ENGINEERING TOMORROW

# Environmental **Product Declaration**

## Solenoid valve 132U1500

## Solenoid Coil 018F7351

| | |
|---|---|
| **EPD issued** | 2024-04-30 |
| **EPD expires** | 2029-04-30 |
| **EPD author** | Danfoss Climate Solutions |
| **EPD type** | Cradle-to-grave |
| **Declared unit** | One product over its Reference Service Life |
| **Products included** | Results presented for Solenoid Valve EV220BW (132U1500) with Solenoid Coil BB230AS (018F7351). EPD of multiple products based on a representative product (All products covered are located in Table14 in Annex) |
| **Manufacturing Location** | Grodzisk, Poland |
| **Use Location** | Europe |
| **Application** | Water applications, heating installations and others such as indirect cooling, steam and laundry |
| **Mass** | 0,93 kg without packaging<br>1,20 kg with packaging |
| **Dimensions (H×W×D)** | 51,5x81x48 mm |
| **Verification** | [ ] External [X] Internal [ ] None |
| **Produced to** | Danfoss Product Category Rules (2022-09) |
| **Internal independent verifier** | Danfoss Power Electronics & Drives A/S |

## Introduction

This Environmental Product Declaration (EPD) follows the Danfoss Product Category Rules (PCR) (2022-09-20). These rules provide a consistent framework for calculating and reporting the environmental performance of Danfoss' products and are aligned with relevant international standards, particularly ISO 14025:2006 and EN 15804+A2:2019.

This document has been produced by Danfoss A/S following an internal verification process, but it is not a third-party verified document.

## What is an EPD?

An EPD is a document used to communicate transparently, the quantified environmental impacts of a product over its lifecycle stages. This quantification is done by performing a Life Cycle Assessment (LCA) in line with a consistent set of rules known as a PCR (Product Category Rules).

An EPD provides:

- A product's carbon footprint together with other relevant environmental indicators, including air pollution, water use, energy consumption, and waste, over its life cycle (Module A-C), as well as the expected benefits of reuse and recycling in reducing the impact of future products (Module D). See Table 1 for module descriptions.
- Environmental data allows customers to calculate LCAs and produce EPDs for their products.

## Type of EPD

This EPD is of the type 'cradle-to-grave' and includes all relevant modules: production (A1-A3), shipping (A4) and installation (A5); operational energy use (B6); deconstruction (C1), waste collection and transport (C2), treatment (C3) and disposal (C4). It also includes potential net benefits to future products from recycling or reusing post-consumer waste (D). The codes in brackets are the module labels from EN 15804+A2. Modules concerning the use, maintenance, repair, replacement, refurbishment (B1-B5), and operational water use (B7) are excluded, following the cut-off rules from EN 15804.

**Table 1:** Modules of the product's life cycle included in the EPD.

| Product stage | | | Installation | | Use stage | | | | | | | End-of-life stage | | | | Benefits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw materials | Transport | Manufacture | Transport | Installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-install. | Transport | Waste processing | Disposal | Benefits and loads outside system boundaries |
| **A1** | **A2** | **A3** | **A4** | **A5** | B1 | B2 | B3 | B4 | B5 | B6 | B7 | **C1** | **C2** | **C3** | **C4** | **D** |
| **X** | **X** | **X** | **X** | X | MNR | MNR | MNR | MNR | MNR | **X** | MNR | **X** | **X** | **X** | **X** | **X** |

(X = declared module; MNR = module not relevant)

## Product Description

Danfoss direct servo operated solenoid valves are an easy way to control and shut off fluids in fluctuating pressure conditions. The reference product used for this EPD are the Danfoss solenoid valve 132U1500 and the Danfoss coil 018F7351 which are representative in sales amongst their range. T The difference between products is in valve size and duty cycle. The EPD covers all product codes listed in Annex Table 14.

The valve type is designed with EPDM seals inside, lead-free dezincification resistant Eco brass for drinking water applications such as water supply / main inlet shut-off:

- Houses and large apartments
- Commercial buildings
- Industrial buildings
- Kitchens and bathrooms
- Zoning

Industrial applications

- Laundry
- Dishwashing
- Dosing machines
- Food processing

See more information about solenoid valve(132U1500) on Danfoss product store and solenoid coil(018F7351) on Danfoss product store.

