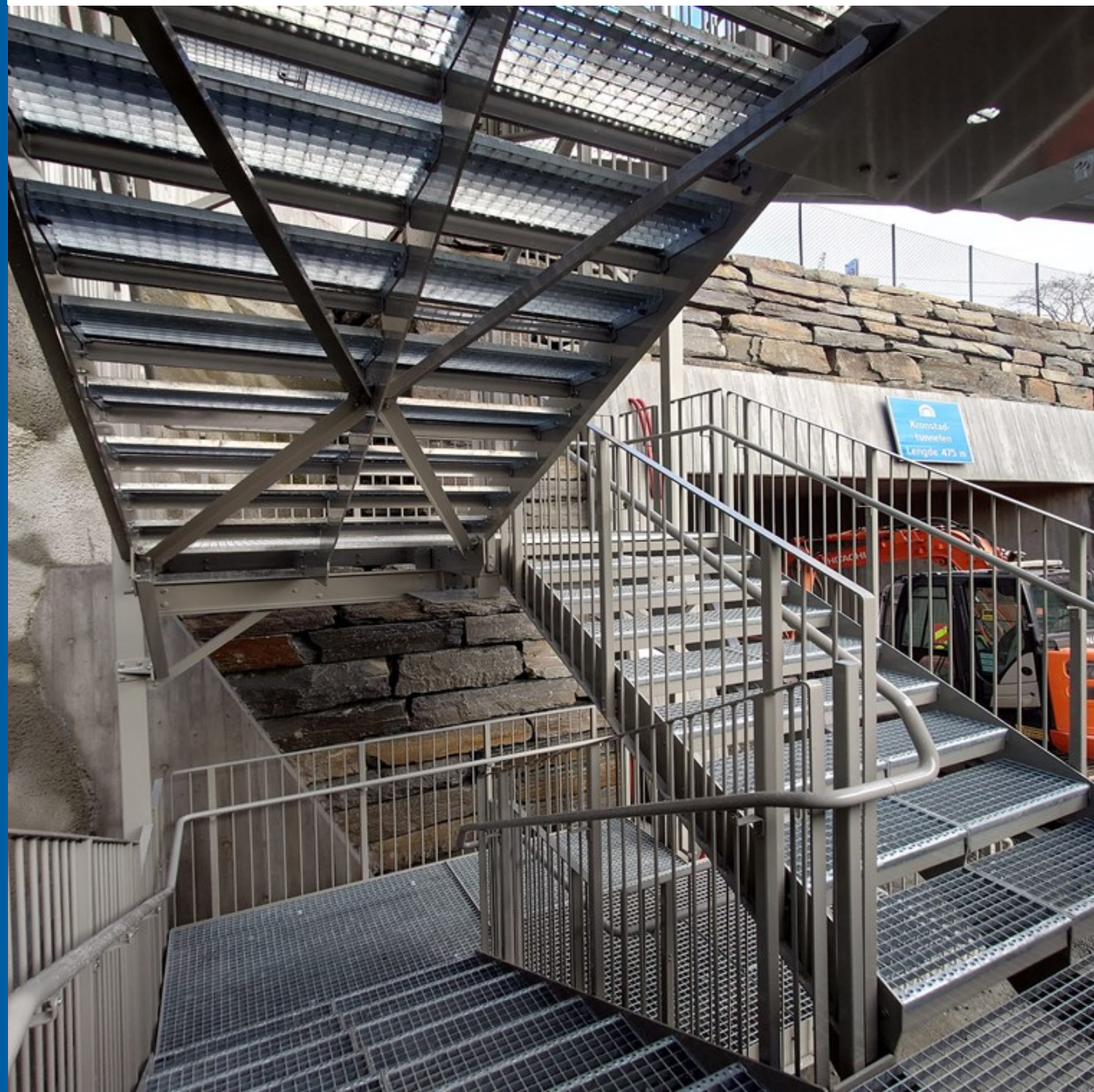
Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

# Steel Products: Spiral Stairs, Platforms and Ramps, Railings, Handrails



| | |
|---|---|
| Registration number: | EPD-Kiwa-EE-179457-EN |
| Issue date: | 19-02-2025 |
| Valid until: | 19-02-2030 |
| Declaration owner: | Anvalda |
| Publisher: | Kiwa-Ecobility Experts |
| Programme operator: | Kiwa-Ecobility Experts |
| Status: | verified |

