ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

COOL WOOD（Wood fireproof materials for 2-hour certification）
Shelter Co.,Ltd.

EPD HUB, HUB-3440
Published on 26.06.2025, last updated on 26.06.2025, valid until 25.06.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 Dec 2023) and JRC characterization factors EF 3.1.

Created with One Click LCA

一般情報 - GENERAL INFORMATION

メーカー

MANUFACTURER

メーカー名 Manufacturer	Shelter Co.,Ltd.
住所 Address	1-5-13 Matsuei, Yamagata-City, Yamagata Pref. 990-2473 Japan
問い合わせ先 Contact details	toiawase@shelter.inc
ウェブサイト Website	https://www.shelter.inc/

This EPD is intended for business-to-business and/or business-to-consumer communication. 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.

EPD 規格、スコープ、認証機関

EPD STANDARDS, SCOPE AND VERIFICATION

プログラムオペレータ Program operator	EPD Hub, hub@epdhub.com
参照規格 Reference standard	EN 15804+A2:2019 and ISO 14025
PCR PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
製品カテゴリ Sector	Construction product
EPD カテゴリ Category of EPD	Third party verified EPD
親 EPD 番号 Parent EPD number	-
EPD のスコープ Scope of the EPD	Cradle to gate with modules C1-C4, D
EPD 申請者 EPD author	Hiroyuki Adachi
EPD 検証 EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD 検証 EPD verifier	Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.

製品 - PRODUCT

製品名 Product name	COOL WOOD（Wood fireproof materials for 2-hour certification）
追加ラベル Additional labels	–
参照製品 Product reference	–
製造地 Place of production	209-1 Yonaza Higashi, Sagae-City, Yamagata Pref. 990-0525, Japan
データ取得年 Period for data	2024/02~2025/01
EPD 平均化 Averaging in EPD	No averaging
A1-A3 の GWP-fossil 変動率 Variation in GWP-fossil for A1-A3 (%)	–

環境影響データ概要 - ENVIRONMENTAL DATA SUMMARY

宣言単位 Declared unit	1m3
宣言単位あたりの質量 Declared unit mass	580,16 kg
GWP-fossil, A1-A3 (kgCO2e) GWP-fossil, A1-A3 (kgCO2e)	2,92E+02
GWP-total, A1-A3 (kgCO2e) GWP-total, A1-A3 (kgCO2e)	-4,35E+02
副資材の投入(%) Secondary material, inputs (%)	0,12
副資材のアウトプット(%) Secondary material, outputs (%)	37,6
エネルギー使用量計, A1-A3 (kWh) Total energy use, A1-A3 (kWh)	1690
水使用量計、A1-A3 (m3) Net fresh water use, A1-A3 (m3)	3,91

製品とメーカー-PRODUCT AND MANUFACTURER

メーカーの概要 - ABOUT THE MANUFACTURER

Shelter Co.,Ltd. seeks to serve as the world's frontrunner in advanced wooden structural technology, and has done so since its establishment in 1974. Owing to our focus on smart innovation, Shelter offers state-of-the-art infrastructure technology for "Creating a Timber City that promises to have a targeted impact on preventing global warming. The synergistic effect of Japan's first metal joinery hardware construction method, the KES system (Kimura Excellent Structure System), and the world's first 3-hour fire-resistant wooden material COOL WOOD has enabled Shelter to realize large-scale, high-rise wooden structures. Moreover, our adoption of Asia's first state-of-the-art 3D woodworking machine has made FREE STYLE WOOD (curved and twisting wooden materials) commercially viable through three-dimensional design and machining. Uniquely artistic buildings can be created by giving shape to virtually any architectural designs that can be imagined. With offices in Yamagata and Tokyo, Shelter has developed a "win-win business model by collaborating with contractors in each area to provide its technology nationwide.

製品説明 - PRODUCT DESCRIPTION

COOL WOOD®(Certified by the Minister of Land, Infrastructure, Transport and Tourism, Japan) is the fireproof structural wood member developed and patented by our company. It covers the wood in the core with gypsum board; the gypsum board is subsequently covered with an extra layer of wood. Production of COOL WOOD is straightforward and it has a low cost. By concealing the fire-resistant members with decorative wood, the appearance of the wood is not compromised.