**Figure 1: 132U1500 with 018F7351**.

### Reference Service Life

For the purpose of this EPD the reference service life (RSL) of the product is considered to be 10 years.

### Intended market.

The intended market of this study is Europe, and the baseline scenario involves the distribution, installation, and end-of-life in Europe.

## Product Description

**Table 2:** Product composition

| Material | Mass (kg) | % |
|---|---|---|
| **Metals** | 0,821 | 88% |
| Steel | 0,093 | 10% |
| Brass | 0,536 | 58% |
| Stainles Steel | 0,119 | 13% |
| Copper | 0,073 | 8% |
| **Plastics** | 0,102 | 11% |
| PBT GF30% | 0,102 | 11% |
| LDPE | 0,000003 | 0,0003% |
| **Other** | 0,009 | 1% |
| PPEPDM | 0,003 | 0% |
| Paper | 0,006 | 1% |
| **Total product** | 0,931 | 100% |
| PE Film | 0,079 | 29% |
| Cardboard | 0,192 | 71% |
| **Total packaging** | 0,271 | 100% |
| **Total product & packaging** | 1,202 | |

The EPD values were calculated for this composition. For other valves & coils a factor was applied, based on the results from LCA calculations for each valve & coil. The factor represents a multiplier of difference between the environmental indicators for this composition and the environmental indicators for other valves & coils, example presented in Table 13. All sales codes covered by this EPD are shown in table 14.

The declared unit is One product over its Reference Service Life (10 years), with a mass of 1,2 kg.

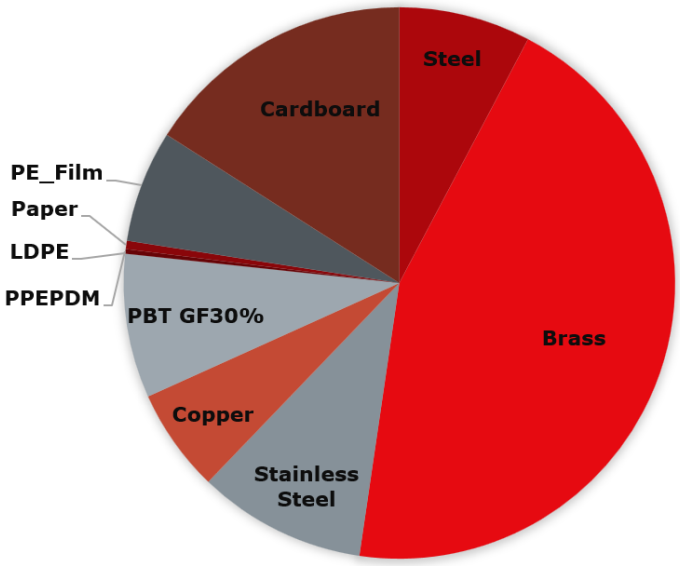


**Figure 2:** Material Composition Overview

## Overview of LCA study

### Data quality

The data quality of the selected datasets is generally assessed as good and very good in terms of geographical, time, and technology representativeness and applicability. Background data is from LCA software LCA for Experts (Sphera) database version 2023.2.

### Allocation and cut-off criteria

The allocation is made in accordance with the provisions of EN 15804+A2. All major raw materials and all the essential energy are included. All hazardous materials and substances are considered in the inventory. Data sets within the system boundary are complete and fulfill the criteria for the exclusion of inputs and output criteria. No known material or energy flows were ignored, including those which fell below the limit of 1%. Accordingly, the total sum of input flows ignored is certainly less than 5% of the energy and mass applied.

Due to unavailable data sets for springs (stainless steel), it was assumed to be produced from a sheet instead. Moreover, the plastic cap used to cover the open ends was assumed to be LDPE

Accordingly, the total sum of input flows ignored is certainly less than 5% of the energy and mass applied.

## Overview of LCA study

### System boundaries

The results in this EPD are split into life cycle modules following EN 15804 (Figure 3): production (A1-A3), distribution (A4), (A5) installation, use (B6), and the end of the product's life (C1-C4). Module D represents environmental benefits and loads that occur beyond the system boundary (i.e., in future products).