# 1 General information

## 1.1 PRODUCT

Steel Products: Spiral Stairs, Platforms and Ramps, Railings, Handrails

## 1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-179457-EN

## 1.3 VALIDITY

**Issue date:** 19-02-2025

**Valid until:** 19-02-2030

## 1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

*(Head of programme operations, Kiwa-Ecobility Experts)*

Dr. Ronny Stadie

*(Verification body, Kiwa-Ecobility Experts)*

## 1.5 OWNER OF THE DECLARATION

**Manufacturer:** Anvalda

**Address:** Fabriko g. 28, LT-25135 Vilnius

**E-mail:** info@anvalda.lt

**Website:** http://www.anvalda.com

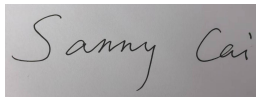
**Production location:** ANVALDA

**Address production location:** Fabriko g. 28, LT-25135 Vilnius

## 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



Sanny (Kiwa - PRC), Kiwa GmbH

## 1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

## 1.8 PRODUCT CATEGORY RULES

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

PCR-B-EPD - Construction product category rules, version 18.10.2022 (Federal Public Service (FPS) of Health, Food Chain Safety and Environment)

## 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.

# 1 General information

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 Products: Spiral Stairs, Platforms and Ramps, Railings, Handrails' with the calculation identifier ReTHiNK-79457.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

Product groups included in this EPD:

- spiral stairs;
- steel platforms and ramps;
- handrails;
- railings.

Wide range of stairs that can be customized according to customer specifications and needs. These stairs are crafted from robust steel, offering both aesthetic appeal and structural integrity. The spiral design saves floor space while adding a distinctive architectural element to any building, making them suitable for indoor and outdoor use, especially in areas with limited space.

Steel platforms and ramps are structural elements used to provide horizontal surfaces and inclined access paths in various applications, including industrial settings, public buildings, and residential structures. These products are fabricated from sturdy steel, ensuring high load-bearing capacity and durability. Platforms and ramps can be customized to meet specific requirements, including size and shape.

Handrails are essential for providing support and stability along stairways, ramps, and walkways. Designed to withstand heavy use and harsh environmental conditions, handrails are available in various shapes, sizes, and finishes to match specific design and safety requirements.

Railings are critical safety components designed to prevent falls and provide support along stairs, balconies, and platforms. Made from high-quality steel, these railings ensure maximum strength and longevity. Steel railings can be customized in various styles and finishes to complement different architectural designs.

The products can be either hot-dip galvanized (process provided by qualified external partner) or powder paint coated (process owned by ANVALDA). Zinc is excluded from this EPD material inventory.

Composition of steel products:

| Product components | Weight, % |
|---|---|
| Steel | 98.9-99.92 |
| Powder coating | 0-1.10 |
| Zinc (optional) | 0-0.08 |
| Total | 100% |

The innovative design and precise fastening systems provide user safety and facilitate easy assembly. With extensive market experience, the stairs adhere to local regulations. Support is available to help clients find optimal solutions for their requirements.

## 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

Spiral steel stairs, railings, handrails, platforms, and ramps are designed for a variety of applications across industrial, commercial, and residential settings. These products provide essential solutions for vertical and horizontal movement, safety, and support in environments such as factories, warehouses, public buildings, and private homes. Customizable to meet specific requirements, they ensure durability, compliance with local regulations, and ease of installation, making them suitable for both indoor and outdoor use.

## 2.3 REFERENCE SERVICE LIFE

### RSL PRODUCT

As the entire life cycle of the product is not considered in the scope of the study, the specification of the reference service life (RSL) is voluntary. According to the information from the manufacturer, the RSL of the product is 50 years.

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

50

## 2.4 TECHNICAL DATA

Technical data of steel products is available in the following table:

| Essential characteristics | Performance |
|---|---|
| Tolerance on geometrical data | ISO 13920 |
| Weld ability | S235 |
| Fracture toughness | 24 J at 0 °C |
| Durability | Surface preparation according to LST EN 1090-2, preparation grade P2, surface painting according to LST EN ISO 12944. |

# 2 Product

## 2.5 SUBSTANCES OF VERY HIGH CONCERN

No substance present in the product with a concentration exceeding 0.1 % of the total weight is included on the “List of Substances of Very High Concern” (SVHC) for authorisation under REACH legislation. Zinc is excluded from this EPD material inventory.

## 2.6 DESCRIPTION PRODUCTION PROCESS

Production process remains consistent across all product groups. Primarily used structural steel (S235, S355) for production, along with stainless steel (1.4301, 1.4401).

