ENVIRONMENTAL-PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	ROCKWOOL International A/S
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	03.07.2024

ROCKWOOL Technical Insulation
ROCKWOOL

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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General Information

ROCKWOOL

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-RWI-20180153-CBB2-EN

This declaration is based on the product category rules:

Mineral insulating materials, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

04.01.2019

Valid to

03.07.2024

Dipl.-Ing Hans Peters
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ROCKWOOL Technical Insulation

Owner of the declaration

ROCKWOOL International A/S
Hovedgaden 584
2640 Hedehusene
Denmark

Declared product / declared unit

1m^2 of stone
wool technical insulation product.

Scope:

The ROCKWOOL products considered in this EPD are mats, slabs and mandrel wound pipe sections used for Industrial and Marine & Offshore applications, belonging to the SeaRox and ProRox families. The declared technical insulation product in this EPD is 1m^2 of a ProRox LF 970 stone wool mat with a thickness of 40 mm, without facing. The corresponding thermal conductivity has been measured at 50ºC as per EN 12667.

For this EPD, the production locations which represent more than 80% of the total Technical Insulation production for 2017 are considered. The ROCKWOOL technical insulation products in this declaration are produced in Bohumin (Czech Republic), Dahej (India), Vamdrup (Denmark), Grand Forks (Canada), Marshall (USA), Roermond (Netherlands), Caparosso (Spain), Pencoed (UK), Rayong (Thailand) and Melaka (Malaysia).

For other specific ROCKWOOL products, the environmental impacts and indicators are determined by applying the appropriate scaling factors and products' RD value (please refer to section "Technical Data" for guidance). The LCA results of the facings are listed in the Annex.

The production data correspond to the year 2017.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A1. In the following, the standard will be simplified as *EN 15804 bezeichnet*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Dr. Frank Werner,
(Independent verifier)

Product

Product description/Product definition

ROCKWOOL stone wool insulation is a firesafe material for insulation against heat, cold, fire, vibrations and noise. It is traditionally made from volcanic rock (typically basalt or dolomite), an increasing proportion of recycled material, and a low percentage of resin binder (in ROCKWOOL Technical Insulation products this is up to 3%).

Stone wool insulation materials are fibre insulation materials. The essential components are stone wool thermal insulation fibres, monofilament synthetic mineral fibres of non-crystalline structure extracted from a silicate melt. The mean fibre diameter is 3-6

µm. The fibres can be up to several centimetres in length.

The unfaced and uncoated synthetic resin-bonded stone wool technical insulation materials described in this declaration are produced in the form of slabs, mats or mandrel wound pipes in the density range from 30 up to 140kg/m³. The products are supplied in thicknesses of 25 to 267 mm.

The calculation of the results for a specific product, which is mentioned in this EPD, are determined by applying the appropriate scaling factors and products R_D value. The assumed lambda, for the calculation of R_D value, correlates with the work temperature of 50°C.

The scaling factors, presented in the tables below, show how much to multiply the environmental burdens by, in order to obtain a thermal resistance of R_D=1 m² K/W with other ROCKWOOL products. The R_D values used for scaling give a very good indication of the amount of materials needed to achieve the desired insulation effect of other product types, but it is not an exact measure, in fact they can be considered a conservative indication of the final impacts, which in reality could be lower/better.

Stone wool insulation products marked with an asterix (*) in the table are sold with extra features for special applications e.g. with wire netting, a fleece or aluminium foil. The extra features are demonstrated in Annex. The impacts from the additional features shall be added to the final result.

The scaling calculation shall follow the following formula:

Environmental Impact per m^2 $_{\text{product X-with facing}}$ = Environmental Impact $_{\text{reference product}}$ * scaling factor + Environmental Impact $_{\text{facing material}}$

Product Name	scaling factor
ProRox MA520ALU	2,2
ProRox MA960	2,7
ProRox SL460	3,1
ProRox SL930	1,7
ProRox SL940	2,2
ProRox SL950	2,6
ProRox SL960	2,7
ProRox WM940	2,3

Product Name	scaling factor
ProRox WM950	2,6
ProRox WM960	3,3
ProRox WM967PF	3,3
ProRox WM970	4,3
SeaRox FB6050ALU	2,1
SeaRox MA720ALU	1,2
SeaRox SL436	4,1
SeaRox SL620ALU	3,3

For the mandrel wound pipe sections the scaling factors correspond to pipe length of 1 m. The factors are calculated according to the density of the two different ProRox products (PS 960 and PS 970), the external diameters of the uninsulated mandrel wound pipe (in mm and inches) and the different thicknesses of the mandrel wound insulation pipe. The input data is according to the technical information that you find in the /ProRox process manual/.

