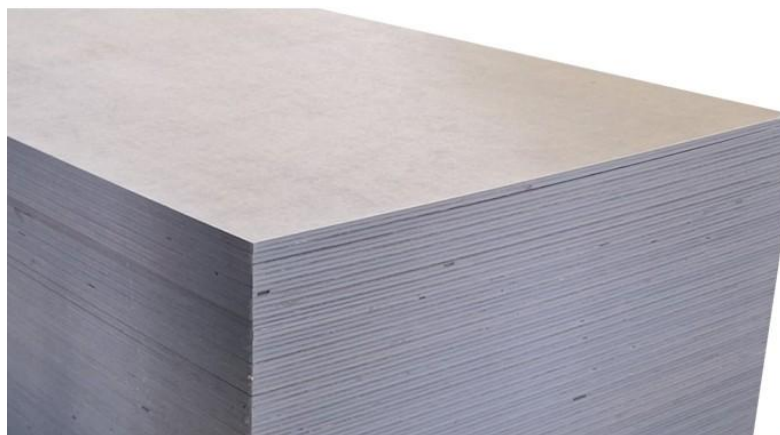




# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

FILM FACED PLYWOOD FOR CONCRETE FORMWORK  
NISSHIN CO.,LTD.



**EPD HUB, HUB-7292**

Published on 21.08.2026, last updated on 21.08.2026, valid until 20.08.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) 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<br>Manufacturer     | NISSHIN CO.,LTD.                                                    |
| 住所<br>Address             | 100 Nishikogyodanchi, Sakaiminato City, Tottori Prefecture          |
| 問い合わせ先<br>Contact details | nss@nisshin.gr.jp                                                   |
| ウェブサイト<br>Website         | <a href="https://www.nisshin.gr.jp/">https://www.nisshin.gr.jp/</a> |

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<br>Program operator | EPD Hub, hub@epdhub.com                                                                                                                                                            |
| 参照規格<br>Reference standard     | EN 15804:2012+A2:2019/AC:2021 , ISO 14025                                                                                                                                          |
| PCR<br>PCR                     | EPD Hub Core PCR Version 1.2, 24 Mar 2025                                                                                                                                          |
| 製品カテゴリ<br>Sector               | Construction product                                                                                                                                                               |
| EPD カテゴリ<br>Category of EPD    | Third party verified EPD                                                                                                                                                           |
| 親 EPD 番号<br>Parent EPD number  | -                                                                                                                                                                                  |
| EPD のスコープ<br>Scope of the EPD  | Cradle to gate with modules C1-C4, D                                                                                                                                               |
| EPD 申請者<br>EPD author          | Yasuhiro Kuramoto (NISSHIN HOLDINGS CO.,LTD. NS WOOD SCIENCE R&D CENTER)                                                                                                           |
| EPD 検証<br>EPD verification     | Independent verification of this EPD and data, according to ISO 14025:<br><input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification |
| EPD 検証者<br>EPD verifier        | Afzal khan Peerukhan as an authorized verifier for EPD Hub                                                                                                                         |

## 製品 - PRODUCT

|                                                                 |                                                                   |
|-----------------------------------------------------------------|-------------------------------------------------------------------|
| 製品名<br>Product name                                             | FILM FACED PLYWOOD FOR CONCRETE FORMWORK                          |
| 追加ラベル<br>Additional labels                                      | -                                                                 |
| 参照製品<br>Product reference                                       | -                                                                 |
| 原材料の原産地<br>Place(s) of raw material origin                      | Japan, Europe                                                     |
| 製造地<br>Place of production                                      | 100 Nishikogyodanchi, Sakaiminato City, Tottori Prefecture, Japan |
| 設置場所および使用場所<br>Place(s) of installation and use                 | Japan                                                             |
| データ取得期間<br>Period for data                                      | 2024/04/01-2025/03/31                                             |
| EPD 平均化<br>Averaging in EPD                                     | No grouping                                                       |
| A1-A3 の GWP-fossil 変動率<br>Variation in GWP-fossil for A1-A3 (%) | -                                                                 |
| 国際標準商品識別コード<br>Global Trade Item Number (GTIN)                  | -                                                                 |
| ノルウェー建築製品データベース<br>Norwegian Building Product Database (NOBB)   | -                                                                 |
| A1-A3 特定データ (%)<br>A1-A3 Specific data (%)                      | 65                                                                |