Most of our materials are sourced from distributors. Once acquired, the materials are stored in the warehouse.

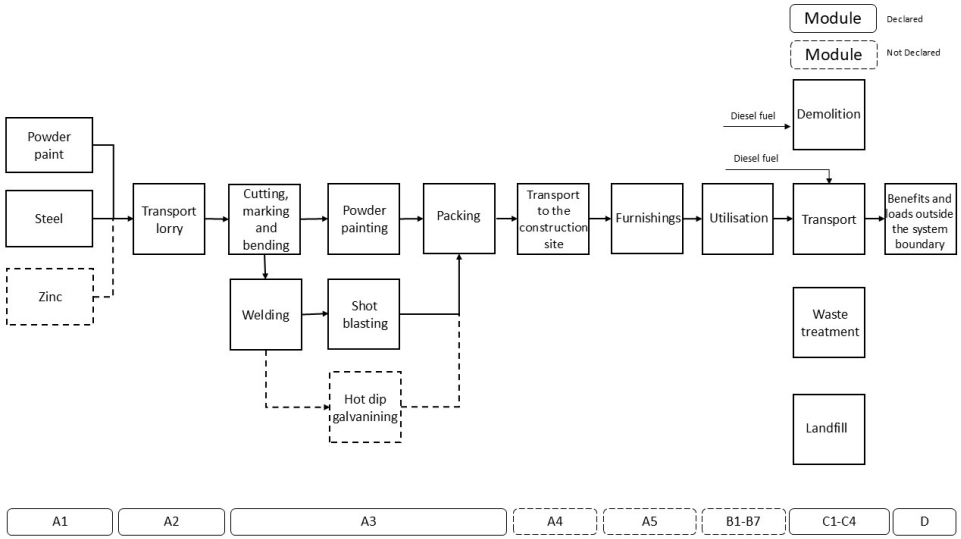
In the initial stage, materials are cut using laser cutters or band saws based on drawings from the engineering department. Laser-cut parts are automatically marked during the cutting process, while parts cut by other methods are marked with oil markers.

After the first marking, parts are cleaned by grinding off unnecessary deposits. Once materials are cut, marked, and cleaned, they proceed to the bending and drilling processes if required.

After the initial material preparation, the parts move to the assembly and welding stages, where they take the shape of the final product and are marked with a product number. Post-welding, the goods are inspected by welders, cleaned of spatter, and inspected again for any deformations. If deformations are found, the parts are sent back for straightening or rewelding.

When the products pass both inspection stages, they are sent to the surface treatment and packing facility, as per the customer's order. Hot-dip galvanizing is performed by certified subcontractors. Powder painting is carried out by ANVALDA, follows a shot blasting process to ensure high-quality surface preparation.

Finished products pass through final inspection are packed into wooden boxes according to the packing list and prepared for shipment. At every stage of production, each part is tracked to efficiently plan production and resource use.



# 3 Calculation rules

## 3.1 DECLARED UNIT

**1 kg steel products: Spiral Stairs, Railings and Handrails**

In LCA calculations, the declared unit was defined as 1 kg of steel products: spiral stairs, platforms and ramps, railings, handrails. This is an EPD of multiple products, based on the average results of the product group.

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 steel products of ANVALDA. The results presented in this EPD are of multiple products, based on the **average** results of the production of one full year.

## 3.5 CUT-OFF CRITERIA

In the Life cycle assessment the following cut-off criteria are applied:

# 3 Calculation rules

**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.

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

## 3.7 DATA COLLECTION & REFERENCE PERIOD

Primary data including all raw materials. packaging materials, energy consumption and ancillary materials was comprehensively collected for the reference year of 2023 (01.01.2023-31.12.2023). EPD of multiple products, based on the average results of the production.

## 3.8 ESTIMATES AND ASSUMPTIONS

- A payload factor of 50 percent was used for all truck transports, which in fact corresponds to a full delivery and empty return trip. A data set for a non-specific truck was used.

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

- The waste scenario for this LCA was determined based on NMD (Nationale Milieudatabase) ID 70, which relates to Steel, construction profiles. According to this standard, the waste treatment process comprises 94 % recycling, 5 % re-use and 1 % landfill.

## 3.9 DATA QUALITY

All primary data were collected by UAB ANVALDA for the reference year of 2023 by presenting third party energy use audit report made by certified expert.

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

ReTHINK EPD web application was used to model the life cycle for the production and disposal of the declared product systems. To ensure that the results are comparable, consistent background data from the international database Ecoinvent was used in the LCA (e.g. data records on energy, transport, auxiliary materials, and suppliers). Almost all consistent data sets contained in the Ecoinvent database are documented and can be viewed online.

