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

fischer Bolt Anchor FAZ II Plus in the version HCR

Registration number:	EPD-Kiwa-EE-181456-EN
Issue date:	16-12-2024
Valid until:	16-12-2029
Declaration owner:	fischerwerke GmbH & Co. KG
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

fischer Bolt Anchor FAZ II Plus in the version HCR

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-181456-EN

1.3 VALIDITY

Issue date: 16-12-2024

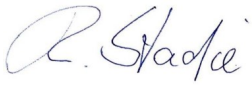
Valid until: 16-12-2029

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

Manufacturer: fischerwerke GmbH & Co. KG

Address: Klaus-Fischer-Straße 1, 72178 Waldachtal, Germany

E-mail: info@fischer.de

Website: www.fischer-international.com

Production location: fischerwerke GmbH & Co. KG (All considered production locations are mentioned in the "Description Production Process".)

Address production location: Klaus-Fischer-Straße 1, 72178 Waldachtal, 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

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

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

Specific Product Category Rules: PCR Guidance texts for building-related products and services - From the programme for environmental product declarations of the Institut Bauen und Umwelt e.V. (IBU) - Part B: Requirements for the EPD for screws *(Original: PCR Anleitungstexte für gebäudebezogene Produkte und Dienstleistungen - Aus dem Programm für Umwelt-Produktdeklarationen des Instituts Bauen und Umwelt e.V. (IBU) - Teil B: Anforderungen an die EPD für Schrauben)*

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 'fischer Bolt Anchor FAZ II Plus in the version HCR' with the calculation identifier ReTHiNK-81456.

2 Product

2.1 PRODUCT DESCRIPTION

The fastener consists of a cone bolt, expansion clip, washer and hexagon nut.

This EPD is valid for the product family fischer Bolt Anchor FAZ II Plus in the version high corrosion resistant (HCR) and is based on the fischer Bolt Anchor FAZ II Plus 8/10 in the version HCR. The products of the product family differ only in their dimensions and not in their material composition, so that there are no differences in the declared unit of 1 kg. The fischer Bolt Anchor FAZ II Plus in the version HCR is an anchor made of high corrosion resistant steel which is placed into a drilled hole and anchored by torque-controlled expansion.

Material category	Material type	Mass percentage
Raw material	High corrosion resistant steel	92.8 %
Packaging	Carton	6.2 %
	Paper	0.7 %
	LDPE foil	0.3 %

The declared unit of 1 kg refers to the product without packaging.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The steel anchors can be used for the anchoring of railings, cable trays, consoles and for dynamic loads such as lifting platforms, conveyor belts and pumps.

The base materials should be compacted reinforced and unreinforced concrete without fibres (cracked or uncracked) according to EN 206-1:2013+A2:2021 and strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The verifications and assessment methods on which the European Technical Assessment of the bolt anchors is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

Since the use stage is not considered in this EPD, the reference service life (RSL) of the product is not taken into account.

USED RSL (YR) IN THIS LCA CALCULATION:

50

2.4 TECHNICAL DATA

Description	Value	Unit
Bolt diameter	6-24	mm
Bolt length	60-600	mm
Material	high corrosion resistant steel	-

