

# Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## Loose Fill Cellulose Insulation

from

**Ekovilla**



Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	S-P-08311
Publication date:	2023-07-04
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Valid until:	2028-07-04

*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
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### Accountabilities for PCR, LCA and independent, third-party verification

#### Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): *Construction products, PCR 2019:14, version 1.2.5 ; Thermal insulation products (EN 16783:2017), C-PCR-005 (TO PCR 2019:14), version 2019-12-20 ; Thermal insulation products — Environmental Product declarations (EPD) — Product Category Rules (PCR) complementary to EN 15804 for factory made and in-situ formed products, prEN 16783:2022*

#### Life Cycle Assessment (LCA)

LCA accountability: Dr. *Carolina Szablewski, WeLOOP*

#### Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: Andrew Norton, Renuables

Approved by: The International EPD® System

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Company information

Owner of the EPD: Ekovilla Oy

Address: Katajajarjuntie 10, 45720 Kuusankoski

Contact:

info@ekovilla.com

+358 5 750 7500

Description of the organisation: Ekovilla Oy (Ltd) is a Finnish company with 40 years of experience and knowledge in forward-thinking thermal insulation. Ekovilla have always been the pacemakers in Finnish thermal insulation and have been considered the strongest brand by consumers for many years. Ekovilla are known to be a trust-worthy partner, a pioneer to innovate and a developer of carbon-free insulation." Ekovilla was established in 1979 and has today around 140 employees. The company's core idea is "To provide thermal insulation made of quality recycled paper, which enables a natural and healthy way of living for a house, and can be both readily- and self-installed."

Name and location of production site(s):

Ekovilla Oy, Kuusankoski, Katajajarjuntie 10, 45720 KUUSANKOSKI;

Ekovilla Oy, Ylistaro, Pajatie 1, 61410 YLISTARO AS

Ekovilla Oy, Kiiminki, Honkiojantie, PL 52, 90901 KIIMINKI

## Product information

Product name: Loose Fill Cellulose Insulation (LFCI)

Product identification: Ekovilla, Ekovilla IA, Ekovilla Puru, Isonem, Isolet, Nviro GreenWoolloose fill cellulose thermal insulation



Product description: Cellulose insulation products are made from recycled newspaper with additives. This insulation material is used for thermal insulation of buildings. This EPD reports cellulose insulation as loose fill. The LFCI can be used in attics, floors, pitched cavities, vertical cavities, sprayed wall applications. The considered service life time is 50 years. Product characteristics are given in the table below.

Name	Value	Unit
<b>Declared unit</b>	1	kg
<b>Lowest density</b>	26	kg/m <sup>3</sup>
<b>Average density</b>	35	kg/m <sup>3</sup>
<b>Highest density</b>	65	kg/m <sup>3</sup>
<b>Thermal conductivity</b>	0.038	W/(m.K)
<b>The duration/life span of the product:</b>	50	Years

UN CPC code: 5465

Geographical scope: This EPD project report is elaborated for LFCI, produced in the Ekovilla plants in Finland, and sold to the European market.

## LCA information

Functional unit / declared unit: Thermal insulation of 1 m<sup>3</sup> with LFCI, with a lambda value of 0,038 W/mK, with a design life span of 50 years, for different applications.

Application	Density	Reference flow
<b>Attic (open blow)</b>	26-36 kg/m <sup>3</sup>	1.178 kg LFCI
<b>Floor (horizontal cavities)</b>	45 kg/m <sup>3</sup>	1.710 kg LFCI
<b>Pitched cavities</b>	45 kg/m <sup>3</sup>	1.710 kg LFCI
<b>Vertical cavities</b>	55 kg/m <sup>3</sup>	2.090 kg LFCI
<b>Sprayed wall</b>	35-40 kg/m <sup>3</sup>	1.425 kg LFCI

Depending on the application, and its required density, the reference flow (quantity of product to fulfill the functional unit) is different and declared in the previous table. In this manner, the results presented in this report for a declared unit of 1 kg. Depending on the application, a conversion factor may be used.

