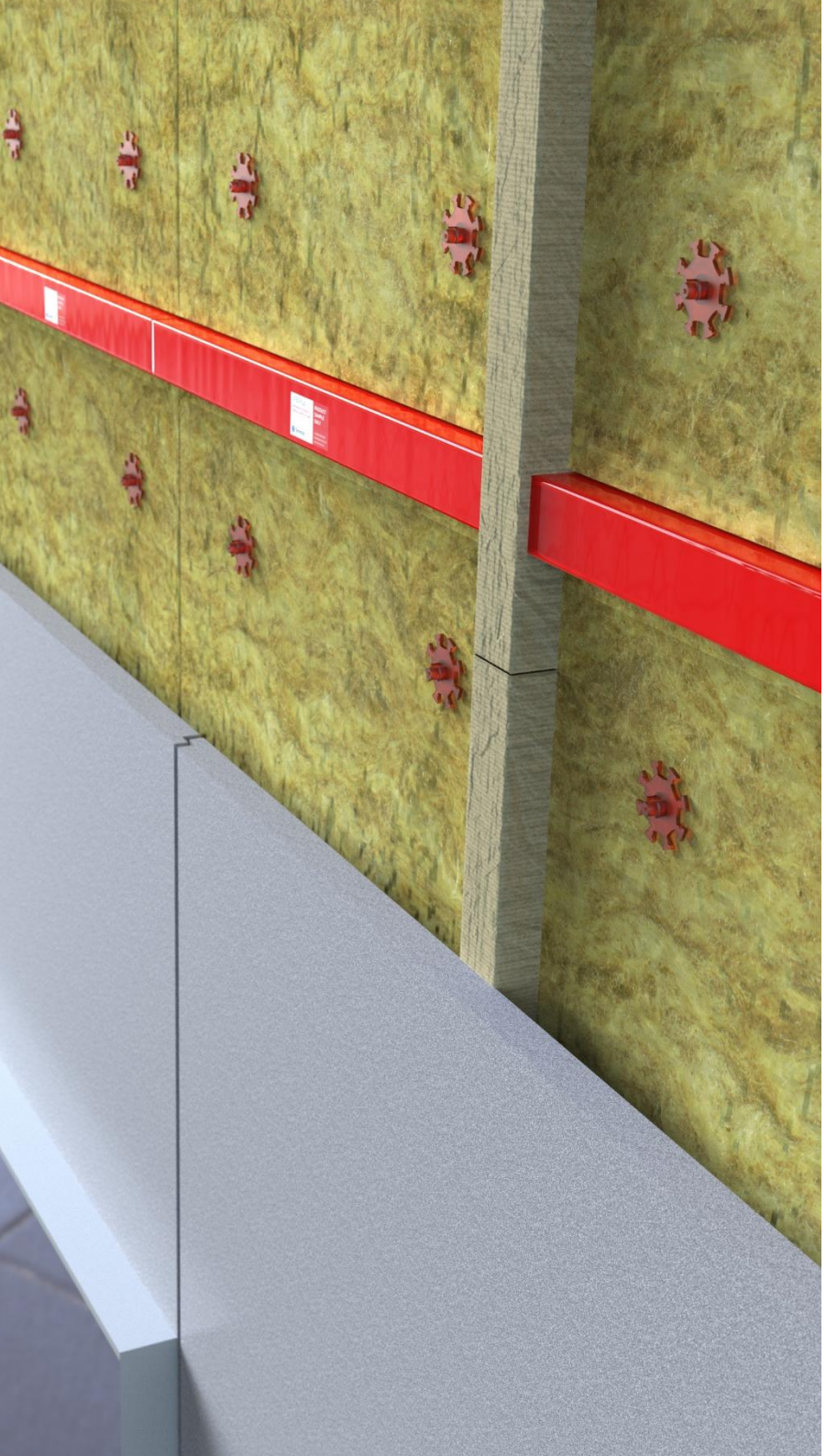


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

FF102/50 Ventilated Cavity Barrier
Tenmat Limited

EPD HUB, HUB-2489
Published on 28.02.2025, last updated on 28.02.2030

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Tenmat Limited
Address	Frank Perkins Way, Northbank Industrial Park, Greater Manchester, GB
Contact details	fpsales@tenmat.com
Website	www.tenmat.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle-to-gate with options, modules A4-A5, modules C1–C4, module D
EPD author	James Ginty, Technical Lead, Tenmat Ltd.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Lucas Rodrigue, as an authorized verifier acting for EPD Hub Limited.

