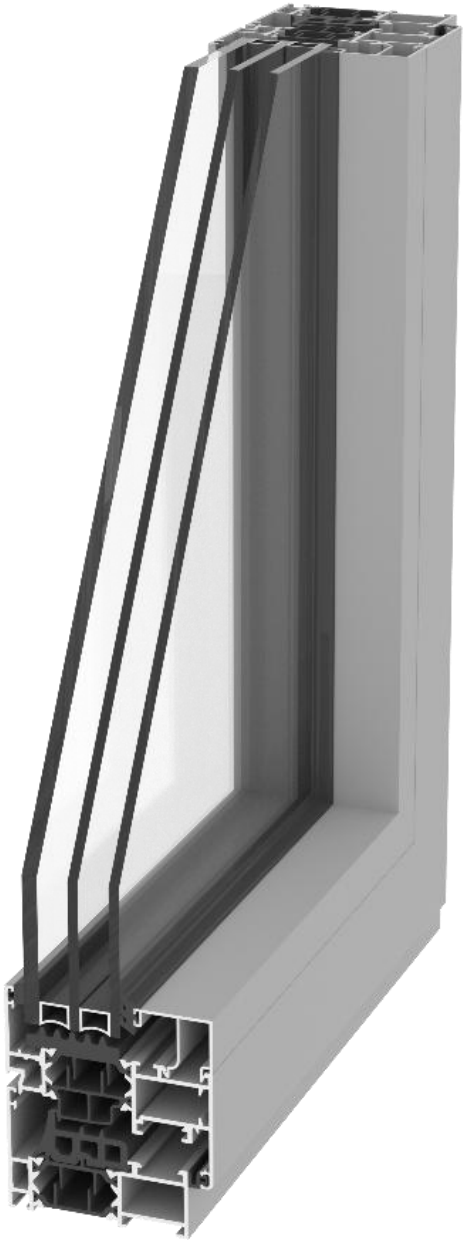
Environmental Product Declaration (EPD)

According to ISO 14025 and EN 15804+A2

# Raw aluminium profiles with thermal break

| | |
|---|---|
| Registration number: | EPD-Kiwa-EE-000467-EN |
| Issue date: | 09.01.2026 |
| Valid until: | 09.01.2031 |
| Declaration owner: | MV Extrusion S.p.A. - |
| Publisher: | Kiwa-Ecobility Experts |
| Program operator: | Kiwa-Ecobility Experts |
| Status: | verified |



# 1 General information

## 1.1 PRODUCT

Raw aluminium profile with thermal break

This declaration is related to extruded aluminium profiles with thermal break containing percentages of pre- and post-consumer recycled aluminium, mainly intended for the building market, and in some cases, also for the railway and furniture market. All the profiles are in EN AW-6060 or EN AW-6063 alloy conforming to UNI EN 573-3 standards (the correct balance of alloying components is guaranteed by strict quality controls carried out at each casting), and UNI EN 755-2, UNI EN 755-9 UNI EN 12020-2 for the verification of mechanical and dimensional conformity.

This EPD declaration also includes the LCA results for coated aluminium profiles with thermal break.

## 1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-000467-EN

## 1.3 VALIDITY

Issue date: 09.01.2026

Valid until: 09.01.2031

## 1.4 PROGRAM OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
Germany

*Raoul Mancke*

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

*Onur Üzüm*

*(Verification body, Kiwa-Ecobility Experts)*

## 1.5 OWNER OF THE DECLARATION

**Declaration owner:** MV Extrusion S.p.A. MV Line Group

**Address:** 75012 Bernalda (MT) Italy - Zona P.I.P.

**E-mail:** info@mvextrusion.it

**Website:** www.mvextrusion.it

| | |
|---|---|
| **Production location:** | Pisticci Scalo (MT) - Z.I. Comparto C |
| | Bernalda (MT) Italy - Zona P.I.P. |
| **Address production location:** | 75010 Pisticci Scalo (MT) Italy - Z.I. Comparto C |
| | 75012 Bernalda (MT) Italy - Zona P.I.P. |

## 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

(Third party verifier)

## 1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The program 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”, Program EE 1201 (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, Program EE 1203 (27.02.2025)]

## 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. 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 EPDs programs 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:** EN15804+A2

**LCA software:** Sphera - LCA for Experts - version 10.9.0.31, scheme 8007 (Sphera Solutions GmbH)

**Characterization method:** EN 15804 +A2 Method v1.0

**LCA database profiles:** Sphera database

**Version database:** version 10.9.0.31

## 1.11 PROJECT REPORT

This EPD is generated on the basis of the following report: MVExtrusion_study report_EPD_thermal break.