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

According to the criteria of the “UN Environmental Global Guidance on LCA database development” mentioned in EN 15804+A2, the data quality for all three representativeness categories (geographical, technical and time) can be described as good.

## 3.10 POWER MIX

Electricity is purchased from Lithuanian electricity provider ESO, and the solar electricity produced on the production site of ANVALDA but returned to the grid. The national residual grid mix of Lithuania was used with Global Warming Potential (GWP) of 0.3885 kg CO2e per kWh.

# 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] |
|---|---|---|---|---|---|---|
| Steel, construction profiles (NMD ID 70) | 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, construction profiles (NMD ID 70) | NL | 0 | 1 | 0 | 94 | 5 |

# 4 Scenarios and additional technical information

| Waste Scenario | Not removed (stays in work) [kg] | Landfill [kg] | Incineration [kg] | Recycling [kg] | Re-use [kg] |
|---|---|---|---|---|---|
| Steel, construction profiles (NMD ID 70) | 0.000 | 0.010 | 0.000 | 0.940 | 0.050 |
| **Total** | **0.000** | **0.010** | **0.000** | **0.940** | **0.050** |

## 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, construction profiles (NMD ID 70) | 0.807 | 0.000 |
| **Total** | **0.807** | **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 |
|---|---|---|---|---|---|---|---|---|---|---|
| GWP-total | kg $CO_2$ eq. | 2.28E+0 | 1.58E-2 | 1.93E+0 | 4.23E+0 | 3.71E-3 | 6.48E-3 | 0.00E+0 | 5.28E-5 | -1.15E+0 |
| GWP-f | kg $CO_2$ eq. | 2.28E+0 | 1.58E-2 | 2.00E+0 | 4.29E+0 | 3.70E-3 | 6.48E-3 | 0.00E+0 | 5.27E-5 | -1.16E+0 |
| GWP-b | kg $CO_2$ eq. | -3.14E-3 | 9.47E-6 | -7.12E-2 | -7.44E-2 | 1.03E-6 | 2.99E-6 | 0.00E+0 | 1.04E-7 | 1.18E-2 |
| GWP-luluc | kg $CO_2$ eq. | 8.30E-4 | 6.64E-6 | 3.92E-3 | 4.76E-3 | 2.92E-7 | 2.37E-6 | 0.00E+0 | 1.47E-8 | 7.93E-4 |
| ODP | kg CFC 11 eq. | 1.39E-7 | 3.41E-9 | 3.95E-7 | 5.37E-7 | 8.00E-10 | 1.43E-9 | 0.00E+0 | 2.17E-11 | -3.00E-8 |
| AP | mol H+ eq. | 9.79E-3 | 9.12E-5 | 1.87E-2 | 2.86E-2 | 3.87E-5 | 3.76E-5 | 0.00E+0 | 5.00E-7 | -4.56E-3 |
| EP-fw | kg P eq. | 1.02E-4 | 1.83E-7 | 2.27E-5 | 1.24E-4 | 1.35E-8 | 6.53E-8 | 0.00E+0 | 5.90E-10 | -4.19E-5 |
| EP-m | kg N eq. | 1.81E-3 | 3.11E-5 | 7.56E-3 | 9.40E-3 | 1.71E-5 | 1.32E-5 | 0.00E+0 | 1.72E-7 | -8.42E-4 |
| EP-T | mol N eq. | 2.00E-2 | 3.43E-4 | 8.33E-2 | 1.04E-1 | 1.88E-4 | 1.46E-4 | 0.00E+0 | 1.90E-6 | -9.84E-3 |
| POCP | kg NMVOC eq. | 1.02E-2 | 1.00E-4 | 2.30E-2 | 3.33E-2 | 5.16E-5 | 4.17E-5 | 0.00E+0 | 5.51E-7 | -6.60E-3 |
| ADP-mm | kg Sb-eq. | 1.51E-5 | 3.89E-7 | 5.94E-6 | 2.14E-5 | 5.68E-9 | 1.64E-7 | 0.00E+0 | 4.82E-10 | -7.58E-7 |
| ADP-f | MJ | 2.48E+1 | 2.36E-1 | 2.92E+1 | 5.43E+1 | 5.10E-2 | 9.77E-2 | 0.00E+0 | 1.47E-3 | -8.35E+0 |
| WDP | m3 world eq. | 5.07E-1 | 8.94E-4 | 1.68E-1 | 6.76E-1 | 6.83E-5 | 3.50E-4 | 0.00E+0 | 6.60E-5 | -2.14E-1 |

