epd-norge.no
The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Paroc AB
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1715-698-EN
Registration number:	NEPD-1715-698-EN
ECO Platform reference number:	
Issue date:	06.03.2019
Valid to:	06.03.2024

Paroc Building Insulation

Paroc WAS 35, Klimatskiva ZERO - ventilated facade system

Paroc AB

General information

Product:

Paroc WAS 35, Klimatskiva Zero - ventilated facade system
Solution used for a ventilated facade including stone wool insulation, wooden laths and screws.

Program operator:

The Norwegian EPD Foundation
P.O. Box 5250 Majorstuen, N - 0303 Oslo, Norway
Phone: +47 977 22 020
e-mail: post@epd-norge.no

Declaration number:

NEPD-1715-698-EN

ECO Platform reference number:

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR.
NPCR 012 version 2 PCR-Part B for Thermal insulation products is followed except that the reference quantity for the functional unit is given when integrated into the construction works.

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence.
EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 m² of external wall thermal insulation.
R-value is 6.05 m^2*K/W.

Declared unit with option:

-

Functional unit:

1 m² of external wall thermal insulation in Scandinavia for a period of 50 years, wood and concrete sub-construction.
Results related to an insulation thickness of 200 mm.
R-value is 6,05 m^2*K/W.

Verification:

The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

Third party verifier:

Martin Erlandsson, IVL
(Independent verifier approved by EPD Norway)

Owner of the declaration:

Paroc AB
Contact person: Josefina Johansson
Phone: + 46 (0) 500 46 90 05
e-mail: josefina.johansson@paroc.com

Manufacturer:

Paroc AB
S - 541 89 Skövde
Phone: + 46 (0) 500 46 90 00
e-mail: paroc.se@paroc.com

Place of production:

Hällekis, Sweden

Management system:

ISO 14001 and ISO 9001

Organisation no:

887294852

Issue date:

06.03.2019

Valid to:

06.03.2024

Year of study:

2019

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

The EPD has been worked out by:

Josefina Johansson

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Paroc WAS 35, Klimatskiva Zero

External insulation solution used for a ventilated facade including stone wool insulation, wooden laths and screws. The system can be used for both wooden and concrete facades. Used for new buildings and renovation.

Product specification:

The insulation slab is mounted to the facade with a system of wooden laths and screws. The cladding is not within the scope of this EPD. The insulation has a thickness of 200 mm. This is the most sold thickness, share over 50%, and therefore chosen. The insulation slab is produced in Hällekis, Sweden. The wooden lath is FSC certified fir and treated with a waterproof fire impregnation.

Market:

Market areas are Sweden, Norway and Denmark. The scenarious beyond cradle-to-grave are based on Norwegian market.

Technical data:

Product content:

Materials	kg/m^2	%
Mineral wool	14.00	87%
Wooden lath (FSC-certified fir)	1.73	10.7%
Screws	0.35	2%
Insulation holder	0.03	0.2%
Total Product	16.11	100%
Packaging	1.50	
Total: Product+Packaging	17.61	

Reference service life:

The reference service lifetime of Paroc WAS 35, Klimatskiva Zero is 60 years, equal to the reference service life of the building.

Products	Average density (kg/m^3)	Thickness (mm)	R (m^2*K/W)	Factor*
Paroc WAS 35, Klimatskiva Zero	70	100	3.00	0.6
Paroc WAS 35, Klimatskiva Zero	70	150	4.50	0.8
Paroc WAS 35, Klimatskiva Zero	70	200	6.05	1
Paroc WAS 35, Klimatskiva Zero	70	250	7.55	1.3

**Factors relevant for Environmental impact and Resource use table, production stage A1-A3.*

The calculation of the weight per square meter is done as follows:

m^2-weight insulation = density (kg/m^3) x insulation thickness (m)
(in order to meet a specified thermal resistance) =
m^2-weight insulation = density (kg/m^3) x R (m^{2}K/W) x lambda (W/mK) = kg/m^2