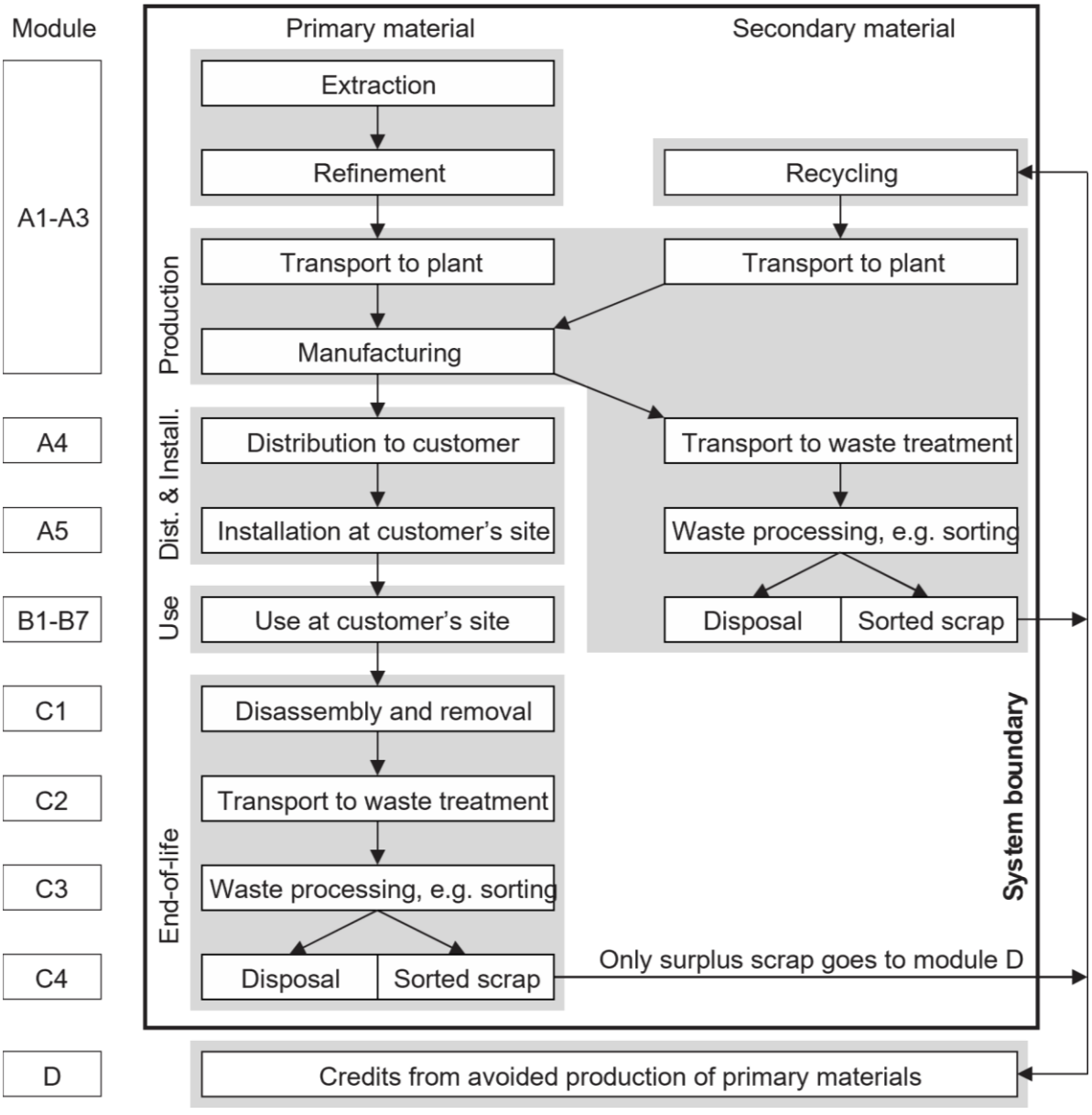


**Figure 3:** Modular structure used in this EPD (following EN 15804+A2)

## Overview of LCA study

### Product and packaging manufacture (A1-A3)

Final manufacturing occurs in the Grodzisk plant, in Poland, data was collected for year 2023. The facility is certified according to IATF 16949 compliant, ISO 14001, ISO 9001, PED/PESR, UL & MID. Where waste generated on-site is recyclable, it is separated and recycled. For further information, see here.. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available.

