# Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## TEPLO-BF & TEPLO-BFR Wall Ties

from

**Composite Connections İnşaat San. ve Tic. Ltd. Şti.**

CompositeConnections

| | |
|---|---|
| Programme: | The International EPD System, www.environdec.com |
| Programme operator: | EPD International AB |
| Licensee: | EPD Türkiye |
| Type of EPD: | EPD of multiple products, based on a representative product |
| EPD registration number: | EPD-IES-0025977 |
| Version date: | 2026-01-12 |
| Validity date: | 2031-01-11 |
| | *An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com* |

*For the full product list, refer to page 4.*

# GENERAL INFORMATION

| Programme Information | |
|---|---|
| **Programme:** | The International EPD® System |
| **Address:** | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| **Website:** | www.environdec.com |
| **E-mail:** | support@environdec.com |
| **Licensee:** | EPD Türkiye |
| **Address:** | NEF O9 B Blok No:7/15, 34415, İstanbul, Türkiye |
| **Website:** | www.epdturkey.org |

| Product Category Rules (PCR) |
|---|
| **CEN standard EN 15804 serves as the Core Product Category Rules (PCR)** |
| **Product Category Rules (PCR):** ***PCR 2019:14 Construction products (EN 15804+A2) (2.0.1)*** |
| **PCR review was conducted by:** ***The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support.*** |

| Life Cycle Assessment (LCA) |
|---|
| LCA accountability: Yıldıray Yılmaz<br>Metsims Sustainability Consulting |

| Third-party Verification |
|---|
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:<br><br>☒ **Individual EPD verification without a pre-verified LCA/EPD tool**<br>Third-party verifier: *Agnieszka Pikus, Greenwise*<br>Approved by: International EPD System |
| Procedure for follow-up of data during EPD validity involves third party verifier:<br><br>☐ Yes ☒ No |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

# INFORMATION ABOUT EPD OWNER

Owner of the EPD: Composite Connections İnşaat San. ve Tic. Ltd. Şti.
Address: Cumhuriyet Serbest Bölge Mah. Eke Fence 1 Sk. No:2/N, Çardak/Denizli/Türkiye
Contact: Süleyman Aytekin
Address and contact information of the LCA practitioner commissioned by the EPD owner:
Metsims Sustainability Consulting, Sanayi Mah Hümeyra Sokak No:7/46-47 NEF09, B-Blok, 34415 Kağıthane/İstanbul. +90 212 281 13 33
Description of the organisation: Composite Connections develops and manufactures thermally insulating fixings and structural connections designed to remove thermal bridging from super insulated buildings.

# PRODUCT INFORMATION

Product name: TEPLO-BF & TEPLO-BFR Wall Ties
Product identification: TEPLO-BF and TEPLO-BFR Wall Ties are high-performance composite wall ties developed by Composite Connections Ltd. designed for use in masonry cavity wall construction. These innovative ties are manufactured using pultruded basalt fibres embedded in a durable resin matrix, offering an advanced alternative to traditional stainless-steel ties with significantly improved thermal and corrosion-resistant properties.

UN CPC code: 36950 Builders' ware of plastics n.e.c.
Product description: The TEPLO-BF range features polymer end-pieces on both ends of the basalt fibre core, allowing for optimal embedment in both leaves of a cavity wall, even when using weaker mortars such as M2 or moderately hydraulic lime mortar. TEPLO-BFR ties, on the other hand, are designed with a polymer end-piece on one side only and are intended for retrofit applications or bonding into existing structures using chemical anchoring systems. Both types support cavity widths ranging from 75 mm up to 450 mm.

These ties are classified according to PD 6697:2019 as Types 1 through 4, meeting structural performance requirements from light to heavy duty applications. Their mechanical strength has been validated through testing in a range of mortars and substrates, including brick, aerated concrete, and conventional concrete. The ties exhibit excellent tensile and compressive properties, with high resistance to pull-out when resin-bonded in retrofit applications.

One of the most distinctive advantages of the TEPLO-BF and BFR ties is their exceptionally low thermal conductivity—0.71 W/m·K for the basalt fibre core and 0.22 W/m·K for the polymer ends—making them highly effective in reducing thermal bridging. This contributes positively to the overall energy efficiency of the building envelope, aiding compliance with increasingly stringent building regulations and carbon reduction targets.

