Environmental Product Declaration

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

Climatizer Plus®

From

CIUR



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0022936
Publication date:	2025-06-12
Valid until:	2030-06-11

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

1. GENERAL INFORMATION

Product name:	**Climatizer Plus®** • Open blowing for attics, • Blown into pitched roofs, • Blown into walls. UN CPC code: 5465
Date of Issue:	June 2025
Date of verification:	June 2025
Validity:	5 years
Declared Unit / Functional Units:	1 kg
Company information	**CIUR a.s.** Official address: Malé náměstí 142/3, 110 00 Praha 1, Czech Republic Contact: Martina Krejčíková, krejcikova@ciur.cz Company description: Producers of cellulose fibres from recycled paper. Manufacturing site: Pražská 1012, 250 01 Brandýs nad Labem, Czech Republic https://www.ciur.cz
Conductor of the LCA	**WeLOOP** 254 rue du Bourg, 59130 Lambersart, France https://www.weloop.org/fr/
Verification:	Independent verification by **external** third-party verifier **Dr. Andrew Norton, Renuables Ltd**
Type of EPD	Individual Cradle-to-grave and module D

PROGRAMME INFORMATION

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

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 product, PCR 2019:14, Version 1.3.4;* *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 ;* *UN CPC 5465*
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: *Dr. Naeem Adibi, Sam Herlicq, 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: Dr Andrew Norton, Renuables Ltd Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programs, 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.

1.1 Product Description

Climatizer Plus® is made from recovered newspaper with mineral inorganic flame retardant additives. This insulation material is used for thermal and acoustic insulation of buildings. It is used to insulate walls, roofs, attics and mezzanine floors. Climatizer Plus® may be reused or recycled at the end-of-life. The product is recovered using a reverse installation process.

1.2 Goal and Scope

This study aims to gather data regarding the environmental effects of Climatizer Plus® during its lifespan to better understand the environmental impact over the complete lifecycle. The results can be used to eco-design the product.

Furthermore, the results can be used to inform potential customers about the environmental impact of Climatizer Plus® in all European countries.

1.3 GEOGRAPHICAL SCOPE

The product assessed in the LCA study is produced in Czech Republic and sold in Europe, as illustrated in Figure 1



Figure 1: Market for Climatizer Plus®

1.4 REPRESENTATIVENESS PRODUCTION PROCESS

This product is made following the company's production protocols and national standards.

2. FUNCTIONAL UNIT DESCRIPTION AND PRODUCT INFORMATION

2.1 DECLARED UNIT

The declared unit is 1 kg of Climatizer Plus®. The average density of the product in this EPD is 45 kg/m³. The declared unit is used instead of the functional unit when the precise function of the product is not defined or not covered among the functional units included in this report. The product has a lambda value of 0.038 W/(m.K) and a lifespan of 50 years.

2.2 CONVERSION FACTORS

The following table shows the conversion factors from the declared unit (1 kg) to obtain the impacts of the product for each application.

Application	Conversion factor
Open-blowing attics	10.37
Pitched roofs	11.97
Wall	6.65

Table 1: Conversion factors for each application

2.3 COMPOSITION AND CONTENT

The main components for 1 kg of product are provided in the following table.

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Recovered paper	0.85	100%	100%, 1.47 kg C/kg of component
Inorganic flame retardant	0.15	0%	0%, 0 kg C/kg
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Plastic film (LDPE)	0.010	1%	0 kg C/kg
Wooden pallets	0.077	8%	0.13 kg C/kg

Table 2: Composition of Climatizer Plus®

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
Boric acid	233-139-2	10043-35-3	3.5%

Table 3: Substances on the candidate list of SVHC

The information on the lifespan of Climatizer Plus® is provided by the manufacturer. If installed correctly according to the manufacturers' guidelines, Climatizer Plus® needs no further maintenance, repair, replacement or refurbishment during the full lifespan of the product. If the product is applied and maintained following the installation and maintenance instructions, the lifespan of 50 years is applicable based on the Durability and the construction products directive from the European Commission.

Climatizer Plus® contains boric acid – SVHC substance registered at ECHA – in a concentration above 0.1% of final product mass, as a fire retardant.

3. LCA STUDY

3.1 SOFTWARE

When calculating the environmental impact categories, SimaPro version 9.5.0.0 (July 2023) was used, as well as environmental data from the Ecoinvent database, version 3.9, released in November 2021.

3.2 INFORMATION ON ALLOCATION

No co-product allocation occurs in the product foreground system. No multi-input allocation occurs in the product system. The allocations from the background database are kept intact.

