

Fiberton A.Ş.



GRC-RIB

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with **EN 15804:2012+A2:2019/AC:2021** and **ISO 14025:2006** for GRC-RIB manufactured by Fiberton A.Ş.

| | |
|---------------------------------|-------------------------------|
| Product Name: | GRC-RIB |
| Programme: | The International EPD® System |
| Programme Operator: | EPD International AB |
| Licensee: | EPD Türkiye |
| EPD Registration Number: | EPD-IES-0021475 |
| Version Date: | 2025-04-22 |
| Validity Date: | 2030-04-21 |
| Geographical Scope: | Global |



An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

PROGRAMME INFORMATION

Programme Operator: The International EPD® System

Address: EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden

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CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):

PCR 2019:14 Construction products, version 1.3.4, Construction products EN

15804:2012+A2:2019/AC:2021 Sustainability of Construction Works

UN CPC Code: 37560, "Other articles of cement, concrete, or artificial stone"

PCR review was conducted by: The Technical Committee of the International EPD® System.

Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be

contacted via the Secretariat, www.environdec.com/contact.

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third party individual verifier: Stephen Forson, ViridisPride Ltd.

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

LCA practitioners

Yıldırım Yılmaz, MSc. & Isıl Atalay Sirt, MSc. – Metsims Sustainability Consulting

Fiberton A.Ş. has the sole ownership, liability, and responsibility for this EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025

HOW TO READ THIS EPD

An Environmental Product Declaration (EPD) is an ISO Type III Environmental Declaration based on ISO 14025 standard. An EPD transparently reports the environmental performance of products or services from a lifecycle perspective. The preparation of an EPD includes different stages, from acquiring raw materials to the end of life of the final product/service. EPDs are based on international standards and consider the entire value chain. Additionally, EPD is a third-party verified document. This EPD includes several sections described below.

1. General and Program Information

The first part of an EPD has information about the name of the manufacturer and product/service and other general information such as the validity and expiration dates of the document, the name of the program operator, geographical scope, etc. The second page states the standards followed and gives information about the program operator, third-party verifier, etc. The followed Product Category Rule (PCR) is indicated on the second page.

2. Company and Product/Service Information

Information about the company and the investigated product is given in this section. It summarizes the characteristics of the product provided by the manufacturer. It also includes information about the product such as product composition and packaging.

3. LCA Information

LCA information is one of the most important parts of the EPD as it describes the functional/declared unit, time representativeness of the study, database(s) and LCA software, along with system boundaries. The table presented in this part has columns for each stage in the life cycle. The considered stages are marked 'X' whereas the ones that are not considered are labeled as 'ND'. Not all EPDs consider the full life cycle assessment for a product's entire life stages. The 'System Boundary' page is also the place where one can find detailed information about the stages and the assumptions made.

4. LCA Results

The results of the Life Cycle Assessment analysis are presented in table format. The first column in each table indicates the name of the impact category and their measurement units are presented in the second column. These tables show an amount at each life cycle stage to see the impact of different indicators on different stages. Each impact can be understood as what is released through the production of the declared unit of the material—in this case, 1 tonne of GRC-Rib panel. The benefits of reuse/recycling of the declared product is reflected in this section.

The first impact in the table is global warming potential (GWP), which shows how much CO₂ is released at each stage. Other impacts include eutrophication potential, acidification potential, ozone layer depletion, land use related impacts, etc. The second table provides results for resource use and the third table is about the waste produced during the production. The fourth and final table shows the results for the GWP-GHG indicator, which is almost equivalent to the GWP-Total indicator mentioned previously. The only difference is that this indicator excludes the biogenic carbon content by following a certain methodology.

ABOUT FIBERTON A.Ş.

Owner of the EPD: Fiberton A.Ş.

Production site: Sariibrahimli, Kızılyaka Mevki No:71, 33100 Akdeniz/Mersin/Türkiye

About

Fiberton A.Ş. has over 20 years of industry experience, with a team of engineers, technicians, and other employees who are experts in their respective fields. Our Mersin factory, located in an area with optimal climate, logistics, and raw material availability for GRC/UHPC production, offers world-class products with exceptional quality and high manufacturing capacity.

