

Owner: Thermocell Sales ApS
No.: MD-23180-EN
Issued: 03-10-2023
Valid to: 03-10-2028

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



FEELING
WOOD®

THERMO
CELL



Owner of declaration
Thermocell Sales ApS
Næssundvej 423
DK - 7960 Karby
DK 39628708



Issued:
03-10-2023

Valid to:
03-10-2028

Programme
EPD Danmark
www.epddanmark.dk



- Industry EPD
- Product EPD

Declared product(s)
FeelingWood

Number of declared datasets/product variations: 1

Production site
Næssundvej 423
DK - 7960 Karby

Product(s) use
Thermal insulation of wooden buildings and old brick buildings.

Declared/ functional unit
1 m²

Year of production site data (A3)
2022

EPD version
First edition

Basis of calculation

This EPD is developed in accordance with the European standard EN 15804+A2.

Comparability

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type

- Cradle-to-gate with modules C1-C4 and D
- Cradle-to-gate with options, modules C1-C4 and D
- Cradle-to-grave and module D
- Cradle-to-gate
- Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

- internal
- external

Third party verifier:

Guangli Du

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)

| Product | | | Construction process | | Use | | | | | | | | End of life | | | | Beyond the system boundary |
|---------------------|-----------|---------------|----------------------|----------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-------------|------------------|----------|--|----------------------------|
| Raw material supply | Transport | Manufacturing | Transport | Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Re-use, recovery and recycling potential | |
| 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 | |

Product information

Product description

The main product components are shown in the table below.

| Material | Weight-% of declared product |
|-----------------------|------------------------------|
| Wood fibers | 78 |
| Ammonia polyphosphate | 12 |
| Al-Adhesion | 10 |

Product packaging:

The composition of the sales- and transport packaging of the product is shown in the table below.

| Material | Weight-% of packaging |
|--------------|-----------------------|
| Polyethylene | 100 |

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of FeelingWood on the production site located in Denmark. Product specific data are based on average values collected in the period 2022. Background data are based on ecoinvent database 3.9.1 and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Picture of product(s)

Hazardous substances

FeelingWood does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

Essential characteristics

FeelingWood batts are covered by harmonised technical specification EN 13171. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

<https://Thermocell.dk>

Reference Service Life (RSL)

Not included in the study.



LCA background

Declared unit

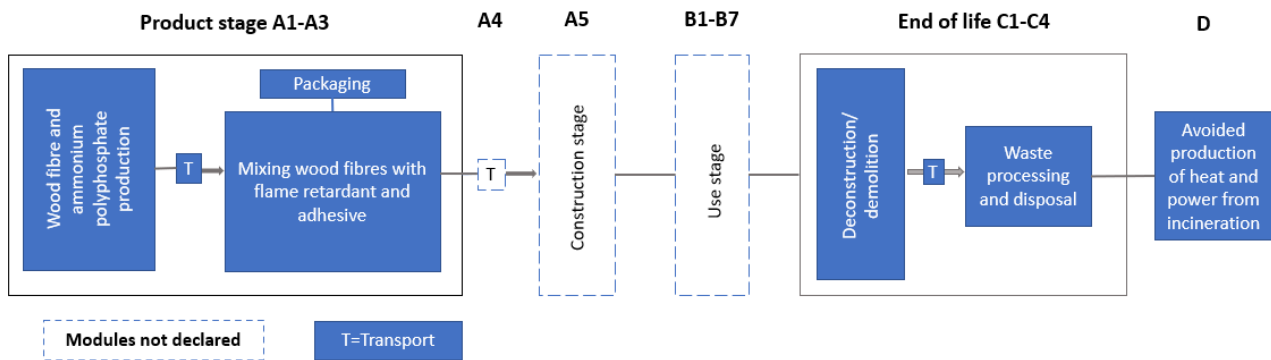
The LCI and LCIA results in this EPD relates to 1 m² 95 mm FeelingWood insulation batts with an R-value of 2,5.

| Name | Value | Unit |
|----------------------------|-------|-------------------|
| Declared unit | 1 | m ² |
| Density | 41 | kg/m ³ |
| Conversion factor to 1 kg. | 0,25 | - |

Functional unit

Not defined.

Flowdiagram



PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and EN 16783:2017 cPCR for Thermal Insulation Products.

