ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Powerwall +
Recticel Insulation Oy

EPD HUB, HUB-0473
Publishing date 22 May 2023, last updated on 22 May 2023, valid until 22 May 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Recticel Insulation Oy
Address	Gneissitie 2 Mäntsälä 04600
Contact details	nordic.insulation@recticel.com
Website	https://www.recticelinsulation.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022 EN 16783 Thermal insulation products
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Maxime Tavernier
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	H.N, as an authorized verifier acting for EPD Hub Limited

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.

PRODUCT

Product name	Powerwall +
Additional labels	-
Product reference	64048
Place of production	Finland
Period for data	2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	Not applicable

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m²
Declared unit mass	4.7 kg
GWP-fossil, A1-A3 (kgCO2e)	1,67E1
GWP-total, A1-A3 (kgCO2e)	1,66E1
Secondary material, inputs (%)	3.67
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	86.2
Total water use, A1-A3 (m3e)	3,68E0

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Recticel Insulation Oy is a producer of PIR insulation boards with a production plant in Mäntsälä. Recticel Insulation Oy is part of the Recticel Insulation.

PRODUCT DESCRIPTION

Powerwall+ is a thermal insulation board consisting of a rigid polyisocyanurate (PIR) foam. The board is faced with a gas diffusion tight aluminium facer and has a λ_D-value of 0.022 W/m.K. Powerwall+ is mainly used in ventilated facades and are available in a thickness range of 80-130 mm. This EPD is calculated for 1 m² of insulation material with an R_D-value of 5.45 m².K/W and a thickness of 120 mm.

Further information can be found at https://www.recticelinsulation.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	11	Europe
Minerals	3	Europe
Fossil materials	86	Europe
Bio-based materials	0	Europe

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

FUNCTIONAL UNIT AND SERVICE LIFE

Mass per declared unit	4.7 kg
Functional unit	1 m² of thermal insulation board with a R_D-value of 5.45 m².K/W
Reference service life	50 years

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

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	x	x	MND	MND	MND	MND	MND	MND	MND	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	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

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.

PIR is formed via the reaction of polyester polyol with isocyanate (MDI). During the production process a blowing agent, flame retardant and additives are also added. The insulation panel is faced with a multilayer foil. The finished insulation boards are stacked on EPS blocks and wrapped in PE foil and moved to storage. After a curation period the boards are ready to be shipped to the customers.

The production waste due to cutting losses for example, and incoming packaging from our raw materials were also considered in the study. For this waste stream the same scenario as for the end of life module was used namely, 95% incinerated with energy recuperation and 5% goes to landfill. The waste transport was assumed to be done by a lorry over an estimated distance of 50 km.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is based on a weighted average of the deliveries in 2022. The average transportation distance is 289 km of which 216 km is done by lorry and 73 km by ferry. The volume capacity utilization factor is assumed to be 1 for the packaged products and empty returns are considered. An estimated installation loss of 2 % has been considered in A5. The waste treatment of the packaging material and the installation waste have been calculated. The packaging material is considered to be recycled. The installation loss is considered to be 95 % incinerated and 5 % goes to landfill. An estimated transportation distance of 50 km to the disposal area is used. This waste is assumed to be transported by lorry as this is most commonly used.

PRODUCT USE AND MAINTENANCE (B1-B7)

In general insulation materials are not replaced during the life span of a building. Additionally, PIR insulation doesn't need any maintenance during its lifetime. Therefore, the use and maintenance stage is not relevant and left out of scope.
Air, soil, and water impacts during the use phase have not been studied.

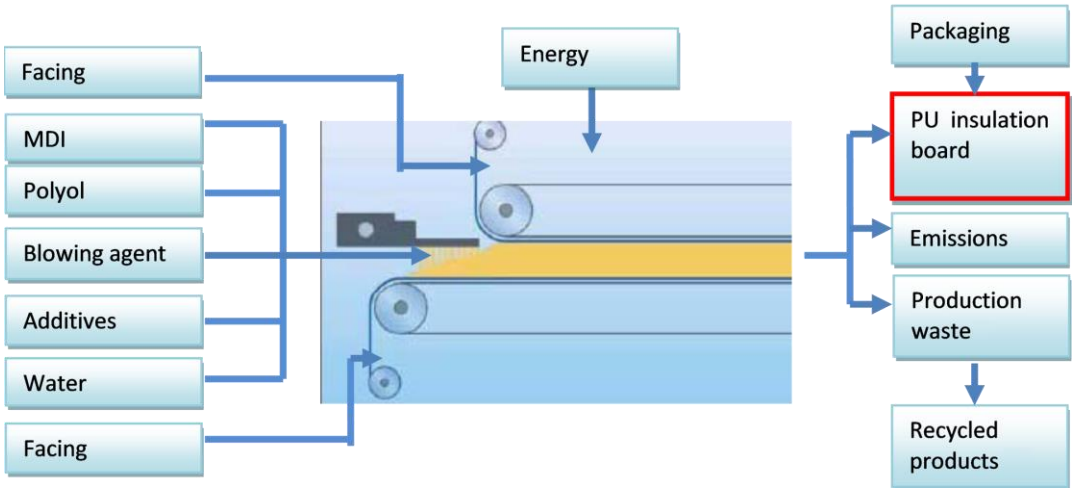
PRODUCT END OF LIFE (C1-C4, D)