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

|                                               |                                                 |
|-----------------------------------------------|-------------------------------------------------|
| 宣言単位<br>Declared unit                         | 1m3 of Film faced plywood for concrete formwork |
| 宣言単位あたりの質量<br>Declared unit mass              | 500 kg                                          |
| 梱包材の質量<br>Mass of packing                     | 0.0208 kg                                       |
| GWP-fossil, A1-A3 (kgCO2e)                    | 355                                             |
| GWP-total, A1-A3 (kgCO2e)                     | -352                                            |
| 二次材料の投入 (%)<br>Secondary material, inputs (%) | 0.16                                            |
| エネルギー使用量計, A1-A3 (kWh)                        | 3970                                            |
| 水使用量計, A1-A3 (m3)                             | 2.95                                            |
| Net fresh water use, A1-A3 (m3)               |                                                 |

## 製品とメーカー

### - PRODUCT AND MANUFACTURER

#### メーカーの概要 - ABOUT THE MANUFACTURER

The Nisshin Group is a corporate group that engages in activities ranging from forestation, timber harvesting, procurement, and development and manufacturing of plywood and lumber products, to sales. Particularly in the manufacturing of plywood, which is essential for wooden house construction, the group holds approximately 30% of the domestic market share.

Nisshin Co., Ltd. operates six factories throughout the Chugoku-Shikoku region and Mie Prefecture, where it develops and manufactures high-quality and diverse plywood products.

#### 製品説明 - PRODUCT DESCRIPTION

Film faced plywood for concrete formwork is a plywood used as formwork into which concrete is poured.

#### Product Standards

Complies with various standards stipulated in the Japanese Agricultural Standard (JAS), including "bending rigidity tests," "adhesive strength tests," "formaldehyde emission tests," "flatwise tension tests," "alkali resistance tests," and "heat-cold cycle tests."

#### Technical and Functional Characteristics

- The surface of the plywood is processed with film overlay, complying with the JAS standard for "surface-treated concrete formwork plywood."
- A key feature is that knotholes inherent to softwood plywood are filled with putty and repaired, and the surface is processed with film overlay, which facilitates easy release of concrete from the formwork and results

in a smooth concrete finish.

- The material is manufactured from softwood, contributing to a reduction in the harvesting of tropical timber and helping to protect the natural environment and biodiversity in Southeast Asia and other regions.
- Compared to coating plywood for concrete formwork, the surface treatment offers higher durability and superior performance in terms of the number of repeated uses.

#### Technical Data

- Performance classification: For width-direction span use, for length-direction span use
- Adhesive durability: Phenolic resin adhesive is used, achieving the highest JAS classification of "Class 1" for water and moisture resistance.
- Low formaldehyde emissions: F☆☆☆ grade (highest grade).

#### Main Product Dimensions

- Thickness: 12 mm
- Width: 600 mm, 900 mm
- Length: 1,800 mm

Further information can be found at:

<https://www.nisshin.gr.jp/>

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

| 原材料カテゴリ<br>Raw material category | 量、質量 - %<br>Amount, mass- % | 原材料の原産地<br>Material origin |
|----------------------------------|-----------------------------|----------------------------|
| 金属<br>Metals                     | -                           | -                          |
| 鉱物<br>Minerals                   | 3                           | Japan                      |
| 化石原料<br>Fossil materials         | 9                           | Japan                      |

|                               |    |               |
|-------------------------------|----|---------------|
| 生物由来原料<br>Bio-based materials | 88 | Japan, Europe |
|-------------------------------|----|---------------|

### 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<br>Biogenic carbon content in product, kg C  | 196.428571 |
| 梱包材の生物起源 CO2 含有量、kg C<br>Biogenic carbon content in packing, kg C | 0          |

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

|                                      |                                                 |
|--------------------------------------|-------------------------------------------------|
| 宣言単位<br>Declared unit                | 1m3 of Film faced plywood for concrete formwork |
| 宣言単位あたりの質量<br>Mass per declared unit | 500 kg                                          |
| 機能単位<br>Functional unit              | -                                               |
| 参照耐用年数<br>Reference service life     | -                                               |

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

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

## 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             | ND             | ND       | ND        | ND          | ND     | ND          | ND            | ND                     | ND                    |  | 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<br>Recovery<br>Recycling |

Not declared = ND.