3.3 INFORMATION ON CUT-OFF

CIUR a.s. reported data, and some plausibility and completeness assessments and checks were conducted for some inputs. For a few remaining data, no extended assessment was conducted, therefore accepting data gaps. In all cases, it is assumed that the cut-off criteria of EN 15804+A2 are met.

3.4 INFORMATION ON EXCLUDED PROCESSES

The following processes were excluded from the inventory:

- The effects of capital goods and infrastructural processes have been excluded.
- Flows related to human activities such as employee transport and administration activity.

3.5 Information on biogenic carbon modelling

Climatizer Plus® is mainly made from recovered sorted paper, with high biogenic carbon content. As long as the product is in use, this carbon is stored in the product. For loose fill cellulose insulation products, the amount is assessed based on the following formula and is provided in the overall LCA results:

CO_2 content kg in air = (paper content) / 1.1 (factor 10% > 0% moisture content) x 0,444 (IPCC, 2006) (carbon content) x 3,67 (mol ratio CO_2 – C) presented in kg CO_2 / kg Cellulose materials.

3.6 Additional or deviating characterisation factors

The impact assessment method used in this study is the EN 15804+A2 (Simapro software) using the EF3.1 indicators from the European Commission adjusted according to the requirement of EN 15804+A2.

3.7 Information on most influencing parameters in the LCA

- Composition of the product (share of recycled paper content of cellulose),
- Composition of additives,
- Energy consumption and source in the manufacturing plant,
- Density of product (specific for applications) and lambda value,
- Transport density and distance (compression rate of product),
- End-of-life scenario.

3.8 Comparability

A comparison or evaluation of EPD data is only possible if all datasets are made following EN 15804+A2, applying the same relevant product category rules and for the same modules.

4. Data

4.1 Data quality

The data used for the LCA are provided by the manufacturer. The data about the process and products are based upon frequent contact with the production site to guarantee that this EPD is based on the most up-to-date production data. Missing data was collected from Ecoinvent version 3.9.

4.2 Period of data collection

The data was collected and updated in 2022.

4.3 Database used for background data

Ecoinvent version 3.9 was used.

4.4 Energy mix

Company-specific energy mix was used for the production of the insulation product. The country of installation's energy mix is considered for the installation of the product in the building. The energy mix of the product's final application market is used to declare the benefits beyond the system boundaries (module D).

4.5 QUALITATIVE INFORMATION

Climatizer Plus® is made according to the production protocols of CIUR a.s., European technical specifications and Czech Republic standards.

5. SYSTEM BOUNDARIES

	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
Geography	CZ	CZ	CZ	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU
Specific data used	>90%			100%	>90%	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4: Modules over the life cycle of a building material as determined in EN 15804+A2