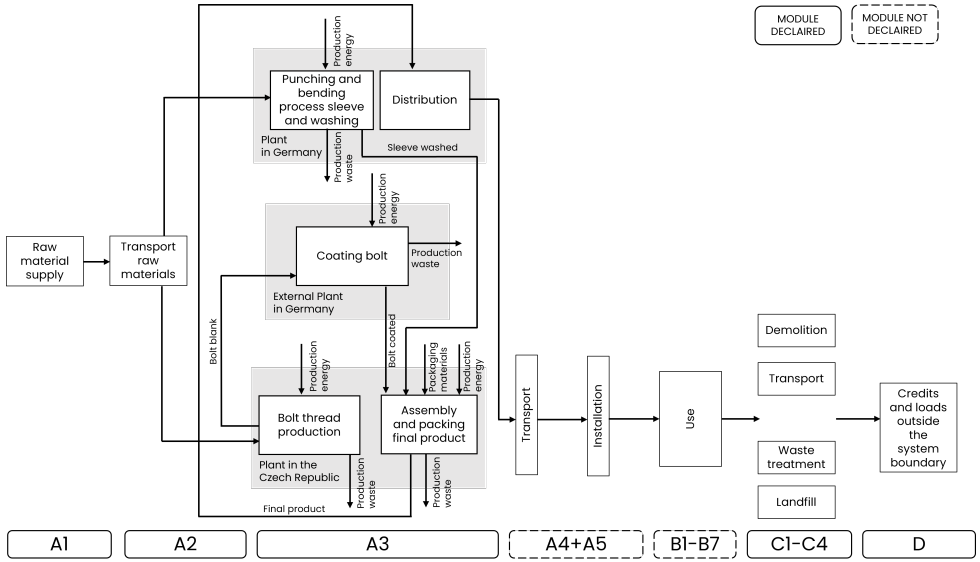
2.5 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances from the candidate list of substances of very high concern (SVHC) for authorisation.

2.6 DESCRIPTION PRODUCTION PROCESS

As shown in the process flow chart, there are different plants involved in the production. For all locations primary data was collected and considered.

2 Product


MODULE DECLAIRED
MODULE NOT DECLAIRED
Production energy
Punching and bending process sleeve and washing
Distribution
Plant in Germany
Production waste
Sleeve washed
Production energy
Raw material supply
Transport raw materials
Coating bolt
Production waste
External Plant in Germany
Bolt blank
Bolt coated
Production energy
Packaging materials
Production energy
Bolt thread production
Assembly and packing final product
Plant in the Czech Republic
Production waste
Production waste
Final product
Transport
Installation
Use
Demolition
Transport
Waste treatment
Landfill
Credits and loads outside the system boundary
A1
A2
A3
A4+A5
B1-B7
C1-C4
D

3 Calculation rules

3.1 DECLARED UNIT

1 kilogram of bolt anchors

This EPD is valid for 1 kilogram of bolt anchors of a product family based on a representative product.

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 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 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 fischer Bolt Anchor FAZ II Plus in the version HCR, a product of fischerwerke GmbH & Co. KG. The results of this EPD are representative for European Union.

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. Only the auxiliary materials cooling lubricating oil and machine lubricating oil were neglected due to the small

3 Calculation rules

amount with less than 1 %. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass. There is no post-consumer recycled content considered in any of the product or packaging raw materials.

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 has been avoided in the LCA of this EPD.

3.7 DATA COLLECTION & REFERENCE PERIOD

Data collection was conducted according to the EN ISO 14044:2006, Chapter 4.3.2. According to the goal definition, all significant in- and output flow that belong to the examined product are identified and quantified. The in- and output flows are attributed to the process in which they take place. For the process stages raw material supply (module A1), transport to manufacturer (module A2) and manufacturing (module A3), the in- and output flows could be clearly assigned.

Data on on raw material suppliers, average product composition, production waste and energy use represent the reference year 2023.

3.8 ESTIMATES AND ASSUMPTIONS

For the electricity consumption during production, the power values of the individual machines were multiplied by the respective operating time.

For the demolition (module C1), the scenario from ‘EPD-AWU-20230569-CBA1-DE’ with an electricity consumption for dismantling with an electric screwdriver of 0.0281 kWh/kg was adopted. The used waste scenarios are based on the Dutch Nationale Milieudatabase (NMD) and are considered representative.

3.9 DATA QUALITY

Overall, the quality of the data can be considered as good. In the operating data survey, all relevant process-specific data could be collected. The data were provided by the manufacturer fischerwerke GmbH & Co. KG.

Secondary data were taken from the Ecoinvent database version 3.6 (2019). The database is regularly checked and thus complies with the requirements of DIN EN ISO 14044 (background data not older than 10 years). The background data meets the requirements of EN 15804. The quantities of raw materials, consumables and supplies used as well as the energy consumption have been recorded and averaged over the entire year of operation.