**Table 3:** Biogenic carbon content in the product

| | Total (excluding recycling) |
|---|---|
| Biogenic carbon content in product [kg] | - |
| Biogenic carbon content in accompanying packaging [kg] | 8,42E-02 |

*Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of $CO_2$.*

### Shipping and installation (A4-A5)

The intended market for the solenoid valve 132U1500 with the coil 018F7351 is Europe (more precisely Stuttgart was used as an approximate central European point). The assembly factory is in Poland, so 1140 km by truck was used to represent the distance between the factory and the approximate central European point.

Module A5 includes disposal of packaging materials only, the benefits from e.g., energy recovered after plastic incineration are allocated to module D. The product is assumed to be installed by hand and there is no loss of product during installation. Energy use in handheld tools during installation is not included as it falls under the cut-off criteria.

### Use phase (B1-B6)

The Reference Service Life (RSL) applied in this EPD is 10 years. The use of electricity consumption is bound to the analyzed product.

The use phase is bound on the application and customer usage, therefore in the below table, three duty rates have been defined and calculated the overall consumption over its lifetime of 10 years. These duty rates are typical for leak detection, shut off, heating installations, water inlet, steam and laundry amongst other applications.

**Table 4:** Use phase data for 132U1500 with 018F7351.

| Aspect | Value | Unit | Comment / Source |
|---|---|---|---|
| Duty rate 0,1% | 0,10 | kWh | Danfoss team |
| Duty rate 1% | 1,07 | kWh | Danfoss team |
| Duty rate 10% | 10,07 | kWh | Danfoss team |

The scope of this study is targeted at the European market; therefore, the product under study is sold and used in Europe. To represent the European market for this assessment, the European electricity grid mix $CO_2$ factor from LCA for Experts database (2023.1) is applied.

## Overview of LCA study

The major limitation of the impact calculations for the use phase is that the electricity grid mix in use is assumed to remain at the same carbon intensity over time. Following the plans for the decarbonization of the grid across Europe, the environmental impacts are expected to decrease over time within the course of the next 10 years. However, as decarbonization will occur in the future and as the pace of decarbonization is uncertain, the use of the emission intensity of today's grid should prove to be a "worst-case", conservative assumption.

### End-of-life (C1-C4)

The following end-of-life procedure has been applied:

- Manual dismantling is used to separate recyclable bulk materials, e.g., bulk metals and plastics.
- Shredding is used for the remaining parts, such as printed circuit board assemblies.
- Ferrous metals, non-ferrous metals, and bulk plastics are recovered through recycling.
- The remaining materials go to either energy recovery or landfill.

In line with EN 15804+A2, only the 'net scrap' (i.e., the leftover recyclable materials remaining after inputs of recycled content required in the manufacturing phase are first satisfied) is used to calculate the benefits and loads beyond the system boundary (Module D).

For this EPD an average scenario with 50% of the product sent to recycling and 50% of the product sent to landfill (C3, C4, D) was used.

This scenario is designed to represent an average end-of-life scenario.

For the EPD this average scenario was chosen as it is assumed that it represents the majority of cases on average.

1. Recycling scenario with 100% of the product sent to recycling at the end-of-life, excluding fractions that cannot be recycled or incinerated (e.g., glass reinforcing in glass-filled plastics) and are sent to landfill.

This scenario illustrates best-case performance. It assumes a 100% collection rate and the best available recycling technologies. Under this scenario, electrical cables, and all metals, flat glass, and unreinforced plastics found within the body and chassis of the product are recycled. Printed circuit board assemblies are incinerated, and the copper and precious metals (gold, silver, palladium, and platinum) are recycled.

2. Landfill scenario with 100% of the product sent to landfill.

This scenario assumes that the whole product, including its packaging, is landfilled. It is designed to represent a poor end-of-life route where valuable resources are lost.

### Benefits and loads beyond the system boundary (D)

Module D considers the net benefit of recycling (including energy recovery) of materials in the product and packaging, considering losses in the recycling process and the recycled material used in the production of the product. Module D covers the two end-of-life scenarios, as described above.

## Environmental performance

This section presents the environmental performance of one-unit solenoid valve 132U1500 with one-unit solenoid coil 018F7351. Figure 4 presents the environmental impact of one-unit 132U1500 with one-unit 018F7351 across several environmental impact categories (following EN 15804+A2:2019) per life cycle stage, over its full life cycle, including Global Warming Potential.