6. LIFE CYCLE STAGES

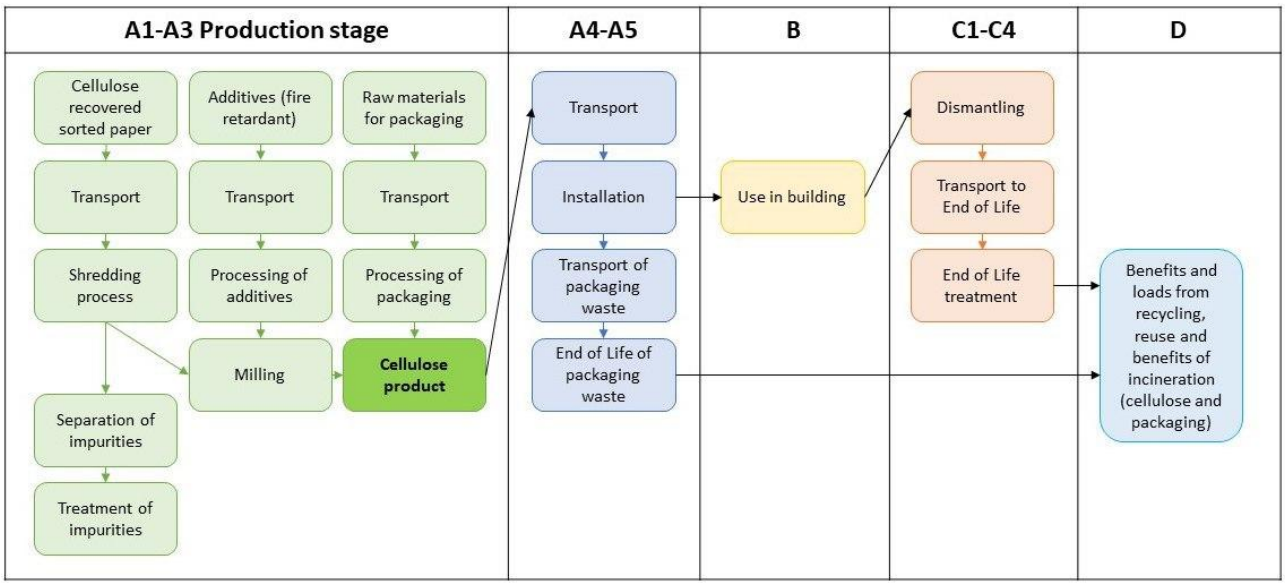


Figure 2: Flowchart illustrating the life cycle of Climatizer Plus®

6.1 PRODUCT STAGE (A1-3)

The recovered paper is transported to the production plant. The impurities are separated, and the paper is shredded. Paper, which still contains tiny amounts of impurities, is recycled into the process. When milling the shredded paper, fire retardants are added. The final product is packed and transported to the retailer or directly to the construction site.

The electricity mix is a green mix declared by CIUR. Its impacts on Climate Change (total) are 0.116 kg $_{CO2eq}$/kWh.

6.2 CONSTRUCTION STAGE (A4-5)

6.2.1 Transport to the building site (A4)

The final product is packed and transported to the construction site. The average transport distance from production to the building site is 466 km.

6.2.2 Installation of the product in the building (A5)

Climatizer Plus® is applied into the construction by a machine. Therefore, the energy consumption of the blowing or spraying machine is considered.

6.3 USE STAGE (B1-7)

If installed correctly according to the manufacturer's and supplier's guidelines, Climatizer Plus® needs no further maintenance, repair, replacement or refurbishment during the full lifespan of the product. If the product is applied following the installation instructions, a lifespan of 50 years is applicable.

6.4 END OF LIFE STAGE (C1-4)

6.4.1 Demolition (C1)

The dismantling is very easy: the product can be sucked with a hose to the truck on the road and may be reused or recycled if appropriate. This process is a fast reverse of the installation process. Although cellulose is easily reclaimed as recyclable and reusable, the CFF parameters for each country are used as the basis for

the modelling of the product. These parameters describe the end-of-life scenario for different materials in all European countries. They are provided by Eurostat.

6.4.2 Transport (C2)

Assumptions transport phase: 50 km to the landfilling site and 100 km to the incineration site. Transport with a Euro 5, 16-32 t total weight lorry.

6.4.3 Waste processing (C3-C4)

Although cellulose is easily recyclable and reusable, these scenarios are not yet mainstreamed in Europe. The waste scenario is defined as incineration with energy recovery and landfilling. Market share in different EU countries and different scenarios per country have been used.

6.5 Benefits and loads beyond the system boundary (D)

The avoided energy use due to the incineration of Climatizer Plus® is considered a benefit beyond the system boundary. Avoided production of virgin materials from recycling is also considered in this module.

7. Life Cycle Assessment Results for Climatizer Plus®

7.1 Environmental impacts of Climatizer Plus®

The results of the LCIA are provided for 1kg of product.

Results for 1 kg of product.

