Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804+A2:2019

Stainless reinforcing steel

Registration number:	EPD-Kiwa-EE-203477-EN
Issue date:	20-08-2025
Valid until:	20-08-2030
Declaration owner:	Scheibinox OHG
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Stainless reinforcing steel

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-203477-EN

1.3 VALIDITY

Issue date: 20-08-2025

Valid until: 20-08-2030

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
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13355 Berlin
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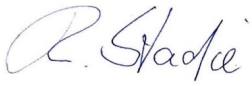
Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: Scheibinox OHG

Address: Max-Planck-Str. 4/6, 47475 Kamp-Lintfort, Germany

E-mail: info@scheibinox.de

Website: https://scheibinox.de/

Production location: Scheibinox OHG

Address production location: Max-Planck_Straße 4/6, 47475 Kamp-Lintfort, 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+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Gaurav Das, Freelancer

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, General Programme Instructions “Product Level”, SOP EE 1203_R. 2.0 (27.02.2025)

Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R. 3.0 (27.02.2025)

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+A2:2019. 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 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: v3.19 (20250306)

** 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 'Stainless reinforcing steel' with the calculation identifier ReTHiNK-103477.

2 Product

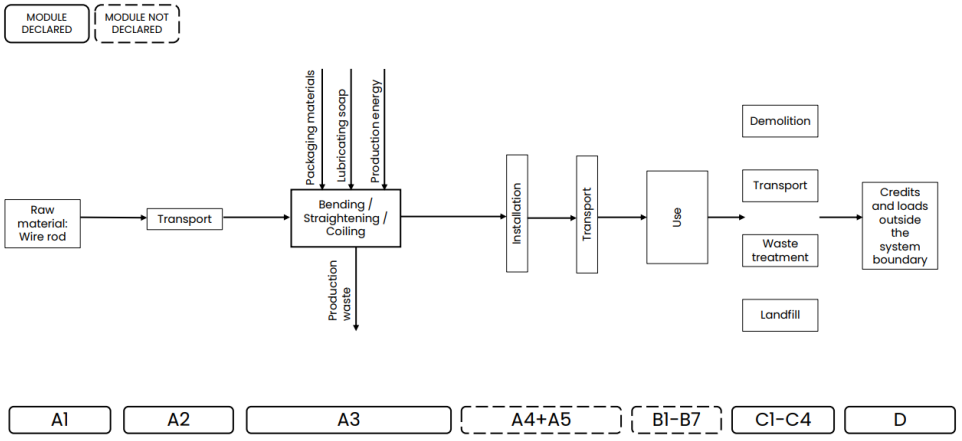
2.1 PRODUCT DESCRIPTION

This is stainless reinforcing steel specifically developed for applications in the construction industry. The product is manufactured using stainless steel grades 1.4482, 1.4362, and 1.4571. The EPD represents an average product declaration.

Available diameters range from 5 mm to 32 mm. Depending on the intended use, the reinforcing steel is supplied in the following forms:

- Coils weighing between 1,300 kg and 2,000 kg,
- Bars with a maximum length of up to 12 meters,
- Or custom-shaped bent components according to customer drawings.

Production is carried out in accordance with the requirements of the German construction authority approval, ensuring its suitability for use in regulated construction sectors.



2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

Used in reinforced concrete primarily in structures where load-bearing safety components or sensitive interfaces come into contact with moisture or chlorides, or where concrete cover is reduced.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

In general, a service life of 100 years is assumed for reinforced concrete structures.

However, since each reinforced concrete structure is used differently, no definitive value can be specified.

The life cycle of the steel is aligned with the service life of the structure.

USED RSL (YR) IN THIS LCA CALCULATION:

100

2.4 TECHNICAL DATA

In accordance with the German building authority specifications Z-1.4-50, Z-1.4-228, Z-1.4-261, Z-1.4-273, and Z-1.4-304, which define technical requirements for construction materials and applications. Further details on these specifications can be found in the official approvals database of the Deutsches Institut für Bautechnik (DIBt): https://www.dibt.de.

2.5 SUBSTANCES OF VERY HIGH CONCERN

The reinforcing steel does not contain any substances from the "Candidate List of Substances of Very High Concern (SVHC) for Authorisation.

