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

# EPD 4 Lighting series: ABOX, ALULINE, COMPACT 200|300, INTEGRA ALULINE, SMARTLINE 200|300, VARIOLINE 170|200|300 (SC)

| | |
|---|---|
| Calculation number: | ReTHiNK-141347 |
| Issue date: | |
| Valid until: | |
| Declaration owner: | Muster GmbH |
| Publisher: | Kiwa-Ecobility Experts |
| Programme operator: | Kiwa-Ecobility Experts |
| Status: | in-progress |

# 1 General information

## 1.1 PRODUCT

EPD 4 Lighting series: ABOX, ALULINE, COMPACT 200|300, INTEGRA ALULINE, SMARTLINE 200|300, VARIOLINE 170|200|300 (SC)

## 1.2 REGISTRATION NUMBER

## 1.3 VALIDITY

**Issue date:**

**Valid until:**

## 1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE



## 1.5 OWNER OF THE DECLARATION

**Declaration owner:** Muster GmbH

**Address:** Musterstraße 1, 12345 Musterstadt

**E-mail:** info@muster-gmbh.de

**Website:** https://www.muster-gmbh.de

**Production location:** Muster GmbH

**Address production location:** Musterstraße 1, 12345 Musterstadt

## 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

## 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-EE GPI R.3.0**
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1203_R. 3.0 (27.02.2025)

**Kiwa-EE GPI R.3.0 Annex B1**
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)

**PCR B**
Institut Bauen und Umwelt e.V. - Part B: Requirements on the EPD for Luminaires, light sources and control gears - v12 (30.09.2024)

## 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 General information

## 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:** v3.20e (2026-03-29)

** 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 'EPD 4 Lighting series: ABOX, ALULINE, COMPACT 200|300, INTEGRA ALULINE, SMARTLINE 200|300, VARIOLINE 170|200|300 (SC)' with the calculation identifier ReTHiNK-141347.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

This Worst-Case EPD refers to exit luminaire manufactured by Muster GmbH in compliance with EN IEC 60598-1:2021+A11:2022+prEN IEC:2023+prAA:2023 and EN 1838:2024, made of anodized aluminum for wall, ceiling and bracket mounting. For wall mounting, installation is via the rear panel of the luminaire, for ceiling and bracket mounting via an adapter supplied with the luminaire. In addition, the luminaire has light emission windows facing downwards.

The luminaire includes one ceiling adapter, one rear panel and one pictogram set - arrow left/right/down/up/blind (visibility distance 40 m) and is equipped with a 2x 2 Watt LED-bar.

This declaration refers to the product ABOX 400 product, which indicates the highest environmental impacts within the declared products. Through the standardized specifications and requirements for product use, the manufacturing processes and primary materials in the product group are comparable. The total weight of the Worst-Case product ABOX 400 product with packagings, is 2.87 kg. The dimension of the product is CM 265 x 167 x 80 mm, WM 265 x 148 x 81 mm, BM 286 x 148 x 80 mm (W x H x D).

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN IEC 60598-2-22:2022, Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting and the CE-marking.

For the application and use the respective national provisions apply.

ABOX 400 is sold in cardboard box. The composition of the product is listed in the following table:

| Component | Value | Substance | Weight in % of component | CAS-no. |
|---|---|---|---|---|
| Aluminum | 30.8 % | Al | 100.000 % | 7429-90-5 |
| Polyvinylfluoride | 27.6 % | PVF | 100.000 % | 24981-14-4 |
| Polycarbonate | 25.2 % | PC | 100.000 % | 25037-45-0 |
| Battery | 9.6 % | Ni(OH)2 | 25.675 % | 12054-48-7 |
| | | Co(OH)2 | 4.210 % | 9050-06-0 |
| | | Ni | 18.040 % | 7440-02-0 |
| | | La | 5.300 % | 7439-91-0 |
| | | Ce | 2.100 % | 7440-45-1 |
| | | Pr | 0.260 % | 7440-10-0 |
| | | Nd | 0.670 % | 7440-00-8 |
| | | Mn | 1.330 % | 7439-96-5 |
| | | Fe | 28.980 % | 7439-89-6 |
| | | KOH | 1.880 % | 1310-58-3 |
| | | NaOH | 0.115 % | 1310-73-2 |
| | | LiOH | 0.020 % | 1310-65-2 |
| | | Cu | 3.980 % | 7440-50-8 |
| | | H20 | 6.300 % | 7732-18-5 |
| | | PP | 1.140 % | 9003-07-0 |
| Printed wiring board | 1.9 % | PC | 45.000 % | 25037-45-0 |
| | | Cu | 20.000 % | 7440-50-8 |
| | | EP | 10.000 % | 25068-38-6 |
| | | GF | 7.000 % | 65997-17-3 |
| | | MnZn-Ferrite | 7.000 % | 68186-85-6 |
| | | Al | 5.000 % | 7429-90-5 |
| | | $BaTiO_3$ | 3.000 % | 12047-27-7 |
| | | Sn | 1.300 % | 7440-31-5 |
| | | Ni | 0.900 % | 7440-02-0 |
| | | ZnO | 0.800 % | 1314-13-2 |
| Polyethylene | 1.2 % | PE | 100.000% | 9002-88-4 |
| LED | 1.1 % | MgO | 10.090 % | 1309-48-4 |
| | | Al2O3 | 10.080 % | 1344-28-1 |
| | | C2H4N4 | 9.440 % | 461-58-5 |
| | | AlPO4 | 9.310 % | 7784-30-7 |
| | | CaO | 8.550 % | 1305-78-8 |
| | | C21H25ClO5 | 7.380 % | 1675-54-3 |