**GWP-total**=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratosperic ozon layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP minerals&metals) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

# 5 Results

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PM | disease incidence | 1.68E-7 | 1.44E-9 | 4.52E-7 | 6.22E-7 | 1.03E-9 | 5.83E-10 | 0.00E+0 | 9.72E-12 | -6.94E-8 |
| IR | kBq U235 eq. | 5.14E-2 | 9.92E-4 | 1.70E-1 | 2.23E-1 | 2.18E-4 | 4.09E-4 | 0.00E+0 | 6.04E-6 | 1.80E-2 |
| ETP-fw | CTUe | 6.27E+1 | 2.24E-1 | 1.99E+1 | 8.28E+1 | 3.07E-2 | 8.71E-2 | 0.00E+0 | 9.55E-4 | -3.89E+1 |
| HTP-c | CTUh | 1.09E-8 | 1.04E-11 | 1.14E-9 | 1.20E-8 | 1.07E-12 | 2.83E-12 | 0.00E+0 | 2.21E-14 | -5.26E-10 |
| HTP-nc | CTUh | 7.17E-8 | 2.50E-10 | 2.47E-8 | 9.66E-8 | 2.64E-11 | 9.53E-11 | 0.00E+0 | 6.79E-13 | 2.12E-7 |
| SQP | Pt | 6.12E+0 | 1.86E-1 | 1.94E+1 | 2.57E+1 | 6.51E-3 | 8.47E-2 | 0.00E+0 | 3.09E-3 | -1.84E+0 |

**PM**=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality idex (SQP)

### CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| ILCD type / level 1 | Global warming potential (GWP) | None |
| | Depletion potential of the stratospheric ozone layer (ODP) | None |
| | Potential incidence of disease due to PM emissions (PM) | None |
| ILCD type / level 2 | Acidification potential, Accumulated Exceedance (AP) | None |
| | Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater) | None |
| | Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine) | None |
| | Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | None |
| | Formation potential of tropospheric ozone (POCP) | None |
| | Potential Human exposure efficiency relative to U235 (IRP) | 1 |
| ILCD type / level 3 | Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) | 2 |
| | Abiotic depletion potential for fossil resources (ADP-fossil) | 2 |
| | Water (user) deprivation potential, deprivation-weighted water consumption (WDP) | 2 |

# 5 Results

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| | Potential Comparative Toxic Unit for ecosystems (ETP-fw) | 2 |
| | Potential Comparative Toxic Unit for humans (HTP-c) | 2 |
| | Potential Comparative Toxic Unit for humans (HTP-nc) | 2 |
| | Potential Soil quality index (SQP) | 2 |

**Disclaimer 1** – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

**Disclaimer 2** – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

## 5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

### PARAMETERS DESCRIBING RESOURCE USE

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 1.30E+0 | 3.46E-3 | 4.10E+0 | 5.41E+0 | 2.76E-4 | 1.22E-3 | 0.00E+0 | 1.19E-5 | 2.08E-1 |
| PERM | MJ | 0.00E+0 | 0.00E+0 | 7.49E-1 | 7.49E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | 1.30E+0 | 3.46E-3 | 4.85E+0 | 6.16E+0 | 2.76E-4 | 1.22E-3 | 0.00E+0 | 1.19E-5 | 2.08E-1 |
| PENRE | MJ | 2.63E+1 | 2.51E-1 | 3.09E+1 | 5.74E+1 | 5.41E-2 | 1.04E-1 | 0.00E+0 | 1.56E-3 | -8.68E+0 |
| PENRM | MJ | 1.14E-1 | 0.00E+0 | 9.97E-2 | 2.14E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PENRT | MJ | 2.64E+1 | 2.51E-1 | 3.10E+1 | 5.76E+1 | 5.41E-2 | 1.04E-1 | 0.00E+0 | 1.56E-3 | -8.68E+0 |
| SM | Kg | 1.83E-1 | 0.00E+0 | 5.96E-3 | 1.89E-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 | $m^3$ | 1.49E-2 | 3.10E-5 | 7.84E-3 | 2.28E-2 | 2.62E-6 | 1.19E-5 | 0.00E+0 | 1.57E-6 | -4.10E-3 |

