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

# Reinforcing steel bars

| | |
|---|---|
| Registration number: | EPD-Kiwa-EE-183188-en |
| Issue date: | 02-10-2024 |
| Valid until: | 02-10-2029 |
| Declaration owner: | Brühler Stahlhandel GmbH |
| Publisher: | Kiwa-Ecobility Experts |
| Programme operator: | Kiwa-Ecobility Experts |
| Status: | verified |

# 1 General information

## 1.1 PRODUCT

Reinforcing steel bars

## 1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-183188-en

## 1.3 VALIDITY

**Issue date:** 02-10-2024

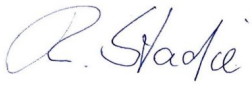
**Valid until:** 02-10-2029

## 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:** Brühler Stahlhandel GmbH

**Address:** Brühler Stahlhandel GmbH, Am Wahler Berg 7, 41541 Dormagen, Germany

**E-mail:** info@bruehler-stahlhandel.de

**Website:** https://www.bruehler-stahlhandel.de/

**Production location:** Brühler Stahlhandel

**Address production location:** Am Volkspark 17, 50321 Brühl, 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

Lucas Pedro Berman, Senda

## 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)

Kiwa-Ecobility Experts (Kiwa-EE) – Construction steel products (2020-03-13) draft

## 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,

# 1 General information

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 'Reinforcing steel bars' with the calculation identifier ReTHiNK-83188.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

Reinforcing steel is used to strengthen reinforced concrete elements. It is available in grade B500B from ø06mm to ø40mm, unprocessed or processed or flat.

**The composition of the product**

| Materials | Weight % |
|---|---|
| Steel | 100 |

## 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

Reinforcing steel is used only in the construction sector and serves as reinforcement for concrete components. These are a modern composite material made of steel and concrete. The reinforcing steel absorbs the tensile and bending forces. It is used in general building construction and civil engineering, for example in bridges, tunnels or wind power foundations. It is installed in the components in accordance with statically tested reinforcement plans prior to concreting.

## 2.3 REFERENCE SERVICE LIFE

**RSL PRODUCT**

As the service life of product is not taken into account, there is no need to specify a reference service life.

50 years is given as the average life of a building.

**USED RSL (YR) IN THIS LCA CALCULATION:**

50

## 2.4 TECHNICAL DATA

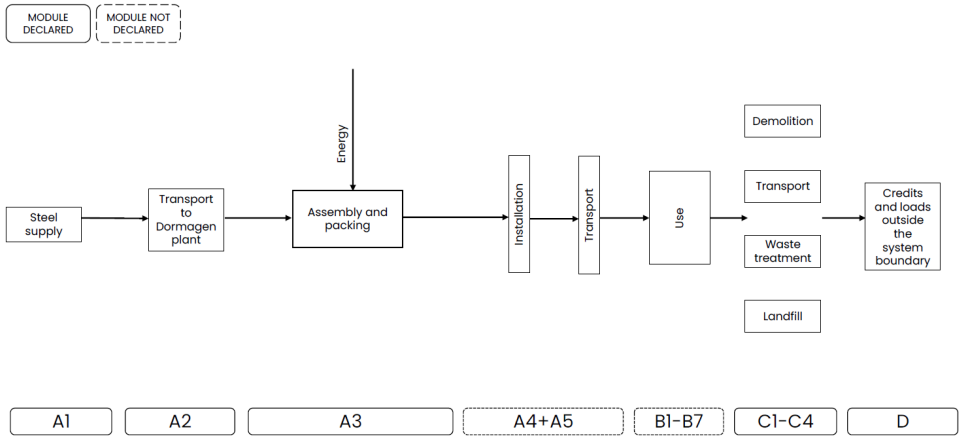
| Characteristic | Value | Unit |
|---|---|---|
| Type of steel | B500B | - |
| Production route (EAF or BOF) | EAF | - |
| Diameter range | 6-40 | mm |

## 2.5 SUBSTANCES OF VERY HIGH CONCERN

The product contains less than 0.1% of substances included in the “Candidate list of substances of very high concern for authorisation” (SVHC).

## 2.6 DESCRIPTION PRODUCTION PROCESS

Brühler Stahlhandel GmbH purchases reinforcing steel in diameters from ø 06mm to ø 40mm and in lengths from 10m to 18m directly from various manufacturers worldwide, taking into account the applicable national approvals, and stores it using magnetic crane systems. Precise processing is carried out on the basis of tested and approved reinforcement plans and lists. The steel is cut on CNC reinforcing steel processing machines and bent if necessary. It is then labeled and bundled by position using binding wire, welded if necessary and loaded onto trucks using crane systems for transport to the construction site. All packaging materials are reused afterwards.