Designed to withstand harsh environmental conditions, these wall ties have an expected service life of over 60 years, are maintenance-free, and demonstrate excellent resistance to moisture penetration. A continuous helical ridge along the tie provides an integrated drip feature, preventing water transmission across the cavity.

Certified by the British Board of Agrément (BBA) and produced under a ISO 9001:2015 quality management system, TEPLO-BF and BFR Wall Ties offer a modern, thermally efficient, and durable solution for both new-build and retrofit masonry constructions.

Name and location of production site(s): Cumhuriyet Serbest Bölge Mah. Eke Fence 1 Sk. No:2/N, Çardak/Denizli/Türkiye.

## Physical and Mechanical Properties

| | |
|---|---|
| Fire Resistance | Suitable for walls with ≥ 120 min fire rating |
| Service Life | > 60 years |
| Thermal Conductivity (BFRP core) | 0.71 W/ (m*K) |
| Thermal Conductivity (Polymer) | 0.22 W/ (m*K) |

**Included Products**

The investigated product has a diameter of 7 mm and length of 375 mm. Below listed products (same product with different nominal lengths and orientations) are within the scope of this EPD.

- TEPLO-BF-2 250
- TEPLO-BF-2 275
- TEPLO-BF-2 300
- TEPLO-BF-2 325
- TEPLO-BF-2 350
- TEPLO-BF-2 375
- TEPLO-BF-2 400
- TEPLO-BF-2 425
- TEPLO-BF-3 450
- TEPLO-BF-3 475
- TEPLO-BF-3 500
- TEPLO-BF-3 525
- TEPLO-BF-4 550
- TEPLO-BF-4 575
- TEPLO-BF-1 200
- TEPLO-BF-1 225
- TEPLO-BF-1 250
- TEPLO-BF-1 275
- TEPLO-BFR-3 535
- TEPLO-BFR-4 585
- TEPLO-BFR-5-245
- TEPLO-BFR-7-245
- TEPLO-BFR-7-345
- TEPLO-BFR-7-445

# CONTENT DECLARATION

The content declaration below describes the representative product with a diameter of 7 mm and length of 375 mm.

| Product content | Mass, % | Post-consumer recycled material, mass-% of product | Biogenic material, mass-% of product | Biogenic material, kg C/product or declared unit |
|---|---|---|---|---|
| Basalt Fiber Roving | 65 - 70 % | 0% | 0% | 0 |
| PP Plastic | 10 - 15 % | 0% | 0% | 0 |
| Epoxy Resin | 7 - 10 % | 0% | 0% | 0 |
| Hardener | 8 - 10 % | 0% | 0% | 0 |
| Others (curing agent, thread etc.) | 1 - 2 % | 0% | 0% | 0 |
| **TOTAL** | **100 %** | **0%** | **0%** | **0** |