[Specifications]
Two-hour fireproof structural specification : Column
The cross-sectional dimensions of internal load bearing material wood (mm) 150×150～3,000×3,000

- The intermediary fire stoppage layer material GB-F (V) 21mm x 3pcs.
- The surface material wood, 20 mm min.
- Patented in Japan, Canada and Switzerland

[Features]

- All tree species can be chosen for the surface layer
- JAS(Japanese Agricultural Standards)-certified materials, incombustible, quasi-incombustible, flame-retardant treated lumber can also be used
- Easy to process (can be manufactured in easily obtainable materials and special tools are unnecessary)

Further information can be found at https://www.shelter.inc/.

主な原材料構成 - PRODUCT RAW MATERIAL MAIN COMPOSITION

原材料カテゴリ Raw material category	量、質量 - % Amount, mass- %	原材料源 Material origin
金属 Metals	0.27%	Japan
鉱物 Minerals	54.66%	Japan
化石原料 Fossil materials	4.47%	Japan
バイオマス原料 Bio-based materials	40.60%	Japan

生物起源 CO2 含有量 - BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

製品の生物起源 CO2 含有量、kg C Biogenic carbon content in product, kg C	198,45
梱包の生物起源 CO2 含有量、kg C Biogenic carbon content in packaging, kg C	-

機能単位と耐用年数 - FUNCTIONAL UNIT AND SERVICE LIFE

宣言単位 Declared unit	1m3
宣言単位あたりの質量 Mass per declared unit	580,16 kg
機能単位 Functional unit	-
参照耐用年数 Reference service life	-

化学物質、REACH 高懸念物質 - SUBSTANCES, REACH - VERY HIGH CONCERN

This product does not contain any substances listed on the Candidate List of Substances of Very High Concern (SVHC) in concentrations above 0.1% (w/w), as published by the European Chemicals Agency (ECHA) at the time of publication.

製品のライフサイクル - PRODUCT LIFE-CYCLE

システム境界 - 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		
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

製造と梱包 - 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.

This product is processed by reinforced gypsum board and surface wood onto laminated wood used as the core material. All materials used are procured domestically and delivered by truck to the Shelter pre-cut factory.

The main manufacturing processes are cutting and gluing. Gypsum board is glued to laminated wood, and surface wood is applied on top of the glued board to complete the process. For gypsum board gluing, it is fixed with staples as a supplement. Decorative wood is fixed with adhesive and finish nails.

The manufacturing process uses electricity to run various equipment such as processing machinery and handy electrical tools. Electric forklifts are used to move the components. Finished products are covered in polyethylene sheets and shipped. Sawdust and wood chips generated during the process are provided free of charge to the local community; therefore, transportation for the waste treatment is excluded in this study. Gypsum board scraps are disposed of as landfill waste.

The metal hardware necessary for connecting beams and columns is attached to this product, but since the specifications of the hardware vary from project to project and the shape varies depending on the structure and application, it is excluded from the scope of the calculation. The hardware is also excluded from the Minister of Land, Infrastructure, Transport and Tourism's certification as COOL WOOD (this product name).

輸送と据付 - 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.

This EPD excludes the A4-A5 stage. Therefore, packaging wastes are considered in the end-of-life stage.

製品使用とメンテナンス - PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD excludes the use stage.

Air, soil, and water impacts during the use phase have not been studied.

製品の廃棄・リサイクル段階 - PRODUCT END OF LIFE (C1-C4, D)

(C1-C2)

It is assumed that 0.00265 L/kg of diesel fuel will be consumed for demolition (C1). This scenario is based on Revised New Demolition Methods and Estimation published by Economic Research Association in April 2017. Transportation distance and methods to the treatment facilities (C2) are assumed to be 50km by a truck in all scenarios.

(C3-C4)

In this EPD, end-of-life scenarios are developed for each material categories.

Wooden materials:

At the end of its lifetime, a timber product can have several end of life scenario options. Because of the uncertainties surrounding waste disposal practices in the future, exact methods of disposal at the end of life is hard to determine. In this EPD, 92.1% of product wastes are assumed to be chipped for the future use as secondary material, 6.3% are assumed to be incinerated without energy recovery, and 1.6% are assumed to be landfilled. The scenario is based on the results of a Survey of construction by-products in 2018 published by the Ministry of Land, Infrastructure and Transport, with the assumption of no material recycled between construction sites.

