Database Development," as specified in EN 15804+A2, the data quality for all three representativeness categories—geographical, technical, and temporal—can be described as good.

4 Scenarios and additional technical information

4.1 DE-CONSTRUCTION, DEMOLITION (C1)

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

4.2 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]
Steel, reinforcement (NMD ID 74)	Lorry (Truck), unspecified (default) market group for (GLO)	0	100	150	50	0

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

4.3 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 [%]
Steel, reinforcement (NMD ID 74)	NL	0	5	0	95	0

4 Scenarios and additional technical information

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Steel, reinforcement (NMD ID 74)	0.000	0.050	0.000	0.950	0.000
Total	0.000	0.050	0.000	0.950	0.000

4.4 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]
Steel, reinforcement (NMD ID 74)	0.714	0.000
Total	0.714	0.000

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 KILOGRAM

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1- A3	C1	C2	C3	C4	D
AP	mol H+ eqv.	8.14E-3	2.31E-4	3.19E-3	1.16E-2	0.00E+0	4.11E-5	0.00E+0	2.50E-6	-3.92E-3
GWP-total	kg CO2 eqv.	2.16E+0	2.72E-2	3.55E-1	2.54E+0	0.00E+0	7.09E-3	0.00E+0	2.64E-4	-1.01E+0
GWP-b	kg CO2 eqv.	-3.02E-3	1.55E-4	-1.54E-1	-1.57E-1	0.00E+0	3.27E-6	0.00E+0	5.20E-7	1.06E-2
GWP-f	kg CO2 eqv.	2.16E+0	2.71E-2	5.00E-1	2.69E+0	0.00E+0	7.09E-3	0.00E+0	2.63E-4	-1.02E+0
GWP-luluc	kg CO2 eqv.	8.30E-4	3.20E-5	8.99E-3	9.85E-3	0.00E+0	2.60E-6	0.00E+0	7.35E-8	7.49E-4
EP-m	kg N eqv.	2.77E-3	8.09E-5	6.39E-4	3.49E-3	0.00E+0	1.45E-5	0.00E+0	8.60E-7	-7.27E-4
EP-fw	kg P eqv.	6.98E-1	1.14E-6	1.88E-2	7.17E-1	0.00E+0	7.15E-8	0.00E+0	2.95E-9	-3.59E-5
EP-T	mol N eqv.	1.70E-2	8.97E-4	5.82E-3	2.38E-2	0.00E+0	1.60E-4	0.00E+0	9.50E-6	-8.49E-3
ODP	kg CFC 11 eqv.	9.42E-8	3.70E-9	3.15E-8	1.29E-7	0.00E+0	1.56E-9	0.00E+0	1.09E-10	-2.48E-8
POCP	kg NMVOC eqv.	8.09E-3	2.44E-4	1.62E-3	9.95E-3	0.00E+0	4.56E-5	0.00E+0	2.75E-6	-5.78E-3
ADP-f	MJ	1.88E+1	3.97E-1	7.05E+0	2.62E+1	0.00E+0	1.07E-1	0.00E+0	7.36E-3	-7.10E+0
ADP-mm	kg Sb-eqv.	5.20E+0	2.17E-7	1.39E-1	5.34E+0	0.00E+0	1.80E-7	0.00E+0	2.41E-9	-6.86E-7
WDP	m3 world eqv.	5.18E-1	3.51E-3	7.11E-1	1.23E+0	0.00E+0	3.82E-4	0.00E+0	3.30E-4	-1.94E-1

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1- A3	C1	C2	C3	C4	D
ETP-fw	CTUe	5.54E+1	4.25E-1	1.25E+1	6.83E+1	0.00E+0	9.53E-2	0.00E+0	4.77E-3	-3.41E+1
PM	disease incidence	1.23E-3	2.02E-9	3.30E-5	1.26E-3	0.00E+0	6.37E-10	0.00E+0	4.86E-11	-5.89E-8
HTP-c	CTUh	9.96E-9	2.60E-11	1.41E-9	1.14E-8	0.00E+0	3.09E-12	0.00E+0	1.11E-13	-1.31E-10
HTP-nc	CTUh	9.33E-8	4.75E-10	1.65E-8	1.10E-7	0.00E+0	1.04E-10	0.00E+0	3.39E-12	2.00E-7
IR	kBq U235 eqv.	4.75E-2	2.22E-3	4.91E-2	9.87E-2	0.00E+0	4.48E-4	0.00E+0	3.02E-5	1.74E-2
SQP	Pt	5.36E+0	2.73E-1	8.37E+0	1.40E+1	0.00E+0	9.27E-2	0.00E+0	1.54E-2	-1.57E+0

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (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
	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
ILCD type / level 2	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
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2