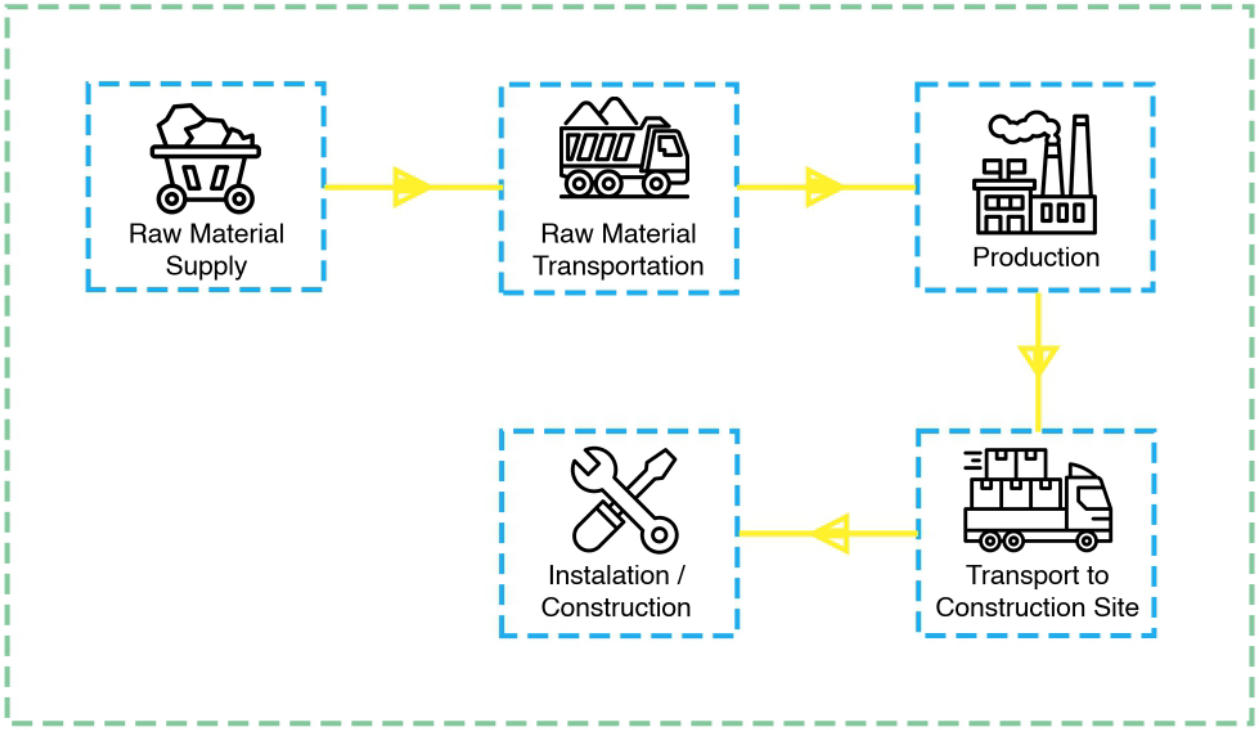
| Packaging materials | Mass, kg | Mass-% (versus the product) | Biogenic material, kg C/product or declared unit |
|---|---|---|---|
| Cardboard | 0.0746 | 7.46% | 0.032 |
| Label | 0.0002 | 0.02% | 0 |
| **TOTAL** | **0.0748** | **7.48** | **0.032** |

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of $CO_2$.

# LCA INFORMATION

Declared unit: 1 kg of Teplo-BF and BFR Wall Ties produced by Composite Connections Ltd.
Time representativeness: 2024 (12 months)
Geographical scope: A1, A2: GLO, A3: TR, A4: GLO, A5: UK, C1, C2, C3, C4, D: GLO.
Database(s) and LCA software used: Ecoinvent 3.11 and SimaPro Craft 10.2
Description of system boundaries:
System boundary: Cradle to gate with options, modules C1–C4, module D and with optional modules (A4 & A5).

Process flow diagram:
Process flow diagram of the product system, divided into the life-cycle stages and modules (or other division of the product life cycle, if defined in the PCR), showing the main processes included and the system boundary of the LCA:




**Allocation**

Sources of raw material, water consumption, energy consumption and raw material transportation were weighted according to 2024 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2024 total waste generation.

**Cut-off Criteria**

The criteria for exclusion were set so that individual input flows less than 1% of the total, with a cumulative limit of less than 5%, could be omitted. This was contingent upon confirming that these excluded flows did not significantly alter the reported data, with “significant” defined as affecting the total by less than 5%.

**REACH Regulation**

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

**LCA Modelling, Calculation and Data Quality**

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while freshwater use is calculated with selected inventory flows in SimaPro according to the PCR. There are no co-product allocations within the LCA study underlying this EPD. The regional energy datasets were used for all energy calculations.

**Background Data**

For all LCA modelling and calculation, Ecoinvent database (v3.11) and SimaPro Craft (v.10.2) LCA software were used. Characterization factors of EN 15804 reference package based on EF 3.1 are utilized. Impact of infrastructure and capital goods are excluded from the analysis.