#### 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.

A market-based approach is used in modelling the electricity mix utilized in the factory.

This product is manufactured by peeling logs into veneers, bonding five or seven veneers together with adhesive with each layer's grain direction oriented perpendicular to the adjacent layers, filling knotholes on the surface with putty, and then applying a film overlay surface treatment.

#### ○Transportation of Raw Materials

Wood materials are sourced domestically within Japan and delivered to the factory by truck or vessel.

Film sheets are imported from Europe by vessel. Auxiliary materials such as adhesives and putty materials, as well as PP band packaging materials, are sourced domestically within Japan and transported by truck.

#### ○Manufacturing Process and Energy Consumption

The main manufacturing processes include log peeling, veneer drying, adhesive application, pressing, cutting, sanding, putty filling, and film overlay pressing. During the manufacturing process, electricity, light oil, LPG, and steam from a woody biomass boiler are used to operate each piece of equipment.

In addition, the Head Office Plant plans to introduce solar power generation facilities from 2026 as part of its efforts to transition to non-fossil energy sources.

#### ○Packaging Materials and Auxiliary Materials Included in the Assessment

Auxiliary materials include raw materials for adhesives (resin, wheat flour, sodium carbonate, calcium carbonate, and water), putty materials, and film sheets.

Packaging materials are limited to strapping bands for bundling loads, kept to the minimum necessary for product transportation.

#### ○Manufacturing By-products and Waste

Approximately 70% of the procured wood volume is converted into products, while the remaining approximately 30% of wood waste is

recycled for effective utilization. Of the wood waste, approximately 80% is used as fuel for the in-house woody biomass boiler, and the remaining approximately 20% is sold as wood chip fuel.

Waste generated from the factory includes adhesive residue and ash from the woody biomass boiler. These are transported by truck to waste treatment facilities located within the region where the factory is situated (within a 50 km radius). Treatment facilities are selected from those equipped with heat recovery incineration systems, cement solidification facilities, and composting facilities, with every effort made to maximize recycling.

### 輸送と設置 - TRANSPORT AND INSTALLATION (A4-A5)

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.

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

For demolition (C1), it is postulated that 0.00265L/kg of diesel fuel is consumed.

This scenario is based on "Revised New Demolition Work Estimation" issued by the Economic Research Association in April 2017.

The transport distance and method to processing facilities (C2) is postulated to be 50km by truck for all scenarios.

In this EPD, end-of-life (EOL) scenarios have been developed for each material category.