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	FF102/50 Ventilated Cavity Barrier
Additional labels	This also covers the FF102/25 Ventilated Cavity Barrier as well as the VFB Plus, VFB 120/120 VFB Vertical and VFB Horizontal ranges in their entirety.
Product reference	-
Place of production	Northbanks Industrial Park, Frank Perkins Way, Irlam, M44 5EW, United Kingdom
Period for data	October 2023-October 2024
Averaging in EPD	Multiple Products
Variation in GWP-fossil for A1-A3	+19.2/-39.9 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	1.34E+00
GWP-total, A1-A3 ($kgCO_2e$)	1.20E+00
Secondary material, inputs (%)	0.21
Secondary material, outputs (%)	6.55
Total energy use, A1-A3 (kWh)	7.56
Net freshwater use, A1-A3 (m^3)	0.01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Tenmat is a leading manufacturer of advanced materials and components and has been for over 100 years.

PRODUCT DESCRIPTION

Tenmat's FF102/50, Ventilated Cavity Fire Barriers, are manufactured from a low smoke zero halogen high expansion intumescent material.

They are designed to reinstate fire resisting performance to external wall cavities that are required to be ventilated (open-state) in non-fire conditions. The FF102/50 is manufactured from a rigid intumescent material allowing it to be provided in a strip format, it is also covered with a protective layer of aluminium foil for ease of handling. The products hold 3rd Party Certification after having undergone extensive fire testing following the principles of BS EN1363-1 and in accordance with ASFP TGD19 (Fire Resistance Test for 'Open-State' Cavity Barriers.

In the event of a fire the FF102/50 intumescent strips will expand to close the external wall cavity, providing effective fire resistance, for integrity and insulation for up to 120 minutes depending upon the construction of the external walls. The FF102/50 is designed for use within cavities of up to 50mm and once installed will close the remaining free air gap in front of the 6mm cavity barrier of up to a maximum of 44mm (depending on construction type). No active maintenance required, where alterations are made around the product it should be checked visually to ensure that the product is still installed as per the approved original design and fitting instructions at the time of original installation.

Further information can be found at www.tenmat.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	20	United Kingdom
Minerals	70	United Kingdom, Europe
Fossil materials	5	Europe
Bio-based materials	5	Europe

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate.

Biogenic Carbon Content was derived from the formula:

GWPbiogenic × Quantity × 12/44

For the Biogenic Carbon Content in the product, using the GWPbiogenic from the results table gives:

0.0699 × 1 × 12/44=0.0191

For the Biogenic Carbon Content in the packaging, using the GWPbiogenic from the results table gives:

0.0734 × 1 × 12/44=0.02

Biogenic carbon content in product, kg C	0.0191
Biogenic carbon content in packaging, kg C	0.02

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	kg
Mass per declared unit	1 kg
Functional unit	-
Reference service life	>60 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
×	×	×	MND	MND	MND	MND	MND	MND	MND	MND	MND	×	×	×	×	×		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

FF102/50 Ventilated Cavity Barriers primarily consist of a mineral wool matrix with intumescent graphite dispersed throughout. Binders and minerals are added to provide strength in normal conditions and during a fire scenario and this strip is then encased within a heat-conductive aluminium foil. The VFB Plus series of products features these strips attached to a mineral wool slab and wrapped in a polythene sleeve. For VFB 120/120 products, a reduced size version of FF102/50 is attached to a mineral wool slab, with the foil wrapping removed, before being wrapped in a polythene sleeve.