**Source of Electricity**

The electricity data modelled for the production processes is taken from Ecoinvent 3.11 dataset that represents medium voltage electricity production in Türkiye with the reference year, 2021.The market consumption data for Türkiye is modified to exclude all the renewable sources as there is no 'secondary data' on the residual market mix for Türkiye. The modified dataset has GWP-GHG impact of 0.91 kg $CO_2$ eq. / kWh. The dataset consists of the following production percentages for electricity. Imported coal, 40.5%, Natural gas, 35%, Lignite 22.1 %, Hard Coal, 1.84%, Asphaltite 0.55% in production.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

| | Product stage | | | Distribution/ installation stage | | Use stage | | | | | | | End-of-life stage | | | | Beyond product life cycle |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| **Module** | **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| Modules declared | X | X | X | X | X | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |
| Geography | GLO | GLO | TR | GLO | UK | - | - | - | - | - | - | - | GLO | GLO | GLO | GLO | GLO |
| Share of primary data | 48.1% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | <10% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | 0% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |

X= Declared Modules, ND= Not Declared Modules, GLO= Global, TR = Türkiye, UK= United Kingdom

| Process | Source type | Source | Reference year | Data category | Share of primary data, of GWP-GHG results for A1-A3 |
|---|---|---|---|---|---|
| Manufacturing of product | Collected data | EPD owner | 2024 | Primary data | 37.6% |
| Transport of materials | Collected data | EPD owner | 2024 | Primary data | 10.5% |
| Other processes | Databases | Ecoinvent v3.11 | 2019–2024 | Secondary data | 0% |
| Total share of primary data, of GWP-GHG results for A1-A3 | | | | | 48.1% |

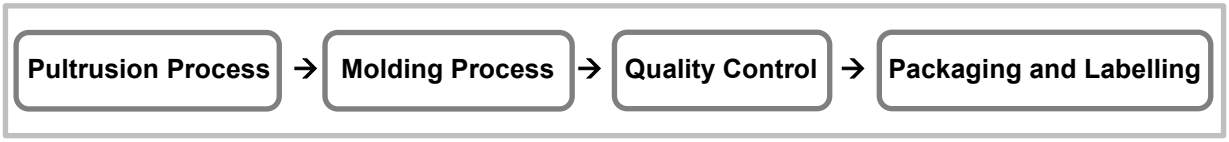
# SYSTEM BOUNDARY DESCRIPTION

**A1 – Raw Material Supply**

This stage includes raw materials extraction and pre-treatments before its use in manufacturing. The effects of raw materials such as epoxy resin, epoxy hardener, basalt fiber roving, PP etc. were evaluated at this stage.

**A2 – Raw Material Transport**
Transport information of the raw materials is provided by the manufacturer. The distances and routes are calculated accordingly.

**A3 – Manufacturing**
The product is manufactured through a continuous pultrusion process combining basalt fibre and epoxy resin, followed by cutting to length and molding of polymer end pieces. The manufacturing stage includes the following processes as shown in the production flow diagram below:




**A4 – Product Transport**
Product transport from manufacturer to customer is considered in product material supply stage. The distances and routes are calculated accordingly. Depending on the customer's location, product is transported via trucks and other supplies come through seaway.

**A5 – Installation**
The installation of the BF-BFR ties is manual and has negligible environmental impact. Therefore, installation is excluded from the system boundary, and only the end-of-life treatment of packaging materials is included in this stage.

**C1 - Deconstruction**
This stage includes the demolition or deconstruction of the discarded product from the sites. Based on the relevant PCR, 10 kWh diesel use per ton of product is assumed.

**C2- Transport**
This stage covers the transportation-related impacts of the discarded product. Since end of life transportation distances for the discarded product cannot be obtained, generic assumption from the PCR, 80 km average distance with Euro 5 lorry and 50% load factor is assumed.

**C3 - Waste Processing**
Any waste processing for the discarded product is included in this stage. Total of 2.6 kWh diesel consumption per tonne of product for loading and unloading at the sorting facility and for other treatments is considered.

**C4 - Disposal**
The product is assumed to be disposed of by 100% landfilling. Recycling or energy recovery is not considered due to the composite material composition.