## 2 Product

| | | | | |
|---|---|---|---|---|
| | | SiO2 | 7.110 % | 60676-86-0 |
| | | (C6H6O)n | 7.050 % | 9003-35-4 |
| | | C21H24O4 | 5.800 % | 25068-38-6 |
| | | C15H12Br4O2 | 4.870 % | 79-94-7 |
| | | Cu | 2.660 % | 7440-50-8 |
| | | Si | 2.340 % | 7440-21-3 |
| | | Sn | 2.170 % | 7440-31-5 |
| | | GaN | 1.800 % | 25617-97-4 |
| | | InxGa1-xN | 1.580 % | 722874-66-6 |
| | | P | 1.500 % | 7723-14-0 |
| | | Y3Al5O12 | 1.170 % | 12036-10-1 |
| | | Au | 1.050 % | 7440-57-5 |
| | | (C5O2H8)n | 1.040 % | 9011-14-7 |
| | | Ni | 1.040 % | 7440-02-0 |
| | | (C2H6OSi)n | 0.880 % | 63148-62-9 |
| | | (C16H14O3)n | 0.820 % | 25037-45-0 |
| | | Ag | 0.610 % | 7440-22-4 |
| | | Y2O3 | 0.470 % | 7440-65-5 |
| | | Al | 0.390 % | 7429-90-5 |
| | | C2H6O2 | 0.370 % | 107-21-1 |
| | | NiCr | 0.300 % | 12604-53-4 |
| | | BaTiO3 | 0.160 % | 12047-27-7 |
| Electricity cables | 0.7 % | Cu | 60.000 % | 7440-50-8 |
| | | PVC (C2H3Cl)n | 25.000 % | 9002-86-2 |
| | | DEHP C24H38O4 | 7.000 % | 117-81-7 |
| | | Ca/Zn Mixed oxides | 2.000 % | 8011-18-1 |
| | | CaCO3 | 5.000 % | 471-34-1 |
| | | Al(OH)3 | 1.000 % | 21645-51-2 |
| Synthetic rubber | 0.6 % | SR | 100.000% | 64706-29-2 |

| | |
|---|---|
| Other components | 0.3 % |

Products covered by this EPD also include:

| |
|---|
| ABOX self contained luminaires |
| ALULINE self contained luminaires |
| COMPACT 200 self contained luminaires |
| COMPACT 300 self contained luminaires |
| INTEGRA ALULINE self contained luminaires |
| SMARTLINE 200 self contained luminaires |
| SMARTLINE 300 self contained luminaires |
| VARIOLINE 170 self contained luminaires |
| VARIOLINE 200 self contained luminaires |
| VARIOLINE 300 self contained luminaires |



### 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The product can be used in all kinds of buildings. In case of an emergency situation the product will guide people to leave the building.

# 2 Product

## 2.3 REFERENCE SERVICE LIFE

**RSL PRODUCT**

Based on the PCR, the reference service life (RSL) is 5 years.

Module B6 - Energy consumption during the use stage:

Energy consumption during operation is the only module of the use phase with input data in this EPD. To calculate the energy consumption of luminares (Emergency), the formula specified in the PCR was used, which is shown follows:

**Energy consumption [kWh] = {Pa × FCP × FO × (FD × tD + FN × tN) + Pp × ty} × 1/1000 × a**

where:

**P [W]** = Nominal power, manufaturer data

**Pc [W]** = Controls passive power, manufaturer data

**Pem [W]** = Emergency module passive power, manufaturer data

**Pp [W]** = Passive power

**Pa [W]** = Active power

**FCP** = Product constant light illuminance factor, according to scenario

**FO** = Occupancy dependency factor, according to scenario

**FD** = Daylight dependency factor, according to scenario

**tD [h]** = Daylight operating hours per year, according to scenario

**FN** = Non-daylight dimming factor, according to scenario

**tN [h]** = Non-daylight operating hours per year, according to scenario

**ty [h]** = standard year time in hours (8,760)

**a** = reference service lifetime of installation in years, according to scenario

| P (W) | Pc (W) | Pem (W) | Pp (W) | Pa (W) | FCP (o. E.) | FO (o. E.) | FD (o. E.) | tD (h) | FN (o. E.) | tN (h) | ty (h) | a (a) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9.0 | 0.0 | 0.5 | 0.5 | 8.5 | 1 | 1 | 1 | 4380 | 1 | 4380 | 8760 | 5 |

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

5

**RSL PARTS**

There is no deviation from the RSL for any of the raw materials/components.