The intumescent material is manufactured entirely at the ISO9001&ISO14001 approved Tenmat, Irlam site in Greater Manchester and the raw materials are sourced from across the UK and Europe. The raw materials are dispersed in water, before being aligned on a porous felt conveyor. Excess water is drained off and the material is laminated to thickness. The material proceeds to the drying ovens and is cut into strips when dry. An automated process is used to apply the foil wrapping where necessary. The intumescent strips and mineral wool slabs are joined together by a shrink-wrapping process. The product may be supplied with metal brackets, depending on the final dimensions and best practice as outlined in the tested fire approval process.

Mass balance analysis shows that 95% of raw material that enters the factory leaves as finished product across the site. Energy in the process is used in the form of electricity to drive machinery and natural gas, which is used in the drying process. Water is used as a dispersion medium for the wet forming process and is filtered and recycled on site before being released to drain. The products are packaged in cardboard containers which are shipped to customers on a wooden pallet.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

All distances to customers within the UK were calculated by using Google Maps to determine road distance with an average transport distance of 330km. For customer locations outside of the UK a relevant transportation scenario was derived and products were assumed to travel to the capitals of regions. Although these assumptions may impact the final result, transport to the building site is a much smaller proportion of total emissions compared to the material and manufacturing modules (A1-A3) and the share of product sold outside the UK makes up a minor fraction of total sales. Transport datasets have been used for EURO5 class lorries and container ships where appropriate. The datasets account for an average load factor for empty returns.

Installation into the building has been considered and modelled appropriately (A5) accounting for the energy consumption during installation, the use of additional fixtures such as galvanised screws where used and the disposal of packaging materials. Waste scenarios for the wood and cardboard used in packaging have been taken from Eurostat & PSR-0014 v2 (2023). As the products are provided to size and installed as a system, there is presumed to be a negligible loss of material in the installation phase that can be cut off.

PRODUCT USE AND MAINTENANCE (B1-B7)

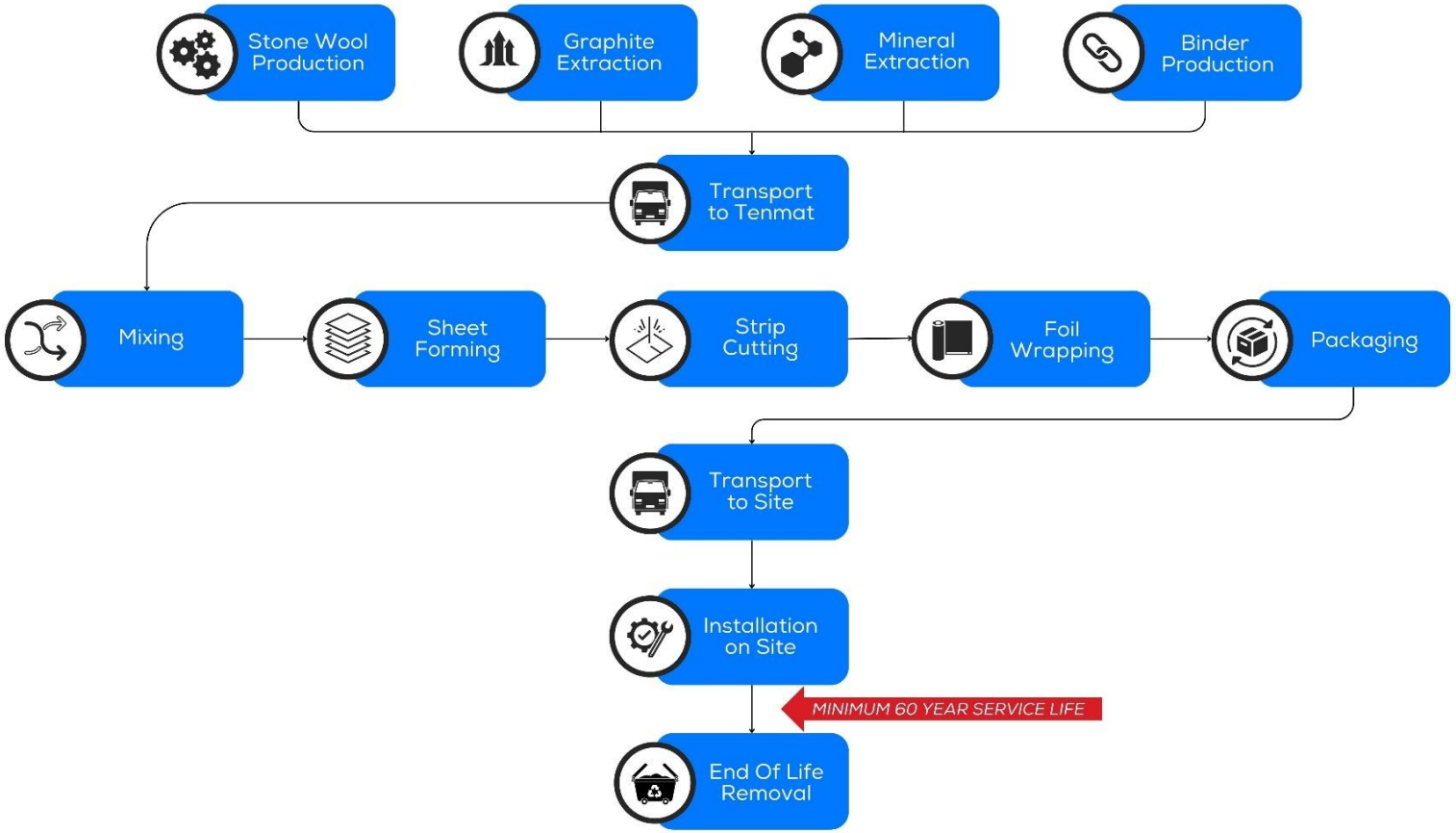
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