	A1 Raw material	A2 Transport	A3 manufacturing	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
GWP total (kg CO2 equiv)	-1,18E+00	2,51E-02	-1,61E-02	-1,17E+00	9,80E-02	1,41E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,44E-03	1,43E-02	6,05E-01	6,58E-01	-1,58E-01
GWP fossil (kg CO2 equiv)	6,65E-02	2,51E-02	1,11E-01	2,03E-01	9,79E-02	1,38E-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	1,43E-02	1,13E-02	6,59E-03	-1,58E-01
GWP biogenic (kg CO2 equiv)	-1,25E+00	0,00E+00	-1,28E-01	-1,37E+00	0,00E+00	1,28E-01	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	5,94E-01	6,51E-01	0,00E+00
GWP luluc (kg CO2 equiv)	1,19E-04	1,19E-05	6,83E-04	8,14E-04	4,67E-05	2,94E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,91E-07	6,81E-06	1,02E-05	1,54E-06	-9,08E-05
ODP (kg CFC 11 equiv)	1,23E-09	5,33E-10	4,09E-09	5,85E-09	2,08E-09	4,67E-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	3,02E-10	2,80E-09	1,64E-10	-5,22E-09
AP (mol H+ eq)	9,42E-04	8,05E-05	5,64E-04	1,59E-03	3,11E-04	1,36E-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	4,53E-05	1,98E-04	9,88E-05	-2,50E-04
EP - freshwater (kg (PO4)3- equiv)	3,95E-06	1,96E-07	5,03E-06	9,18E-06	7,63E-07	2,51E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,57E-08	1,11E-07	3,40E-07	5,87E-08	-7,50E-06
EP - marine (kg (PO4)3- equiv)	9,60E-05	2,74E-05	1,30E-04	2,53E-04	1,06E-04	3,80E-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	1,54E-05	8,62E-05	8,70E-04	-5,50E-05
EP - terrestrial (kg (PO4)3- equiv)	1,10E-03	2,93E-04	1,87E-03	3,27E-03	1,13E-03	3,94E-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	1,65E-04	9,63E-04	2,16E-04	-6,33E-04
POCP (kg Ethene equiv)	3,63E-04	1,22E-04	5,48E-04	1,03E-03	4,65E-04	1,24E-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	6,77E-05	2,52E-04	3,59E-04	-2,92E-04
ADP Elements (kg Sb equiv)	3,49E-05	7,52E-08	7,94E-07	3,58E-05	3,06E-07	1,89E-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	4,46E-08	5,24E-08	3,62E-08	-8,42E-08
ADP fossil fuels (MJ)	1,13E+00	3,50E-01	1,97E+00	3,46E+00	1,35E+00	4,10E-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	1,97E-01	1,08E-01	1,43E-01	-2,49E+00
WDP (m^3 water eq deprived)	4,57E-02	1,51E-03	4,61E-02	9,33E-02	5,59E-03	4,00E-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	8,15E-04	5,56E-03	7,42E-04	-1,60E-02

GWP = GLOBAL WARMING POTENTIAL (CLIMATE CHANGE); **ODP** = OZONE DEPLETION POTENTIAL; **AP** = ACIDIFICATION POTENTIAL FOR SOIL AND WATER; **EP** = EUTROPHICATION POTENTIAL; **POCP** = PHOTOCHEMICAL OZONE CREATION; **ADPE** = ABIOTIC DEPLETION POTENTIAL – ELEMENTS; **ADPF** = ABIOTIC DEPLETION POTENTIAL – FOSSIL FUELS

Results for 1 kg of product.

	Production				Construction process stage		Use stage							End-of-life stage				
	A1 Raw material	A2 Transport	A3 manufacturing	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
PERE (MJ, net calorific value)	1,53E-01	5,35E-03	1,86E+00	2,02E+00	2,10E-02	3,52E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,23E-04	3,06E-03	5,91E+00	2,56E-02	-3,50E-01
PERM (MJ, net calorific value)	1,24E+01	0,00E+00	1,03E+00	1,34E+01	0,00E+00	-6,55E-01	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	-5,90E+00	0,00E+00	3,10E-01
PERT (MJ, net calorific value)	1,25E+01	5,35E-03	2,89E+00	1,54E+01	2,10E-02	-3,03E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,23E-04	3,06E-03	9,62E-03	2,56E-02	-4,01E-02
PENRE (MJ, net calorific value)	1,31E+00	3,56E-01	2,19E+00	3,85E+00	1,38E+00	1,96E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,67E-02	2,01E-01	1,33E-01	1,45E-01	-2,90E+00
PENRM (MJ, net calorific value)	0,00E+00	0,00E+00	4,27E-01	4,27E-01	0,00E+00	-2,65E-01	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	1,18E-01
PENRT (MJ, net calorific value)	1,31E+00	3,56E-01	2,61E+00	4,28E+00	1,38E+00	-6,90E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,67E-02	2,01E-01	1,33E-01	1,45E-01	-2,78E+00
SM (kg)	8,49E-01	0,00E+00	0,00E+00	8,49E-01	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	0,00E+00	0,00E+00	0,00E+00
RSF (MJ, net calorific value)	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF (MJ, net calorific value)	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW (m^3 eq. water)	-7,17E-03	-1,26E-04	-1,07E-02	-1,80E-02	-5,10E-04	-1,16E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,15E-05	-7,44E-05	-3,11E-04	1,64E-04	4,47E-02

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

Results for 1 kg of product.