Fire-resistant gypsum board:

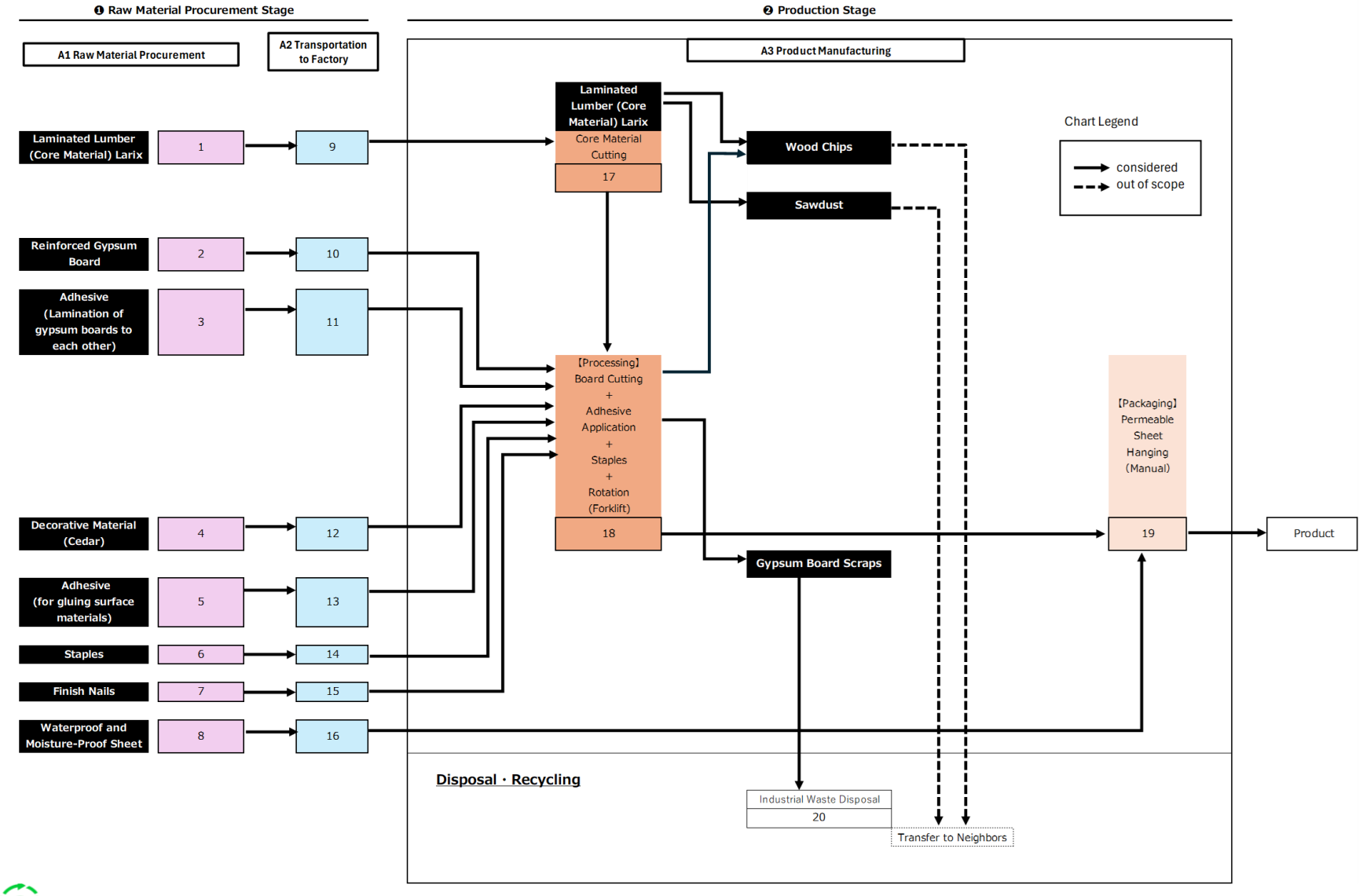
Assumed scenario for waste derived from the gypsum board is hard to identify in publicly available sources since this product is newly developed and certified after 2021. Therefore, the conservative approach is adopted in this category; All the wastes derived from gypsum boards are treated as landfill wastes.