## 2.4 TECHNICAL DATA

The technical specifications for the product SBOX V2A 300 WM are listed below.

| Name | Value | Unit |
|---|---|---|
| Width x height x depth | CM 265 x 167 x 80, WM 265 x 148 x 81, BM 286 x 148 x 80 | mm |
| Luminous energy | 960 | lm s |
| Luminous flux | 960 | lm |
| Luminous intensity | 580 | cd |
| Luminance | 580 | cd/ m2 |
| Luminous efficiency | 240 | lm/W |
| Light distribution | 580 | cd |

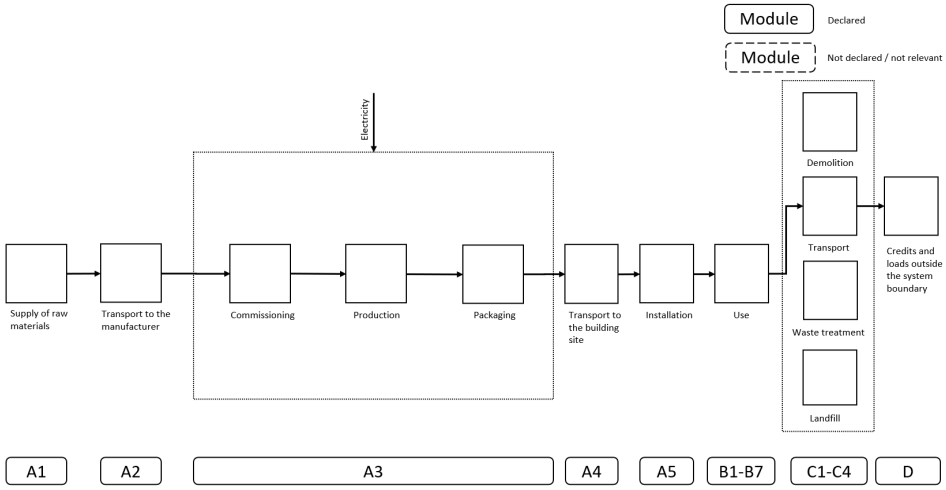
## 2.5 SUBSTANCES OF VERY HIGH CONCERN

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

## 2.6 DESCRIPTION PRODUCTION PROCESS

Final assembly of the product components uses electrical energy. Apart from electrical energy, no other energy is used in the production process. No waste or scrap is generated during the production process.

# 2 Product




## 2.7 CONSTRUCTION DESCRIPTION

The product is installed manually.

# 3 Calculation rules

## 3.1 FUNCTIONAL UNIT

**One self contained luminaire**

According to the PCR, the declared unit is one system involving a luminaire, a lamp or a component for a luminaire.

Reference unit: piece (p)

## 3.2 CONVERSION FACTORS

| Description | Value | Unit |
|---|---|---|
| Reference unit | 1 | p |
| Weight per reference unit | 2.647 | kg |
| Conversion factor to 1 kg | 0.377729 | p |



## 3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to grave 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 | X | X | X | X | X | X | X | X | X | 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 for EPD 4 Lighting series: ABOX, ALULINE, COMPACT 200|300, INTEGRA ALULINE, SMARTLINE 200|300, VARIOLINE 170|200|300 (SC), a product of Muster GmbH. 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. For each unit process, the cut-off criteria of 1% of the renewable and non-renewable use of primary energy and 1% of the total mass of this unit process are complied with. The total neglected input flows do not exceed the limit of 5 % of energy use and mass.

# 3 Calculation rules

**Construction process stage (A4-A5)**
All input flows (e.g. transportation to the construction site, additional raw material use for construction, installation energy (use)of energy use for assembly , etc.) and output flows (e.g. construction waste, packaging waste, etc.) are considered in this LCA. For each unit process, the cut-off criteria of 1% of the renewable and non-renewable use of primary energy and 1% of the total mass of this unit process are complied with. The total neglected input flows do not exceed the limit of 5 % of energy use and mass.