**D- Reuse, Recovery, Recycling Potential**
No benefits or loads beyond the system boundary are declared.

## ENVIRONMENTAL PERFORMANCE

# LCA results of the product(s) - main environmental performance results

## Mandatory impact category indicators according to EN 15804

*The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).*

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP-total | kg $CO_2$ eq. | 3.99E+00 | 1.51E-01 | 1.25E-03 | 3.41E-03 | 1.27E-02 | 8.86E-04 | 4.41E-02 | 0.00E+00 |
| GWP-fossil | kg $CO_2$ eq. | 3.90E+00 | 1.51E-01 | 1.25E-03 | 3.41E-03 | 1.27E-02 | 8.86E-04 | 4.41E-02 | 0.00E+00 |
| GWP-biogenic | kg $CO_2$ eq. | 6.08E-03 | 5.49E-05 | 1.69E-07 | 1.71E-07 | 4.35E-07 | 4.44E-08 | 1.31E-07 | 0.00E+00 |
| GWP-luluc | kg $CO_2$ eq. | 8.86E-02 | 2.65E-06 | 9.66E-08 | 1.40E-07 | 1.98E-07 | 3.65E-08 | 8.90E-06 | 0.00E+00 |
| ODP | kg CFC 11 eq. | 1.55E-07 | 3.47E-09 | 1.01E-11 | 5.18E-11 | 2.85E-10 | 1.35E-11 | 2.63E-10 | 0.00E+00 |
| AP | mol $H^+$ eq. | 1.70E-02 | 4.46E-04 | 1.08E-05 | 3.15E-05 | 3.17E-05 | 8.18E-06 | 1.27E-04 | 0.00E+00 |
| EP-freshwater | kg P eq. | 2.09E-03 | 8.19E-07 | 4.17E-07 | 2.84E-08 | 6.46E-08 | 7.39E-09 | 7.14E-05 | 0.00E+00 |
| EP-marine | kg N eq. | 4.44E-03 | 1.01E-04 | 6.11E-06 | 1.48E-05 | 1.20E-05 | 3.86E-06 | 9.06E-04 | 0.00E+00 |
| EP-terrestrial | mol N eq. | 3.49E-02 | 1.11E-03 | 5.82E-05 | 1.63E-04 | 1.31E-04 | 4.23E-05 | 3.85E-04 | 0.00E+00 |
| POCP | kg NMVOC eq. | 1.34E-02 | 5.38E-04 | 1.42E-05 | 4.85E-05 | 5.27E-05 | 1.26E-05 | 3.11E-04 | 0.00E+00 |
| ADP-minerals&metals* | kg Sb eq. | 4.35E-07 | 3.91E-09 | 2.68E-10 | 1.19E-10 | 3.27E-10 | 3.10E-11 | 2.28E-09 | 0.00E+00 |
| ADP-fossil* | MJ | 6.29E+01 | 2.07E+00 | 6.63E-03 | 4.45E-02 | 1.67E-01 | 1.16E-02 | 2.53E-01 | 0.00E+00 |
| WDP* | $m^3$ | 7.40E+00 | 1.64E-03 | 5.32E-04 | 5.61E-05 | 1.32E-04 | 1.46E-05 | -1.62E-01 | 0.00E+00 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | |

** Disclaimer: 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.*

## Additional mandatory and voluntary impact category indicators

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP-GHG[1] | kg $CO_2$ eq. | 3.99E+00 | 1.51E-01 | 1.25E-03 | 3.41E-03 | 1.27E-02 | 8.86E-04 | 4.41E-02 | 0.00E+00 |
| *Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017* | | | | | | | | | |

## Resource use indicators

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 7.95E+00 | 5.09E-03 | 9.60E-01 | 9.71E-05 | 4.16E-04 | 2.52E-05 | 4.23E-03 | 0.00E+00 |
| PERM | MJ | 9.59E-01 | 0.00E+00 | -9.59E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PERT | MJ | 8.91E+00 | 5.09E-03 | 8.00E-05 | 9.71E-05 | 4.16E-04 | 2.52E-05 | 4.23E-03 | 0.00E+00 |
| PENRE | MJ | 6.34E+01 | 2.07E+00 | 9.31E-03 | 4.45E-02 | 1.67E-01 | 1.16E-02 | 2.53E-01 | 0.00E+00 |
| PENRM | MJ | 2.68E-03 | 0.00E+00 | -2.68E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT | MJ | 6.34E+01 | 2.07E+00 | 6.63E-03 | 4.45E-02 | 1.67E-01 | 1.16E-02 | 2.53E-01 | 0.00E+00 |
| SM | kg | 7.37E-02 | 1.09E-06 | 2.59E-07 | 8.96E-08 | 8.61E-08 | 2.33E-08 | 9.37E-06 | 0.00E+00 |
| RSF | MJ | 6.98E-03 | 8.54E-08 | 4.07E-08 | 1.55E-08 | 7.13E-09 | 4.04E-09 | 1.16E-06 | 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 |
| FW | $m^3$ | 5.40E-01 | 4.00E-05 | 1.24E-05 | 1.35E-06 | 3.23E-06 | 3.51E-07 | -3.78E-03 | 0.00E+00 |
| Acronyms | 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 = Use of net fresh water | | | | | | | | |

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic $CO_2$ is set to zero.