As this EPD does not include A5 stage, packaging wastes are considered in the end-of-life stage.

Plastic wastes:

Plastic wastes are assumed to be 25% recycled, 63% incinerated with energy recovery, 7% incinerated without energy recovery, and 6% landfilled. This scenario is based on the survey report published by Japan Plastic Recycling and Reuse Association.

製造プロセス - MANUFACTURING PROCESS



ライフサイクルアセスメント - LIFE-CYCLE ASSESSMENT

カットオフ基準 - 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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

This EPD includes all raw materials, transportation, energy and manufacturing waste used in the manufacture of the product, and final disposal of the product. The use phase is excluded as there are no emissions or exchanges during use. It includes all processes from raw material procurement and processing, product manufacturing and end-of-life disposal.

データの検証- VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

配分、推定 - 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:

データタイプ - Data type	配分 - Allocation
原材料 - Raw materials	Allocated by mass or volume
梱包材 - Packaging materials	Allocated by mass or volume
補助材料 - Ancillary materials	Not applicable
製造エネルギーと廃棄物 - Manufacturing energy and waste	Allocated by mass or volume

製品と製造拠点のグループ化 - PRODUCT & MANUFACTURING SITES GROUPING

グループ化の種類 - Type of grouping	No grouping
グループ化方法 - Grouping method	Not applicable
A1-A3 における GWP-fossil の変動率 - Variation in GWP-fossil for A1-A3 (%)	-

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LCA ソフトウェアと参考文献 - 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. Ecoinvent v3.10.1 and One Click LCA databases were used as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

環境影響データ - ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

主な環境影響指標 - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

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	-5,00E+02	1,69E+01	4,75E+01	-4,35E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,88E+00	3,12E+00	6,91E+02	5,77E+01	-1,21E+01
GWP – fossil	kg CO_2e	2,28E+02	1,69E+01	4,75E+01	2,92E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,88E+00	3,12E+00	7,44E+00	1,24E+01	-1,20E+01
GWP – biogenic	kg CO_2e	-7,28E+02	0,00E+00	3,86E-04	-7,28E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	6,83E+02	4,53E+01	0,00E+00
GWP – LULUC	kg CO_2e	3,97E-01	7,35E-03	5,87E-03	4,10E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,02E-04	1,40E-03	3,23E-02	1,27E-02	-3,36E-02
Ozone depletion pot.	kg CFC_{-11}e	2,06E-05	2,45E-07	8,23E-07	2,17E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	9,00E-08	4,61E-08	5,72E-08	2,08E-07	-8,30E-08
Acidification potential	mol H^+e	1,58E+00	3,79E-02	7,33E-01	2,35E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,31E-02	1,06E-02	3,80E-02	1,12E+01	-7,37E-02
EP-freshwater[2)]	kg Pe	2,94E-02	1,31E-03	9,39E-03	4,01E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,70E-04	2,43E-04	2,70E-03	1,89E-03	-3,96E-03
EP-marine	kg Ne	3,57E-01	8,55E-03	3,95E-02	4,05E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,46E-02	3,50E-03	1,02E-02	4,04E-02	-1,47E-02
EP-terrestrial	mol Ne	4,10E+00	9,24E-02	4,12E-01	4,60E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,70E-01	3,81E-02	1,06E-01	2,73E-01	-1,54E-01
POCP (“smog”)[3)]	kg NMVOCe	1,15E+00	5,18E-02	1,63E-01	1,36E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,04E-02	1,57E-02	3,55E-02	7,63E-01	-4,99E-02
ADP-minerals & metals[4)]	kg Sbe	1,33E-02	5,52E-05	5,72E-05	1,34E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,11E-06	8,71E-06	9,54E-06	4,04E-05	-1,15E-05
ADP-fossil resources	MJ	3,08E+03	2,34E+02	6,14E+02	3,92E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,69E+01	4,53E+01	8,90E+01	1,86E+02	-1,33E+02
Water use[5)]	m^3e depr.	1,13E+02	1,04E+00	5,80E+00	1,20E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,92E-01	2,24E-01	1,47E+00	5,08E+00	-1,67E+00

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.