## 1.12 OTHER INFORMATION

**C.A.M.* (MINIMUM ENVIRONMENTAL CRITERIA) IN CONSTRUCTION AND SUSTAINABILITY PROTOCOLS**

The amount of recycled material contained in the aluminium profile, in the percentages reported in the following pages, make the products covered by this certification compliant with the parameters required by the ITALIAN DECREE of 23 June 2022 "Minimum Environmental Criteria for the entrusting of design services for building interventions, for the entrusting of works for building interventions and for the joint entrusting of design and works for building interventions". Furthermore, this certification is valid for the fulfilment of the requirements of the main sustainability protocols (LEED, BREEAM, WELL). It should be noted that the Declaration does not apply to all the other components required to make the window frame, such as glass, gaskets and hardware.

*Criteri Ambientali Minimi

**RECYCLED**

Environmental self-declaration in compliance with UNI EN ISO 14021.

Product type: extruded aluminium alloy profiles EN AW 6060.

Production site: aluminium profiles are extruded at the plant located in Compartment C - Z.I. Pisticci Scalo (MT) – ITALY and coupled with polyamide that is produced at Bernalda site located in Zona P.I.P. – Bernalda (MT) Italy.

**Recycled material (Aluminium)**

Provenance of recycled materials (pre-consumer or post-consumer) in the product:

The recycled materials come from:

- aluminium scrap,
- scraps received from outside,
- waste subject to recovery.

The percentage of primary - secondary aluminium is shown in the table below:

| RECYCLED ALUMINIUM IN THE EXTRUDED PROFILE | |
|---|---|
| Pre-consumer recycled aluminium (% of total Al) | 24.7%* |
| Post-consumer recycled aluminium (% of total Al) | 15.6% |
| Primary aluminium (% of total Al) | 59.7% |

*Pre-consumer content of recycled aluminium (24.7%) comes from:

- 18.9% Internal scraps
- 5.8% scraps received from outside

The declared unit considered is 1 kg of profiles with thermal break.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

This declaration is related to extruded aluminium profiles with thermal break containing percentages of pre- and post-consumer recycled aluminium, mainly intended for the building market and, in some cases, also for the railway and furniture market. All the profiles are in EN AW-6060 or EN AW-6063 alloy conforming to UNI EN 573-3 standards, and UNI EN 755-2, UNI EN 755-9 UNI EN 12020-2 for the verification of mechanical and dimensional conformity.

This EPD is about raw aluminium profiles with thermal break and that LCA results for coated aluminium profiles with thermal break were calculated in addition and shown in chapter 5.5.

**Product specification**

The composition of the product is described in the following table:

| Materials | Weight [m-%] |
|---|---|
| Extruded aluminium EN AW-6060 and EN AW-6063 | 87% |
| Polyamide | 13% |

## 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The profiles can be sold unfinished or coated in the coating department also located in the Pisticci Scalo factory. They can also be coupled with an extruded polyamide bar to obtain thermal break profiles for door frame components and windows production that guarantee excellent thermal insulation performance, improving energy saving and living comfort.

## 2.3 REFERENCE SERVICE LIFE (RSL)

**RSL PRODUCT**

The reference service life for aluminium extruded profiles is considered of 50 years based on efficiency levels and usage class.