λ = 0,033 W/mK

LCA: Calculation rules

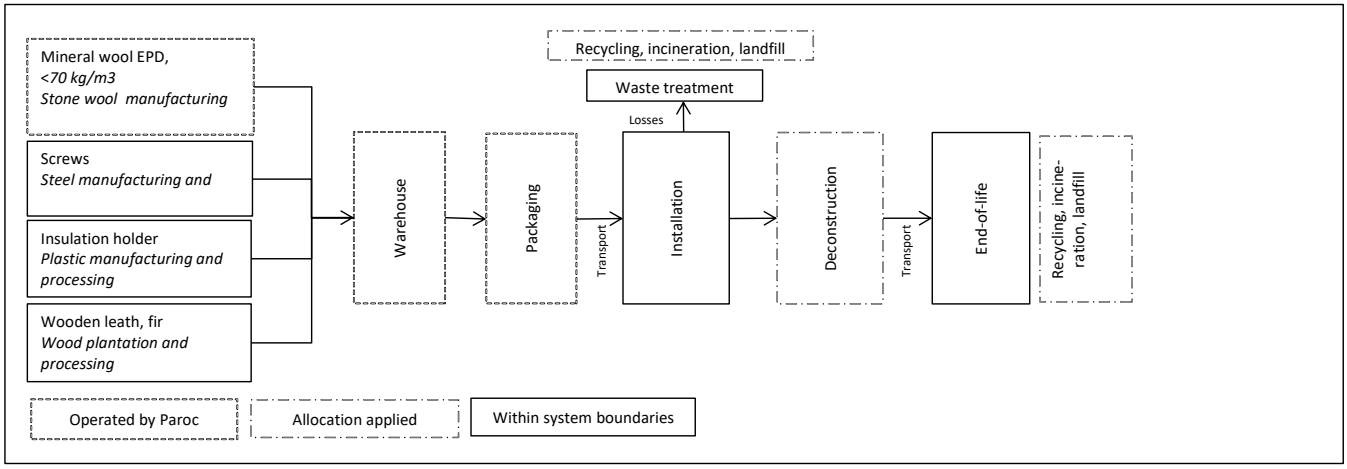
Functional unit:
1 m² of external wall thermal insulation in Scandinavia for a period of 50 years, wood and concrete sub-construction. Results related to an insulation thickness of 200 mm.
R-value is 6,05 m2*K/W.

System boundary:
EDP-type: Cradle to grave, included are:
Production stage (A1-A3), Installation stage (A4-transport to site, A5-installation into the building), End of life stages (C2-transport, C3-waste processing and C4-disposal) and Recovery and recycling (D). The deconstruction and demolition module C1 has not been taken into account for this EPD since different methods and tools can be used.

Production of stone wool takes place in Hällekis. The data for the stone wool is based on EPD published on Norwegian-EPD Programme, with reference NEPD00265.E. Therefore not modelled again for this EPD. Orders are put together in Hällekis and transported from there.

The following scenarios were considered in this study:
Modules A4: The avg.distance to building site is 500 km.
Modules A5: The installation requires hand-held tools. Estimated waste is 5%. Waste of stone wool is assumed landfilled. Screws will be recycled as iron. Plastic will be recycled or incinerated. Wood will be incinerated with energy recovery.
Modules C2-C4: Similar to installation scenario with similar kind of waste. In C2 a transport to waste treatment distance 50 km is assumed.
Module D: Credits from waste treatment (recycling and incineration with energy recovery) of product parts after use and from installation losses.

Figure 1. Schematic representation of LCA system boundaries for the production module (A1-A5) and the End-of-Life (C1-C4) and Recovery and recycling (D).



Data quality:
The stone wool production data is site specific from PAROC plant Hällekis in Sweden. Foreground data refer to the year 2015.

For life cycle modeling the GaBi ts Software System for Life Cycle Assessment, developed by Thinkstep AG, is used (/GaBi ts 2018/). All relevant background datasets are taken from the GaBi ts software database. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.
The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.
Background data refer to the years 2014 till 2017 (/GaBi ts 2018/) with a country specific scope as far as available, e.g. for raw material extraction and production, transportation, fuels and energy supply.
All relevant processes (foreground and background) have been considered when modelling stone wool production. The process data and the used background data are consistent. The data quality can be qualified as good.

Cut-off criteria:
All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

Allocation:
The allocation is made in accordance with the provisions of EN 15804.
Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

End of Life (C2, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	16.11
Reuse	kg	0
Recycling	kg	0.35
Energy recovery	kg	1.76
To landfill	kg	14

Paroc maintains and offers its customers a used product take-back system called "Paroc Re-Wool" to enable the recyling of old stone wool boards.