The general rule has been complied that specific data from specific production processes or average data derived from specific processes must be given priority when calculating an EPD or Life Cycle Assessment. Data for processes that the manufacturer cannot influence or choose, were backed up with generic data.

The selection of the best fitting data sets is based on research and the help of experts. The transport distances for the waste treatments as well as the used environmental profiles for loads and benefits are based on the data from the Dutch Nationale Miliedatabase (NMD).

Environmental profile	Geographical representativeness	Technical representativeness	Time representativeness
Steel, chromium steel 18/8 | steel production, converter (EU)	Good	Fair	Good
Wire drawing, steel | processing (EU) (only process)	Good	Fair	Good
Sheet rolling, chromium steel | processing (EU) (only process)	Good	Fair	Good
	Good	Fair	Good

3 Calculation rules

Environmental profile	Geographical representativeness	Technical representativeness	Time representativeness
Aluminium, cast alloy, 100% primary (EU)			
Metal working, average for Aluminium products manufacturing (EU)	Good	Fair	Good
Polyethylene, low-density (LDPE), packaging film / foil | production (EU)	Good	Fair	Good
Corrugated board base paper, kraftliner | production (EU) | corr. acc. EN16449	Good	Fair	Good
Kraft paper, bleached | production (EU) | corr. acc. EN16449	Good	Fair	Good
Electricity, low voltage, nuclear {CZ}	Very good	Fair	Very good
Electricity (EU) - low voltage (max 1kV)	Very good	Fair	Good

3.10 POWER MIX

Based on the information regarding the electricity mix provided by fischerwerke GmbH & Co. KG, a market-based approach for the production (module A3) with 100 % nuclear power electricity mix for the Czech Republic (GWP: 0.093 kg CO2e/kWh) is considered. For the demolition (module C1) a location-based approach with the average electricity mix for Europe (GWP: 0.443 kg CO2e/kWh) is considered.

4 Scenarios and additional technical information

4.1 DE-CONSTRUCTION, DEMOLITION (C1)

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

Description	Amount	Unit
Electricity (EU) - low voltage (max 1kV)	0.028	kWh

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]
Waste scenario for chromium steel (based on NMD ID 50)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
Waste scenario for aluminium cast alloy (based on NMD ID 4)	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.