	A1 Raw material	A2 Transport	A3 manufacturing	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed EU (kg)	1,84E-03	3,34E-04	3,13E-03	5,31E-03	1,29E-03	2,22E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,77E-05	1,88E-04	7,57E-03	2,02E-04	-1,07E-03
Non hazardous waste disposed EU (kg)	1,32E-01	2,35E-02	3,59E-02	1,91E-01	7,68E-02	1,31E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,55E-04	1,12E-02	6,32E-03	5,25E-01	-1,42E-02
Radioactive waste disposed EU (kg)	4,95E-06	1,12E-07	2,20E-06	7,26E-06	4,39E-07	2,00E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,22E-09	6,40E-08	1,90E-07	3,47E-07	-5,19E-06
Components for reuse (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	0,00E+00	0,00E+00	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	0,00E+00	2,59E-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	0,00E+00	0,00E+00
Materials for energy recovery (kg)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,92E-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	4,05E-01	0,00E+00	0,00E+00
Exported energy (kg)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,48E-01	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	1,77E+00	0,00E+00	0,00E+00

Results for 1 kg of product.

		Production				Construction process stage		Use stage							End-of-life stage				
		A1 Raw material	A2 Transport	A3 manufacturing	A1-A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairs	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	GWP-GHG (kg CO2 equiv)	6,66E-02	2,51E-02	1,12E-01	2,03E-01	9,80E-02	1,38E-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	1,43E-02	1,13E-02	6,60E-03	-1,58E-01
	Particulate matter (desease inc.)	1,86E-08	2,08E-09	6,00E-09	2,66E-08	7,56E-09	9,73E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E-09	1,10E-09	1,51E-09	9,40E-10	-1,00E-09
	Ionising radiation (kBq U-235 eq)	6,27E-03	1,74E-04	2,89E-03	9,33E-03	6,78E-04	2,70E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,16E-05	9,88E-05	2,75E-04	6,43E-04	-6,73E-03
	Ecotoxicity, freshwater (CTUe)	3,24E-01	1,84E-01	4,21E-01	9,29E-01	7,15E-01	1,03E-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	1,04E-01	1,06E+00	2,32E+00	-1,25E-01
	Human toxicity, cancer (CTUh)	3,04E-11	1,10E-11	1,01E-10	1,42E-10	4,33E-11	4,43E-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	6,31E-12	1,62E-10	7,93E-12	-2,62E-11
	Human toxicity, non-cancer (CTUh)	1,15E-09	3,24E-10	2,26E-09	3,73E-09	1,25E-09	5,20E-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	1,83E-10	1,11E-09	1,86E-09	-5,26E-10
	Land use (Pt)	3,70E-01	2,48E-01	7,17E+00	7,78E+00	8,04E-01	1,66E-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	1,17E-01	3,12E-02	3,01E-01	-2,28E-01

GWP-GHG = GLOBAL WARMING POTENTIAL – GREENHOUSE GAS
HTCE = HUMAN TOXICITY – CANCER EFFECTS;
HTNCE = HUMAN TOXICITY – NON CANCER EFFECTS;
ETF = ECOTOXICITY – FRESHWATER;
PM = PARTICULATE MATTER;
IRHH = IONIZING RADIATION – HUMAN HEALTH EFFECTS

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

8. ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES TO INDOOR AIR, SOIL, AND WATER DURING THE USE STAGE

8.1 INDOOR AIR

The VOC emission test, as part of mandatory environmental labelling, was carried out according to ISO EN 16000-3, ISO EN 16000- 6, CSN EN ISO 16000-10 and CSN EN ISO 16000-11. The loose fill cellulose insulation is rated as A + or A depending on the product and its application (roof, wall, attic). The certificat number is 100-051252.

Type of VOC	Unit	Result
Formaldehyde	mg/m^3	<0.001
Aldehydes, ketones	mg/m^3	<0.01
Benzene	mg/m^3	<0.001
Toluene	mg/m^3	<0.01
Total xylenes	mg/m^3	<0.01
Styrene	mg/m^3	<0.01
Ethylbenzene	mg/m^3	<0.01
Trichlorethlene	mg/m^3	<0.01
Tetrachlorethylene	mg/m^3	<0.01
Other volatile organic substances	mg/m^3	<0.01
Total volatile organic substances	mg/m^3	<10

Table 5: VOC emission test results

8.2 SOIL AND WATER

Not applicable as this product is not in contact with drinking water, runoff water, seepage water, or surface water.

8.3 MOULD AND MICRO-ORGANISMS

The study of the behaviour of a material according to the standard CSN EN 15101-1 annex F was carried out. Results show that the product is not a favourable medium for fungal growth.