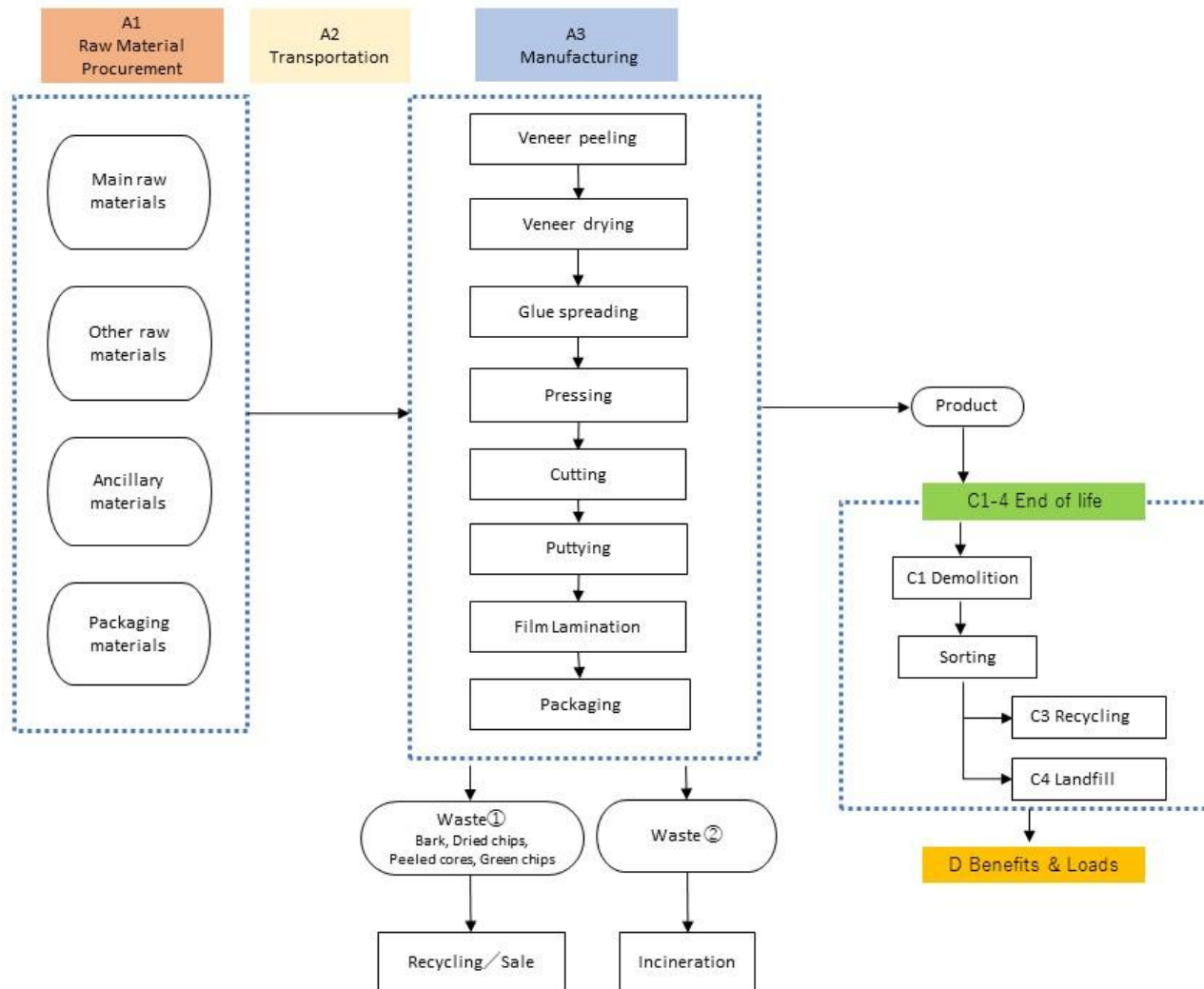
Wooden waste:

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 fuel, 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.

# 製造プロセス - SYSTEM DIAGRAM



# 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.

### 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.

Note on indicator consistency:

A technical inconsistency was identified between PENRT (total use of non-renewable primary energy resources) and ADP-fossil (abiotic

depletion potential for fossil resources) in modules A1-A3. The inconsistency was traced to a specific characterization factor contained in the background environmental profile of phenolic resin, which is a key raw material. These inconsistencies are inherent to the third-party verified EPDs and background databases used in the assessment and cannot be adjusted by the practitioner.

### 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                             | Physical Properties |
| 梱包材 - Packaging materials                       | Physical Properties |
| 補助材料 - Ancillary materials                      | Physical Properties |
| 製造エネルギーと廃棄物<br>- Manufacturing energy and waste | Physical Properties |

### 製品と製造拠点の平均化 - PRODUCT & MANUFACTURING SITES GROUPING

|                                                                       |                |
|-----------------------------------------------------------------------|----------------|
| 平均化の種類 - Type of grouping                                             | No grouping    |
| 平均化の方法 - Grouping method                                              | Not applicable |
| A1-A3 における GWP-fossil の変動率<br>- Variation in GWP-fossil for A1-A3 (%) | -              |

This EPD is product and factory specific and does not contain average calculations.

#### 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 for EPD Hub V3 and EPD Process Certification v3.2.5. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent v3.11 and One Click LCA databases were used as sources of environmental data. Allocation used in Ecoinvent 3.11 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, EF 3.1