5 Results

ILCD classification	Indicator	Disclaimer
	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	C1	C2	C3	C4	D
PERE	MJ	1.14E+0	3.42E-2	1.07E-2	1.18E+0	0.00E+0	1.34E-3	0.00E+0	5.95E-5	2.06E-1
PERM	MJ	0.00E+0	0.00E+0	1.46E+0	1.46E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.14E+0	3.42E-2	1.47E+0	2.64E+0	0.00E+0	1.34E-3	0.00E+0	5.95E-5	2.06E-1
PENRE	MJ	2.40E+1	4.20E-1	7.35E+0	3.18E+1	0.00E+0	1.13E-1	0.00E+0	7.82E-3	-7.37E+0
PENRM	MJ	0.00E+0	0.00E+0	1.16E-1	1.16E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	2.40E+1	4.20E-1	7.47E+0	3.19E+1	0.00E+0	1.13E-1	0.00E+0	7.82E-3	-7.37E+0
SM	Kg	2.70E-1	0.00E+0	8.16E-3	2.78E-1	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
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
FW	M3	3.85E-2	1.86E-4	1.80E-2	5.67E-2	0.00E+0	1.30E-5	0.00E+0	7.85E-6	-3.68E-3

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	Kg	1.18E-4	7.70E-7	1.10E-5	1.29E-4	0.00E+0	2.71E-7	0.00E+0	1.10E-8	-1.22E-4
NHWD	Kg	4.69E-1	5.35E-3	1.39E-1	6.13E-1	0.00E+0	6.78E-3	0.00E+0	5.00E-2	-9.95E-2
RWD	Kg	1.69E-4	2.43E-6	4.51E-5	2.17E-4	0.00E+0	7.02E-7	0.00E+0	4.83E-8	5.99E-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	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
MFR	Kg	9.04E-5	0.00E+0	2.55E-2	2.56E-2	0.00E+0	0.00E+0	9.50E-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
EET	MJ	0.00E+0	0.00E+0	2.37E-2	2.37E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	MJ	0.00E+0	0.00E+0	1.37E-2	1.37E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+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 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:

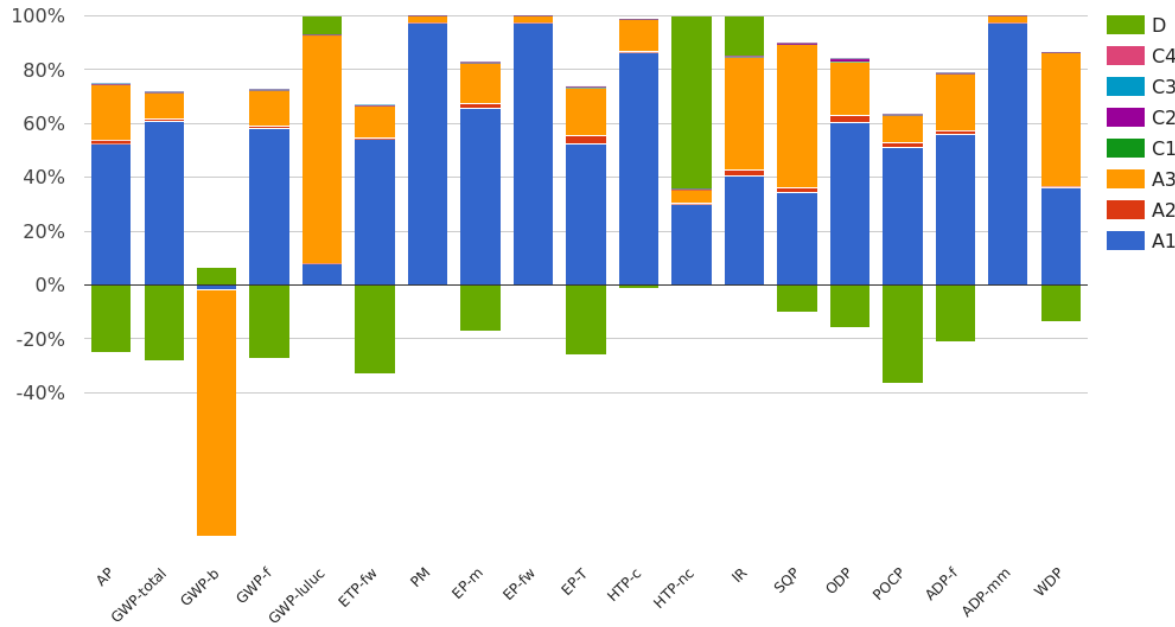
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.04267	kg C

UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount 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.

Uptake Biogenic Carbon dioxide	Amount	Unit
Packaging	0.1565	kg CO2 (biogenic)

6 Interpretation of results



The graph illustrates the impact of various factors on the x-axis, representing different indicator factors, while the legends denote the modules on the y-axis. With A1 having the most impact and D having the most balancing impact. The main impact is from A1 as the main input is Raw material and there are some small processes happening which has not so much impact.

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 14040:2006

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

PCR A

PCR A – General Program Category Rules for Construction Products from the EPD programme of Kiwa-Ecobility Experts; Version 2.1 (2022)

PCR B

Kiwa-Ecobility Experts, Berlin, 2020: PCR B – Product Category Rules for steel construction products, Requirements on the Environmental Product Declarations for steel construction products; Version 2020-03-13 (draft)

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