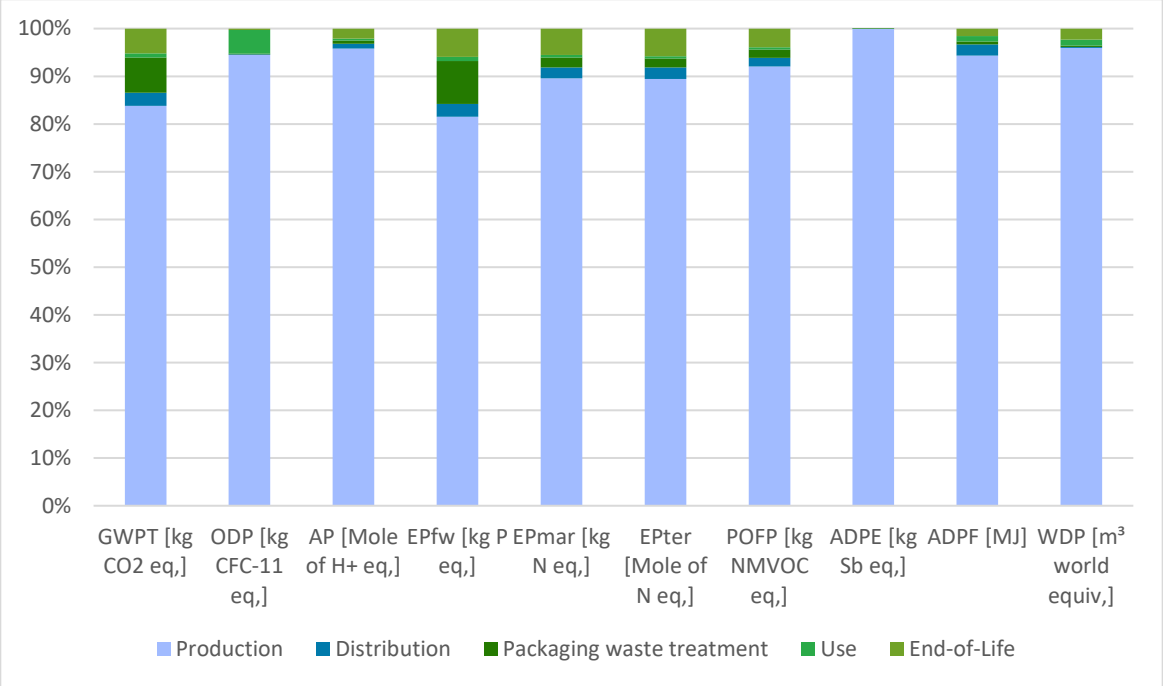


**Figure 4:** Breakdown of environmental impacts by life cycle stages (see Table 6 for descriptions of environmental impact indicators).