LCA: Results

Life Cycle Impact Assessment results represent the environmental impacts for the life cycle of Paroc WAS 35, Klimatskiva Zero from cradle to grave - with options.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage						End of life stage					Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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	MNR	MNR	MND	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP_{Tot}*	kg CO_2-eqv	9.97	0.695	2.82	0.0404	3.29	0.223	-2.8
ODP	kg CFC11-eqv	9.9E-09	1.9E-14	4.95E-10	1.1E-15	6.45E-14	5.06E-14	-4.45E-12
POCP	kg C_2H_4-eqv	0.00222	-0,000518	9.67E-05	-2.82E-05	2.52E-05	1.03E-04	-0.000492
AP	kg SO_2-eqv	0.0399	0.00156	0.0023	0.000087	0.000315	0.00132	-0.00521
EP	kg PO_4^{3-}-eqv	0.00739	3.92E-04	4.38E-04	2.19E-05	6.57E-05	1.82E-04	-0.000526
ADPM	kg Sb-eqv	7.09E-05	5.71E-08	2E-07	3.31E-09	3.14E-08	8.56E-08	-5.26E-07
ADPE	MJ	132	9.47	6.95	0.549	0.559	2.88	-34.5

*including 5,0 kg CO2-eq uptake of biogenic carbon dioxide included in product (3,2 kg) and packaging (1,8 kg).

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources.

Resource use

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
RPEE	MJ	17.7	-	-	-	-	-	-
RPEM	MJ	53.3	-	-	-	-	-	-
TPE	MJ	71	0.524	2.73	0.0304	0.108	0.37	-6.61
NRPE	MJ	132	-	-	-	-	-	-
NRPM	MJ	22.5	-	-	-	-	-	-
TRPE	MJ	155	9.5	8.28	0.55	0.671	2.99	-42.1
SM	kg	0.00322	-	-	-	-	-	-
RSF	MJ	-	-	-	-	-	-	-
NRSF	MJ	-	-	-	-	-	-	-
W	m^3	0.0578	9.66E-04	9.99E-03	5.59E-05	7.80E-03	5.71E-04	-0.00946

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HW	kg	7.36E-07	5.49E-07	6.26E-08	3.18E-08	4.19E-10	5.14E-08	-1.87E-08
NHW	kg	1.36	0.000796	0.775	4.61E-05	0.00734	14	-0.0268
RW	kg	0.00878	1.3E-05	5.19E-04	7.53E-07	4.46E-05	4.33E-05	-0.003

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
CR	kg	0	0	0	0	0	0	0
MR	kg	0	0	0	0	0.362	0	0
MER	kg	0.00896	0	1.39	0	1.76	0	0
EEE	MJ	0.103	0	4.05	0	4.69	0	0
ETE	MJ	0.226	0	7.47	0	8.42	0	0

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 = $9{,}0*10^{-3}$ = 0,009

Key environmental indicators	Unit	Cradle to gate A1-A3	Transport ****
Global warming	kg CO_2-eqv	9.97	0.70
Energy use (=TPE+TRPE)	MJ	226	-
Dangerous substances	*	-	-

* The product contain no substances from the Reach candidate list or the Norwegian priority list.

**** Transport from production site to central warehouse in Norway

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

National production mix from import, low woltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess (A3).

Data source	Amount	Unit
GaBi ts database SP 36 (2018)	0.044	CO_2-eqv/kWh

Dangerous substances

- ☑ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.
- ☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- ☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.

Dangerous substances

None of the following substances have been added to the product: Substances on the REACH Candidate list of substances of very high concern or substances on the Norwegian Priority list as of 03.09.2015 or substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations.

Transport

Transport from production site to central warehouse in Norway is: 245 km

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14040:2006	*Environmental management - Life cycle assessment - Principles and framework*
ISO 14044:2006	*Environmental management - Life cycle assessment - Requirements and guidelines*
EN 15804:2012+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
Dr. Iris Matzke, Yannick Bernard	*Background report for EPD of Paroc Parafon Acoustic Board and Zero insulation elements. Revised January 2019.*
PCR	*NPCR 010 rev1, Building Boards, The Norwegian EPD Foundation, 12/2013*

epd-norge.no The Norwegian EPD Foundation	**Program operator and Publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: e-mail: web	+47 977 22 020 post@epd-norge.no www.epd-norge.no
PAROC	**Owner of the declaration** Paroc AB SE-541 86 Skövde	Phone: e-mail: web	+46 (0) 500 46 90 00 paroc.se@paroc.com www.paroc.com
thinkstep	**thinkstep AG** Yannick Bernard Hauptstraße 111-113 70771 Leinfelden-Echterdingen	Phone: Fax e-mail: web	+49 (0) 711 34 18 17-0 +49 (0) 711 34 18 17-25 info@thinkstep.com www.thinkstep.com