# 3 Calculation rules

## 3.1 DECLARED UNIT

**kg**

The declared unit is 1 kilogram of reinforcing steel bar.
This is an average EPD for reinforcing steel bars, which were produced at the plant location Brühler Stahlhandel. The average is calculated on the basis of the 2023 production volume.

Reference unit: kilogram (kg)

## 3.2 CONVERSION FACTORS

| Description | Value | Unit |
|---|---|---|
| Reference unit | 1 | kg |
| Conversion factor to 1 kg | 0.999981 | 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 reinforcing steel bars, a product of Brühler Stahlhandel. The results of this EPD are representative for Europe.

The considered scenarios are currently in use and are representative of one of the most likely scenario alternatives.

## 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.

The following processes are excluded:

- Manufacturing of equipment used in production, buildings or any other capital asset
- Transportation of personnel to the plant
- The transportation of personnel within the plant
- Research and development activities
- Long-term emissions

**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

Allocations were avoided as far as possible. There are no coproducts or by-product in the manufacturing of the examined product. Based on energy consumption measurements, the energy requirements of the production were allocated to the individual products. Specific information about allocations within the background data is included in the documentation of the Ecoinvent datasets.

## 3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data were collected for the operating year 2023.

## 3.8 ESTIMATES AND ASSUMPTIONS

All datasets chosen for the LCA refer to Europe as the geographic reference.

A data set for a non-specific truck was used for phase A2.

No $CO_2$ certificates were considered.

## 3.9 DATA QUALITY

To ensure the comparability of the results, only consistent background data from the Ecoinvent data-base version 3.6 (2019) was used in the LCA (e.g. data sets on energy, transports, auxiliary and operating materials). The database is regularly checked and thus complies with the requirements of EN 15804 (background data not older than 10 years). Almost all consistent data sets contained in the Ecoinvent database version 3.6 are documented and can be viewed in the online documentation. The raw material data were converted into reference flows (input per declared unit). The general rule was followed that specific data from specific production processes or average data derived from specific processes must have priority in the calculation of an LCA. Data for processes over which the manufacturer has no influence were assigned generic data.

The LCA calculation was carried out using Nibe's LCA & EPD tool R<THiNK.

## 3.10 POWER MIX

The location-based approach was used, no Guarantees of Origin are required. Electricity is represented by the Residual German powermix, low voltage, from the Ecoinvent database version 3.6 (2019). Part of the electricity is generated by solar panels installed on the premises and the electricity is used by the company itself.

# 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 |
|---|---|---|
| Diesel, burned in machine (incl. emissions) | 0.001 | l |

## 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] |
|---|---|---|---|---|---|---|
| Abfallszenario Betonstahl | 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 [%] |
|---|---|---|---|---|---|---|
| Abfallszenario Betonstahl | DE | 0 | 10 | 0 | 90 | 0 |