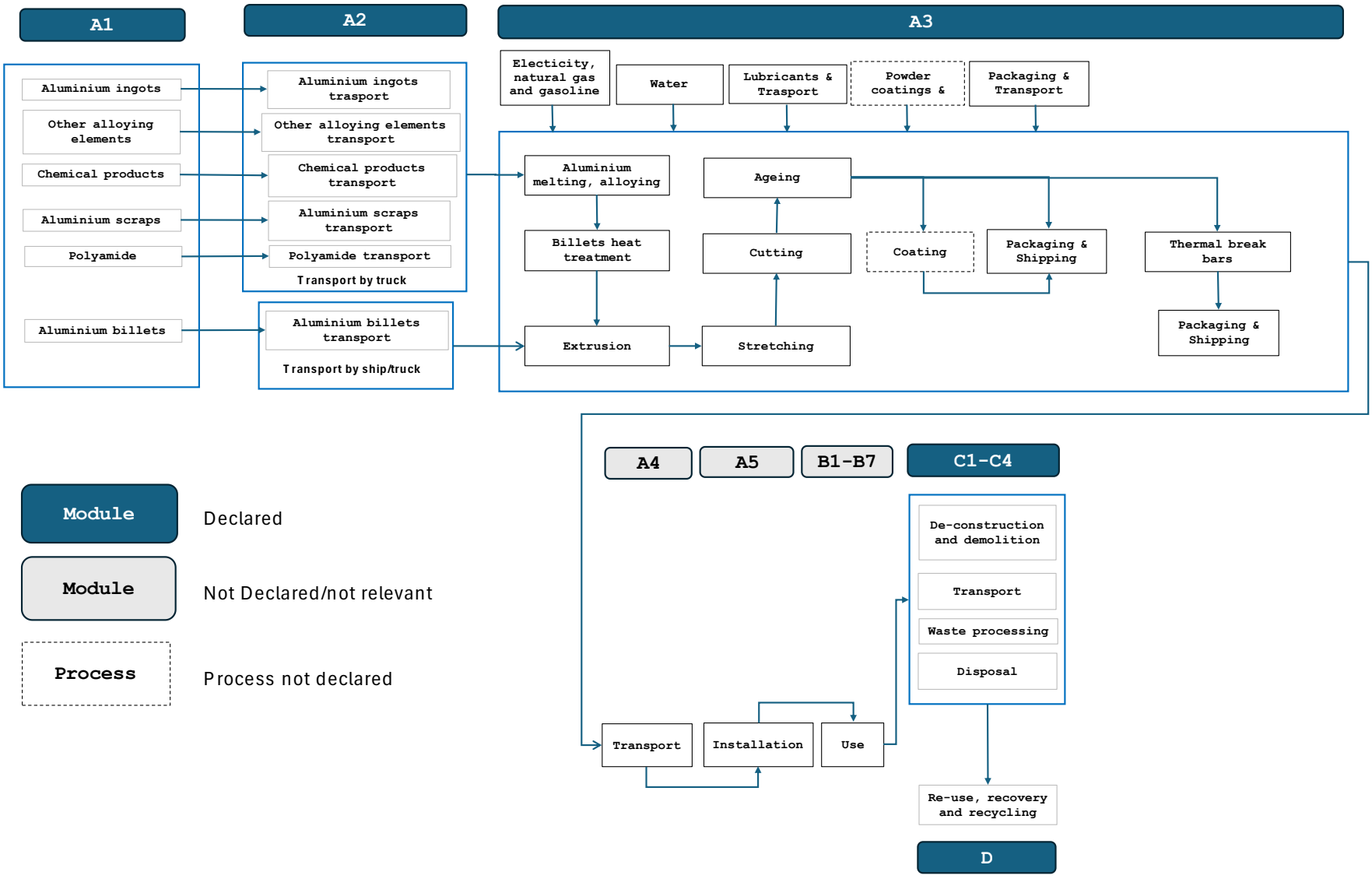
**USED RSL (YR) IN THIS CALCULATION**

50 years

## 2.4 SUBSTANCES OF VERY HIGH CONCERN

Aluminium raw and coated profiles with thermal break do not contain SVHC.

## 2.5 DESCRIPTION PRODUCTION PROCESS



# 3 Calculation rules

## 3.1 DECLARED UNIT

The declared unit is 1 kg of extruded raw profile with thermal break.

## 3.2 CONVERSION FACTORS

| Description | Value | Unit |
|---|---|---|
| Reference unit | 1 | kg |
| Weight per reference unit | 1 | kg |

## 3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

Cradle to gate with module C1-C4 and module D.

The life cycle stages included are as shown below:

(X = module declared, 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 | ND | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |

The modules of the EN15804+A2 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 = Deconstruction / 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 raw aluminium profiles, a product of MV Extrusion S.p.A. MV Line Group.

Environmental impacts were calculated with reference to the production site. The reference market and end-of-life scenario consider the European context. Further references to countries or regions representative of the processes are given in the section on modelling with the software.

## 3.5 CUT-OFF CRITERIA

The cut-off applied are related to the alloying components and packaging. Therefore, 0.67% of the total mass of module A1-A3 was excluded, which is within the maximum limit required by the PCR.

## 3.6 ALLOCATION

A mass allocation was carried out in order to allocate energy and material inputs and outputs to the different profiles (raw, coated, thermal cut) produced in the plant. Allocation factor was calculated on the basis of the production history of the individual profile type compared to the total number of profiles produced in 2024. The quantities allocated according to this assumption concern aluminium, packaging, alloying components, lubricating oil, waste, energy data, fuel, water and transport. Quantities relating to polyamide and paint (treatment and powder) were allocated on the basis of the production of profiles with thermal break and paint only.

## 3.7 DATA COLLECTION & REFERENCE TIME PERIOD

Primary data including all raw materials, packaging materials, energy consumption and ancillary materials was comprehensively collected for the reference year from 2024-01-01 to 2024-12-31.

## 3.8 ESTIMATES AND ASSUMPTIONS

Only for LCA results of coated aluminium profiles, for coating powders process, the data in the EPD document "Interpon D2000 Powder Coatings from Akzo Nobel Powder Coatings Ltd" was used. The document reports the environmental impacts, divided according to the indicators required by the standard, for 1 kg of product, with the trade name INTERPON D2000, applied to an aluminium surface.