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
Waste scenario for chromium steel (based on NMD ID 50)	EU	0	0	0	100	0
Waste scenario for aluminium cast alloy (based on NMD ID 4)	EU	0	3	3	94	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
Waste scenario for chromium steel (based on NMD ID 50)	0.000	0.000	0.000	1.000	0.000
Waste scenario for aluminium cast alloy (based on NMD ID 4)	0.000	0.000	0.000	0.000	0.000
Total	**0.000**	**0.000**	**0.000**	**1.000**	**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]
Waste scenario for chromium steel (based on NMD ID 50)	1.000	0.000
Waste scenario for aluminium cast alloy (based on NMD ID 4)	0.000	0.000
Total	**1.000**	**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.	3.30E-2	1.05E-3	1.35E-2	4.75E-2	7.04E-5	3.91E-5	8.79E-8	5.85E-10	-5.50E-3
GWP-total	kg CO2 eqv.	5.34E+0	1.82E-1	2.03E+0	7.55E+0	1.25E-2	6.75E-3	2.03E-5	8.88E-8	-1.41E+0
GWP-b	kg CO2 eqv.	4.29E-2	8.39E-5	-1.02E-1	-5.93E-2	3.62E-4	3.12E-6	-1.49E-8	1.09E-9	1.48E-2
GWP-f	kg CO2 eqv.	5.29E+0	1.82E-1	2.13E+0	7.60E+0	1.21E-2	6.75E-3	2.03E-5	8.77E-8	-1.42E+0
GWP-luluc	kg CO2 eqv.	8.90E-3	6.66E-5	3.18E-3	1.22E-2	2.81E-5	2.47E-6	1.02E-8	8.13E-11	1.05E-3
EP-m	kg N eqv.	5.50E-3	3.72E-4	2.25E-3	8.12E-3	8.93E-6	1.38E-5	1.48E-8	1.36E-10	-1.02E-3
EP-fw	kg P eq	2.48E-4	1.83E-6	2.13E-4	4.63E-4	1.29E-6	6.81E-8	5.82E-10	3.03E-12	-5.03E-5
EP-T	mol N eqv.	6.27E-2	4.10E-3	2.44E-2	9.12E-2	1.10E-4	1.52E-4	1.73E-7	1.53E-9	-1.19E-2
ODP	kg CFC 11 eqv.	2.79E-7	4.01E-8	8.13E-7	1.13E-6	1.02E-9	1.49E-9	1.41E-12	9.86E-15	-3.48E-8
POCP	kg NMVOC eqv.	2.07E-2	1.17E-3	6.18E-3	2.80E-2	2.79E-5	4.34E-5	4.87E-8	4.54E-10	-8.09E-3
ADP-f	MJ	5.76E+1	2.74E+0	1.95E+2	2.55E+2	2.48E-1	1.02E-1	1.52E-4	1.23E-6	-9.94E+0
ADP-mm	kg Sb-eqv.	2.06E-4	4.61E-6	7.48E-5	2.86E-4	8.78E-8	1.71E-7	3.57E-10	6.71E-13	-6.84E-7
WDP	m3 world eqv.	1.40E+0	9.81E-3	1.94E+0	3.35E+0	2.78E-3	3.64E-4	1.36E-6	3.15E-8	-2.72E-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	1.83E+2	2.45E+0	8.38E+1	2.69E+2	1.70E-1	9.07E-2	5.07E-4	1.36E-3	-4.77E+1
PM	disease incidence	4.37E-7	1.64E-8	1.14E-7	5.68E-7	1.84E-10	6.07E-10	1.08E-12	7.96E-15	-8.25E-8
HTP-c	CTUh	7.92E-8	7.93E-11	2.04E-8	9.97E-8	4.39E-12	2.94E-12	1.16E-14	7.63E-17	-1.84E-10
HTP-nc	CTUh	1.61E-7	2.67E-9	1.40E-7	3.04E-7	1.50E-10	9.93E-11	5.08E-13	2.15E-15	2.80E-7
IR	kBq U235 eqv.	1.65E-1	1.15E-2	2.79E+0	2.97E+0	2.14E-3	4.26E-4	6.48E-7	4.19E-9	2.44E-2
SQP	Pt	2.84E+1	2.38E+0	2.20E+1	5.28E+1	6.06E-2	8.83E-2	1.48E-4	1.53E-6	-2.20E+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
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

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	1.42E+1	3.43E-2	5.64E+0	1.99E+1	4.70E-2	1.27E-3	1.67E-5	7.28E-8	2.89E-1
PERM	MJ	0.00E+0	0.00E+0	1.14E+0	1.14E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.42E+1	3.43E-2	6.78E+0	2.11E+1	4.70E-2	1.27E-3	1.67E-5	7.28E-8	2.89E-1
PENRE	MJ	6.12E+1	2.91E+0	1.96E+2	2.61E+2	2.60E-1	1.08E-1	1.62E-4	1.31E-6	-1.03E+1
PENRM	MJ	0.00E+0	0.00E+0	1.81E-1	1.81E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	6.12E+1	2.91E+0	1.97E+2	2.61E+2	2.60E-1	1.08E-1	1.62E-4	1.31E-6	-1.03E+1
SM	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
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	4.25E-2	3.34E-4	6.85E-2	1.11E-1	2.08E-4	1.24E-5	7.94E-8	9.29E-10	-5.15E-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	1.40E-4	6.95E-6	8.45E-6	1.55E-4	1.65E-7	2.58E-7	4.54E-7	1.19E-12	-1.70E-4
NHWD	Kg	5.75E+0	1.74E-1	1.67E+0	7.59E+0	8.40E-4	6.46E-3	5.49E-6	2.23E-6	-1.39E-1
RWD	Kg	1.51E-4	1.80E-5	2.28E-3	2.45E-3	1.76E-6	6.68E-7	7.18E-10	4.89E-12	8.40E-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	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	0.00E+0	0.00E+0	2.60E-1	2.60E-1	0.00E+0	0.00E+0	1.00E+0	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	0.00E+0	0.00E+0	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 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:

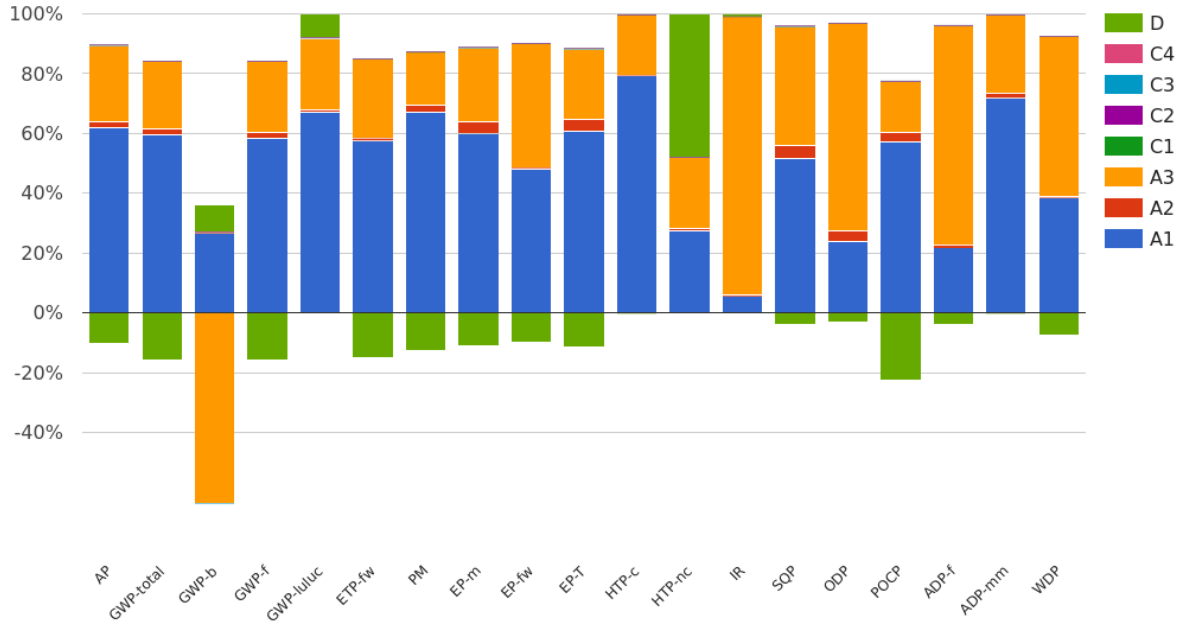
Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0.03307	kg C

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	0.1213	kg CO2 (biogenic)

6 Interpretation of results



As can be seen in the graph, the raw material supply (module A1) has the highest impact for most environmental impact categories, followed by the manufacturing (module A3). Furthermore, for the benefits and loads beyond the product system boundaries (module D) the benefits (negative values) dominate over the loads (positive values) in most of the environmental impact categories.

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

Specific Product Category Rules
PCR Guidance texts for building-related products and services - From the programme for environmental product declarations of the Institut Bauen und Umwelt e.V. (IBU) - Part B: Requirements for the EPD for screws *(Original: PCR Anleitungstexte für gebäudebezogene Produkte und Dienstleistungen - Aus dem Programm für Umwelt-Produktdeklarationen des Instituts Bauen und Umwelt e.V. (IBU) - Teil B: Anforderungen an die EPD für Schrauben)*

LCA Database
Ecoinvent 3.6 (2019)

8 Contact information

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