**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 | 1.66E-4 | 1.36E-6 | 6.77E-5 | 2.35E-4 | 1.39E-7 | 2.48E-7 | 0.00E+0 | 2.20E-9 | -1.39E-4 |
| NHWD | Kg | 4.19E-1 | 1.34E-2 | 7.66E-2 | 5.09E-1 | 6.04E-5 | 6.20E-3 | 0.00E+0 | 1.00E-2 | -1.10E-1 |
| RWD | Kg | 5.16E-5 | 1.54E-6 | 1.95E-4 | 2.48E-4 | 3.54E-7 | 6.42E-7 | 0.00E+0 | 9.67E-9 | 5.54E-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 | 1.53E-3 | 1.53E-3 | 0.00E+0 | 0.00E+0 | 5.00E-2 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 0.00E+0 | 0.00E+0 | 2.84E-2 | 2.84E-2 | 0.00E+0 | 0.00E+0 | 9.40E-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 | -1.07E-3 | -1.07E-3 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EEE | MJ | 0.00E+0 | 0.00E+0 | -6.19E-4 | -6.19E-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:

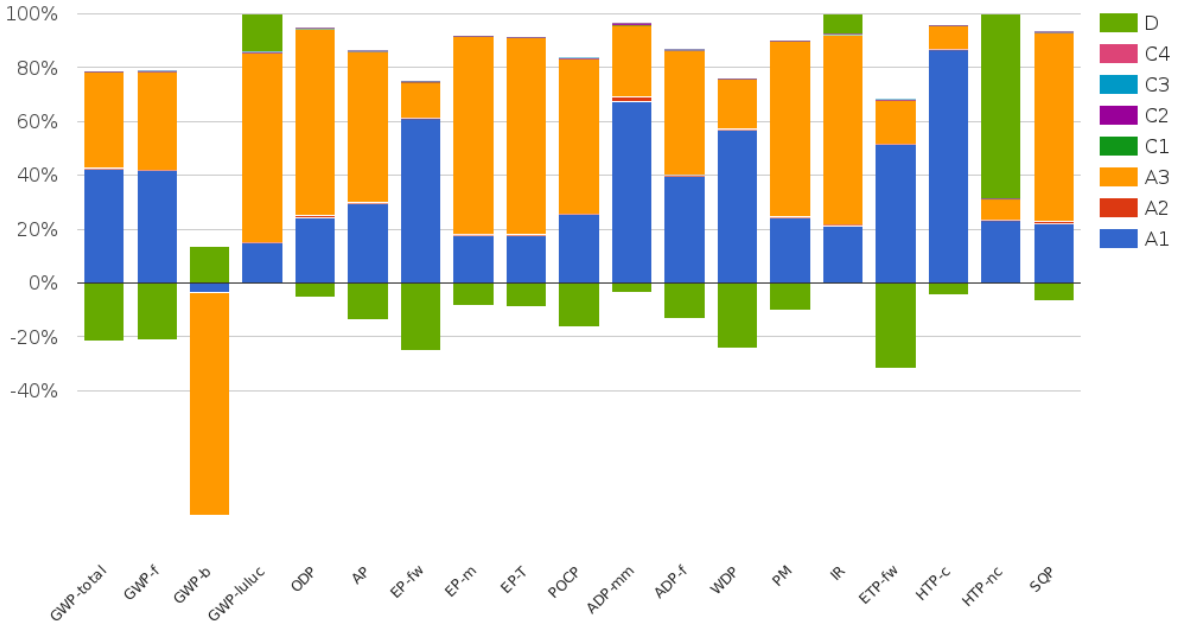
| Biogenic carbon content | Amount | Unit |
|---|---|---|
| Biogenic carbon content in the product | 0 | kg C |
| Biogenic carbon content in accompanying packaging | 0.02431 | kg C |

### 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 | 0.08915 | kg CO2 (biogenic) |

# 6 Interpretation of results




The figure illustrates the impact categories for 1 kg of steel products. As depicted, Modules A1 (Materials) and A3 (Production) followed by Module D (Reuse-Recovery-Recycling) are the most significant contributors to all assessed indicators. Contribution of production and materials modules' have no significant difference which indicates of existing potencial in production improvements. A3 (Production) module is ca. 35% of GWP-total and could be reduced by improving production process by replacing existing equipments with more energy efficient ones.

High values in Module D indicate environmental benefits.

# 7 References

**ISO 14040**
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

**ISO 14044**
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14044:2006

**ISO 14025**
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

**EN 15804+A2**
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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

**PCR** B-EPD - Construction product category rules, version 18.10.2022 (Federal Public Service (FPS) of Health, Food Chain Safety and Environment)

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