Reference service life: 50 years

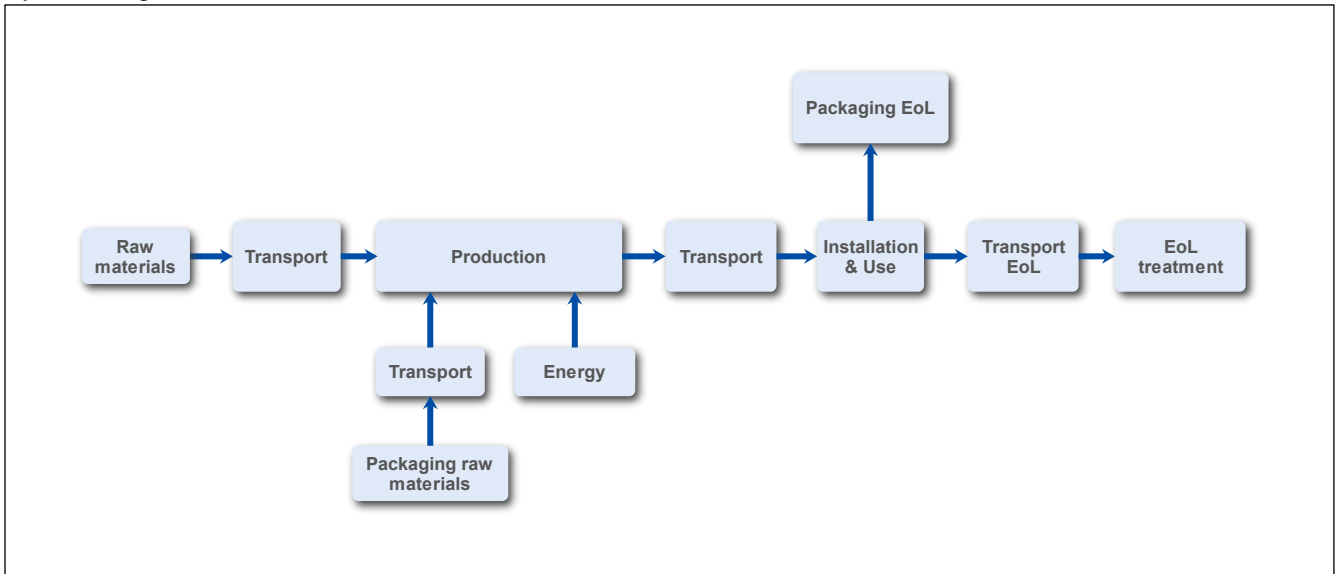
Time representativeness: 2021

Database(s) and LCA software used: Ecoinvent 3.8

Description of system boundaries: Cradle to grave

Cellulose thermal insulation is composed by sorted paper, newspaper and cardboard, with additives. Raw materials transport is considered, mainly truck transport. The raw materials are added in the manufacturing stage, electricity and fuel consumption are considered. The product is packed and distributed to the final client, distribution transportation is volume based. Installation is considered for loose fill cellulose insulation, as blowing the product. The product has 50 years lifespan, and it is 100% recycled at its end of life.

System diagram:



More information: Electricity consumed by Ekovilla is 100% wind sourced.

**Product stage (A1-3)**

The product stage covers all raw materials, raw materials transport and the manufacturing process in the production of LFCI.

Sorted paper used as raw materials is a waste, and no environmental impacts have been associated with its production.

After manufacturing, LFCI is packed in plastic packaging.

The carbon content of LFCI raw materials has been taken into account in the calculation. This assessment is based on 44,4% of carbon content in the cellulose. Raw materials transport is mass-based and done by truck 16-32 metric ton.

**Construction stage (A4-5)**

The packed product is transported to the construction site. Insulation materials are light, then the transport is volume-based.

LFCI is installed by blower on site. Packaging waste is generated and its treatment is considered in the installation process.

**Use stage (B1-7)**

According to the manufacturer, it can be assumed that during 50 years of use in normal conditions, the product will not require any maintenance or repairs.

**End-of-life stage (C1-4) and impacts and benefits beyond the system boundaries.**

LFCI is removed with a machine at its end-of-life stage. The product is then 100% recycled into LFCI. Ekovilla is making a study to consider recycling into biochar. This could be considered as the end-of-life for LFCI.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	FI	FI	FI	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	
Specific data used	>90%			100%	>90%	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Paper	0.9	90.8	90.8 resp 0.4
Additives	0.1	0	0.2 resp 0
TOTAL	1	90.8	90.8 resp 0.4
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
PE film	6.18E-3	0.618	0
Wood pallet	1.44E-2	1.44	0.006
Cardboard	8.52E-5	0.00852	3.78E-05
TOTAL	0.0207	2.07	6.04E-3

The loose-fill cellulose insulation contains boric acid – SVHC substance registered at ECHA – in a concentration above 0.1% of final product mass, as a fire retardant.

## Results of the environmental performance indicators

The results are provided for 1kg of LFCI.