## 3.9 DATA QUALITY

Regarding raw materials quantities, specific data taken from the suppliers' bills of lading and from the company's internal management system were used.

Regarding electrical power, the data from electric meter inside the plant and electrical panel of the machinery in the production lines were used.

Data used for raw materials and water responds to geographical representativeness: Italian data was used within the database or, in nonexistence case of such Europeans, global data only in a few cases.

All data used are compliant with requirements of coverage, accuracy, completeness, representativeness, consistency and reproducibility, and sources and uncertainties have been included for each data item.

All data refer to the financial year 2024, thus not older than 5 years as required by the PCR.

Regarding the raw material production, over which the organization has no influence, secondary data from the Sphera database were used, trying to identify the most representative process flow.

In the absence of the process flow within the paint powder database, data from the EPD document "Interpon D2000 Powder Coatings from Akzo Nobel Powder Coatings Ltd", EPD registration number: S-P-09129, Publication date: 2023-05-23, Revision date: 2024-07-10 (Version 1.2), Valid until: 2028-05-23 were used.

| Quality requirement | Specific requirement | Data quality level | Notes |
|---|---|---|---|
| **Time-related coverage** | Age of data and minimum time period for data collection. | Very Good | All data refer to the financial year 2024, thus not older than 5 years |
| **Geographical coverage** | Upstream: Unit process for raw material should be collected for respective geographic region | Good | Regarding raw materials quantities, specific data taken from the suppliers' bills of lading and from the company's internal management system were used. |
| | Core: Unit process for production should represent the real site. | Good | Regarding electrical power, were used data taken from the meter inside the plant and the plate data of the machinery present on the production lines. |
| | Downstream: End-of-life disposal should represent the region of disposal. | Good | - |
| **Technical representativeness** | Qualitative assessment of the degree to which the data set reflects the true population of interest (technology) | Good | - |

## 3.10 POWER MIX

The electrical power energy used at the Pisticci Scalo production plant is taken from the grid, the power supply is medium voltage and there is a MV/LV transformation cabin. There are no self-generating (photovoltaic) plants inside the production site.

The electricity modelling is based on the market-based approach. No guarantee of origin (GO) is available from trader then residual Italian mix it's been applied.

The GWP value of the electrical energy used is 0,441 kg CO2 per kWh (AIB report 2024).

# 4 Scenarios and additional technical information

## 4.1 RAW MATERIAL SUPPLY (A1)

This module concerns the supply of raw material.

## 4.2 TRANSPORT (A2)

The module covers the transport phase of the raw materials supplied:

## 4.3 MANUFACTURING (A3)

The module concerns energy, fuel, water and gas consumption, auxiliary materials and packaging, waste produced and their transport.

## 4.4 DE-CONSTRUCTION, DEMOLITION (C1)

The scenario regards the demolition/demontage.

## 4.5 TRANSPORT END-OF-LIFE (C2)

This module concerns the end-of-life transport phase (the default value assumed is equal to 50 km):

·waste transport

## 4.6 END OF LIFE (C3, C4)

This module concerns the stage at which the waste is processed and sent 100% to landfill:

·waste sent to landfill (100%)

## 4.7 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The module covers the phase of reuse of production waste, scrap and returns:

·scrap, waste and returns

·energy

# 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 endpoints 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 1 KG OF ALUMINIUM PROFILE WITH THERMAL BREAK

### CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| AP | mol $H^+$ eqv. | 3,34E-02 | 2,54E-03 | 9,86E-04 | 3,69E-02 | 1,06E-04 | 5,87E-04 | 1,38E-05 | 1,06E-04 | -1,47E-02 |
| GWP-total | kg $CO_2$ eqv. | 1,02E+01 | 3,49E-01 | 7,05E-01 | 1,12E+01 | 1,50E-02 | 9,87E-02 | 2,75E-03 | 1,50E-02 | -3,31E+00 |
| GWP-b | kg $CO_2$ eqv. | 3,52E-02 | 2,62E-03 | 5,76E-02 | 2,50E-02 | 1,03E-04 | 8,40E-04 | 5,24E-05 | 1,03E-04 | 3,13E-03 |
| GWP-f | kg $CO_2$ eqv. | 1,02E+01 | 3,46E-01 | 7,61E-01 | 1,13E+01 | 1,50E-02 | 9,79E-02 | 2,76E-03 | 1,50E-02 | -3,32E+00 |
| GWP-luluc | kg $CO_2$ eqv. | 1,63E-03 | 5,23E-03 | 9,32E-04 | 7,79E-03 | 8,98E-05 | 1,65E-03 | 3,74E-05 | 8,98E-05 | -7,40E-04 |
| EP-m | kg N eqv. | 8,34E-03 | 1,20E-03 | 3,72E-04 | 9,91E-03 | 2,74E-05 | 2,87E-04 | 6,37E-06 | 2,74E-05 | -2,71E-03 |
| EP-fw | kg P eqv. | 5,45E-06 | 1,34E-06 | 7,62E-07 | 7,55E-06 | 3,40E-08 | 4,20E-07 | 1,08E-08 | 3,40E-08 | -4,25E-07 |
| EP-t | mol N eqv. | 9,06E-02 | 1,33E-02 | 4,06E-03 | 1,08E-01 | 3,01E-04 | 3,19E-03 | 7,04E-05 | 3,01E-04 | -2,96E-02 |
| ODP | kg CFC 11 eqv. | 7,59E-12 | 3,42E-14 | 6,45E-12 | 1,41E-11 | 4,04E-14 | 9,92E-15 | 4,99E-15 | 4,04E-14 | -1,13E-11 |
| POCP | kg NMVOC eqv | 2,55E-02 | 2,54E-03 | 1,05E-03 | 2,91E-02 | 8,37E-05 | 5,51E-04 | 1,76E-05 | 8,37E-05 | -8,18E-03 |
| ADP-f | MJ | 1,42E+02 | 4,50E+00 | 1,60E+01 | 1,63E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| ADP-mm | kg Sb-eqv. | 7,08E-07 | 2,73E-08 | 4,18E-08 | 7,77E-07 | 9,70E-10 | 8,38E-09 | 2,90E-09 | 9,70E-10 | -1,00E-07 |
| WDP* | $m^3$ world eqv. | 1,49E+00 | 4,70E-03 | 1,73E-01 | 1,66E+00 | 1,71E-03 | 1,47E-03 | 5,29E-04 | 1,71E-03 | -4,09E-01 |

**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)

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| ETP-fw | CTUe | 4,86E+01 | 3,31E+00 | 1,86E+00 | 5,38E+01 | 1,14E-01 | 9,46E-01 | 3,60E-02 | 1,14E-01 | -3,02E+01 |
| PM | Disease incidence | 6,27E-07 | 3,01E-08 | 1,70E-08 | 6,74E-07 | 1,33E-09 | 3,75E-09 | 2,72E-10 | 1,33E-09 | -2,53E-07 |
| HTP-c | CTUh | 6,49E-09 | 6,59E-11 | 1,24E-10 | 6,68E-09 | 2,69E-12 | 1,90E-11 | 7,88E-13 | 2,69E-12 | -9,92E-04 |
| HTP-nc | CTUh | 9,49E-08 | 2,86E-09 | 5,33E-09 | 1,03E-07 | 1,04E-10 | 8,45E-10 | 2,89E-11 | 1,04E-10 | -1,79E-08 |
| IR | kBq U-235 eqv. | 6,65E-01 | 8,02E-04 | 2,04E-02 | 6,87E-01 | 2,40E-04 | 2,32E-04 | 1,03E-04 | 2,40E-04 | -1,47E-02 |
| SQP | Pt | 3,86E+00 | 2,01E+00 | 1,38E+01 | 1,97E+01 | 5,44E-02 | 6,36E-01 | 1,62E-02 | 5,44E-02 | -1,15E+00 |
| GWP-GHG* | kg $CO_2$ eq. | 1,02E+01 | 3,47E-01 | 7,63E-01 | 1,13E+01 | 1,50E-02 | 9,81E-02 | 2,77E-03 | 1,50E-02 | -3,31E+00 |

**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)

*This indicator takes all greenhouse gases into account, except for the absorption and emission of biogenic carbon dioxide and biogenic carbon stored in the product. Therefore, the indicator is identical to the total GWP, except for the conductivity factor (CF) for biogenic $CO_2$, which is set to zero.

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

### PARAMETERS DESCRIBING RESOURCE USE

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 5,80E+01 | 3,46E-01 | 2,55E+00 | 6,09E+01 | 3,44E-02 | 1,09E-01 | 5,52E-03 | 3,44E-02 | -4,88E+00 |
| PERM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,80E+01 | 3,46E-01 | 2,55E+00 | 6,09E+01 | 3,44E-02 | 1,09E-01 | 5,52E-03 | 3,44E-02 | -4,88E+00 |
| PENRE | MJ | 1,42E+02 | 4,50E+00 | 1,60E+01 | 1,63E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| PENRM | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 1,42E+02 | 4,50E+00 | 1,60E+01 | 1,63E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| SM | kg | 1,56E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | $m^3$ | 4,14E-02 | 3,88E-04 | 4,12E-03 | 4,59E-02 | 5,23E-05 | 1,22E-04 | 1,54E-05 | 5,23E-05 | -9,85E-03 |