# 4 Scenarios and additional technical information

| Waste Scenario | Not removed (stays in work) [kg] | Landfill [kg] | Incineration [kg] | Recycling [kg] | Re-use [kg] |
|---|---|---|---|---|---|
| Abfallszenario Betonstahl | 0.000 | 0.100 | 0.000 | 0.900 | 0.000 |
| **Total** | **0.000** | **0.100** | **0.000** | **0.900** | **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] |
|---|---|---|
| Abfallszenario Betonstahl | -0.035 | 0.000 |
| **Total** | **-0.035** | **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. | 2.06E-3 | 6.21E-4 | 8.41E-5 | 2.76E-3 | 3.43E-5 | 4.30E-5 | 2.69E-4 | 5.00E-6 | 1.92E-4 |
| GWP-total | kg CO2 eqv. | 5.02E-1 | 1.07E-1 | 1.99E-2 | 6.30E-1 | 3.28E-3 | 7.43E-3 | 2.10E-2 | 5.28E-4 | 4.91E-2 |
| GWP-b | kg CO2 eqv. | 4.88E-3 | 4.95E-5 | 1.15E-4 | 5.04E-3 | 9.12E-7 | 3.43E-6 | -1.27E-3 | 1.04E-6 | -5.17E-4 |
| GWP-f | kg CO2 eqv. | 4.97E-1 | 1.07E-1 | 1.98E-2 | 6.24E-1 | 3.28E-3 | 7.42E-3 | 2.22E-2 | 5.27E-4 | 4.97E-2 |
| GWP-luluc | kg CO2 eqv. | 3.68E-4 | 3.93E-5 | 1.34E-5 | 4.21E-4 | 2.58E-7 | 2.72E-6 | 2.48E-5 | 1.47E-7 | -3.66E-5 |
| EP-m | kg N eqv. | 4.64E-4 | 2.19E-4 | 1.87E-5 | 7.01E-4 | 1.51E-5 | 1.52E-5 | 5.94E-5 | 1.72E-6 | 3.55E-5 |
| EP-fw | kg P eq | 1.48E-5 | 1.08E-6 | 7.87E-7 | 1.67E-5 | 1.19E-8 | 7.49E-8 | 1.51E-6 | 5.90E-9 | 1.75E-6 |
| EP-T | mol N eqv. | 5.06E-3 | 2.41E-3 | 2.09E-4 | 7.68E-3 | 1.66E-4 | 1.67E-4 | 6.89E-4 | 1.90E-5 | 4.15E-4 |
| ODP | kg CFC 11 eqv. | 2.23E-8 | 2.36E-8 | 1.15E-9 | 4.71E-8 | 7.08E-10 | 1.64E-9 | 3.19E-9 | 2.17E-10 | 1.21E-9 |
| POCP | kg NMVOC eqv. | 1.46E-3 | 6.89E-4 | 5.95E-5 | 2.21E-3 | 4.57E-5 | 4.77E-5 | 1.88E-4 | 5.51E-6 | 2.82E-4 |
| ADP-f | MJ | 6.68E+0 | 1.62E+0 | 2.79E-1 | 8.57E+0 | 4.51E-2 | 1.12E-1 | 3.08E-1 | 1.47E-2 | 3.47E-1 |
| ADP-mm | kg Sb-eqv. | 8.61E-7 | 2.71E-6 | 3.43E-7 | 3.92E-6 | 5.03E-9 | 1.88E-7 | 1.23E-6 | 4.82E-9 | 3.36E-8 |
| WDP | m3 world eqv. | 8.70E-2 | 5.78E-3 | 3.28E-3 | 9.60E-2 | 6.05E-5 | 4.01E-4 | 3.10E-3 | 6.60E-4 | 9.47E-3 |

**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 | 4.95E+0 | 1.44E+0 | 2.48E-1 | 6.64E+0 | 2.72E-2 | 9.98E-2 | 1.32E+0 | 9.55E-3 | 1.67E+0 |
| PM | disease incidence | 1.81E-8 | 9.64E-9 | 7.03E-10 | 2.85E-8 | 9.09E-10 | 6.68E-10 | 3.38E-9 | 9.72E-11 | 2.88E-9 |
| HTP-c | CTUh | 1.11E-9 | 4.67E-11 | 2.65E-11 | 1.18E-9 | 9.50E-13 | 3.24E-12 | 3.22E-11 | 2.21E-13 | 6.42E-12 |
| HTP-nc | CTUh | 4.14E-9 | 1.58E-9 | 4.00E-10 | 6.12E-9 | 2.34E-11 | 1.09E-10 | 1.53E-9 | 6.79E-12 | -9.77E-9 |
| IR | kBq U235 eqv. | 1.84E-2 | 6.77E-3 | 8.45E-4 | 2.60E-2 | 1.93E-4 | 4.69E-4 | 1.53E-3 | 6.04E-5 | -8.49E-4 |
| SQP | Pt | 2.14E+0 | 1.40E+0 | 1.33E-1 | 3.67E+0 | 5.76E-3 | 9.71E-2 | 6.20E-1 | 3.09E-2 | 7.67E-2 |

**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 | 1.30E+0 | 2.02E-2 | 1.07E-1 | 1.43E+0 | 2.44E-4 | 1.40E-3 | 4.83E-2 | 1.19E-4 | -1.01E-2 |
| PERM | MJ | 5.51E-1 | 0.00E+0 | 1.04E-2 | 5.62E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | 1.85E+0 | 2.02E-2 | 1.18E-1 | 1.99E+0 | 2.44E-4 | 1.40E-3 | 4.83E-2 | 1.19E-4 | -1.01E-2 |
| PENRE | MJ | 5.92E+0 | 1.72E+0 | 2.73E-1 | 7.91E+0 | 4.79E-2 | 1.19E-1 | 3.26E-1 | 1.56E-2 | 3.60E-1 |
| PENRM | MJ | 1.11E+0 | 0.00E+0 | 2.10E-2 | 1.14E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PENRT | MJ | 7.04E+0 | 1.72E+0 | 2.94E-1 | 9.05E+0 | 4.79E-2 | 1.19E-1 | 3.26E-1 | 1.56E-2 | 3.60E-1 |
| SM | Kg | 1.02E+0 | 0.00E+0 | 1.92E-2 | 1.04E+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 | 2.04E-2 | 1.97E-4 | 4.96E-4 | 2.11E-2 | 2.32E-6 | 1.36E-5 | 1.46E-4 | 1.57E-5 | 1.80E-4 |