### Mandatory impact category indicators according to EN 15804

Results per 1 kg of LFCI																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	1.34E-01	2.91E-02	1.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.44E-03	0.00E+00	0.00E+00	0.00E+00	8.94E-02
GWP-biogenic	kg CO <sub>2</sub> eq.	-1.39E+00	0.00E+00	6.00E-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	1.33E+00	0.00E+00	-1.35E+00
GWP-luluc	kg CO <sub>2</sub> eq.	1.83E-04	1.34E-05	1.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E-07	0.00E+00	0.00E+00	0.00E+00	2.12E-06
GWP-total	kg CO <sub>2</sub> eq.	-1.23E+00	2.91E-02	2.67E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.44E-03	0.00E+00	1.35E+00	0.00E+00	-1.40E+00
ODP	kg CFC 11 eq.	2.41E-09	6.19E-10	6.13E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.90E-11	0.00E+00	0.00E+00	0.00E+00	1.73E-09
AP	mol H <sup>+</sup> eq.	1.42E-03	9.53E-05	1.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.02E-05	0.00E+00	0.00E+00	0.00E+00	-4.49E-04
EP-freshwater	kg P eq.	4.73E-06	2.29E-07	8.06E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-08	0.00E+00	0.00E+00	0.00E+00	-7.94E-07
EP-marine	kg N eq.	2.04E-04	3.26E-05	4.67E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.86E-05	0.00E+00	0.00E+00	0.00E+00	8.61E-05
EP-terrestrial	mol N eq.	2.25E-03	3.49E-04	5.14E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-04	0.00E+00	0.00E+00	0.00E+00	8.66E-04
POCP	kg NMVOC eq.	7.99E-04	1.48E-04	1.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.00E-05	0.00E+00	0.00E+00	0.00E+00	3.91E-04
ADP-minerals&metals*	kg Sb eq.	6.68E-05	7.63E-08	3.21E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-09	0.00E+00	0.00E+00	0.00E+00	-5.88E-05
ADP-fossil*	MJ	2.18E+00	4.14E-01	7.44E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.68E-02	0.00E+00	0.00E+00	0.00E+00	9.66E-01
WDP*	m <sup>3</sup>	7.50E-02	2.00E-03	7.67E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-04	0.00E+00	0.00E+00	0.00E+00	-3.16E-02
Acronyms	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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.



### Additional mandatory and voluntary impact category indicators

Results per 1 kg of LFCI																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG1	kg CO2 eq.	1.34E-01	2.91E-02	1.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.44E-03	0.00E+00	0.00E+00	0.00E+00	8.94E-02
Particulate matter	disease inc.	1.85E-08	2.85E-09	1.76E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-09	0.00E+00	0.00E+00	0.00E+00	1.02E-09
Ionising radiation	kBq U-235 eq.	5.07E-03	1.99E-04	1.38E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-05	0.00E+00	0.00E+00	0.00E+00	-3.07E-03
Ecotoxicity, freshwater	CTUe	8.29E-01	2.17E-01	1.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E-02	0.00E+00	0.00E+00	0.00E+00	7.30E-01
Human toxicity, cancer	CTUh	1.09E-10	1.23E-11	5.56E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-12	0.00E+00	0.00E+00	0.00E+00	7.58E-11
Human toxicity, non-cancer	CTUh	2.51E-09	3.86E-10	7.31E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.92E-11	0.00E+00	0.00E+00	0.00E+00	1.09E-09
Land use	Pt	3.32E+00	4.20E-01	3.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.79E-03	0.00E+00	0.00E+00	0.00E+00	2.58E+00

<sup>1</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

## Resource use indicators

Results per 1 kg of LFCI																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1.22 E+00	6.06 E-03	2.31 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	3.23 E-04	0.00 E+00	0.00 E+00	0.00 E+00	9.40 E-01
PERM	MJ	1.38 E+01	0.00 E+00	- 3.68 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	- 1.33 E+01	0.00 E+00	1.34 E+01
PERT	MJ	1.50 E+01	6.06 E-03	- 1.37 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	3.23 E-04	0.00 E+00	- 1.33 E+01	0.00 E+00	1.44 E+01
PENRE	MJ	2.39 E+00	4.21 E-01	1.95 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	5.67 E-02	0.00 E+00	0.00 E+00	0.00 E+00	9.01 E-01
PENRM	MJ	2.52 E-01	0.00 E+00	- 1.84 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	6.93 E-02
PENRT	MJ	2.65 E+00	4.21 E-01	1.03 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	5.67 E-02	0.00 E+00	0.00 E+00	0.00 E+00	9.70 E-01
SM	kg	9.10 E-01	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
RSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
NRSF	MJ	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
FW	m <sup>3</sup>	- 8.00 E-03	- 1.30 E-04	- 6.18 E-06	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	- 1.15 E-05	0.00 E+00	0.00 E+00	0.00 E+00	5.82 E-03
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

## Waste indicators

Results per 1 kg of LFCI																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Non-hazardous waste disposed	kg	0.00 E+00	0.00 E+00	1.10 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Radioactive waste disposed	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	6.22 E-09	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

## Output flow indicators

Results per 1 kg of LFCI																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Material for recycling	kg	0.00 E+00	0.00 E+00	1.29 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	1.00 E+00	0.00 E+00	0.00 E+00
Materials for energy recovery	kg	0.00 E+00	0.00 E+00	1.88 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Exported energy, electricity	MJ	0.00 E+00	0.00 E+00	3.31 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00
Exported energy, thermal	MJ	0.00 E+00	0.00 E+00	6.61 E-02	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00	0.00 E+00

## References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:14. Construction products. Version 1.2.5

EN15804+A2:2019

EN 16783:2017 Thermal insulation products – Environmental Product declarations (EPD) – Product Category Rules (PCR) complementary to EN 15804 for factory-made and in-situ formed products  
C-PCR-005 (TO PCR 2019:14) Thermal insulation products version 2019-12-20