**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

**OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES**

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 1,23E-08 | 1,45E-10 | 1,45E-09 | 1,39E-08 | 4,92E-11 | 4,16E-11 | 7,48E-12 | 4,92E-11 | -1,08E-08 |
| NHWD | kg | 3,85E+00 | 6,74E-04 | 9,02E-02 | 3,94E+00 | 1,00E+00 | 2,00E-04 | 1,42E-05 | 1,00E+00 | -6,62E-01 |
| RWD | kg | 6,73E-03 | 5,75E-06 | 1,34E-04 | 6,87E-03 | 2,07E-06 | 1,66E-06 | 6,51E-07 | 2,07E-06 | -1,40E-04 |

**HWD**=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

**ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS**

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| CRU | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| MFR | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| MER | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EET | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EEE | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

**CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

## 5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER 1 KG OF RAW ALUMINIUM PROFILE WITH THERMAL BREAK

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 |

### UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount 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 |
|---|---|---|
| Product | 0 | kg $CO_2$ (biogenic) |
| Packaging | 0 | kg $CO_2$ (biogenic) |

## 5.4 ADDITIONAL INFORMATION: ENVIRONMENTAL IMPACT INDICATORS PER 1 KG OF COATED ALUMINIUM PROFILE WITH THERMAL BREAK

### CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| AP | mol $H^+$ eqv. | 3,34E-02 | 3,41E-03 | 3,23E-03 | 4,00E-02 | 1,06E-04 | 5,87E-04 | 1,38E-05 | 1,06E-04 | -1,47E-02 |
| GWP-total | kg $CO_2$ eqv. | 1,02E+01 | 4,95E-01 | 9,54E-01 | 1,16E+01 | 1,50E-02 | 9,87E-02 | 2,75E-03 | 1,50E-02 | -3,31E+00 |
| GWP-biogenic | kg $CO_2$ eqv. | 3,52E-02 | 3,86E-03 | 6,00E-02 | 2,87E-02 | 1,03E-04 | -8,40E-04 | 5,24E-05 | 1,03E-04 | 3,13E-03 |
| GWP-fossil | kg $CO_2$ eqv. | 1,02E+01 | 4,91E-01 | 1,01E+00 | 1,17E+01 | 1,50E-02 | 9,79E-02 | 2,76E-03 | 1,50E-02 | -3,32E+00 |
| GWP-luluc | kg $CO_2$ eqv. | 1,63E-03 | 7,68E-03 | 4,78E-03 | 1,41E-02 | 8,98E-05 | 1,65E-03 | 3,74E-05 | 8,98E-05 | -7,40E-04 |
| EP-marine | kg N eqv. | 8,34E-03 | 1,62E-03 | 5,55E-04 | 1,05E-02 | 2,74E-05 | 2,87E-04 | 6,37E-06 | 2,74E-05 | -2,71E-03 |
| EP-freshwater | kg P eqv. | 5,45E-06 | 1,96E-06 | 4,48E-05 | 5,22E-05 | 3,40E-08 | 4,20E-07 | 1,08E-08 | 3,40E-08 | -4,25E-07 |
| EP-terrestrial | mol N eqv. | 9,06E-02 | 1,80E-02 | 5,74E-03 | 1,14E-01 | 3,01E-04 | 3,19E-03 | 7,04E-05 | 3,01E-04 | -2,96E-02 |
| ODP | kg CFC 11 eqv. | 7,59E-12 | 4,88E-14 | 1,32E-08 | 1,32E-08 | 4,04E-14 | 9,92E-15 | 4,99E-15 | 4,04E-14 | -1,13E-11 |
| POCP | kg NMVOC eqv | 2,55E-02 | 3,35E-03 | 1,79E-03 | 3,07E-02 | 8,37E-05 | 5,51E-04 | 1,76E-05 | 8,37E-05 | -8,18E-03 |
| ADP-fossil* | MJ | 1,42E+02 | 6,40E+00 | 2,08E+01 | 1,69E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| ADP-minerals&metals* | kg Sb-eqv. | 7,08E-07 | 3,97E-08 | 3,07E-06 | 3,82E-06 | 9,70E-10 | 8,38E-09 | 2,90E-09 | 9,70E-10 | -1,00E-07 |
| WDP* | $m^3$ world eqv. | 1,49E+00 | 6,87E-03 | 3,20E-01 | 1,81E+00 | 1,71E-03 | 1,47E-03 | 5,29E-04 | 1,71E-03 | -4,09E-01 |