**Use stage (B1-B7)**
All (known) input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. emissions to soil, air and water, construction waste, packaging waste, end-of-life waste, etc.) related to the use stage are considered in this LCA. For each unit process, the cut-off criteria of 1% of the renewable and non-renewable use of primary energy and 1% of the total mass of this unit process are complied with. The total neglected input flows do 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. For each unit process, the cut-off criteria of 1% of the renewable and non-renewable use of primary energy and 1% of the total mass of this unit process are complied with. The total neglected input flows do 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.

The following processes are excluded:

- Water and electricity consumption of the building, if not relevant to production
- 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

## 3.6 ALLOCATION

The energy consumption is calculated based on the total consumption at the production site in 2025 (for all products manufactured) and converted to the quantity used for the production of a single product. The amount of energy is stated per product manufactured.

No allocation is performed with regard to the use of secondary materials or fuels, co-products, plant-specific production processes or multi-input systems. The polluter pays principle applies to the use of waste as a substitute for primary fuels or materials.

## 3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data are collected for the reference year 2025 (01.01.2025 - 31.12.2025).

## 3.8 ESTIMATES AND ASSUMPTIONS

For all raw materials used (raw materials, operating materials, packaging), the transportation distance is recorded. A payload factor of 50% is used for all truck transports (suppliers, disposal transports and internal transports), which corresponds to a full delivery and empty return journey.

Excluded are the manufacturing of capital equipment, construction undertakings, and infrastructure development, along with the maintenance and operation of capital equipment. Additionally, activities related to personnel, as well as energy and water consumption associated with company management and sales, are also excluded.

For module A4 (Transportation from the production gate to the construction site), the average transport distance is calculated as 315.02 km based on the distribution across the different salesregions.

At the end of its life cycle, the product can be almost completely broken down into its individual components and recycled.

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

# 3 Calculation rules

## 3.9 DATA QUALITY

The data are based on the annual average. Generic datasets from the ecoinvent database V3.9.1 are used for the secondary data, which refers to reference year 2022. This database is regularly maintained and meets the requirements of 15804:2012+A2:2019+AC:2021 (background data not older than 10 years). All consistent datasets contained in the ecoinvent database are documented and can be viewed in the online ecoinvent documentation. In the operating data survey all relevant process-specific data could be collected. The quality of the data can be thus considered as good.

The primary data are collected and provided by Muster GmbH**.** and most of the datasets selected in the LCA for raw materials refer to **Rest-of-the-World** as the geographical reference, repesenting the average global production.

| Aspect | Data quality assessment |
|---|---|
| Time-related coverage | The primary data represent the current situation of the date of study (2025) or as close as possible (<5 years). The secondary data are updated within last 10 years. |
| Geographical coverage | Most of the datasets selected for the LCA refer to Rest-of-the-World as the geographical reference, repesenting the average global production. |
| Technology coverage | The data are representative of the technology used in production processes. |
| Completeness | Specific data are benchmarked with literature data. Simple validation checks (e.g. mass or energy balances) are performed. |
| Representativeness | The data fulfill the defined time-related, geographical, and technological scope. |
| Precision | The data used are as representative as possible. The data are derived from credible sources, and references are provided. |
| Reproducibility | Information about the method and data (reference source) are provided. |
| Sources of the data | The data are derived from credible sources, and references are provided. |



## 3.10 POWER MIX

In 2025, a photovoltaic system (PV system) was installed on-site. 36.09% of the annual electricity demand is covered by on-site generation. The share of green electricity with certificates of origin refers exclusively to the remaining purchased electricity and amounts to 50.9% of the total purchased electricity volume. The remaining purchased electricity is modeled based on the German residual electricity mix. The GWP-total of the electricity is calculated at 0.3138 kg CO2 equivalent/kWh.

# 4 Scenarios and additional technical information

## 4.1 TRANSPORT TO CONSTRUCTION SITE (A4)

For the transport from production place to assembly/user, the following scenario is assumed for module A4 of this EPD.

| | 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 |
| Distance | 315 km |
| Capacity utilisation (including empty returns) | 50 % (loaded up and return empty) |
| Bulk density of transported products | inapplicable |
| Volume capacity utilisation factor | 1 |

## 4.2 ASSEMBLY (A5)

The following information describes the scenarios for flows entering the system and flows leaving the system at module A5.



### FLOWS ENTERING THE SYSTEM

There are no significant environment impacts as a result of materials or energy used in the construction stage (A5).

### FLOWS LEAVING THE SYSTEM

The following output flows leaving the system at module A5 are assumed.

| Description | Value | Unit |
|---|---|---|
| Output materials as result of loss during construction | 0 | % |
| Output materials as result of waste processing of materials used for installation/assembly at the building site | 0.000 | kg |
| Output materials as result of waste processing of used packaging | 0.221 | kg |

## 4.3 USE STAGE (B1)

No significant environment impact in the use stage modules, because there is no (significant) emission to air, soil or water.

## 4.4 MAINTENANCE (B2)

For maintenance no input or output flows are modelled.