The manufacturing facility is strategically located 3 km and 70 km from two key high-quality Portland cement manufacturers in Türkiye. The Çukurova region, essential for GRC/UHPC production, possesses the richest and highest quality silica sites in the country. Consequently, the region hosts Türkiye's most significant glass factories. Mersin, with one of the largest ports in the country, provides excellent logistics opportunities. It is the most critical logistical base for sea, land, and rail transportation. As a result, Fiberton A.Ş. products can be transported quickly and efficiently to all regions of Türkiye and the world.

Also, its quality, occupational health and environmental awareness are certified with ISO 9001:2015 quality management, OHSAS 18001:2007 occupational health and safety and 14001:2015 environmental management system.



ABOUT THE PRODUCT

Product Name: GRC - Rib

Glass Fiber Reinforced Concrete (GFRC/GRC) is an advanced composite material that integrates high-quality Portland cement, pozzolanic industrial byproducts as cement replacements, and carefully optimized silica sand with omnidirectionally woven alkali-resistant glass fiber reinforcement. This innovative combination allows for the production of thin and lightweight panels exhibiting exceptional physical properties.

The incorporation of glass fiber eliminates the need for reinforcement, enabling the manufacture of facades as modular pieces that are both thin and light, facilitating efficient installation and finishing processes.

GFRC is highly formable, A1 class incombustible, and can be produced in a variety of colors, offering outstanding surface quality that accommodates diverse forms and textures.

GRC can be produced with supporting ribs made from the same material. The ribs are constructed from the same material and feature a hollow core. These supporting ribs ensure the dimensional stability of the panels and provide accommodation for fixing points. Rib-supported panels enable closer attachment to the structure.



The reduced thickness of these panels not only decreases material consumption but also enhances transport efficiency and eliminates the need for heavy machinery during installation.

Moreover, GFRC is a sustainable material, characterized by excellent durability, a long service life, low maintenance requirements, and minimal material usage, all while maintaining superior formability within a lightweight shell.

ABOUT THE PRODUCT

Fiberton manufactures GRC-Rib panels at its production facility in Mersin, Türkiye. The panels are produced in various shapes to meet customer demands and project-specific requirements. The declared unit for the Life Cycle Assessment (LCA) analysis is defined as the production of **1 tonne of GRC-Rib panel**.

The thickness of the panels commonly ranges from 10 to 40 mm and different thicknesses can also be selected based on the project requirements. As the thickness increases, the quantity of materials and energy required to produce an equivalent surface area of the product also increases. Therefore, the study uses a mass-based functional unit (1 tonne) to ensure consistency and comparability. The materials required for the production of the analyzed product are detailed in the table below.



| *Product components | Weight (%) | Post-consumer material weight- % | Biogenic material (kg C / declared unit) |
|---------------------|------------|----------------------------------|--|
| CEM II Cement | 40 - 42 | 0 | 0 |
| Agregates | 40 - 42 | 0 | 0 |
| Glass Fibre | 2 - 4 | 0 | 0 |
| Plasticizer | 0 - 1 | 0 | 0 |
| Acrylic Polymer | 0 - 1 | 0 | 0 |
| Water | 13 - 14 | 0 | 0 |
| Sum | 100 | 0 | 0 |

| Packaging components | Weight, kg | Weight - % (versus the product) | Biogenic material (kg C / declared unit) |
|----------------------|-------------|---------------------------------|--|
| Underlay (PE-based) | 6.0 | 0.6 | 0 |
| XPS | 5.0 | 0.5 | 0 |
| Structural Timber | 3.0 | 0.3 | 1.4 |
| Sum | 11.0 | 1.1 | 1.4 |

*Product composition is presented as percentages rather than specific weights to maintain confidentiality while transparently communicating the relative proportions of each component.

SYSTEM BOUNDARY

A1 - Raw Material Supply

This stage includes raw materials extraction and pre-treatment processes before production. Main materials used in the product are cement, sand, glass fibre, stainless steel, timber and others (such as plasticizers, pigments etc.). Environmental impacts of production of these materials are considered in this stage. Geographical scope is global.

A2 - Raw Material Transport

This stage is relevant for the delivery of raw materials to the production plant. Highway transport is the dominant mean of transport at this stage. In addition, seaway transportation is also utilized. Transport routes and distances are supplier-specific and provided by the manufacturer. Geographical scope is global.

A3 - Manufacturing

This stage includes impacts of each production step. The production starts with mixing cement, silica sand / limestone, and chemicals together. The mixture is cast into molds suitable for the project using a spray method adding glass fiber from the spray gun and cured in controlled environment. Quality control measures are applied during the production process to ensure the product's high strength and durability. Geographical scope is Türkiye.