**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)

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| ETP-fw | CTUe | 4,86E+01 | 4,71E+00 | 7,13E+00 | 6,05E+01 | 1,14E-01 | 9,46E-01 | 3,60E-02 | 1,14E-01 | -3,02E+01 |
| PM | Disease incidence | 6,27E-07 | 3,56E-08 | 2,79E-08 | 6,91E-07 | 1,33E-09 | 3,75E-09 | 2,72E-10 | 1,33E-09 | -2,53E-07 |
| HTP-c | CTUh | 6,49E-09 | 9,40E-11 | 4,77E-10 | 7,06E-09 | 2,69E-12 | 1,90E-11 | 7,88E-13 | 2,69E-12 | -9,92E-04 |
| HTP-nc | CTUh | 9,49E-08 | 4,11E-09 | 1,31E-08 | 1,12E-07 | 1,04E-10 | 8,45E-10 | 2,89E-11 | 1,04E-10 | -1,79E-08 |
| IR | kBq U-235 eqv. | 6,65E-01 | 1,14E-03 | 3,81E-02 | 7,05E-01 | 2,40E-04 | 2,32E-04 | 1,03E-04 | 2,40E-04 | -1,47E-02 |
| SQP | Pt | 3,86E+00 | 2,95E+00 | 1,39E+01 | 2,07E+01 | 5,44E-02 | 6,36E-01 | 1,62E-02 | 5,44E-02 | -1,15E+00 |
| GWP-GHG* | kg $CO_2$ eq. | 1,02E+01 | 4,92E-01 | 1,01E+00 | 1,17E+01 | 1,50E-02 | 9,81E-02 | 2,77E-03 | 1,50E-02 | -3,31E+00 |

**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)

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 5,80E+01 | 5,06E-01 | 3,10E+00 | 6,16E+01 | 3,44E-02 | 1,09E-01 | 5,52E-03 | 3,44E-02 | -4,88E+00 |
| PERM | MJ | 0,00E+00 | 0,00E+00 | 3,10E-02 | 3,10E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,80E+01 | 5,06E-01 | 3,10E+00 | 6,16E+01 | 3,44E-02 | 1,09E-01 | 5,52E-03 | 3,44E-02 | -4,88E+00 |
| PENRE | MJ | 1,42E+02 | 6,40E+00 | 2,08E+01 | 1,69E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| PENRM | MJ | 0,00E+00 | 0,00E+00 | 1,40E+00 | 1,40E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | MJ | 1,42E+02 | 6,40E+00 | 2,08E+01 | 1,69E+02 | 1,97E-01 | 1,29E+00 | 5,17E-02 | 1,97E-01 | -3,11E+01 |
| SM | kg | 1,56E-01 | 0,00E+00 | 0,00E+00 | 1,56E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | $m^3$ | 4,14E-02 | 5,69E-04 | 7,89E-03 | 4,99E-02 | 5,23E-05 | 1,22E-04 | 1,54E-05 | 5,23E-05 | -9,85E-03 |

**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

## 5.5 ADDITIONAL INFORMATION: INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI) PER 1 KG OF COATED ALUMINIUM PROFILE

### PARAMETERS DESCRIBING RESOURCE USE

### OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 1,23E-08 | 2,06E-10 | 1,79E-09 | 1,43E-08 | 4,92E-11 | 4,16E-11 | 7,48E-12 | 4,92E-11 | -1,08E-08 |
| NHWD | kg | 3,85E+00 | 9,69E-04 | 1,56E-01 | 4,01E+00 | 1,00E+00 | 2,00E-04 | 1,42E-05 | 1,00E+00 | -6,62E-01 |
| RWD | kg | 6,73E-03 | 8,21E-06 | 1,70E-04 | 6,90E-03 | 2,07E-06 | 1,66E-06 | 6,51E-07 | 2,07E-06 | -1,40E-04 |

**HWD**=hazardous waste disposed | **NHWD**=non-hazardous waste disposed | **RWD**=radioactive waste disposed

### ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

| Abbreviation | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| Components for re-use | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling | kg | 0,00E+00 | 0,00E+00 | 2,27E-03 | 2,27E-03 | 0,00E+00 | 0,00E+00 | 0,00E-01 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

**CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

## 5.6 ADDITIONAL INFORMATION: INFORMATION ON BIOGENIC CARBON CONTENT PER 1 KG OF COATED ALUMINIUM PROFILE WITH THERMAL BREAK

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 |

### UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount 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 |
|---|---|---|
| Product | 0 | kg $CO_2$ (biogenic) |
| Packaging | 0 | kg $CO_2$ (biogenic) |

# 6 Interpretation of results

## 6.1 CONTRIBUTION ANALYSIS

### RAW ALUMINIUM PROFILE WITH THERMAL BREAK

The largest contribution is from modules A1-A3 (production phase).

| A1-A3 | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| 98,85% | 0,13% | 0,86% | 0,02% | 0,13% |

The largest contribution is due to aluminium billets and ingots and polyamide, to a small extent to electricity and coating powders.

| Aluminium billets | Aluminium ingots | polyamide | Electricity | Coating powders |
|---|---|---|---|---|
| 45,90% | 19,45% | 23,41% | 3,49% | 1,94% |

## 6.2 SENSITIVITY ANALYSES

A sensitivity analysis was conducted to assess the effects on the results provided by the model induced by changes in the values of the input variables in order to improve the decision-making process.