FF102/50, VFB120/120 and VFB Plus products have a service lifetime of over 60 years, making modelling for their end-of-life scenarios challenging. In accordance with best practice, the worst-case scenario has been assumed in which most of the product is sent to landfill where no energy or material recovery is undertaken. The exceptions to this are the metal products, which follow the end-of-life scenarios as defined in RICS WLCA, 2nd Edition, Table 23 Section 5.6.1. Disassembly is presumed to take 0.01 kWh of work. The sorting of waste metals is included in the selected datapoints. Module D accounts for benefits beyond the system scope, primarily the transfer of carbon in the recycling and reuse of the packaging and metal materials.

MANUFACTURING PROCESS

MODULAR DIAGRAM A1, A2, A3



MANUFACTURING PROCESS DESCRIPTION

The raw materials are transported to the Tenmat manufacturing site in Manchester by a combination of road and sea vehicles. Stone wool, intumescent graphite, mineral reinforcement and binders are combined in a wet mixing process to form a slurry. The slurry is formed into sheets using a vacuum process and these are dried in a gas fired oven.

The dried sheets are inspected for their reaction to fire properties in the Quality Control lab and then cut into strips using a panel saw. The strips are loaded into an automatic wrapper which encases the strip in foil.

When these strips are used to create VFBs, such as the VFB Plus range, the strip is affixed to a mineral wool bat. A shrink-wrapper is then used to encase the VFB in polythene wrapping.

The finished products are loaded into cardboard boxes and stacked on pallets. They are delivered either directly to construction sites or distribution warehouses by a combination of road and sea vehicles.

At site the products are installed using powered hand tools. The lifetime of the products has been tested as being equal to or greater than the expected working life of the buildings (60 years or greater) and the material does not require additional maintenance during this period.

LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	No allocation

AVERAGES AND VARIABILITY

Type of average	Multiple Products
Averaging method	Representative Product
Variation in GWP-fossil for A1-A3	+19.2/-39.9 %

The representative product used is the FF102/50 Ventilated Cavity Barrier. This is supplied as a foil wrapped intumescent strip with a mass per product of 0.5826kg. For the purpose of this EPD, all inputs have been scaled to 1kg of product.