# 4 Scenarios and additional technical information

## 4.5 REPAIR (B3)

Repairs are not applicable within the functional unit and to achieve the reference service life.

## 4.6 OPERATIONAL ENERGY USE (B6)

| Description | Service cycle (yr) | Number of cycles (n) | Amount per cycle | Total Amount | Unit |
|---|---|---|---|---|---|
| Electricity consumption during operation | 5 | 1.00 | 394.2 | 394.20 | kWh |

## 4.7 OPERATIONAL WATER USE (B7)

| Description | Service cycle (yr) | Number of cycles (n) | Amount per cycle | Total Amount | Unit |
|---|---|---|---|---|---|

## 4.8 DE-CONSTRUCTION, DEMOLITION (C1)

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



## 4.9 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] |
|---|---|---|---|---|---|---|
| EoL electronics - passive components (3.9.1) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 0 |
| (ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) plastics, via residue (NMD ID 43) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |

# 4 Scenarios and additional technical information

| Waste Scenario | Transport conveyance | Not removed (stays in work) [km] | Landfill [km] | Incineration [km] | Recycling [km] | Re-use [km] |
|---|---|---|---|---|---|---|
| (ei3.9.1) Steel, light (NMD ID 73) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) aluminium (GLO), cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) copper, mixed (electricity cables) (NMD ID 42) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |
| (ei3.9.1) plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45) | (ei3.9.1) Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 50 |



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 |

## 4.10 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 [%] |
|---|---|---|---|---|---|---|
| EoL electronics - passive components (3.9.1) | DE | 0 | 5 | 35 | 60 | 0 |
| (ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57) | NL | 0 | 10 | 85 | 5 | 0 |
| (ei3.9.1) plastics, via residue (NMD ID 43) | NL | 0 | 20 | 80 | 0 | 0 |
| (ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41) | NL | 0 | 5 | 0 | 95 | 0 |
| (ei3.9.1) Steel, light (NMD ID 73) | NL | 0 | 1 | 0 | 87 | 12 |
| (ei3.9.1) aluminium (GLO), cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4) | NL | 0 | 3 | 3 | 94 | 0 |
| (ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20) | NL | 0 | 10 | 85 | 5 | 0 |
| (ei3.9.1) copper, mixed (electricity cables) (NMD ID 42) | NL | 0 | 10 | 5 | 85 | 0 |
| (ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50) | NL | 0 | 5 | 5 | 90 | 0 |
| (ei3.9.1) plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45) | NL | 0 | 0 | 90 | 10 | 0 |



| Waste Scenario | Not removed (stays in work) [kg] | Landfill [kg] | Incineration [kg] | Recycling [kg] | Re-use [kg] |
|---|---|---|---|---|---|
| (ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57) | 0.000 | 0.009 | 0.072 | 0.004 | 0.000 |
| (ei3.9.1) plastics, via residue (NMD ID 43) | 0.000 | 0.280 | 1.119 | 0.000 | 0.000 |
| (ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41) | 0.000 | 0.000 | 0.000 | 0.002 | 0.000 |
| (ei3.9.1) Steel, light (NMD ID 73) | 0.000 | 0.000 | 0.000 | 0.011 | 0.002 |
| (ei3.9.1) aluminium (GLO), cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4) | 0.000 | 0.024 | 0.024 | 0.766 | 0.000 |
| (ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20) | 0.000 | 0.002 | 0.014 | 0.001 | 0.000 |
| (ei3.9.1) copper, mixed (electricity cables) (NMD ID 42) | 0.000 | 0.005 | 0.002 | 0.042 | 0.000 |
| (ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50) | 0.000 | 0.001 | 0.001 | 0.012 | 0.000 |
| (ei3.9.1) plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45) | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| **Total** | **0.000** | **0.320** | **1.233** | **0.838** | **0.002** |

## 4.11 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.

## 4 Scenarios and additional technical information

| Waste Scenario | Net output flow [kg] | Energy recovery [MJ] |
|---|---|---|
| (ei3.9.1) polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57) | 0.004 | 1.175 |
| (ei3.9.1) plastics, via residue (NMD ID 43) | 0.000 | 29.616 |
| (ei3.9.1) copper (i.a. sheets, pipes) (NMD ID 41) | 0.002 | 0.000 |
| (ei3.9.1) Steel, light (NMD ID 73) | 0.011 | 0.000 |
| (ei3.9.1) aluminium (GLO), cast alloy for buildings (i.a. profiles, sheets, pipes) (NMD ID 4) | 0.164 | 0.000 |
| (ei3.9.1) elastomeres (i.a. epdm) (i.a. roofing, foils) (NMD ID 20) | 0.001 | 0.370 |
| (ei3.9.1) copper, mixed (electricity cables) (NMD ID 42) | 0.042 | 0.040 |
| (ei3.9.1) Metals, others (i.a. fasteners, fittings) (NMD ID 50) | 0.006 | 0.000 |
| (ei3.9.1) plastics, other (i.a. profiles, sheets, pipes) (NMD ID 45) | 0.000 | 0.000 |
| **Total** | **0.230** | **31.201** |