**Table 5:** Environmental Impact Indicators

| | Production | Distribution | Packaging waste treatment | Use | End-of-Life | | | | (Not included in Figure 5) |
|---|---|---|---|---|---|---|---|---|---|
| **Life cycle stages based on EN 15804+A2** | **A1-A3** | **A4** | **A5** | **B6** | **C1** | **C2** | **C3** | **C4** | **D** |
| **Description** / **Environmental Impact Indicators** | Manufacture of the product from 'cradle-to-gate' | Transport of the product to the customer | Installation of the product and disposal of used packaging | Use of the product over its lifetime e.g., 10 years | Deinstallation of the product from the site | Transport of the product to waste treatment | Processing waste for recycling | Disposal of waste that cannot be recycled (through landfill and incineration) | Potential benefits and loads beyond the system boundary due to reuse, recycling, and energy recovery |
| GWPT [kg CO2 eq.] | 3,65E+00 | 1,12E-01 | 3,35E-01 | 3,48E-02 | 0,00E+00 | 9,51E-03 | 4,73E-02 | 1,56E-01 | -1,07E+00 |
| GWPF [kg CO2 eq.] | 3,96E+00 | 1,11E-01 | 2,60E-02 | 3,44E-02 | 0,00E+00 | 9,51E-03 | 4,69E-02 | 1,56E-01 | -1,07E+00 |
| GWPB [kg CO2 eq.] | -3,09E-01 | 0,00E+00 | 3,09E-01 | 3,74E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| GWPLULUC [kg CO2 eq.] | 3,43E-03 | 1,03E-03 | 2,64E-05 | 3,71E-06 | 0,00E+00 | 2,30E-07 | 4,29E-04 | 2,26E-05 | -2,34E-03 |
| ODP [kg CFC-11 eq.] | 1,19E-11 | 1,44E-14 | 1,74E-14 | 6,29E-13 | 0,00E+00 | 1,11E-18 | 6,00E-15 | 2,96E-14 | -4,82E-13 |
| AP [Mole of H+ eq.] | 1,85E-02 | 1,91E-04 | 1,34E-04 | 7,25E-05 | 0,00E+00 | 1,30E-05 | 2,92E-04 | 1,03E-04 | -7,00E-03 |
| EPfw [kg P eq.] | 1,24E-05 | 4,05E-07 | 1,37E-06 | 1,28E-07 | 0,00E+00 | 2,06E-09 | 1,69E-07 | 7,32E-07 | -1,24E-06 |
| EPmar [kg N eq.] | 2,96E-03 | 7,55E-05 | 6,88E-05 | 1,74E-05 | 0,00E+00 | 5,19E-06 | 1,43E-04 | 3,49E-05 | -8,50E-04 |
| EPter [Mole of N eq.] | 3,17E-02 | 8,66E-04 | 6,55E-04 | 1,82E-04 | 0,00E+00 | 5,71E-05 | 1,58E-03 | 4,07E-04 | -9,10E-03 |
| POFP [kg NMVOC eq.] | 8,69E-03 | 1,72E-04 | 1,65E-04 | 4,64E-05 | 0,00E+00 | 1,23E-05 | 2,70E-04 | 8,64E-05 | -2,74E-03 |
| ADPE [kg Sb eq.] | 3,04E-04 | 7,30E-09 | 1,34E-09 | 5,28E-09 | 0,00E+00 | 3,38E-10 | 3,05E-09 | 6,60E-10 | -1,03E-04 |
| ADPF [MJ] | 5,97E+01 | 1,51E+00 | 3,54E-01 | 7,15E-01 | 0,00E+00 | 1,37E-01 | 6,30E-01 | 2,42E-01 | -1,54E+01 |
| WDP [$m^3$ world equiv.] | 5,48E-01 | 1,34E-03 | 1,38E-03 | 7,49E-03 | 0,00E+00 | 1,61E-05 | 5,60E-04 | 1,25E-02 | -3,71E-01 |

How to read scientific numbers:

e.g. 2,05E02 = 2,05 x $10^2$ = 205

2,04E-01 = 2,04 x $10^{-1}$ = 0,204

**Table 6:** Environmental impact indicator descriptions

| Acronym | Unit | Indicator |
|---|---|---|
| GWPT | kg $CO_2$ eq. | Carbon footprint (Global Warming Potential) – total |
| GWPF | kg $CO_2$ eq. | Carbon footprint (Global Warming Potential) – fossil |
| GWPB | kg $CO_2$ eq. | Carbon footprint (Global Warming Potential) – biogenic |
| GWPLULUC | kg $CO_2$ eq. | Carbon footprint (Global Warming Potential) – land use and land use change |
| ODP | kg CFC-11 eq. | Depletion potential of the stratospheric ozone layer |
| AP | Mole H+ eq. | Acidification potential |
| EPfw | kg P eq. | Eutrophication potential – aquatic freshwater |
| EPmar | kg N eq. | Eutrophication potential – aquatic marine |
| EPter | Mole of N eq. | Eutrophication potential – terrestrial |
| POFP | kg NMVOC eq. | Summer smog (photochemical ozone formation potential) |
| ADPE* | kg Sb eq. | Depletion of abiotic resources – minerals and metals |
| ADPF* | MJ | Depletion of abiotic resources – fossil fuels |
| WDP* | $m^3$ world eq. | Water deprivation potential (deprivation-weighted water consumption) |

Results for modules A1-A3 are specific to the product. All results from module A4 onwards should be considered as scenarios that represent one possible outcome. The true environmental performance of the product will depend on actual use.

The results in this section are relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks. EPDs from others may not be comparable.

### Carbon footprint

The total carbon footprint (GWPT), cradle-to-grave, of the product is 4,35E+00 kg CO2-eq (A1-C4). The carbon footprint (GWPT) of production of this product, cradle-to-gate, is 3,65E+00 kg CO2-eq (A1-A3).