LCAs of modules A1-A3 were carried out for the largest and smallest VFB 120/120 and VFB Plus products and the FF102/25 Ventilated Cavity Barrier. These are as follows:

- VFB 120/120 15x75x1000 mm 0.7715 kg
- VFB 120/120 475x75x1000 mm 11.3849 kg
- VFB Plus 16x75x1000 mm 0.7835 kg
- VFB Plus 456x75x1000 mm 11.2742 kg
- FF102/25 0.3366 kg

The VFB Horizontal and VFB Vertical products were also considered, functionally the results are identical to VFB 120/120 although this does not account for the additional rail pads that must be used in brickslip systems and only accounts for the cavity barrier product. Contact Tenmat directly to discuss the impacts to an LCA when using a brickslip system.

Due to the wide range in mass, these LCAs were also prepared using a Declared Unit of 1 kg. Comparison between these models show variance of

less than 50% from the representative product. The rationale for choosing the FF102/50 Ventilated Cavity Barrier as the representative product is due to its status as the base material. The VFB 120/120 and VFB Plus ranges could be considered modifications of the design, wherein the significant change is attaching the intumescent strip to a slab of mineral wool fibre. The variance seen is due to the lower carbon intensity of the mineral wool fibre slabs, resulting in a lower CO_2 e/kg per Declared Unit (1 kg) when using larger products for larger cavities. Likewise, the smallest VFB 120/120 and VFB Plus products feature a greater proportion of the more carbon intensive intumescent materials, as well as requiring additional energy due to processing. The product with the lowest GWP (VFB Plus 456x75x1000 mm) has a module A1-A3 GWP value 39.9% lower than the representative product. The representative product has a 19.2% lower GWP than the highest product (FF102/25).

