

Owner: Thermocell Sales ApS  
No.: MD-23179-EN  
Issued: 03-10-2023  
Valid to: 03-10-2028

3<sup>rd</sup> PARTY VERIFIED

**EPD**

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**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](http://www.epddanmark.dk)



- Industry EPD
- Product EPD

**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.

**Declared product(s)**  
 Thermocell Loose Wool (Løsuld)

Number of declared datasets/product variations: 1

**Production site**  
 Næssundvej 423  
 DK - 7960 Karby  
 Denmark

- 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

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

CEN standard EN 15804 serves as the core PCR

**Declared/ functional unit**  
 1 kg

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

- internal
- external

**Year of production site data (A3)**  
 2022

Third party verifier:

Guangli Du

**EPD version**  
 First edition

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
<b>X</b>	<b>X</b>	<b>X</b>	MND	MND	MND	MND	MND	MND	MND	MND	MND	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# Product information

## Product description

The main product components are shown in the table below.

Material	Weight-% of declared product
Wood fibers	95
Ammonia polyphosphate	5

## 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 Thermocell Loose Wool 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 datasets from the ecoinvent database 3.9.1 and are less than 10 years old. Generally, the used background datasets are of high quality, and most of the datasets are only a couple of years old.

## Hazardous substances

Thermocell Loose Wool 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

Thermocell Loose Wool is 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 manufacturer's website:

<https://Thermocell.dk>

## Reference Service Life (RSL)

Not included in the study.

## Picture of product(s)



# LCA background

## Declared unit

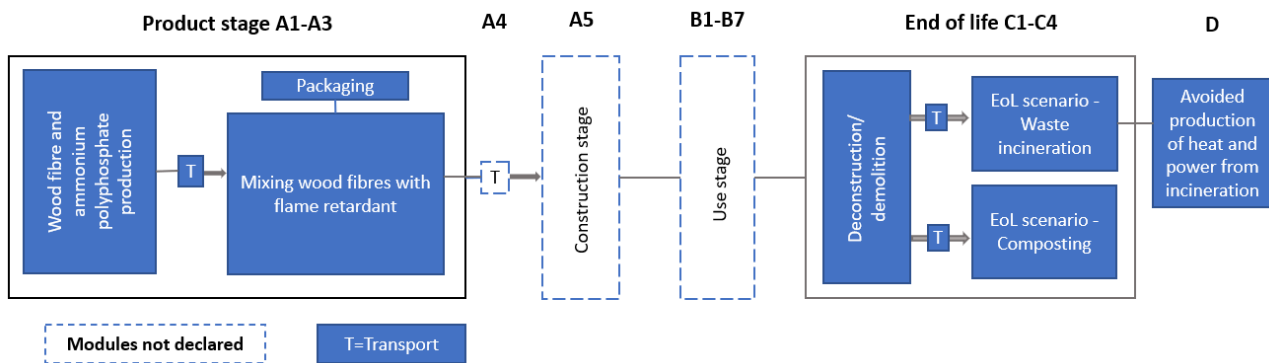
The LCI and LCIA results in this EPD relates to 1 kg Thermocell Loose Wool with a lambda-value of 0,037.

Name	Value	Unit
Declared unit	1	kg
Density	26-46	kg/m <sup>3</sup>
Conversion factor to 1 kg.	1	-

## 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.

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## 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 and the flame-retardant ammonium polyphosphate from Italy. The pulp and the flame-retardant is mixed at Thermocell in Denmark and the loose wool is afterwards 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:**

Thermocell loose wool is removed from the building at demolition and transported to waste handling site. There are two end-of-life scenarios presented in this EPD. Both are currently in use.

As the loose wool does not consist of anything harmful to the environment, one end-of-life scenario presented in this EPD is the loose wool being composted.

As an alternative to composting an end-of-life incineration scenario is also presented.

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

There is no reuse or recovery included in the scenario for composting. Therefore, there is no impact included in module D.

For the incineration scenario the avoided production of heat and electricity is included in module D.