追加(オプション)の環境影響指標 - ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

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	1,91E-05	1,08E-06	1,02E-06	2,12E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,51E-06	3,13E-07	4,31E-07	9,65E-06	-1,01E-06
Ionizing radiation[6)]	kBq U235e	1,56E+01	1,92E-01	3,38E+00	1,92E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,41E-02	3,95E-02	5,43E-01	3,38E-01	-6,44E-01
Ecotoxicity (freshwater)	CTUe	6,69E+03	4,02E+01	1,22E+02	6,85E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,24E+00	6,41E+00	1,93E+01	1,09E+03	-2,83E+01
Human toxicity, cancer	CTUh	1,30E-07	2,64E-09	8,87E-09	1,42E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,05E-10	5,15E-10	1,66E-09	2,07E-08	-2,53E-09
Human tox. non-cancer	CTUh	3,90E-06	1,37E-07	2,91E-07	4,33E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	9,57E-09	2,93E-08	5,24E-08	1,56E-06	-7,63E-08
SQP[7)]	-	8,06E+02	1,21E+02	1,69E+02	1,10E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,39E+00	4,56E+01	6,07E+03	2,33E+02	-6,10E+03

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.

天然資源の利用 - 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	2,14E+03	3,38E+00	6,09E+01	2,20E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,87E-01	6,21E-01	-1,39E+03	-2,43E+02	1,32E+03
Renew. PER as material	MJ	6,84E+03	0,00E+00	0,00E+00	6,84E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-6,23E+03	-6,12E+02	0,00E+00
Total use of renew. PER	MJ	8,98E+03	3,38E+00	6,09E+01	9,04E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,87E-01	6,21E-01	-7,61E+03	-8,54E+02	1,32E+03
Non-re. PER as energy	MJ	3,03E+03	2,34E+02	6,09E+02	3,87E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,69E+01	4,53E+01	8,54E+01	1,85E+02	-1,33E+02
Non-re. PER as material	MJ	6,80E+01	0,00E+00	4,40E+00	7,24E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-7,74E+00	-6,47E+01	0,00E+00
Total use of non-re. PER	MJ	3,10E+03	2,34E+02	6,14E+02	3,95E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,69E+01	4,53E+01	7,77E+01	1,20E+02	-1,33E+02
Secondary materials	kg	6,65E-01	9,99E-02	8,07E-02	8,46E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,20E-02	1,93E-02	4,96E-02	7,21E-02	-5,26E-02
Renew. secondary fuels	MJ	8,38E-03	1,20E-03	3,53E-03	1,31E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,35E-05	2,45E-04	9,32E-04	9,37E-04	-3,68E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	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	3,81E+00	3,04E-02	7,65E-02	3,91E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,09E-03	6,70E-03	3,48E-02	-1,35E+00	-4,22E-02

8) PER = Primary energy resources.

廃棄・リサイクル段階 — 廃棄 - 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	1,21E+01	4,00E-01	2,59E+00	1,51E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,56E-02	7,68E-02	6,22E-01	1,45E+00	-9,42E-01
Non-hazardous waste	kg	2,97E+02	7,70E+00	1,40E+02	4,44E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,17E+00	1,42E+00	1,61E+01	1,99E+03	-1,85E+01
Radioactive waste	kg	1,02E-02	4,71E-05	7,36E-04	1,10E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,36E-06	9,66E-06	1,32E-04	8,28E-05	-1,54E-04

廃棄・リサイクル段階 — 出力フロー - 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	2,14E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,79E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,98E+01	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	6,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,38E+01	0,00E+00	0,00E+00

環境影響 - ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

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	2,24E+02	1,68E+01	4,73E+01	2,88E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	5,85E+00	3,11E+00	7,43E+00	1,23E+01	-1,20E+01
Ozone depletion Pot.	kg $CFC_{-11}e$	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acidification	kg SO_2e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Eutrophication	kg PO_4^3e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
POCP (“smog”)	kg C_2H_4e	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-elements	kg Sbe	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-fossil	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

検証報告 - VERIFICATION STATEMENT

本 EPD の検証プロセス - 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.

第三者検証報告 - 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.

Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.

26.06.2025