2.6 DESCRIPTION PRODUCTION PROCESS

In the first process step, cold forming of the wire rod takes place, during which the wire is drawn through a ribbing cassette to create the characteristic surface ribs that ensure better anchorage in concrete.

The process then splits into two alternative further processing steps:

Option 1 (Coil Production):
The ribbed wire is wound into coils and prepared for further transport or downstream processing.

Option 2 (Bar and Shaped Steel Production):
The ribbed wire is straightened and cut to defined lengths. It is then bent into bars or custom-shaped components according to specific application requirements.

3 Calculation rules

3.1 DECLARED UNIT

ton

The declared unit is 1 tonne of stainless reinforcing steel from the company Scheibinox OHG. This EPD represents an average product declaration based on annual production data for the year 2024.

Reference unit: ton (ton)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	ton
Weight per reference unit	1000.000	kg
Conversion factor to 1 kg	0.001000	ton

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with 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	ND	ND	ND	ND	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 of stainless reinforcing steel, a product of Scheibinox OHG. The results of this EPD are representative of Germany.

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

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.

3.6 ALLOCATION

Allocation was avoided wherever possible. In this life cycle assessment study, allocation is based on physical properties. The declared unit of 1 kg was taken into account. Raw material, energy, and production data were calculated based on the annual production volume using this allocation key. Differences in the composition, diameter, and shape of reinforcing steels were neglected by using annual average production data.

3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data was collected for the operating year 2024, covering the period from January to December.

If data was provided by a manufacturer (e.g., an EPD), it was used as the data source.

3.8 DATA QUALITY

All process-specific data was collected for the operating year 2024 and is therefore up to date. The data is based on annual averages and takes into account the production volumes of the plant. To ensure comparability of results, only consistent background data from the ecoinvent database version 3.9.1 was used in the life cycle assessment (e.g. datasets for energy, transport, auxiliary and operating materials), which refer to the reference year 2022. The database is regularly reviewed and thus meets the requirements of EN 15804 (background data not older than 10 years). All consistent datasets contained in the ecoinvent database are documented and can be accessed in the ecoinvent online documentation.

The primary data was provided by Schibinox. The life cycle was modeled using the R<THINK EPD App.

In accordance with the criteria of 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 considered very good.

3.9 POWER MIX

The electricity mix considered in this EPD follows the market-based approach. The dataset “Electricity (DE) – low voltage (max 1kV), residual mix” was used. This German electricity mix has a Global Warming Potential (GWP-100) of 0.725 kg CO_2-equivalent per kWh.

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]
(ei3.9.1) Steel, reinforcement (NMD ID 74)	(ei3.9.1) 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	(ei3.9.1) 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.

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
(ei3.9.1) Steel, reinforcement (NMD ID 74)	NL	0	5	0	95	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
(ei3.9.1) Steel, reinforcement (NMD ID 74)	0.000	50.000	0.000	950.000	0.000
Total	**0.000**	**50.000**	**0.000**	**950.000**	**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]
(ei3.9.1) Steel, reinforcement (NMD ID 74)	439.450	0.000
Total	**439.450**	**0.000**

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 TON

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq.	2.41E+3	1.94E+2	1.72E+1	2.62E+3	0.00E+0	7.82E+0	0.00E+0	3.04E-1	-6.98E+2
GWP-f	kg CO_2 eq.	2.40E+3	1.94E+2	1.87E+1	2.61E+3	0.00E+0	7.79E+0	0.00E+0	3.04E-1	-7.00E+2
GWP-b	kg CO_2 eq.	1.45E+1	7.76E-2	-1.57E+0	1.30E+1	0.00E+0	2.54E-3	0.00E+0	1.33E-4	1.68E+0
GWP-luluc	kg CO_2 eq.	1.76E+0	5.71E-2	1.59E-2	1.83E+0	0.00E+0	2.78E-2	0.00E+0	1.83E-4	2.83E-1
ODP	kg CFC 11 eq.	4.69E-5	4.59E-5	4.88E-7	9.33E-5	0.00E+0	1.39E-7	0.00E+0	8.79E-9	-2.67E-5
AP	mol H+ eq.	1.16E+1	9.93E-1	8.64E-2	1.27E+1	0.00E+0	3.73E-2	0.00E+0	2.29E-3	-1.97E+0
EP-fw	kg P eq.	4.45E-1	1.49E-3	1.72E-3	4.48E-1	0.00E+0	7.75E-5	0.00E+0	2.96E-6	6.10E-2
EP-m	kg N eq.	2.40E+0	3.36E-1	1.85E-2	2.76E+0	0.00E+0	1.42E-2	0.00E+0	8.74E-4	-3.49E-1
EP-T	mol N eq.	2.60E+1	3.72E+0	2.04E-1	2.99E+1	0.00E+0	1.51E-1	0.00E+0	9.42E-3	-6.72E+0
POCP	kg NMVOC eq.	1.07E+1	1.11E+0	8.64E-2	1.19E+1	0.00E+0	5.16E-2	0.00E+0	3.28E-3	-4.93E+0
ADP-mm	kg Sb-eq.	4.08E-2	3.34E-3	2.23E-4	4.43E-2	0.00E+0	2.44E-5	0.00E+0	4.22E-7	2.08E-3
ADP-f	MJ	3.43E+4	3.04E+3	2.25E+2	3.75E+4	0.00E+0	1.12E+2	0.00E+0	7.57E+0	-5.94E+3
WDP	m3 world eq.	6.18E+2	9.90E+0	2.16E+0	6.30E+2	0.00E+0	6.09E-1	0.00E+0	3.34E-1	-9.93E+2