## Waste indicators

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| Hazardous waste disposed | kg | 1.62E-01 | 8.54E-05 | 4.32E-04 | 4.68E-06 | 6.35E-06 | 1.22E-06 | 3.39E-04 | 0.00E+00 |
| Non-hazardous waste disposed | kg | 1.27E+01 | 6.68E-03 | 7.61E-02 | 1.60E-04 | 5.39E-04 | 4.15E-05 | 2.70E+00 | 0.00E+00 |
| Radioactive waste disposed | kg | 5.81E-05 | 1.23E-07 | 1.04E-09 | 2.08E-09 | 1.01E-08 | 5.40E-10 | 7.42E-08 | 0.00E+00 |

## Output flow indicators

| Indicator | Unit | A1-A3 | A4 | A5 | 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 |
| Material for recycling | 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 |
| 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 |
| 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 |
| 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 |

## Additional LCA results (other environmental performance results) of the product(s)

The analyzed reference product is selected based on the production volume and corresponds to BF-BFR product with a diameter of 7 mm and length of 375 mm. While the diameter and installation length may vary under different application conditions, such variations have only a limited influence on the overall environmental performance, as the life cycle assessment is based on a declared unit of 1 kg of product rather than a single piece.

Therefore, the table below illustrates the indicative range of results across the product group, considering both minimum and maximum configurations.

| LCA result of one declared unit product (A-C) | Unit | Min | Max |
|---|---|---|---|
| GWP-total | kg $CO_2$ eq. | -0.26 % | +2.29 % |
| GWP-fossil | kg $CO_2$ eq. | -0.15 % | +1.59 % |
| GWP- biogenic | kg $CO_2$ eq. | -0.12 % | -1.1 % |
| GWP-luluc | kg $CO_2$ eq. | +0.8 % | -27.65 % |
| ODP | kg CFC 11 eq. | +13.41 % | +71.48 % |
| AP | mol H+ eq. | +1.14 % | -3.14 % |
| EP-freshwater | kg P eq. | +1.90% | -5.45 % |
| EP- marine | kg N eq. | +1.68 % | -8.65 % |
| EP-terrestrial | mol N eq. | +0.95 % | -3.48 % |
| POCP | kg NMVOC eq. | -3.16 % | +10.86 % |
| ADP-minerals & metals* | kg Sb eq. | +4.51 % | -11.61 % |
| ADP-fossil* | MJ | -5.16 % | +16.08 % |
| WDP* | $m^3$ | +9.11 % | -25.65 % |