Guarantee of Origin – certificates

No Guarantees of Origin are used in this study.

System boundary

This EPD is based on a cradle-to-gate LCA, in which 100 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

- A1 – Extraction and processing of raw materials
- A2 – Transport to the production site
- A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the “end-of-waste” state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

Thermocell in Karby receives the wood pulp (chemi-thermomechanical pulp) from Sweden, the flame-retardant ammonium polyphosphate from Italy, and the Al-adhesive from Varde in Denmark. The pulp, the flame-retardant and the Al-adhesive are mixed at Thermocell in Denmark. Afterwards, the FeelingWood batts are cut into shape and prepared for transport with PE packaging.

Construction process stage (A4-A5) includes:

Modules are not included in this study.

Use stage (B1-B7) includes:

Modules are not included in this study.

End of Life (C1-C4) includes:

The FeelingWood batts are removed from the buildings when they are demolished. From the demolition site the FeelingWood insulation batts are transported to the incineration plant.

Re-use, recovery and recycling potential (D) includes:

In module D, the avoided production of heat and power is credited because of the incineration of the FeelingWood batts.

LCA results

| ENVIRONMENTAL IMPACTS PER M ² | | | | | | | | | | |
|--|---|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
| GWP-total | [kg CO ₂ eq.] | 8,46E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,86E-02 | 7,40E-02 | 6,70E+00 | 0,00E+00 | -1,89E+00 |
| GWP-fossil | [kg CO ₂ eq.] | 6,73E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,86E-02 | 7,39E-02 | 2,33E+00 | 0,00E+00 | -1,85E+00 |
| GWP-biogenic | [kg CO ₂ eq.] | -5,92E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,12E-05 | 6,93E-05 | 4,37E+00 | 0,00E+00 | -3,86E-02 |
| GWP-Juluc | [kg CO ₂ eq.] | 2,27E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,09E-05 | 3,59E-05 | 2,95E-04 | 0,00E+00 | -1,82E-03 |
| ODP | [kg CFC 11 eq.] | 1,80E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,80E-09 | 1,57E-09 | 7,84E-08 | 0,00E+00 | -1,23E-07 |
| AP | [mol H ⁺ eq.] | 2,83E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,62E-04 | 1,58E-04 | 2,20E-03 | 0,00E+00 | -3,58E-03 |
| EP-freshwater | [kg P eq.] | 2,40E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,04E-06 | 5,12E-06 | 3,40E-04 | 0,00E+00 | -4,94E-04 |
| EP-marine | [kg N eq.] | 6,02E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,54E-04 | 3,97E-05 | 7,62E-04 | 0,00E+00 | -8,88E-04 |
| EP-terrestrial | [mol N eq.] | 5,31E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,84E-03 | 4,04E-04 | 7,19E-03 | 0,00E+00 | -9,98E-03 |
| POCP | [kg NMVOC eq.] | 2,16E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,16E-03 | 2,44E-04 | 2,39E-03 | 0,00E+00 | -2,92E-03 |
| ADPm ¹ | [kg Sb eq.] | 1,95E+02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,93E+00 | 1,62E+00 | 6,13E+00 | 0,00E+00 | -3,05E+01 |
| ADPf ¹ | [MJ] | 3,87E-05 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,83E-08 | 2,36E-07 | 1,59E-06 | 0,00E+00 | -1,29E-05 |
| WDP ¹ | [m ³ world eq. deprived] | 6,04E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,61E-03 | 4,28E-03 | 9,69E-02 | 0,00E+00 | -2,90E-01 |
| Caption | GWP-total = Globale Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-Juluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential | | | | | | | | | |
| | The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112. | | | | | | | | | |
| Disclaimer | ¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. | | | | | | | | | |