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 mm) | **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 EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PM	disease incidence	8.33E-5	1.81E-5	1.23E-6	1.03E-4	0.00E+0	7.69E-7	0.00E+0	5.01E-8	-6.73E-5
IR	kBq U235 eq.	1.42E+1	1.33E+1	2.96E-1	2.78E+1	0.00E+0	4.35E-2	0.00E+0	2.00E-3	1.25E+1
ETP-fw	CTUe	4.55E+3	2.42E+3	8.97E+1	7.07E+3	0.00E+0	8.24E+1	0.00E+0	3.55E+0	7.06E+3
HTP-c	CTUh	6.81E-6	5.97E-8	1.22E-7	6.99E-6	0.00E+0	4.13E-9	0.00E+0	1.29E-10	8.31E-6
HTP-nc	CTUh	1.24E-5	2.76E-6	3.40E-7	1.55E-5	0.00E+0	8.97E-8	0.00E+0	1.62E-9	6.95E-5
SQP	Pt	3.00E+3	3.49E+3	1.91E+2	6.68E+3	0.00E+0	8.81E+1	0.00E+0	1.50E+1	-9.64E+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
	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	C1	C2	C3	C4	D
PERE	MJ	2.68E+3	3.83E+1	3.14E+1	2.75E+3	0.00E+0	1.58E+0	0.00E+0	6.41E-2	3.08E+2
PERM	MJ	0.00E+0	0.00E+0	1.38E+1	1.38E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	2.68E+3	3.83E+1	4.52E+1	2.76E+3	0.00E+0	1.58E+0	0.00E+0	6.41E-2	3.08E+2
PENRE	MJ	2.86E+4	3.23E+3	2.13E+2	3.20E+4	0.00E+0	1.12E+2	0.00E+0	7.57E+0	-5.94E+3
PENRM	MJ	0.00E+0	0.00E+0	2.23E+0	2.23E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	2.86E+4	3.23E+3	2.15E+2	3.20E+4	0.00E+0	1.12E+2	0.00E+0	7.57E+0	-5.94E+3
SM	Kg	2.90E+2	0.00E+0	1.71E+0	2.91E+2	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	m^3	1.08E+1	3.47E-1	7.34E-2	1.13E+1	0.00E+0	2.70E-2	0.00E+0	8.04E-3	-1.97E+1

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	C1	C2	C3	C4	D
HWD	Kg	4.49E+0	7.37E-3	1.01E-2	4.51E+0	0.00E+0	7.12E-4	0.00E+0	4.01E-5	-1.30E-1
NHWD	Kg	3.05E+2	2.65E+2	7.96E+0	5.78E+2	0.00E+0	7.38E+0	0.00E+0	5.00E+1	1.64E+2
RWD	Kg	1.32E+0	2.08E-2	2.87E-3	1.34E+0	0.00E+0	2.55E-5	0.00E+0	1.12E-6	8.35E-3

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	2.06E+0	0.00E+0	1.90E+0	3.96E+0	0.00E+0	0.00E+0	9.50E+2	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	7.70E+6	0.00E+0	1.54E+4	7.72E+6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	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