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	4.80E-01	4.28E-02	6.79E-01	1.20E+00	1.32E-01	7.05E-02	MND	MND	MND	MND	MND	MND	MND	4.02E-03	4.83E-03	8.50E-03	7.67E-02	-3.72E-01
GWP – fossil	kg CO_2e	5.49E-01	4.28E-02	7.49E-01	1.34E+00	1.32E-01	8.80E-03	MND	MND	MND	MND	MND	MND	MND	4.01E-03	4.83E-03	8.50E-03	1.01E-02	-3.66E-01
GWP – biogenic	kg CO_2e	-6.99E-02	0.00E+00	-7.01E-02	-1.40E-01	0.00E+00	6.17E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	6.66E-02	7.80E-04
GWP – LULUC	kg CO_2e	4.56E-04	1.67E-05	1.63E-04	6.35E-04	5.12E-05	2.03E-05	MND	MND	MND	MND	MND	MND	MND	9.39E-06	1.78E-06	4.64E-06	1.02E-05	-7.01E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	2.51E-08	9.70E-09	9.51E-08	1.30E-07	2.97E-08	4.46E-10	MND	MND	MND	MND	MND	MND	MND	2.03E-10	1.11E-09	4.14E-10	3.07E-09	-2.59E-08
Acidification potential	mol H^+e	3.94E-03	2.24E-04	2.01E-03	6.18E-03	5.91E-04	5.01E-05	MND	MND	MND	MND	MND	MND	MND	2.29E-05	2.04E-05	3.21E-05	8.53E-05	-3.06E-03
EP-freshwater[2)]	kg Pe	1.50E-05	3.45E-07	3.47E-05	4.99E-05	1.08E-06	9.18E-07	MND	MND	MND	MND	MND	MND	MND	4.26E-07	3.95E-08	1.97E-07	1.57E-07	-1.22E-05
EP-marine	kg Ne	5.84E-04	6.39E-05	7.57E-04	1.40E-03	1.72E-04	6.82E-06	MND	MND	MND	MND	MND	MND	MND	3.04E-06	6.08E-06	3.81E-06	2.91E-05	-3.48E-04
EP-terrestrial	mol Ne	7.32E-03	7.06E-04	6.62E-03	1.46E-02	1.90E-03	7.69E-05	MND	MND	MND	MND	MND	MND	MND	3.45E-05	6.70E-05	4.56E-05	3.20E-04	-3.92E-03
POCP ("smog")[3)]	kg NMVOCe	2.27E-03	2.15E-04	1.40E-03	3.89E-03	5.89E-04	2.12E-05	MND	MND	MND	MND	MND	MND	MND	9.46E-06	2.14E-05	1.33E-05	9.26E-05	-1.40E-03
ADP-minerals & metals[4)]	kg Sbe	7.15E-06	1.10E-07	1.39E-06	8.64E-06	3.69E-07	5.81E-06	MND	MND	MND	MND	MND	MND	MND	3.69E-08	1.13E-08	4.05E-07	3.40E-08	-2.36E-06
ADP-fossil resources	MJ	9.43E+00	6.33E-01	1.40E+01	2.41E+01	1.94E+00	2.47E+00	MND	MND	MND	MND	MND	MND	MND	8.50E-02	7.25E-02	5.68E-02	2.33E-01	-3.45E+00
Water use[5)]	m^3e depr.	3.54E-01	2.79E-03	3.58E-01	7.15E-01	8.59E-03	4.90E-03	MND	MND	MND	MND	MND	MND	MND	2.26E-03	3.24E-04	1.32E-03	1.45E-03	-1.48E-01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. 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.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	3.78E-08	4.51E-09	1.22E-08	5.45E-08	1.34E-08	2.38E-10	MND	MND	MND	MND	MND	MND	MND	7.49E-11	5.56E-10	5.27E-10	1.71E-09	-3.76E-08
Ionizing radiation[6]	kBq U235e	2.72E-02	3.00E-03	1.14E-01	1.44E-01	9.16E-03	4.89E-03	MND	MND	MND	MND	MND	MND	MND	2.28E-03	3.45E-04	6.11E-04	1.12E-03	-1.65E-02
Ecotoxicity (freshwater)	CTUe	1.15E+01	5.68E-01	1.01E+01	2.22E+01	1.76E+00	1.64E-01	MND	MND	MND	MND	MND	MND	MND	5.78E-02	6.52E-02	2.11E-01	1.86E-01	-1.10E+01
Human toxicity, cancer	CTUh	9.64E-10	1.50E-11	2.72E-10	1.25E-09	4.64E-11	4.87E-12	MND	MND	MND	MND	MND	MND	MND	1.89E-12	1.60E-12	5.83E-12	7.33E-12	-4.14E-10
Human tox. non-cancer	CTUh	1.14E-08	5.50E-10	4.13E-09	1.61E-08	1.70E-09	1.41E-10	MND	MND	MND	MND	MND	MND	MND	6.22E-11	6.46E-11	2.55E-10	1.16E-10	-1.53E-08
SQP[7]	-	1.19E+01	6.46E-01	8.51E+00	2.11E+01	1.86E+00	3.46E-02	MND	MND	MND	MND	MND	MND	MND	1.54E-02	8.36E-02	5.99E-02	5.68E-01	-5.08E-01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	1.42E+00	7.11E-03	1.74E+00	3.17E+00	2.22E-02	3.92E-01	MND	MND	MND	MND	MND	MND	MND	1.69E-02	8.17E-04	7.75E-03	4.05E-03	-2.49E+00