# LCA results

ENVIRONMENTAL IMPACTS PER KG												
Parameter	Unit	A1-A3	Composting					Incineration				
			C1	C2	C3	C4	D	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	-1,05E+00	2,27E-02	1,90E-02	2,81E-01	0,00E+00	0,00E+00	2,27E-02	1,90E-02	1,51E+00	0,00E+00	-4,64E-01
GWP-fossil	[kg CO <sub>2</sub> eq.]	9,56E-01	2,27E-02	1,90E-02	2,36E-02	0,00E+00	0,00E+00	2,27E-02	1,90E-02	1,45E-01	0,00E+00	-4,54E-01
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-2,02E+00	1,06E-05	1,78E-05	2,54E-01	0,00E+00	0,00E+00	1,06E-05	1,78E-05	1,37E+00	0,00E+00	-9,50E-03
GWP-luluc	[kg CO <sub>2</sub> eq.]	3,04E-03	2,81E-06	9,19E-06	9,28E-06	0,00E+00	0,00E+00	2,81E-06	9,19E-06	3,55E-05	0,00E+00	-4,46E-04
ODP	[kg CFC 11 eq.]	3,94E-08	4,62E-10	4,02E-10	3,31E-10	0,00E+00	0,00E+00	4,62E-10	4,02E-10	8,59E-09	0,00E+00	-3,02E-08
AP	[mol H <sup>+</sup> eq.]	4,69E-03	1,95E-04	4,04E-05	2,18E-03	0,00E+00	0,00E+00	1,95E-04	4,04E-05	3,37E-04	0,00E+00	-8,80E-04
EP-freshwater	[kg P eq.]	2,93E-04	1,04E-06	1,31E-06	2,16E-06	0,00E+00	0,00E+00	1,04E-06	1,31E-06	4,07E-05	0,00E+00	-1,22E-04
EP-marine	[kg N eq.]	1,06E-03	9,07E-05	1,02E-05	8,90E-05	0,00E+00	0,00E+00	9,07E-05	1,02E-05	1,37E-04	0,00E+00	-2,18E-04
EP-terrestrial	[mol N eq.]	8,52E-03	9,85E-04	1,04E-04	9,66E-03	0,00E+00	0,00E+00	9,85E-04	1,04E-04	1,27E-03	0,00E+00	-2,46E-03
POCP	[kg NMVOC eq.]	3,39E-03	2,97E-04	6,27E-05	1,02E-04	0,00E+00	0,00E+00	2,97E-04	6,27E-05	3,91E-04	0,00E+00	-7,19E-04
ADPm <sup>1</sup>	[kg Sb eq.]	3,74E+01	4,96E-01	4,16E-01	2,75E-01	0,00E+00	0,00E+00	4,96E-01	4,16E-01	7,78E-01	0,00E+00	-7,51E+00
ADPf <sup>1</sup>	[MJ]	5,81E-06	9,82E-09	6,04E-08	9,30E-08	0,00E+00	0,00E+00	9,82E-09	6,04E-08	1,95E-07	0,00E+00	-3,17E-06
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	1,48E+00	6,68E-04	1,10E-03	1,05E-03	0,00E+00	0,00E+00	6,68E-04	1,10E-03	3,44E-03	0,00E+00	-7,12E-02
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = 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 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											
Disclaimer	<sup>1</sup> 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 KG												
Parameter	Unit	A1-A3	Composting					Incineration				
			C1	C2	C3	C4	D	C1	C2	C3	C4	D
PM	[Disease incidence]	5,70E-08	5,50E-09	1,38E-09	1,11E-08	0,00E+00	0,00E+00	5,50E-09	1,38E-09	3,98E-09	0,00E+00	-5,28E-09
IRP <sup>2</sup>	[kBq U235 eq.]	1,86E+00	2,37E-04	3,55E-04	2,76E-03	0,00E+00	0,00E+00	2,37E-04	3,55E-04	2,41E-03	0,00E+00	-5,06E-02
ETP-fw <sup>1</sup>	[CTUe]	4,49E+00	1,09E-01	1,12E-01	8,35E+00	0,00E+00	0,00E+00	1,09E-01	1,12E-01	1,99E+00	0,00E+00	-5,18E-01
HTP-c <sup>1</sup>	[CTUh]	3,90E-10	5,74E-12	4,42E-12	1,40E-11	0,00E+00	0,00E+00	5,74E-12	4,42E-12	2,61E-11	0,00E+00	-5,88E-11
HTP-nc <sup>1</sup>	[CTUh]	8,17E-09	1,11E-10	6,79E-11	1,95E-10	0,00E+00	0,00E+00	1,11E-10	6,79E-11	7,31E-10	0,00E+00	-1,24E-09
SQP <sup>1</sup>	-	1,65E+02	1,95E-02	1,58E-01	2,20E-01	0,00E+00	0,00E+00	1,95E-02	1,58E-01	2,03E-01	0,00E+00	-3,14E+00
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 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											
Disclaimers	<sup>1</sup> 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.											
	<sup>2</sup> 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 KG												
Parameter	Unit	A1-A3	Composting					Incineration				
			C1	C2	C3	C4	D	C1	C2	C3	C4	D
PERE	[MJ]	5,88E-01	2,10E-03	3,12E-03	4,28E-02	0,00E+00	0,00E+00	2,10E-03	3,12E-03	2,50E-02	0,00E+00	-1,65E+00
PERM	[MJ]	2,80E+01	5,02E-04	1,02E-03	4,18E-02	0,00E+00	0,00E+00	5,02E-04	1,02E-03	6,57E-03	0,00E+00	-6,81E-01
PERT	[MJ]	2,85E+01	2,60E-03	4,13E-03	8,46E-02	0,00E+00	0,00E+00	2,60E-03	4,13E-03	3,16E-02	0,00E+00	-2,33E+00
PENRE	[MJ]	1,68E+00	2,09E-01	1,54E-01	0,00E+00	0,00E+00	0,00E+00	2,09E-01	1,54E-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	0,00E+00	0,00E+00
PENRT	[MJ]	1,68E+00	2,09E-01	1,54E-01	0,00E+00	0,00E+00	0,00E+00	2,09E-01	1,54E-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	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	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	0,00E+00	0,00E+00
FW	[m <sup>3</sup> ]	2,00E-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	0,00E+00	0,00E+00
Caption	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 The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											

WASTE CATEGORIES AND OUTPUT FLOWS PER KG												
Parameter	Unit	A1-A3	Composting					Incineration				
			C1	C2	C3	C4	D	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	0,00E+00	0,00E+00
NHWD	[kg]	0,00E+00	0,00E+00	0,00E+00	1,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,50E-01	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	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	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	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	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	0,00E+00	0,00E+00	-2,29E+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	0,00E+00	0,00E+00	-1,29E+01
Caption	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 The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											

BIOGENIC CARBON CONTENT PER KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0,41
Biogenic carbon content in accompanying packaging	[kg C]	0,033
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

# 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	Composting	Incineration	Unit
Collected separately	1	1	kg
Collected with mixed waste	-	-	kg
For reuse	-	-	kg
For recycling	-	-	kg
For energy recovery	-	1	kg
For final disposal	1	-	kg
Assumptions for scenario development	-	-	As appropriate

### Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Composting	Incineration	Unit
Energy recovery from waste incineration	-	15,19	MJ



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#### **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

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

### General programme instructions

General Programme Instructions, version 2.0, spring 2020  
[www.epddanmark.dk](http://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”