| Impact category                     | Unit                   | A1        | A2       | A3       | A1-A3     | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1       | C2       | C3       | C4       | D         |
|-------------------------------------|------------------------|-----------|----------|----------|-----------|----|----|----|----|----|----|----|----|----|----------|----------|----------|----------|-----------|
| GWP – total <sup>1)</sup>           | kg CO <sub>2</sub> e   | -1.07E+03 | 4.97E+01 | 6.66E+02 | -3.52E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.10E+00 | 4.02E+00 | 6.28E+02 | 9.47E+01 | -1.49E+01 |
| GWP – fossil                        | kg CO <sub>2</sub> e   | 1.23E+02  | 4.97E+01 | 1.82E+02 | 3.55E+02  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.09E+00 | 4.02E+00 | 1.49E+01 | 5.75E-01 | -1.49E+01 |
| GWP – biogenic                      | kg CO <sub>2</sub> e   | -1.19E+03 | 1.51E-03 | 4.84E+02 | -7.07E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 9.70E-04 | 5.74E-08 | 6.13E+02 | 9.41E+01 | 0.00E+00  |
| GWP – LULUC                         | kg CO <sub>2</sub> e   | 1.09E+00  | 2.34E-02 | 6.26E-02 | 1.18E+00  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.22E-04 | 1.86E-03 | 6.71E-02 | 1.87E-04 | -6.72E-02 |
| Ozone depletion pot.                | kg CFC <sub>11</sub> e | 3.75E-06  | 6.71E-07 | 1.41E-06 | 5.83E-06  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 7.56E-08 | 5.34E-08 | 1.13E-07 | 7.62E-09 | -1.13E-07 |
| Acidification potential             | mol H <sup>+</sup> e   | 6.36E-01  | 3.51E-01 | 2.17E+00 | 3.16E+00  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.55E-02 | 1.84E-02 | 7.89E-02 | 5.69E-03 | -7.90E-02 |
| EP-freshwater <sup>2)</sup>         | kg Pe                  | 6.19E-02  | 4.78E-03 | 1.26E-01 | 1.93E-01  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.64E-04 | 4.46E-04 | 5.49E-03 | 2.87E-04 | -5.49E-03 |
| EP-marine                           | kg Ne                  | 1.99E-01  | 8.42E-02 | 7.85E-01 | 1.07E+00  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.12E-02 | 6.79E-03 | 2.09E-02 | 5.54E-03 | -2.09E-02 |
| EP-terrestrial                      | mol Ne                 | 1.84E+00  | 9.29E-01 | 8.54E+00 | 1.13E+01  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.32E-01 | 7.40E-02 | 2.18E-01 | 2.85E-02 | -2.18E-01 |
| POCP (“smog”) <sup>3)</sup>         | kg NMVOCe              | 6.41E-01  | 3.18E-01 | 2.15E+00 | 3.11E+00  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.94E-02 | 2.55E-02 | 7.26E-02 | 7.56E-03 | -7.27E-02 |
| ADP-minerals & metals <sup>4)</sup> | kg Sbe                 | 8.82E-04  | 1.49E-04 | 2.17E-04 | 1.25E-03  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.83E-06 | 1.32E-05 | 2.10E-05 | 1.18E-06 | -2.10E-05 |
| ADP-fossil resources                | MJ                     | 2.19E+03  | 6.71E+02 | 2.05E+03 | 4.91E+03  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.63E+01 | 5.65E+01 | 1.88E+02 | 6.27E+00 | -1.89E+02 |
| Water use <sup>5)</sup>             | m <sup>3</sup> e depr. | 8.63E+01  | 3.28E+00 | 3.36E+01 | 1.23E+02  | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.71E-01 | 3.17E-01 | 2.89E+00 | 1.14E+00 | -2.90E+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 PO<sub>4</sub>e; 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, EF 3.1

| 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 | 6.96E-06 | 3.05E-06 | 1.75E-05 | 2.75E-05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.30E-06 | 3.77E-07 | 9.08E-07 | 7.13E-08 | -9.09E-07 |
| Ionizing radiation <sup>6)</sup> | kBq U235e | 3.94E+00 | 5.08E-01 | 3.69E+00 | 8.14E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.82E-02 | 4.78E-02 | 1.13E+00 | 6.52E-03 | -1.14E+00 |
| Ecotoxicity (freshwater)         | CTUe      | 5.55E+03 | 7.19E+02 | 1.26E+04 | 1.89E+04 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.79E+01 | 6.54E+01 | 3.83E+02 | 1.45E+01 | -3.83E+02 |
| Human toxicity, cancer           | CTUh      | 7.46E-08 | 8.47E-09 | 8.96E-08 | 1.73E-07 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.19E-10 | 9.68E-10 | 3.07E-09 | 9.34E-10 | -3.08E-09 |
| Human tox. non-cancer            | CTUh      | 1.23E-06 | 3.68E-07 | 3.56E-06 | 5.16E-06 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 8.16E-09 | 3.87E-08 | 9.19E-08 | 6.29E-08 | -9.20E-08 |
| SQP <sup>7)</sup>                | -         | 8.15E+04 | 3.22E+02 | 2.31E+02 | 8.21E+04 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.39E+00 | 4.16E+01 | 1.24E+04 | 5.82E+00 | -1.24E+04 |