SYSTEM BOUNDARY

A4 - Transport to Customer

This stage is relevant for the delivery of final product to the intended markets and customers. Highway, and seaway transportation are involved in this stage. The transport routes and distances are supplier-specific and provided by the manufacturer. Geographical scope is global.

C1 - De-construction/Demolition

This stage includes the impacts during the deconstruction, demolition of the repetitive ribbed GRC-GFRC panel from the building. Based on the study of (Akbarnezhad, A., & Xiao, J. 2017), 0.01 kWh of energy is assumed to be needed for the demolition of 1 kg product construction waste. Considering the weight of investigated product per declared unit, this equals total of 10 kWh of diesel consumption of the construction machinery. Geographical scope is global.

C2 - Waste Transport

This stage includes the transportation of discarded product to the waste processing/disposal area. All of the end-of-life product is assumed to be sent to the closest facilities without any loss. Thus, 100 km distance by lorry with Euro5 motor is assumed. Geographical scope is global.

C3 - Waste Processing

It is assumed that after the discarded product removed from the structure, it requires waste processing such as sorting etc. Impact of these waste processing are considered at this stage. Geographical scope is global.

C4 - Disposal

Since steel has high economic value and different end-of-life fate, the steel amount within the product is assumed to be treated differently than the rest of the product. According to the *JRC report, Annex C V.2.1, around 72% of the steel is assumed to be recycled and the rest is landfilled. For the rest of the product, after accounting for 10% collection and related losses, the remaining discarded concrete will be treated as waste concrete content. 10% is the collection loss rate. Considering that 10% will be lost, the remaining 90% was included in the EoL processes. The lost 10% was treated as 'landfill'. Geographical scope is global.

D - Reuse-Recovery-Recycling-Potential

The recycled amount of waste concrete can substitute the use of aggregate content for further concrete making processes. According to the Cement Sustainability Initiative (CSI), this substitution can be between 10 - 45%. In this study, 30% substitution is assumed. In addition, the benefit of using recycled steel content for further steel making processes is considered. These benefits are allocated accordingly.

* <https://publications.jrc.ec.europa.eu/repository/handle/JRC115959>

LCA INFORMATION

Declared Unit

1 tonne of GRC - Rib panel manufactured by Fiberton A.Ş.

System Boundary

Cradle to gate with options, modules C1-C4, module D and with optional modules (A1-A3 + A4 + C + D)

Cut-Off Rules

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).

Background Data

For all LCA modelling and calculation, Ecoinvent database (v3.10, EN15804 method) and SimaPro (v10) 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 for all the considered modules.

Period Under Review

The data collected for this LCA study is based on the company's production figures for the full calendar year of 2023.

Source of Electricity

The electricity data modelled for the production processes is taken from Ecoinvent 3.10 dataset that represents medium voltage electricity production in Türkiye with the reference year, 2021. The chosen dataset has GWP-GHG impact of 0.575 kg CO₂ eq. / kWh. The dataset consist the following production percentages for electricity. Coal, 37%, Hydro, 33%, Natural gas, 17%, Wind, 8%, Geothermal, 3%, Biogas, 1%, Other, 1%, Biomass, <1%.

Allocations

Energy consumption and raw material transportation were weighted according to 2023 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the total waste generation in 2023. Throughout the study, mass allocation is followed.

Assumptions

Upstream and downstream road transportation are assumed to be carried out with Euro5 motor vehicles with a size class of > 32 metric tonnes. Upstream sea transportation is assumed to be carried out via bulk carrier with 51,000 tonnes load capacity. Downstream sea transportation is assumed to be carried out via container ships with 43,000 tonnes load capacity. Transport distances are acquired through Google Maps. In addition, 100 km distance for the waste transport at C2 stage is assumed.