Renew. PER as material	MJ	5.72E-01	0.00E+00	6.17E-01	1.19E+00	0.00E+00	-8.24E-01	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	-5.45E-01	1.24E-02
Total use of renew. PER	MJ	1.99E+00	7.11E-03	2.36E+00	4.36E+00	2.22E-02	-4.33E-01	MND	MND	MND	MND	MND	MND	MND	1.69E-02	8.17E-04	7.75E-03	-5.41E-01	-2.48E+00
Non-re. PER as energy	MJ	9.43E+00	6.33E-01	1.40E+01	2.40E+01	1.94E+00	2.66E+00	MND	MND	MND	MND	MND	MND	MND	8.48E-02	7.25E-02	5.68E-02	2.34E-01	-3.45E+00
Non-re. PER as material	MJ	6.93E+00	0.00E+00	-2.94E-01	6.64E+00	0.00E+00	-3.62E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	-6.60E+00	2.86E-03
Total use of non-re. PER	MJ	1.64E+01	6.33E-01	1.37E+01	3.07E+01	1.94E+00	2.63E+00	MND	MND	MND	MND	MND	MND	MND	8.48E-02	7.25E-02	5.68E-02	-6.37E+00	-3.45E+00
Secondary materials	kg	2.08E-03	1.86E-04	1.11E-02	1.34E-02	5.83E-04	1.80E-02	MND	MND	MND	MND	MND	MND	MND	8.66E-06	2.01E-05	3.53E-05	8.47E-05	2.48E-02
Renew. secondary fuels	MJ	4.66E-04	1.95E-06	1.47E-02	1.52E-02	6.57E-06	1.72E-07	MND	MND	MND	MND	MND	MND	MND	7.07E-08	2.03E-07	1.30E-06	3.24E-06	-1.40E-05
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	8.67E-03	7.92E-05	5.07E-03	1.38E-02	2.42E-04	1.55E-04	MND	MND	MND	MND	MND	MND	MND	7.17E-05	9.39E-06	4.21E-05	2.50E-04	-1.27E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4.43E-02	8.56E-04	9.40E-02	1.39E-01	2.67E-03	6.75E-04	MND	MND	MND	MND	MND	MND	MND	3.05E-04	9.62E-05	8.31E-04	0.00E+00	-1.26E-01
Non-hazardous waste	kg	6.24E-01	1.38E-02	1.80E-01	8.17E-01	4.31E-02	4.30E-02	MND	MND	MND	MND	MND	MND	MND	1.94E-02	1.58E-03	4.67E-02	9.60E-01	-5.22E-01
Radioactive waste	kg	1.22E-05	4.23E-06	4.74E-05	6.38E-05	1.29E-05	1.32E-06	MND	MND	MND	MND	MND	MND	MND	6.15E-07	4.85E-07	2.12E-07	0.00E+00	-1.33E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	1.40E-03	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.30E-04	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	6.73E-02	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.80E-03	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	5.34E-01	4.23E-02	7.40E-01	1.32E+00	1.30E-01	1.86E-01	MND	MND	MND	MND	MND	MND	MND	3.97E-03	4.78E-03	8.46E-03	9.93E-03	-3.64E-01
Ozone depletion Pot.	kg CFC_{-11}e	2.24E-08	7.68E-09	8.04E-08	1.11E-07	2.35E-08	7.77E-09	MND	MND	MND	MND	MND	MND	MND	1.76E-10	8.80E-10	3.51E-10	2.44E-09	-2.62E-08
Acidification	kg SO_2e	3.24E-03	1.76E-04	1.44E-03	4.86E-03	4.60E-04	1.99E-03	MND	MND	MND	MND	MND	MND	MND	1.94E-05	1.59E-05	2.72E-05	6.46E-05	-2.56E-03
Eutrophication	kg PO_4^3e	8.90E-04	3.53E-05	5.42E-04	1.47E-03	1.01E-04	1.00E-04	MND	MND	MND	MND	MND	MND	MND	1.49E-05	3.62E-06	1.06E-05	2.07E-05	-5.87E-04
POCP (“smog”)	kg C_2H_4e	1.88E-04	6.36E-06	8.07E-05	2.75E-04	1.78E-05	1.10E-04	MND	MND	MND	MND	MND	MND	MND	7.95E-07	6.20E-07	1.26E-06	2.63E-06	-2.17E-04
ADP-elements	kg Sbe	7.06E-06	1.06E-07	1.36E-06	8.53E-06	3.59E-07	5.81E-06	MND	MND	MND	MND	MND	MND	MND	3.69E-08	1.10E-08	4.04E-07	3.28E-08	-2.36E-06
ADP-fossil	MJ	9.42E+00	6.33E-01	1.40E+01	2.41E+01	1.94E+00	2.47E+00	MND	MND	MND	MND	MND	MND	MND	8.48E-02	7.25E-02	5.68E-02	2.33E-01	-3.45E+00

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Lucas Rodriguez, as an authorized verifier acting for EPD Hub Limited.
28.02.2025