## ABBREVIATIONS

| Abbreviation | Definition |
|---|---|
| **General Abbreviations** | |
| EN | European Norm (Standard) |
| EPD | Environmental Product Declaration |
| EF | Environmental Footprint |
| GPI | General Programme Instructions |
| ISO | International Organization for Standardization |
| LCA | Life Cycle Assessment |
| PCR | Product Category Rules |
| c-PCR | Complementary Product Category Rules |
| CEN | European Committee for Standardization |
| CLC | Co-location centre |
| CPC | Central product classification |
| GHS | Globally harmonized system of classification and labelling of chemicals |
| GRI | Global Reporting Initiative |
| **Environmental Impact Indicators (EN 15804)** | |
| GHG | Greenhouse gas |
| GWP | Global Warming Potential (kg $CO_2$ eq.) |
| GWP-fossil | Global Warming Potential from fossil sources (kg $CO_2$ eq.) |
| GWP-biogenic | Global Warming Potential from biogenic sources (kg $CO_2$ eq.) |
| GWP-luluc | Global Warming Potential from land use and land use change (kg $CO_2$ eq.) |
| GWP-total | Total Global Warming Potential (kg $CO_2$ eq.) |
| GWP-GHG | Global Warming Potential for greenhouse gases (kg $CO_2$ eq.) |
| ODP | Ozone Depletion Potential (kg CFC-11 eq.) |
| AP | Acidification Potential (mol $H^+$ eq.) |
| EP | Eutrophication Potential |
| EP-freshwater | Freshwater eutrophication potential (kg P eq.) |
| EP-marine | Marine eutrophication potential (kg N eq.) |
| EP-terrestrial | Terrestrial eutrophication potential (mol N eq.) |
| POCP | Photochemical Ozone Creation Potential (kg NMVOC eq.) |
| ADP | Abiotic Depletion Potential |
| ADP-minerals&metals | Abiotic depletion potential for non-fossil resources (kg Sb eq.) |
| ADP-fossil | Abiotic depletion potential for fossil resources (MJ) |
| WDP | Water Deprivation Potential ($m^3$) |
| **Resource Use Indicators** | |
| PERE | Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ) |
| PERM | Use of renewable primary energy resources used as raw materials (MJ) |
| PERT | Total use of renewable primary energy resources (MJ) |
| PENRE | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ) |
| PENRM | Use of non-renewable primary energy resources used as raw materials (MJ) |
| PENRT | Total use of non-renewable primary energy resources (MJ) |
| SM | Use of secondary material (kg) |
| RSF | Use of renewable secondary fuels (MJ) |
| NRSF | Use of non-renewable secondary fuels (MJ) |
| FW | Use of net fresh water ($m^3$) |
| Waste Indicators | |
| HW | Hazardous Waste (disposed) (kg) |
| NHW | Non-Hazardous Waste (disposed) (kg) |
| RW | Radioactive Waste (disposed) (kg) |
| **Output Flow Indicators** | |
| CFR | Components for Reuse (kg) |
| MR | Material for Recycling (kg) |

| | |
|---|---|
| MER | Materials for Energy Recovery (kg) |
| EEE | Exported Energy, Electricity (MJ) |
| EET | Exported Energy, Thermal (MJ) |
| **Lifecycle Stages / Modules** | |
| A1 | Raw material supply |
| A2 | Transport |
| A3 | Manufacturing |
| A4 | Transport to site |
| A5 | Construction/Installation |
| B1 | Use |
| B2 | Maintenance |
| B3 | Repair |
| B4 | Replacement |
| B5 | Refurbishment |
| B6 | Operational energy use |
| B7 | Operational water use |
| C1 | Deconstruction/Demolition |
| C2 | Transport to waste processing |
| C3 | Waste processing |
| C4 | Disposal |
| D | Reuse-Recovery-Recycling potential |
| **Other Relevant Terms** | |
| SVHC | Substances of Very High Concern |
| EC No. | European Community Number |
| CAS No. | Chemical Abstracts Service Number |
| MJ | Megajoule |
| kg | Kilogram |
| $m^3$ | Cubic Meter |
| NMVOC | Non-Methane Volatile Organic Compounds |
| Sb eq. | Antimony Equivalents |
| P eq. | Phosphorus Equivalents |
| N eq. | Nitrogen Equivalents |
| CFC-11 eq. | Chlorofluorocarbon-11 Equivalents |
| $CO_2$ eq. | Carbon Dioxide Equivalents |
| kg C | Kilograms of Carbon |
| kg $CO_2$ eq. | Kilograms of Carbon Dioxide Equivalent |
| ND | Not Declared |

# REFERENCES

**EN 15804:2012+A2:2019+AC:2021** Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

**PCR 2019:14 (ver. 2.0.1)** Construction products

**ISO 14040:2021** “Environmental management - Life cycle assessment - Principles and framework”.

**ISO 14044:2018** “Environmental management - Life cycle assessment - Requirements and guidelines”.

**ISO 14025:2006** “Environmental labels and declarations - Type III environmental declarations - Principles and procedures”.

**General Program Instructions of International EPD System**, (Ver. 5.0.1) 2025-02-27 “General Programme Instructions for International EPD System”.

**Ecoinvent database** (v3.11) - www.ecoinvent.org

**Composite connections** www.compositeconnections.com

**Metsims** www.metsims.com

# VERSION HISTORY

Original Version of the EPD, 2026-01-12

EPD
INTERNATIONAL EPD SYSTEM
www.environdec.com