It is assumed that the impact related to the demolition process is negligible (C1). The transportation to a disposal area is assumed to be done by lorry

over an estimated distance of 50 km (C2). As PIR insulation material has a relatively high caloric value it makes it suitable for incineration with energy recovery. That is why a scenario of 95 % of end- of life product is assumed to be incinerated (C3) and the remaining 5 % is sent to landfill (C4). The benefits of energy recovery from material incineration, namely electricity and heat production, are declared in module D. Additionally, the benefits and loads of the waste recycling of the packaging material (A5) are considered in module D.

MANUFACTURING PROCESS

A schematic overview of the production process for PU insulation boards is depicted in the following figure.



LIFE-CYCLE ASSESSMENT

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.

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:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	Not applicable

There is no average result considered in this study.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,51E1	4,86E-1	1,03E0	1,66E1	2,07E-1	5,4E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,69E0	2,16E-3	-5,56E0
GWP – fossil	kg CO_2e	1,52E1	4,86E-1	1,07E0	1,67E1	2,09E-1	5,43E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,7E0	2,16E-3	-5,54E0
GWP – biogenic	kg CO_2e	-1,11E-1	9,09E-5	-4,73E-2	-1,58E-1	0E0	-1,22E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-6,49E-3	4,88E-6	-7,15E-3
GWP – LULUC	kg CO_2e	1,73E-2	2,14E-4	2,87E-3	2,04E-2	9,2E-5	4,2E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,47E-4	2,22E-6	-8,59E-3
Ozone depletion pot.	kg $CFC_{-11}e$	1,46E-5	1,11E-7	5,38E-8	1,48E-5	4,71E-8	2,98E-7	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,99E-8	5,59E-10	-2,99E-7
Acidification potential	mol H^+e	5,23E-2	4,38E-3	2,52E-3	5,92E-2	1,94E-3	1,41E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,28E-3	1,73E-5	-4,25E-2
EP-freshwater[2)]	kg Pe	1,56E-3	3,11E-6	1,74E-5	1,58E-3	1,32E-6	3,19E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	7,62E-6	4,63E-8	-2,17E-4
EP-marine	kg Ne	1,01E-2	1,17E-3	6,05E-4	1,19E-2	5,18E-4	3,46E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,38E-3	5,25E-6	-5,03E-3
EP-terrestrial	mol Ne	1,1E-1	1,3E-2	6,48E-3	1,3E-1	5,74E-3	3,62E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,31E-2	5,8E-5	-5,9E-2
POCP ("smog")[3)]	kg NMVOCe	3,66E-2	3,66E-3	1,66E-2	5,68E-2	1,59E-3	1,38E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,85E-3	1,7E-5	-1,66E-2
ADP-minerals & metals[4)]	kg Sbe	7,21E-5	1,31E-6	2,16E-6	7,56E-5	6,52E-7	1,65E-6	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,41E-6	5,01E-9	-6,13E-6
ADP-fossil resources	MJ	7,28E1	7,11E0	1,59E1	9,59E1	3,01E0	2,08E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,2E0	4,5E-2	-7,31E1
Water use[5)]	m^3e depr.	-1,59E1	3,13E-2	3,21E-1	-1,56E1	1,3E-2	-3,05E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,68E-1	2,91E-4	-9,51E-1

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 PO4e; 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.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