# 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 PIECE

### CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP-total | kg $CO_2$ eq. | 4.21E+1 | 9.02E-1 | -5.28E-2 | 4.30E+1 | 1.35E-1 | 3.62E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.43E+2 | 0.00E+0 | 0.00E+0 | 4.19E-2 | 3.66E+0 | 3.48E-2 | -8.37E+0 |
| GWP-f | kg $CO_2$ eq. | 4.20E+1 | 9.00E-1 | 2.73E-1 | 4.32E+1 | 1.34E-1 | 1.39E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.42E+2 | 0.00E+0 | 0.00E+0 | 4.17E-2 | 3.66E+0 | 3.47E-2 | -8.34E+0 |
| GWP-b | kg $CO_2$ eq. | 7.71E-2 | 2.12E-4 | -3.29E-1 | -2.52E-1 | 4.37E-5 | 3.48E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 7.76E-1 | 0.00E+0 | 0.00E+0 | 1.36E-5 | 1.44E-3 | 2.06E-5 | -1.07E-2 |
| GWP-luluc | kg $CO_2$ eq. | 7.15E-2 | 1.43E-3 | 2.62E-3 | 7.56E-2 | 4.78E-4 | 1.29E-5 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.54E-1 | 0.00E+0 | 0.00E+0 | 1.49E-4 | 5.23E-4 | 3.83E-6 | -1.87E-2 |
| ODP | kg CFC 11 eq. | 1.01E-5 | 1.43E-8 | 9.72E-9 | 1.01E-5 | 2.39E-9 | 4.87E-10 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.70E-6 | 0.00E+0 | 0.00E+0 | 7.43E-10 | 8.94E-8 | 9.67E-11 | -5.71E-6 |
| AP | mol H+ eq. | 4.62E-1 | 2.00E-2 | 1.48E-3 | 4.84E-1 | 6.42E-4 | 7.99E-5 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 8.12E-1 | 0.00E+0 | 0.00E+0 | 2.00E-4 | 2.35E-3 | 3.29E-5 | -2.03E-1 |
| EP-fw | kg P eq. | 2.71E-3 | 5.14E-6 | 1.89E-5 | 2.73E-3 | 1.33E-6 | 1.91E-7 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.40E-2 | 0.00E+0 | 0.00E+0 | 4.15E-7 | 1.40E-5 | 8.90E-8 | -5.49E-4 |
| EP-m | kg N eq. | 1.79E-1 | 5.17E-3 | 5.82E-4 | 1.84E-1 | 2.44E-4 | 3.20E-5 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.02E-1 | 0.00E+0 | 0.00E+0 | 7.60E-5 | 5.72E-4 | 2.73E-5 | -8.99E-2 |
| EP-T | mol N eq. | 5.01E-1 | 5.70E-2 | 4.09E-3 | 5.62E-1 | 2.60E-3 | 3.41E-4 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.19E+0 | 0.00E+0 | 0.00E+0 | 8.10E-4 | 6.40E-3 | 1.22E-4 | -1.14E-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 mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprication potential, deprivation-weighted water consumption (WDP)

## 5 Results

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POCP | kg NMVOC eq. | 1.75E-1 | 1.58E-2 | 1.29E-3 | 1.92E-1 | 8.89E-4 | 1.15E-4 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.82E-1 | 0.00E+0 | 0.00E+0 | 2.77E-4 | 1.89E-3 | 4.93E-5 | -4.32E-2 |
| ADP-mm | kg Sb-eq. | 1.77E-3 | 1.44E-6 | 1.15E-6 | 1.77E-3 | 4.20E-7 | 5.43E-8 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.69E-3 | 0.00E+0 | 0.00E+0 | 1.31E-7 | 6.69E-6 | 9.80E-9 | -6.61E-4 |
| ADP-f | MJ | 5.16E+2 | 1.16E+1 | 3.69E+0 | 5.31E+2 | 1.92E+0 | 1.51E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.21E+3 | 0.00E+0 | 0.00E+0 | 5.98E-1 | 4.05E+0 | 9.30E-2 | -9.87E+1 |
| WDP | m3 world eq. | 1.85E+1 | 3.82E-2 | 1.05E-1 | 1.86E+1 | 1.05E-2 | 1.47E-3 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.62E+1 | 0.00E+0 | 0.00E+0 | 3.26E-3 | 1.68E-1 | 3.63E-3 | -5.09E+0 |