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 TON

BIOGENIC CARBON CONTENT

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

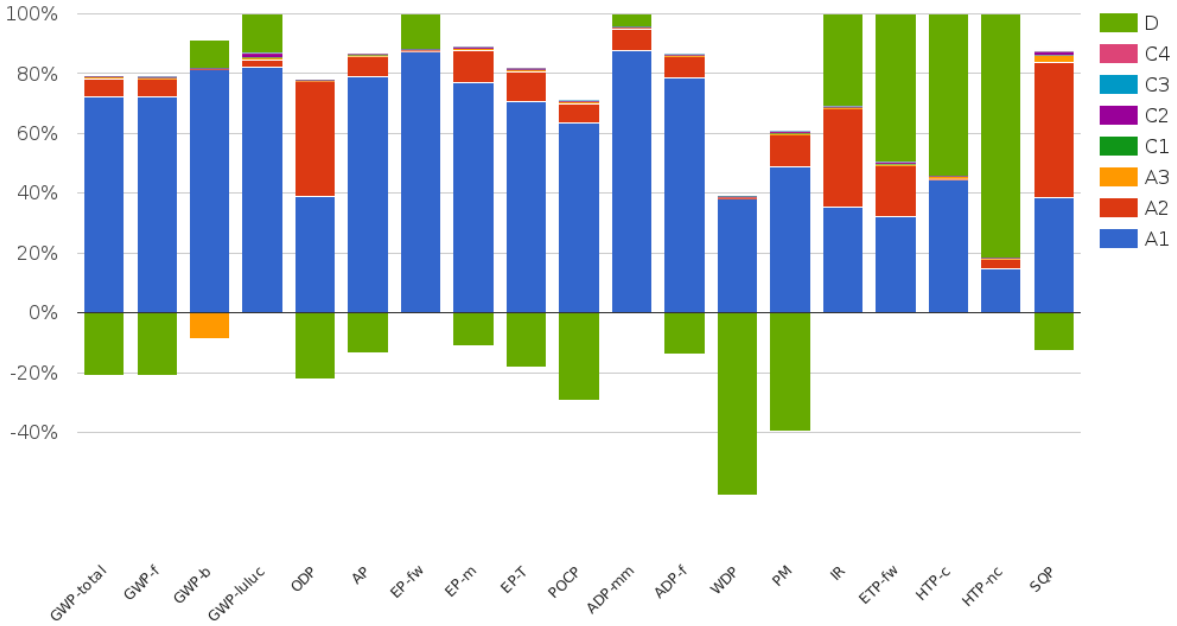
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.4413	kg C

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	1.618	kg CO2 (biogenic)

6 Interpretation of results



Most emissions occur in the upstream life cycle stages A1 to A3, contributing approximately 2,655 kg CO_2-eq in total.
A1 (raw material supply) accounts for about 64.2%, A2 (transport) for 10.0%, and A3 (manufacturing) for 0.9% of the total GWP before credits.

The end-of-life stages C1 to C4 contribute only around 0.4%.

A significant credit of −698.37 kg CO_2-eq is achieved through Module D due to material recycling, reducing the overall impact by around 36.1%.

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-EE GPI R.3.0 (2025)
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1201_R.3.0 (03.06.2025)

Kiwa-EE GPI R.3.0 Annex B1 (2025)
Kiwa-Ecobility Experts, 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)

German building authority specifications Z-1.4-50 (2023)
Stainless, cold-formed, ribbed reinforcing steel in coils B500B NR, material no. 1.4571, nominal diameters 6–14 mm.

German building authority specifications Z-1.4-228 (2022)
Stainless, cold-formed, ribbed reinforcing steel in coils B500A NR, material no. 1.4362, nominal diameters 6–12 mm.

German building authority specifications Z-1.4-273 (2023)
Stainless, hot-rolled reinforcing steel B500B NR “INOXRIPP 4486”, material no. 1.4482 (as per registered analysis), nominal diameters 16 and 20 mm.

German building authority specifications Z-1.4-304 (2023)
Stainless, hot-rolled reinforcing steel in coils B500B NR “INOXRIPP 4486”, material no. 1.4482 (as per registered analysis), nominal diameters 8–16 mm.

8 Contact information

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Kiwa-Ecobility Experts is established member of the ECO PLATFORM