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	8,52E-7	4,36E-8	1,63E-8	9,12E-7	1,59E-8	1,97E-8	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,29E-8	3,13E-10	-4E-7
Ionizing radiation[6)]	kBq U235e	5,94E-1	3,63E-2	4,57E-1	1,09E0	1,55E-2	2,28E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,02E-2	2,24E-4	-1,35E0
Ecotoxicity (freshwater)	CTUe	2,09E2	5,7E0	9,28E0	2,24E2	2,4E0	5,69E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,63E1	1,69E1	-1,27E2
Human toxicity, cancer	CTUh	1,14E-8	1,95E-10	2,92E-10	1,19E-8	8,62E-11	2,9E-10	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,89E-9	1,48E-12	-1,72E-9
Human tox. non-cancer	CTUh	3,66E-7	5,65E-9	5,83E-9	3,77E-7	2,32E-9	8,11E-9	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,06E-8	3,92E-11	-5,29E-8
SQP[7)]	-	1,81E1	5,8E0	6,77E0	3,07E1	1,84E0	7,34E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,84E-1	8,36E-2	-4,7E1

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.

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[8)]	MJ	1,76E1	9,06E-2	2,72E0	2,04E1	3,94E-2	4,16E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,22E-1	1,24E-3	-1,48E1
Renew. PER as material	MJ	2,79E-1	0E0	-2,69E-1	9,81E-3	0E0	-9,8E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	3,71E-1
Total use of renew. PER	MJ	1,78E1	9,06E-2	2,45E0	2,04E1	3,94E-2	4,06E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,22E-1	1,24E-3	-1,45E1
Non-re. PER as energy	MJ	2,68E2	7,11E0	1,5E1	2,9E2	3,01E0	5,96E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,2E0	4,5E-2	-7,01E1
Non-re. PER as material	MJ	1,12E2	0E0	-2,72E0	1,09E2	0E0	-2,21E0	MND	MND	MND	MND	MND	MND	MND	-4,97E0	0E0	-1,02E2	0E0	-3,23E-1
Total use of non-re. PER	MJ	3,79E2	7,11E0	1,23E1	3,99E2	3,01E0	3,75E0	MND	MND	MND	MND	MND	MND	MND	-4,97E0	0E0	-9,84E1	4,5E-2	-7,04E1
Secondary materials	kg	1,68E-1	2,37E-3	1,59E-3	1,72E-1	1,05E-3	3,69E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,16E-3	1E-5	4,15E-2
Renew. secondary fuels	MJ	1,7E-3	2E-5	1,51E-3	3,23E-3	9,9E-6	6,7E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,62E-5	4,02E-7	-3,32E-5
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	3,32E0	8,54E-4	3,59E-1	3,68E0	3,47E-4	7,39E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5,88E-3	4,44E-5	-5,46E-2

8) PER = Primary energy resources.

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	8,63E-1	8,15E-3	2,79E-2	8,99E-1	3,44E-3	1,86E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-4,29E-1
Non-hazardous waste	kg	9,78E0	1,3E-1	8,78E-1	1,08E1	5,54E-2	3,19E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,47E0	2,35E-1	-1,72E1
Radioactive waste	kg	1,99E-4	4,92E-5	1,01E-4	3,49E-4	2,08E-5	7,59E-6	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-3,86E-4

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	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	3,31E-2	3,31E-2	0E0	5,39E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	3,18E0	3,18E0	0E0	1,58E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	7,42E1	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

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_2e	1,46E1	4,82E-1	1,05E0	1,61E1	2,07E-1	5,3E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,66E0	2,1E-3	-5,43E0
Ozone depletion Pot.	kg $CFC_{-11}e$	1,93E-5	8,79E-8	4,74E-8	1,95E-5	3,73E-8	3,92E-7	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,77E-8	4,43E-10	-2,44E-7
Acidification	kg SO_2e	4,35E-2	3,46E-3	2,02E-3	4,9E-2	1,53E-3	1,14E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5,65E-3	1,34E-5	-3,63E-2
Eutrophication	kg PO_4^3e	1,67E-2	5,33E-4	1,16E-3	1,84E-2	2,34E-4	6,13E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	4,37E-3	3,34E-6	-7,8E-3
POCP (“smog”)	kg C_2H_4e	3,97E-3	1,08E-4	1,53E-4	4,23E-3	4,73E-5	8,8E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	7,27E-5	7,19E-7	-1,63E-3
ADP-elements	kg Sbe	7,5E-5	1,27E-6	2,13E-6	7,84E-5	6,38E-7	1,68E-6	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,13E-6	4,83E-9	-6,15E-6
ADP-fossil	MJ	3,79E2	7,11E0	1,72E1	4,04E2	3,01E0	8,23E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,2E0	4,5E-2	-7,18E1

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
22.05.2023

VERIFIED ISO 14025