**Table 7:** Resource use

| | A1-A3 | A4 | A5 | B6 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE [MJ] | 1,61E+01 | 1,10E-01 | 2,16E-02 | 4,28E-01 | 0,00E+00 | 4,52E-04 | 4,59E-02 | 2,36E-02 | -1,96E+00 |
| PERM [MJ] | 8,88E-02 | 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] | 1,61E+01 | 1,10E-01 | 2,16E-02 | 4,28E-01 | 0,00E+00 | 4,52E-04 | 4,59E-02 | 2,36E-02 | -1,96E+00 |
| PENRE [MJ] | 5,97E+01 | 1,51E+00 | 3,71E-01 | 7,15E-01 | 0,00E+00 | 1,37E-01 | 6,35E-01 | 2,42E-01 | -1,54E+01 |
| PENRM [MJ] | 1,40E-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 |
| PENRT [MJ] | 5,98E+01 | 1,51E+00 | 3,71E-01 | 7,15E-01 | 0,00E+00 | 1,37E-01 | 6,35E-01 | 2,42E-01 | -1,54E+01 |
| SM [kg] | 7,21E-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 [m3] | 2,12E-02 | 1,20E-04 | 4,57E-05 | 3,44E-04 | 0,00E+00 | 7,26E-07 | 5,00E-04 | 3,00E-04 | -1,33E-02 |

**Table 8:** Resource use indicator descriptions

| Acronym | Unit | Indicator |
|---|---|---|
| PERE | MJ | Use of renewable primary energy excluding renewable primary energy resources used as raw materials |
| PERM | MJ | Use of renewable primary energy resources used as raw materials |
| PERT | MJ | Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) |
| PENRE | MJ | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials |
| PENRM | MJ | Use of non-renewable primary energy resources used as raw materials |
| PENRT | MJ | Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) |
| SM | kg | Use of secondary material |
| RSF | MJ | Use of renewable secondary fuels |
| NRSF | MJ | Use of non-renewable secondary fuels |
| FW | $m^3$ | Net use of fresh water |

**Table 9:** Waste categories and output flows

| | A1-A3 | A4 | A5 | B6 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD [kg] | 9,45E-08 | 4,69E-12 | 1,24E-11 | -5,59E-11 | 0,00E+00 | 9,44E-13 | 1,96E-12 | 7,59E-12 | -7,55E-05 |
| NHWD [kg] | 2,52E-01 | 2,31E-04 | 1,10E-01 | 5,25E-04 | 0,00E+00 | 1,37E-05 | 9,65E-05 | 4,66E-01 | -3,98E-02 |
| RWD [kg] | 1,03E-03 | 2,83E-06 | 2,22E-06 | 1,13E-04 | 0,00E+00 | 1,47E-07 | 1,19E-06 | 2,84E-06 | -6,65E-05 |
| 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 | 4,12E-01 | 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 |
| EEE [MJ] | 2,68E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,27E-01 | 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 | 4,05E-01 | 0,00E+00 |

**Table 10:** Waste category and output flow descriptions

| Acronym | Unit | Indicator |
|---|---|---|
| HWD | kg | Hazardous waste disposed |
| NHWD | kg | Non-hazardous waste disposed |
| RWD | kg | Radioactive waste disposed |
| CRU | kg | Components for reuse |
| MFR | kg | Materials for recycling |
| MER | kg | Materials for energy recovery |
| EEE | kg | Exported energy (electrical) |
| EET | kg | Exported energy (thermal) |

**Table 11:** Additional indicators*

| | A1-A3 | A4 | A5 | B6 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM [Disease incidences] | 2,10E-07 | 1,32E-09 | 9,77E-10 | 6,10E-10 | 0,00E+00 | 1,81E-10 | 1,88E-09 | 9,43E-10 | -1,15E-07 |
| IRP [kBq U235 eq.] | 1,36E-01 | 4,23E-04 | 2,92E-04 | 1,89E-02 | 0,00E+00 | 2,08E-05 | 1,77E-04 | 4,04E-04 | -8,95E-03 |
| ETPfw [CTUe] | 2,39E+01 | 1,07E+00 | 3,09E-01 | 3,15E-01 | 0,00E+00 | 9,94E-02 | 4,48E-01 | 1,22E+00 | -8,70E+00 |
| HTPc [CTUh] | 3,59E-07 | 2,19E-11 | 8,86E-12 | 1,05E-11 | 0,00E+00 | 1,85E-12 | 9,20E-12 | 1,13E-11 | -1,04E-08 |
| HTPnc [CTUh] | 6,26E-08 | 1,23E-09 | 7,84E-10 | 2,59E-10 | 0,00E+00 | 8,08E-11 | 5,75E-10 | 1,05E-09 | -1,70E-08 |
| SQP [Pt] | 2,94E+01 | 6,31E-01 | 5,26E-02 | 2,82E-01 | 0,00E+00 | 3,51E-04 | 2,64E-01 | 3,10E-02 | -2,77E+00 |
| GWP-GHG [kg CO2 eq.] | 3,96E+00 | 1,12E-01 | 2,60E-02 | 3,36E-02 | 0,00E+00 | 9,51E-03 | 4,73E-02 | 1,56E-01 | -1,07E+00 |