| ADDITIONAL ENVIRONMENTAL IMPACTS PER M ² | | | | | | | | | | |
|---|--|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
| PM | [Disease incidence] | 2,85E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,14E-08 | 5,37E-09 | 2,43E-08 | 0,00E+00 | -2,15E-08 |
| IRP ² | [kBq U235 eq.] | 6,46E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 9,23E-04 | 1,39E-03 | 2,11E-02 | 0,00E+00 | -2,06E-01 |
| ETP-fw ¹ | [CTUe] | 2,22E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,23E-01 | 4,37E-01 | 1,79E+01 | 0,00E+00 | -2,11E+00 |
| HTP-c ¹ | [CTUh] | 1,70E-09 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,24E-11 | 1,72E-11 | 1,55E-10 | 0,00E+00 | -2,39E-10 |
| HTP-nc ¹ | [CTUh] | 6,17E-08 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,33E-10 | 2,65E-10 | 5,81E-09 | 0,00E+00 | -5,06E-09 |
| SQP ¹ | - | 5,30E+02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,61E-02 | 6,18E-01 | 1,29E+00 | 0,00E+00 | -1,28E+01 |
| Caption | PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless) | | | | | | | | | |
| | The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 ² or 195, while 1,12E-11 is the same as 1,12*10 ⁻¹¹ or 0,0000000000112. | | | | | | | | | |
| Disclaimers | ¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. | | | | | | | | | |
| | ² 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. | | | | | | | | | |

| RESOURCE USE PER M ² | | | | | | | | | | |
|---------------------------------|---|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
| PERE | [MJ] | 5,31E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,17E-03 | 1,22E-02 | 2,16E-01 | 0,00E+00 | -6,70E+00 |
| PERM | [MJ] | 8,73E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,96E-03 | 3,96E-03 | 5,45E-02 | 0,00E+00 | -2,77E+00 |
| PERT | [MJ] | 9,26E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,01E-02 | 1,61E-02 | 2,71E-01 | 0,00E+00 | -9,47E+00 |
| PENRE | [MJ] | 5,97E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,15E-01 | 6,00E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRM | [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PENRT | [MJ] | 5,97E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,15E-01 | 6,00E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| SM | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| RSF | [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NRSF | [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| FW | [m ³] | 6,09E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Caption | <p>PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p> | | | | | | | | | |

| WASTE CATEGORIES AND OUTPUT FLOWS PER M ² | | | | | | | | | | |
|--|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Parameter | Unit | A1-A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
| HWD | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| NHWD | [kg] | 1,88E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,43E+00 | 0,00E+00 | 0,00E+00 |
| RWD | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

| | | | | | | | | | | |
|---------|---|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| CRU | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| MFR | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| MER | [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| EEE | [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | -9,32E+00 |
| EET | [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | -5,25E+01 |
| Caption | <p>HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p> | | | | | | | | | |

| BIOGENIC CARBON CONTENT PER M ² | | |
|---|---|---------------------|
| Parameter | Unit | At the factory gate |
| Biogenic carbon content in product | [kg C] | 0,34 |
| Biogenic carbon content in accompanying packaging | [kg C] | 0,13 |
| Note | 1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂ | |

Additional information

LCA interpretation

The production of wood pulp, which is the dominant part of the insulation product, is the main contributor to the impacts related to this product.

Technical information on scenarios

End of life (C1-C4)

| Scenario information | Value | Unit |
|--------------------------------------|-------|----------------|
| Collected separately | 3,9 | kg |
| Collected with mixed waste | - | kg |
| For reuse | - | kg |
| For recycling | - | kg |
| For energy recovery | 3,9 | kg |
| For final disposal | - | kg |
| Assumptions for scenario development | - | As appropriate |

Re-use, recovery and recycling potential (D)

| Scenario information/Materiel | Value | Unit |
|---|-------|------|
| Energy recovery from waste incineration | 61,82 | MJ |


Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

| | |
|--------------------------------------|--|
| Publisher |  www.epddanmark.dk <small>Template version 2023.1</small> |
| Programme operator | Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk |
| LCA-practitioner | Mie Ostenfeldt FORCE Technology Park Allé 345 2605 Brøndby www.forcetechnology.com |
| LCA software /background data | <i>SimaPro 9.5.0.0</i> <i>Database - ecoinvent 3.9.1</i> |
| 3rd party verifier | Guangli Du Aalborg University A.C. Meyers Vænge 15 2450 København SV www.aau.dk |

General programme instructions

General Programme Instructions, version 2.0, spring 2020
www.epddanmark.dk

EN 15804

DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 16783

DS/EN 16783:2017 – "Thermal insulation products – Product Category Rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations"

EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040

DS/EN ISO 14040:2008 – “ Environmental management – Life cycle assessment – Principles and framework”

ISO 14044

DS/EN ISO 14044:2008 – “ Environmental management – Life cycle assessment – Requirements and guidelines”