**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)



### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM | disease incidence | 2.40E-6 | 4.47E-8 | 2.92E-8 | 2.48E-6 | 1.32E-8 | 1.39E-9 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.58E-6 | 0.00E+0 | 0.00E+0 | 4.12E-9 | 2.71E-8 | 6.53E-10 | -6.72E-7 |
| IR | kBq U235 eq. | 3.95E+0 | 3.10E-3 | 8.04E-3 | 3.96E+0 | 7.49E-4 | 1.82E-4 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.86E+1 | 0.00E+0 | 0.00E+0 | 2.33E-4 | 1.28E-2 | 6.89E-5 | -1.78E+0 |
| ETP-fw | CTUe | 9.92E+2 | 6.65E+0 | 2.15E+0 | 1.00E+3 | 1.42E+0 | 2.04E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 5.39E+2 | 0.00E+0 | 0.00E+0 | 4.41E-1 | 4.02E+1 | 5.11E-1 | -3.91E+2 |
| HTP-c | CTUh | 3.41E-8 | 4.13E-10 | 2.26E-10 | 3.47E-8 | 7.10E-11 | 2.66E-11 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 6.62E-8 | 0.00E+0 | 0.00E+0 | 2.21E-11 | 7.44E-10 | 3.18E-12 | -1.44E-8 |
| HTP-nc | CTUh | 9.11E-7 | 5.34E-9 | 5.85E-9 | 9.22E-7 | 1.54E-9 | 1.88E-10 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.63E-6 | 0.00E+0 | 0.00E+0 | 4.80E-10 | 1.73E-8 | 9.79E-11 | -6.56E-7 |

**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 index (SQP)

# 5 Results

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SQP | Pt | 2.45E+2 | 3.58E+0 | 1.70E+1 | 2.66E+2 | 1.52E+0 | 5.82E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 6.27E+2 | 0.00E+0 | 0.00E+0 | 4.72E-1 | 2.23E+0 | 1.96E-1 | -1.17E+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 index (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 |
| | 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 Results

## 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 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 7.34E+1 | 1.09E-1 | 6.34E-1 | 7.41E+1 | 2.72E-2 | 5.51E-3 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 7.01E+2 | 0.00E+0 | 0.00E+0 | 8.45E-3 | 4.69E-1 | 2.49E-3 | -2.66E+1 |
| PERM | MJ | 0.00E+0 | 0.00E+0 | 2.73E+0 | 2.73E+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 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | 7.34E+1 | 1.09E-1 | 3.36E+0 | 7.68E+1 | 2.72E-2 | 5.51E-3 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 7.01E+2 | 0.00E+0 | 0.00E+0 | 8.45E-3 | 4.69E-1 | 2.49E-3 | -2.66E+1 |
| PENRE | MJ | 5.14E+2 | 1.16E+1 | 3.70E+0 | 5.29E+2 | 1.92E+0 | 1.52E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.21E+3 | 0.00E+0 | 0.00E+0 | 5.99E-1 | 4.05E+0 | 9.30E-2 | -9.85E+1 |
| PENRM | MJ | 1.82E+0 | 0.00E+0 | 0.00E+0 | 1.82E+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 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | -1.46E-1 |
| PENRT | MJ | 5.16E+2 | 1.16E+1 | 3.70E+0 | 5.31E+2 | 1.92E+0 | 1.52E-1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 3.21E+3 | 0.00E+0 | 0.00E+0 | 5.99E-1 | 4.05E+0 | 9.30E-2 | -9.87E+1 |
| SM | Kg | 6.14E-1 | 0.00E+0 | 0.00E+0 | 6.14E-1 | 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 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | -1.22E-2 |
| 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 | 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 | 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 | 5.33E-1 | 1.54E-3 | 3.35E-3 | 5.38E-1 | 4.64E-4 | 7.33E-5 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.54E+0 | 0.00E+0 | 0.00E+0 | 1.45E-4 | 5.46E-3 | 9.19E-5 | -1.38E-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

### OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | Kg | 4.37E-3 | 6.30E-5 | 1.51E-5 | 4.44E-3 | 1.22E-5 | 9.23E-7 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 5.64E-3 | 0.00E+0 | 0.00E+0 | 3.81E-6 | 5.07E-3 | 4.36E-7 | 5.05E-3 |
| NHWD | Kg | 6.39E+0 | 2.71E-1 | 5.40E-2 | 6.71E+0 | 1.27E-1 | 5.85E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.28E+1 | 0.00E+0 | 0.00E+0 | 3.95E-2 | 1.35E+0 | 3.34E-1 | -2.25E+0 |
| RWD | Kg | 5.83E-3 | 1.72E-6 | 5.82E-6 | 5.84E-3 | 4.40E-7 | 1.34E-7 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 2.30E-2 | 0.00E+0 | 0.00E+0 | 1.37E-7 | 9.24E-6 | 4.25E-8 | -3.11E-3 |