**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 | 6.84E-6 | 4.09E-6 | 1.27E-6 | 1.22E-5 | 1.23E-7 | 2.84E-7 | 9.27E-7 | 2.20E-8 | 5.96E-6 |
| NHWD | Kg | 6.59E-2 | 1.02E-1 | 4.88E-3 | 1.73E-1 | 5.34E-5 | 7.10E-3 | 9.00E-3 | 1.00E-1 | 4.86E-3 |
| RWD | Kg | 9.90E-5 | 1.06E-5 | 2.52E-6 | 1.12E-4 | 3.13E-7 | 7.35E-7 | 1.83E-6 | 9.67E-8 | -2.93E-7 |

**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 | 1.67E-2 | 0.00E+0 | 3.14E-4 | 1.70E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 8.85E-2 | 0.00E+0 | 1.95E-2 | 1.08E-1 | 0.00E+0 | 0.00E+0 | 9.00E-1 | 0.00E+0 | 0.00E+0 |
| MER | Kg | 2.50E-5 | 0.00E+0 | 4.70E-7 | 2.55E-5 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EET | MJ | 2.71E-4 | 0.00E+0 | 5.09E-6 | 2.76E-4 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EEE | MJ | 1.57E-4 | 0.00E+0 | 2.95E-6 | 1.60E-4 | 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

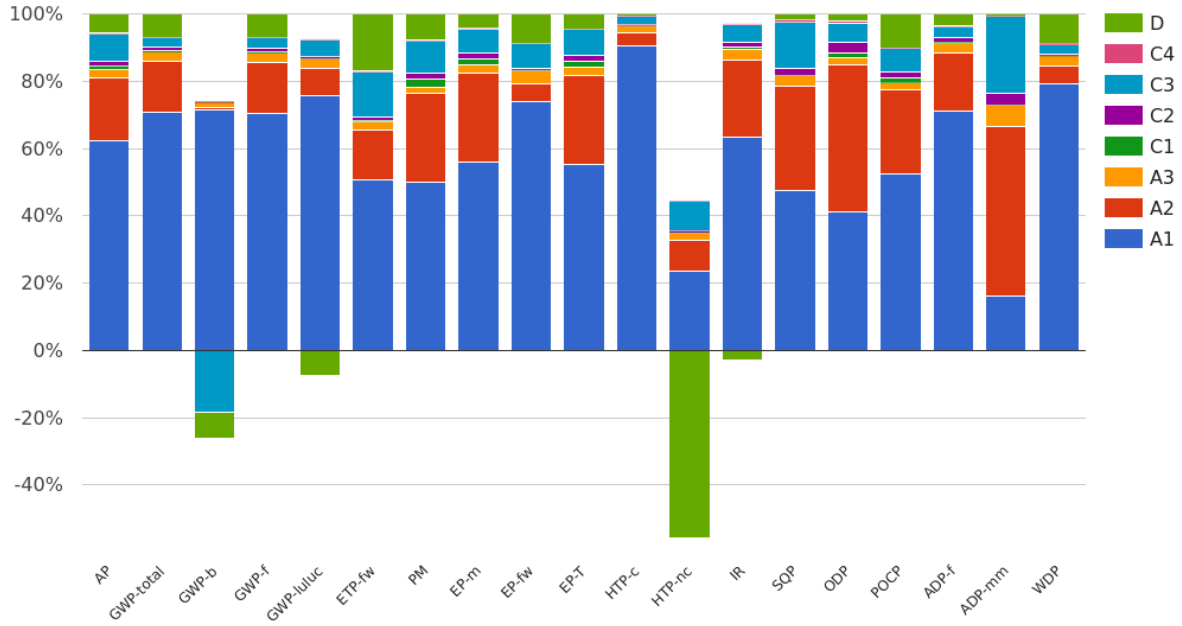
## 5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER KILOGRAM

### 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 | kg C |

# 6 Interpretation of results




For ease of understanding, the results are presented graphically to show correlations and relationships between the data.

The largest contribution to the GWP-total comes from the production phase, most of this impact comes from raw material supply (A1). After that module A2 has the highest impact, on the categories resource use, minerals and metals (ADP-mm) and ozone depletion (ODP).

# 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

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

**Specific PCR Ecobility Experts**
Kiwa-Ecobility Experts (Kiwa-EE) – Construction steel products (2020-03-13) draft

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