**Table 12:** Optional indicator descriptions

| Acronym | Unit | Indicator |
|---|---|---|
| PM | Disease incidence | Potential incidence of disease due to particulate matter emissions |
| IRP** | kBq U235 eq. | Potential human exposure efficiency relative to U235 |
| ETPfw* | CTUe | Potential Comparative Toxic Unit for Ecosystems (freshwater) |
| HTPc* | CTUh | Potential Comparative Toxic Unit for humans (cancer) |
| HTPnc* | CTUh | Potential Comparative Toxic Unit for humans (non-cancer) |
| SQP* | Dimensionless | Potential soil quality index |
| GWP-GHG [kg CO2 eq.] | kg CO2 eq. | Carbon footprint – greenhouse gases |

**Disclaimer for ADPE, ADPF, WDP, ETPfw, HTPc, HTPnc, SQP:* The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

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

ANNEX 1

The solenoid valve chosen (132U1500) for this EPD accounts for a significant portion of sales, and all the valves share the same coil.
The logic behind the scaling factor covering multiple sales code is the following. The representative code of the bunch is usually the heaviest amongst and chosen to represent the worst-case scenario covering the lighter 3 other products (sales code). The use phase (duty rate) has been defined in three scenarios of actively being used throughout its lifetime, at 0,1%, 1% and 10%, and depends on the application.

To calculate the GWPT of a specific sales code, you would have to select the representative sales code of the bunch, with its specific duty rate and multiply its corresponding scaling factor with the GWPT of the reference (Scaling factor 1).

GWPT covers A1-C4.

Table 13 Reference table for calculating GWPT.

| | | Duty Rate | Scaling Factor | GWPT |
|---|---|---|---|---|
| Baseline | 132U1500 | 0,10% | 1,00 | 4,35E+00 |
| | | 1% | 1,00 | 4,65E+00 |
| | | 10% | 1,00 | 7,71E+00 |

Example:
Sales code 132U2500 is being represented by 132U2404 and a duty rate of 0,1%. We multiply its corresponding scaling factor of 1,16 with the GWPT values of the baseline with the same duty rate of 0,1%, in this case 4,35E+00.

GWPT for 132U2500 = 1,16 X 4,35E+00 kgCO2eq = 5,05 kgCO2eq/functional unit

Table 14 Table with products codes that are covered by this EPD and Scaling factors.

| Sales code | Representative of the sales code | Duty Rate | Scaling Factor |
|---|---|---|---|
| 132U1500 | 132U1500 | 0,10% | 1,00 |
| 132U2400 | | 1% | 1,00 |
| 132U1501 | | 10% | 1,00 |
| 132U2001 | 132U2001 | 0,10% | 0,93 |
| 132U2402 | | 1% | 0,94 |
| 132U2000 | | 10% | 0,96 |
| 132U2404 | 132U2404 | 0,10% | 1,16 |
| 132U2500 | | 1% | 1,15 |
| 132U2501 | | 10% | 1,09 |
| 132U2406 | 132U2406 | 0,10% | 1,28 |
| 132U3200 | | 1% | 1,27 |
| 132U3201 | | 10% | 1,16 |
| 132U2408 | 132U2408 | 0,10% | 1,62 |
| 132U4000 | | 1% | 1,58 |
| 132U4001 | | 10% | 1,35 |
| 132U2410 | 132U2410 | 0,10% | 1,92 |
| 132U5000 | | 1% | 1,86 |
| 132U5001 | | 10% | 1,52 |

## References


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