Within the lifecycle of the production of aluminium profiles, one of the largest impacts (excluding the production of aluminium ingots and billets) is the use of polyamide for the thermal break. Consequently, the 'sensitive' link in the entire life cycle is the type of material used to make the thermal break to the product. Therefore, a sensitivity analysis was conducted on the type of material, specifically ABS instead of polyamide.

The following table shows the delta relating to the reduction of environmental impacts as a result of the choice to replace polyamide with ABS (the values shown in the table refer to the impacts related to the raw profile with thermal break):

| Indicator | Unit | Normal value | Sensitivity Analyses | Δ |
|---|---|---|---|---|
| GWP-total | kg $CO_2$eq. | 1,12E+01 | 9,51E+00 | -15% |
| GWP-fossil | kg $CO_2$eq. | 1,13E+01 | 9,54E+00 | -15% |
| GWP-biogenic | kg $CO_2$eq. | -2,50E-02 | -4,02E-02 | 61% |
| GWP-luluc | kg $CO_2$eq. | 7,79E-03 | 7,66E-03 | -2% |
| ODP | kg CFC 11 eq. | 1,41E-11 | 1,16E-11 | -17% |
| AP | mol H+ eq. | 3,69E-02 | 3,54E-02 | -4% |
| EP-freshwater | kg P eq. | 7,55E-06 | 7,03E-06 | -7% |
| EP-marine | kg N eq. | 9,91E-03 | 9,40E-03 | -5% |
| EP-terrestrial | mol N eq. | 1,08E-01 | 1,03E-01 | -5% |
| POCP | kg NMVOC eq. | 2,91E-02 | 2,65E-02 | -9% |
| ADP-minerals&metals* | kg Sb eq. | 7,77E-07 | 7,63E-07 | -2% |
| ADP-fossil* | MJ | 1,63E+02 | 1,41E+02 | -13% |
| WDP* | $m^3$ | 1,66E+00 | 1,87E+00 | 12% |

Results per declared unit (1 kg)

| Indicator | Unit | Normal value | Sensitivity Analyses | Δ |
|---|---|---|---|---|
| GWP-GHG* | kg $CO_2$ eq. | 1,13E+01 | 9,55E+00 | -15% |
| Particulate matter | Disease incidences | 6,74E-07 | 6,61E-07 | -2% |
| Ionising radiation, human health | kBq U235 eq. | 6,87E-01 | 6,66E-01 | -3% |
| Ecotoxicity, freshwater | CTUe | 5,38E+01 | 4,23E+01 | -21% |
| Human toxicity, cancer | CTUh | 6,68E-09 | 6,37E-09 | -5% |
| Human toxicity, non-cancer | CTUh | 1,03E-07 | 9,48E-08 | -8% |
| Land use | Pt | 1,97E+01 | 2,00E+01 | 2% |

Results per declared unit (1 kg)

| Indicator | Unit | Normal value | Sensitivity Analyses | Δ |
|---|---|---|---|---|
| PERE | MJ | 6,09E+01 | 6,06E+01 | 0% |
| PERT | MJ | 6,09E+01 | 6,06E+01 | 0% |
| PENRE | MJ | 1,63E+02 | 1,41E+02 | -13% |
| PENRT | MJ | 1,63E+02 | 1,41E+02 | -13% |
| FW | $m^3$ | 4,59E-02 | 4,56E-02 | -1% |

Results per declared unit (1 kg)

| Indicator | Unit | Normal value | Sensitivity Analyses | Δ |
|---|---|---|---|---|
| Hazardous waste disposed | kg | 1,39E-08 | 6,68E-08 | 380% |
| Non-hazardous waste disposed | kg | 3,94E+00 | 3,93E+00 | 0% |
| Radioactive waste disposed | kg | 6,87E-03 | 6,73E-03 | -2% |

Almost all indicators improved, in particular GWP, ODP, ADP fossil, ecotoxycity FW PENRE E PENRT.

# 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

**Kiwa-EE GPI R.3.0**

Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, Program EE 1201 (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, Program EE 1203 (27.02.2025)

**Background database**

Sphera database version 10.9.0.31

MVExtrusion_study report_EPD_English version

EPD Interpon D2000 Akzo Nobel - registration number: S-P-09129, Publication date: 2023-05-23, Revision date: 2024-07-10 (Version 1.2), Valid until: 2028-05-23

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