LCA INFORMATION

| | Product Stage | | | Construction Process Stage | | Use Stage | | | | | | | End of Life Stage | | | Benefits and Loads | |
|-----------------------------|---------------------|------------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|-----------------------------|------------|------------------|--------------------|----------|
| | Raw Material Supply | Transport | Manufacturing | Transport | Construction Installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational Energy Use | Operational Water Use | Deconstruction / Demolition | Transport | Waste Processing | | Disposal |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules Declared | X | X | X | X | ND | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |
| Geography | GLO | GLO | TR | GLO | - | | | | | | | GLO | GLO | GLO | GLO | GLO | |
| Specific Data Used | 31% | | | - | | | | | | | | | | | | | |
| Variation - Products | 0% | | | - | | | | | | | | | | | | | |
| Variation - Sites | 0% | | | - | | | | | | | | | | | | | |

LCA RESULTS

The LCA results provided below are for 1 tonne of F-UHPC panel. 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 this EPD should not be used without the consideration of Module C.

| Core environmental impact indicators (Mandatory) | Unit | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
|---|---|----------|----------|----------|----------|-----------|----------|-----------|
| GWP - Total | kg CO ₂ eq. | 6.84E+02 | 1.44E+01 | 3.38E+00 | 8.01E+00 | 1.21E+01 | 1.98E+00 | 1.15E-01 |
| GWP - Fossil | kg CO ₂ eq. | 6.81E+02 | 1.44E+01 | 3.38E+00 | 8.01E+00 | 1.21E+01 | 1.98E+00 | 1.17E-01 |
| GWP - Biogenic | kg CO ₂ eq. | 7.16E-01 | 5.83E-04 | 1.45E-04 | 9.19E-04 | 1.19E-02 | 1.23E-03 | -1.01E-03 |
| GWP - Luluc | kg CO ₂ eq. | 2.31E+00 | 4.14E-04 | 1.16E-04 | 2.31E-04 | 1.92E-02 | 9.72E-05 | -6.94E-04 |
| ODP | kg CFC-11 eq. | 4.09E-06 | 2.01E-07 | 5.32E-08 | 1.06E-07 | 1.75E-07 | 2.94E-08 | 8.35E-09 |
| AP | mol H+ eq. | 2.97E+00 | 2.24E-01 | 3.16E-02 | 2.10E-02 | 8.40E-02 | 1.80E-02 | 3.87E-03 |
| EP - Freshwater | kg P eq. | 2.91E-01 | 2.00E-04 | 2.76E-05 | 1.61E-04 | 3.42E-03 | 5.99E-05 | -2.50E-04 |
| EP - Marine | kg N eq. | 6.56E-01 | 5.82E-02 | 1.49E-02 | 7.60E-03 | 3.20E-02 | 8.20E-03 | 2.68E-03 |
| EP - Terrestrial | mol N eq. | 6.67E+00 | 6.45E-01 | 1.63E-01 | 8.29E-02 | 3.46E-01 | 8.97E-02 | 2.99E-02 |
| POCP | kg NMVOC | 2.06E+00 | 1.81E-01 | 4.84E-02 | 3.14E-02 | 1.06E-01 | 2.71E-02 | 8.58E-03 |
| *ADPE | kg Sb eq. | 8.47E-03 | 5.31E-07 | 1.41E-07 | 4.69E-07 | 9.90E-07 | 7.84E-08 | -4.09E-08 |
| *ADPF | MJ | 6.63E+03 | 1.84E+02 | 4.45E+01 | 1.05E+02 | 1.69E+02 | 2.55E+01 | 2.07E+00 |
| *WDP | m ³ depriv. | 1.81E+02 | 2.10E-01 | 5.79E-02 | 1.48E-01 | -1.96E+01 | 3.63E-02 | -1.62E+01 |
| Additional environmental impact indicators (Mandatory) | | | | | | | | |
| **GWP-GHG | kg CO ₂ eq. | 6.84E+02 | 1.44E+01 | 3.38E+00 | 8.01E+00 | 1.21E+01 | 1.98E+00 | 1.15E-01 |
| Additional environmental impact indicators (Optional) | | | | | | | | |
| PM | disease inc. | 1.92E-05 | 7.99E-07 | 9.07E-07 | 6.58E-07 | 9.26E-06 | 5.07E-07 | 2.17E-06 |
| ***IR | kBq U-235 eq. | 1.24E+01 | 3.11E-02 | 9.47E-03 | 1.60E-02 | 3.22E-01 | 6.49E-03 | -7.07E-02 |
| *ETP-FW | CTUe | 1.96E+03 | 2.84E+00 | 4.42E-01 | 2.18E+00 | 4.65E+01 | 5.25E-01 | -1.16E+00 |
| *HTP - C | CTUh | 5.15E-07 | 1.68E-09 | 2.37E-10 | 6.85E-10 | 3.31E-09 | 4.33E-10 | -1.06E-09 |
| *HTP - NC | CTUh | 7.52E-06 | 7.80E-08 | 3.38E-09 | 6.60E-08 | 8.74E-08 | 2.71E-09 | -2.71E-09 |
| *SQP | Pt | 2.76E+03 | 5.51E-01 | 9.44E-02 | 4.31E-01 | 7.31E+01 | 3.01E+01 | -8.00E+00 |
| Acronyms | GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality. | | | | | | | |
| Legend | A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, C1: Demolition, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Future reuse, recycling or energy recovery potentials | | | | | | | |