8.4 EMISSIONS OF DUST AND FIBRES DURING BUILDING USE PHASE

Climatizer Plus® is separated from indoor air; therefore, it is not intended to be in contact with indoor air.

8.5 CHARACTERISTICS OF THE PRODUCT LINK TO THE CREATION OF HYGROTHERMAL COMFORT CONDITIONS IN THE BUILDING

Climatizer Plus® has a high thermal insulation performance (lambda = 0.038 W/m.K depending on product and applications).

Resistance to airflow according to CSN EN ISO 9053-1:2020 (certificate number 040-076114):

Property	Specific air resistance r (AFR)	Uncertainty	Unit
Density 45 kg/m^3, thickness 30 mm	11.36	20%	$kPa.s.m^{-2}$
Density 60 kg/m^3, thickness 70 mm	15.53	20%	$kPa.s.m^{-2}$

Table 6: Results of resistance to airflow tests

8.6 CHARACTERISTICS OF PRODUCT LINK TO THE ACOUSTIC COMFORT IN THE BUILDING

Climatizer Plus® is, in addition to hygro-thermal performances, able to bring acoustic comfort. It is class D in acoustic certification according to CSN EN ISO 11654:1998 and VDI 3755:2015-01. The certificate number is 040-061626.

9. ADDITIONAL INFORMATION ON CONVERSION FACTORS

The following table shows the conversion factors from the declared unit (1 kg) to obtain the impacts of the product for each application.

Application	Conversion factor
Open-blowing attics	10.37
Pitched roofs	11.97
Wall	6.65

Table 7: Conversion factors for each application

9.1 OPEN-BLOWING ATTICS APPLICATIONS

Cellulose insulation is installed in open attics using a dry blowing process without glue or water, as shown in Figure 2. The functional unit in open attics is defined as:

"The thermal insulation of 1 m^2 of open blowing attics, with a Climatizer Plus® (installed density of 39 kg/m^3) thickness (266 mm) that gives an overall thermal resistance of 7 (m^2·K/W) (R-value), with a designed lifespan of 50 years".



Figure 3: Cellulose insulation in open attics (left) and open blowing application (right)

Product description	Average	Units
Lowest installed density	30	kg/m^3
Highest installed density	48	kg/m^3
Average gross installed density	39	kg/m^3
Lambda value (λ)	0.038	W/(m·K)
Quantity in the FU	10.37	kg
The duration/life span of the product	50	Years

Table 8: Characteristics of cellulose insulation in attic applications

For open-blowing applications, there is a settlement of the blown layer, which is already considered in the density of the product.

9.2 PITCHED ROOF APPLICATIONS

Climatizer Plus® is installed in a pitched roof by blowing dry cellulose into the roof cavity (compartment) without adding any glue or water, as shown in **Erreur ! Source du renvoi introuvable.**. T he functional unit of the pitched roof application is defined as:

"*The thermal insulation of 1 m² of a pitched roof, with a Climatizer Plus® (installed density of 45 kg/m³) thickness (266 mm) that gives an overall thermal resistance of 7 (m²·K/W) (R-value), with a designed lifespan of 50 years*".



Figure 4: Cellulose insulation in a pitched roof

Product description	Average	Units
Lowest installed density	35	kg/m³
Highest installed density	55	kg/m³
Average gross installed density	45	kg/m³
Lambda value (λ)	0.038	W/(m·K)
Quantity in the FU	11.97	kg
The duration/life span of the product	50	Years

Table 9: Characteristics of cellulose insulation in pitched roof applications

9.3 WALL APPLICATIONS

Climatizer Plus® is installed in walls by blowing dry cellulose into the closed wall cavity (compartment), as shown in Figure 4. The functional unit of the wall applications is defined as:

"*The thermal insulation of 1 m² of a wall, with a Climatizer Plus® (installed density of 50 kg/m³) thickness (133 mm) that gives an overall thermal resistance of 3.5 (m²·K)/W (R-value), with a designed lifespan of 50 years*".



Figure 5 Cellulose insulation in a wall

Product description	Average	Units
Lowest installed density	40	kg/m³
Highest installed density	60	kg/m³
Average gross installed density	50	kg/m³
Lambda value (λ)	0.038	W/(m.K)
Quantity in the FU	6.65	kg
The duration/life span of the product	50	Years

Table 10: Characteristics of cellulose insulation in wall applications

10. REFERENCES

- General Program Instructions of the International EPD® System. Version 4.0.
- Construction product, PCR 2019:14, Version 1.3.4
- 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

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