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 <sup>8)</sup> | MJ             | 7.57E+03 | 8.93E+00 | -5.78E+03 | 1.80E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.16E-01 | 8.11E-01 | -2.90E+03 | -6.69E+02 | 2.90E+03  |
| Renew. PER as material             | MJ             | 6.47E+03 | 0.00E+00 | 0.00E+00  | 6.47E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | -5.96E+03 | -5.11E+02 | -4.99E+03 |
| Total use of renew. PER            | MJ             | 1.40E+04 | 8.93E+00 | -5.78E+03 | 8.27E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.16E-01 | 8.11E-01 | -8.85E+03 | -1.18E+03 | -2.09E+03 |
| Non-re. PER as energy              | MJ             | 1.53E+03 | 6.71E+02 | 2.03E+03  | 4.23E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.63E+01 | 5.65E+01 | 1.88E+02  | 6.13E+00  | -1.89E+02 |
| Non-re. PER as material            | MJ             | 6.21E+02 | 0.00E+00 | 6.82E-01  | 6.22E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | -5.73E+02 | -4.92E+01 | 0.00E+00  |
| Total use of non-re. PER           | MJ             | 2.15E+03 | 6.71E+02 | 2.03E+03  | 4.85E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.63E+01 | 5.65E+01 | -3.85E+02 | -4.31E+01 | -1.89E+02 |
| Secondary materials                | kg             | 8.20E-01 | 2.98E-01 | 4.62E-01  | 1.58E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.74E-02 | 2.47E-02 | 1.04E-01  | 1.08E-02  | -1.04E-01 |
| Renew. secondary fuels             | MJ             | 3.93E-01 | 3.22E-03 | 8.26E+03  | 8.26E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 7.19E-05 | 3.20E-04 | 1.99E-03  | 4.65E-05  | -2.00E-03 |
| Non-ren. secondary fuels           | MJ             | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00  | 0.00E+00  |
| Use of net fresh water             | m <sup>3</sup> | 2.46E+00 | 8.35E-02 | 3.99E-01  | 2.95E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.25E-03 | 7.99E-03 | 6.65E-02  | -2.34E-02 | -6.66E-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   | 1.11E+01 | 1.43E+00 | 1.67E+01 | 2.93E+01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 7.44E-02 | 1.28E-01 | 1.35E+00 | 2.07E-01 | -1.35E+00 |
| Non-hazardous waste | kg   | 2.66E+02 | 2.70E+01 | 6.16E+02 | 9.08E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.08E+00 | 2.48E+00 | 2.77E+01 | 5.35E+01 | -2.77E+01 |
| Radioactive waste   | kg   | 9.66E-04 | 1.24E-04 | 8.95E-04 | 1.99E-03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.93E-06 | 1.17E-05 | 2.74E-04 | 1.62E-06 | -2.75E-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 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 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 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 4.60E+02 | 0.00E+00 | 0.00E+00 |
| Materials for energy rec      | kg   | 0.00E+00 | 0.00E+00 | 5.16E+02 | 5.16E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 1.19E-02 | 0.00E+00 | 0.00E+00 |
| Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 2.84E-01 | 0.00E+00 | 0.00E+00 |
| Exported energy – Electricity | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 4.27E-02 | 0.00E+00 | 0.00E+00 |
| Exported energy – Heat        | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00E+00 | 0.00E+00 | 2.41E-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 <sub>2</sub> e               | 1.23E+02 | 4.94E+01 | 1.82E+02 | 3.55E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.07E+00 | 4.00E+00 | 1.49E+01 | 1.03E+00 | -1.49E+01 |
| Ozone depletion Pot. | kg CFC <sub>11</sub> e             | 3.00E-06 | 5.39E-07 | 1.14E-06 | 4.68E-06 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.02E-08 | 4.30E-08 | 9.44E-08 | 6.26E-09 | -9.45E-08 |
| Acidification        | kg SO <sub>2</sub> e               | 4.92E-01 | 2.81E-01 | 1.62E+00 | 2.40E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.20E-02 | 1.37E-02 | 6.29E-02 | 4.00E-03 | -6.30E-02 |
| Eutrophication       | kg PO <sub>4</sub> <sup>3</sup> e  | 5.62E+00 | 4.11E-02 | 3.73E-01 | 6.04E+00 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 7.54E-03 | 3.44E-03 | 1.04E-02 | 1.70E-03 | -1.04E-02 |
| POCP (“smog”)        | kg C <sub>2</sub> H <sub>4</sub> e | 5.18E-02 | 1.73E-02 | 1.34E-01 | 2.03E-01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.40E-03 | 1.12E-03 | 5.23E-03 | 4.17E-04 | -5.23E-03 |
| ADP-elements         | kg Sbe                             | 8.09E-04 | 1.45E-04 | 2.07E-04 | 1.16E-03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.78E-06 | 1.29E-05 | 2.05E-05 | 9.95E-07 | -2.05E-05 |
| ADP-fossil           | MJ                                 | 2.13E+03 | 6.63E+02 | 1.99E+03 | 4.78E+03 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.59E+01 | 5.58E+01 | 1.71E+02 | 6.17E+00 | -1.71E+02 |