LCA RESULTS

| Indicators describing resource use (Mandatory) | Unit | A1-A3 | A4 | C1 | C2 | C3 | C4 | D |
|--|---|----------|----------|----------|----------|-----------|----------|-----------|
| PERE | MJ | 1.36E+03 | 3.26E-01 | 9.97E-02 | 1.72E-01 | 4.79E+00 | 1.20E-01 | -8.10E-01 |
| PERM | MJ | 4.03E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PERT | MJ | 1.40E+03 | 3.26E-01 | 9.97E-02 | 1.72E-01 | 4.79E+00 | 1.20E-01 | -8.10E-01 |
| PENRE | MJ | 6.18E+03 | 1.84E+02 | 4.45E+01 | 1.05E+02 | 1.69E+02 | 2.55E+01 | 2.07E+00 |
| PENRM | MJ | 4.48E+02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT | MJ | 6.63E+03 | 1.84E+02 | 4.45E+01 | 1.05E+02 | 1.69E+02 | 2.55E+01 | 2.07E+00 |
| SM | kg | 1.73E-01 | 1.03E-04 | 8.01E-05 | 7.85E-05 | 2.23E-03 | 5.16E-05 | -1.36E-03 |
| RSF | MJ | 2.27E+01 | 8.70E-06 | 1.59E-05 | 7.23E-06 | 1.79E-04 | 9.78E-06 | -6.07E-06 |
| NRSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | m ³ | 4.62E+00 | 5.04E-03 | 1.40E-03 | 3.54E-03 | -4.53E-01 | 8.81E-04 | -3.78E-01 |
| Acronyms | PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water. | | | | | | | |
| Environmental information describing waste categories (Mandatory) | Unit | | | | | | | |
| HWD | kg | 3.53E+01 | 4.07E-02 | 4.81E-03 | 3.35E-02 | 3.07E-01 | 1.22E-02 | -5.20E-02 |
| NHWD | kg | 1.61E+03 | 1.08E+00 | 1.62E-01 | 8.45E-01 | 6.36E+02 | 3.03E-01 | -1.27E+00 |
| RWD | kg | 3.06E-03 | 7.34E-06 | 2.27E-06 | 3.80E-06 | 7.80E-05 | 1.56E-06 | -1.73E-05 |
| Environmental information describing output flow (Mandatory) | Unit | | | | | | | |
| CRU | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR | kg | 2.47E-01 | 4.17E-06 | 1.14E-06 | 2.92E-06 | 2.70E+02 | 7.23E-07 | -4.11E-06 |
| MER | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE (Electric) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE (Thermal) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acronyms | HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy thermal. | | | | | | | |
| *Disclaimer 1 | 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 experience with the indicator. | | | | | | | |
| **Disclaimer 2 | GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO ₂ is set to zero. | | | | | | | |
| ***Disclaimer 3 | This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator. | | | | | | | |

REFERENCES

Akbarnezhad, A., & Xiao, J. (2017). Estimation and Minimization of Energy Consumption in Demolition of Buildings. Journal of Cleaner Production, 166, 1037–1045

Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental Product Declarations – Core rules for the product category of construction products

European Commission – Joint Research Centre. (2020). Annex C: End-of-Life formulas and parameters (Version 2.1, May 2020). Part of the Product Environmental Footprint Category Rules (PEFCR) Guidance for the Product Environmental Footprint (PEF) method, developed under the European Commission's PEF initiative. JRC Technical Reports. <https://publications.jrc.ec.europa.eu/repository/handle/JRC115959>

GPI/ General Programme Instructions of the International EPD® System. Version 4.0.

ISO 9001:2015/ Quality Management Systems

ISO 50001:2018/ Energy Management Systems

ISO 14020:2000/ Environmental Labels and Declarations – General principles

ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations – Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

PCR for Construction Products and Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 1.3.4.

SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

www.fiberton.com

www.metsims.com

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Programme operator & Licensee

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