**HWD**=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

# 5 Results

## ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CRU | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.04E-3 | 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 | 1.52E-3 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 1.67E-1 | 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 | 8.38E-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 | 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 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 9.88E+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 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 5.74E+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 PIECE

### BIOGENIC CARBON CONTENT

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

| Biogenic carbon content | Amount | Unit |
|---|---|---|
| Biogenic carbon content in the product | 0 | kg C |
| Biogenic carbon content in accompanying packaging | 0.09636 | kg C |

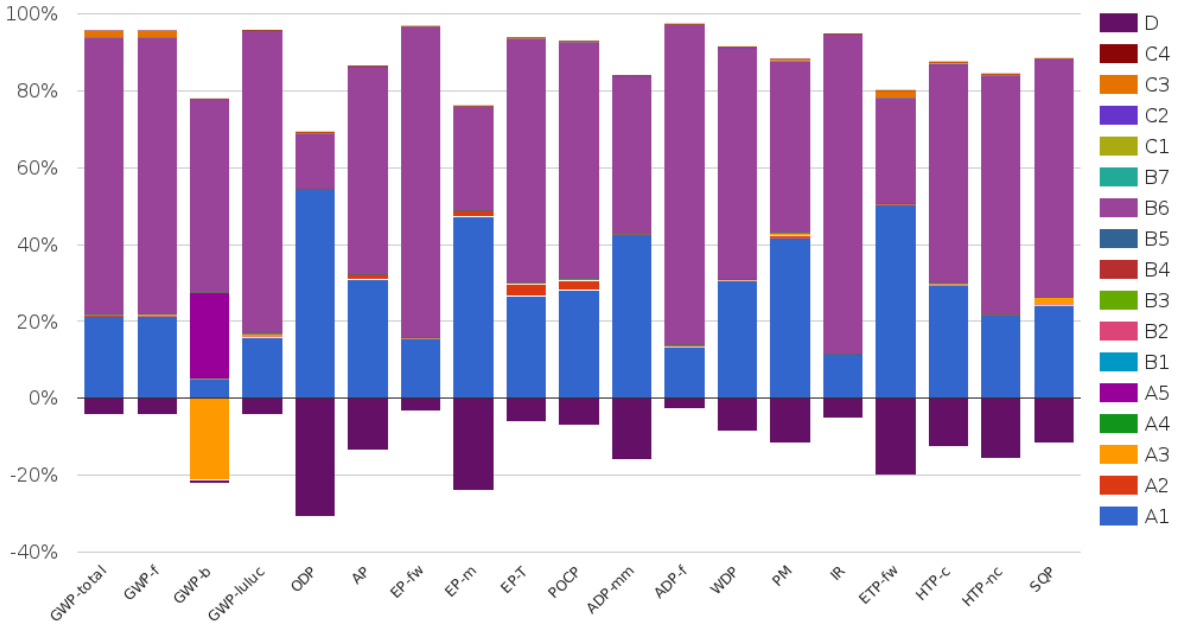
### UPTAKE OF BIOGENIC CARBON DIOXIDE

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 | 0.3533 | kg CO2 (biogenic) |

# 6 Interpretation of results




In most impact categories, the environmental impact of the ABOX 400 is primarily determined by energy consumption during operation (module B6) and raw material extraction and processing (module A1). In the GWP-Total impact category, energy consumption during operation (module B6) contributes 78.6 % to the overall result of all modules, followed by raw material extraction and processing (module A1) with 23.2 %. Within module A1, the LED module of the electronics has the largest environmental impact with regard to GWP-Total, at 36.6 %.

# 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**
Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1203_R. 3.0 (27.02.2025)

**Kiwa-EE GPI R.3.0 Annex B1**
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)

**PCR B**
Institut Bauen und Umwelt e.V. - Part B: Requirements on the EPD for Luminaires, light sources and control gears - v12 (30.09.2024)

**Ecoinvent**
ecoinvent Version 3.9.1 (December 2022)

**R<THINK characterization method**
ecoinvent 3.9.1: EN 15804+A2 indicators (EF 3.1)

**EN 60598-2-22:2020-12**
EN 60598-2-22:2020-12, Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting (IEC 60598-2-22:2014 + COR1:2015 + COR2:2016 + Amd.1:2017); German version EN 60598-2-22:2014 + AC:2016-05 + AC:2016-09 + A1:2020

**EN 1838:2025-03**
EN 1838:2025-03, Lighting applications - Emergency lighting for buildings; German version EN 1838:2024

# 8 Contact information

**Owner of declaration**

**Muster GmbH**
Musterstraße 1
12345 Musterstadt, DE

**E-mail:**
info@muster-gmbh.de
**Website:**
https://www.muster-gmbh.de



Kiwa-Ecobility Experts is established member of the ECO PLATFORM