## 環境影響 - ENVIRONMENTAL IMPACTS – GWP-GHG

| Impact category       | Unit                 | A1       | A2       | A3       | A1-A3    | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1       | C2       | C3       | C4       | D         |
|-----------------------|----------------------|----------|----------|----------|----------|----|----|----|----|----|----|----|----|----|----------|----------|----------|----------|-----------|
| GWP-GHG <sup>9)</sup> | kg CO <sub>2</sub> e | 1.24E+02 | 4.97E+01 | 1.82E+02 | 3.56E+02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.09E+00 | 4.02E+00 | 1.49E+01 | 5.75E-01 | -1.49E+01 |

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide – were updated in line with the guidance. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO<sub>2</sub> is set to zero.

# シナリオドキュメント

## - SCENARIO DOCUMENTATION

### データソース - DATA SOURCES

### 製造エネルギーのシナリオドキュメント - Manufacturing energy scenario documentation

1. Heat production, untreated waste wood, at furnace 1000-5000 kW, World, Ecoinvent, 2.07 kgCO<sub>2</sub>e/kg
2. Diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO<sub>2</sub>e/MJ
3. Heat production, propane, at industrial furnace >100kW, World, Ecoinvent, 0.0919 kgCO<sub>2</sub>e/MJ
4. Electricity production, natural gas, conventional power plant, Japan, Ecoinvent, 0.75 kgCO<sub>2</sub>e/kWh
5. Electricity production, hard coal, Japan, Ecoinvent, 0.97 kgCO<sub>2</sub>e/kWh
6. Electricity production, oil, Japan, Ecoinvent, 0.88 kgCO<sub>2</sub>e/kWh

### 廃棄・リサイクル段階のシナリオドキュメント - End of life (C1-C4) -

#### Scenario documentation

| シナリオパラメータ - Scenario parameter                                                                | 値 - Value                  |
|-----------------------------------------------------------------------------------------------|----------------------------|
| 回収プロセス：分別回収 (kg)<br>Collection process: collected separately (kg)                             | 500.0208                   |
| 回収プロセス：混合廃棄物 (kg)<br>Collection process: Mixed waste (kg)                                     | -                          |
| 再生：再使用 (kg)<br>Recovery: re-use (kg)                                                          | -                          |
| 再生：リサイクル (kg)<br>Recovery: recycling (kg)                                                     | 460.0052                   |
| 再生：エネルギー回収 (kg)<br>Recovery: energy recovery (kg)                                             | 0.0119                     |
| 廃棄 (kg)<br>Disposal (kg)                                                                      | 40.0037                    |
| シナリオの前提条件（例：輸送 [手段、km] およびその他）<br>Scenario assumptions e.g. transportation (mode, km) & other | Transported 50 km by lorry |

## 検証報告

### - THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

#### Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Afzal khan Peerukhan as an authorized verifier for EPD Hub Limited  
21.08.2026