SCALING FACTORS PROROX PS960

Pipe Diameter (mm, inch)		Insulation Pipe Thickness (mm) 25	30	40	50	60	65	70	75	80	90	100
28	0,75	0,4	0,5	0,7	1,1	1,4	1,6	1,8	2,1	2,3	2,9	3,5
35	1	0,4	0,5	0,8	1,1	1,5	1,8	2,0	2,2	2,5	3,0	3,6
48	1,5	0,5	0,6	0,9	1,3	1,7	2,0	2,2	2,5	2,8	3,3	4,0
60	2	0,6	0,7	1,1	1,5	1,9	2,2	2,5	2,7	3,0	3,6	4,3
89	3	0,8	1,0	1,4	1,9	2,4	2,7	3,0	3,3	3,6	4,3	5,1
114	4	0,9	1,2	1,7	2,2	2,8	3,1	3,5	3,8	4,2	5,0	5,8
169	6	1,3	1,6	2,3	3,0	3,7	4,1	4,5	4,9	5,4	6,3	7,3
219	8	1,6	2,0	2,8	3,6	4,5	5,0	5,5	5,9	6,5	7,5	8,6
324	12	2,4	2,9	3,9	5,0	6,2	6,8	7,4	8,1	8,7	10,0	11,4
406	16		3,5	4,8	6,1	7,5	8,3	9,0	9,7	10,5	12,0	13,6
610	24			7,0	8,9	10,8	11,8	12,8	13,9	14,9	17,0	19,1
813	32			9,2	11,6	14,1	15,4	16,7	18,0	19,3	21,9	24,6

SCALING FACTORS PROROX PS970

Pipe Diameter (mm, inch)		Insulation Pipe Thickness (mm) 25	30	40	50	60	65	70	75	80	90	100
28	0,75	0,5	0,6	1,0	1,4	1,9	2,2	2,5	2,8	3,2	3,9	4,7
35	1	0,5	0,7	1,1	1,6	2,1	2,4	2,7	3,0	3,4	4,1	4,9
48	1,5	0,7	0,9	1,3	1,8	2,4	2,7	3,0	3,4	3,8	4,6	5,4
60	2	0,8	1,0	1,5	2,0	2,6	3,0	3,3	3,7	4,1	4,9	5,9
89	3	1,0	1,3	1,9	2,5	3,3	3,7	4,1	4,5	5,0	5,9	6,9
114	4	1,3	1,6	2,3	3,0	3,8	4,3	4,7	5,2	5,7	6,7	7,8
169	6	1,8	2,2	3,1	4,0	5,0	5,6	6,1	6,7	7,3	8,5	9,9
219	8	2,2	2,7	3,8	4,9	6,1	6,8	7,4	8,1	8,8	10,2	11,7
324	12	3,2	3,9	5,3	6,9	8,4	9,3	10,1	11,0	11,8	13,7	15,5
406	16		4,8	6,5	8,4	10,2	11,2	12,2	13,2	14,3	16,4	18,5
610	24			9,5	12,1	14,7	16,1	17,4	18,8	20,2	23,1	26,0
813	32			12,5	15,8	19,2	20,9	22,7	24,4	26,2	29,8	33,5

For ProRox products (with the exception of ProRox LF 970) from European factories the Regulation (EU) No 305/2011 applies, for the placing on the market of construction products in the European Union/EFTA (with the exception of Switzerland),. The products need a Declaration of Performance taking into consideration the harmonized product standard /EN 14303/ “Thermal insulation products for building equipment and industrial installations, factory made mineral wool (MW) products – specification" and the CE-marking. For the applications and use, national regulations apply.

For SeaRox products and ProRox LF 970 the respective national provisions at the place of use apply for the use and application of the product.

Application

The products covered in this EPD are used for technical insulation applications such as insulation of pipelines, including district heating pipelines, boilers, vessels, tanks, columns and other industrial equipment. Marine and Offshore applications include additionally bulkheads and decks, doors, technical installations including HVAC, fire doors, wall and ceiling panels

etc. for all kind of commercial vessels, cruise liners, passenger vessels, naval ships etc. and fixed and floating offshore equipment.

Technical Data

The technical specifications for the products described in the EPDs are given by the range below, measured based on the given standards. For the product specific characteristics please refer to the manufacturers' specifications, available in /ProRox - Industrial insulation: product catalogue/.

Constructional data

Name	Value	Unit
Thermal conductivity /EN 12667/	0.035 - 0.04	W/(mK)
Water vapour diffusion resistance factor /EN 12086/	μ=1	-
Water vapor diffusion equivalent air layer thickness	-	m
Sound absorption coefficient	-	%
Gross density	30 - 140	kg/m^3
Compressive strength	-	N/mm^2
Maximum Service Temperature /EN 14706/	680	°C
Reaction to Fire /EN 13501-1/	Euroclass A1	
Water Absorption /EN 1609/	<1	kg/m2
AS quality /EN 13468/	<10	ppm

The ProRox technical insulation products (with the exception of ProRox LF970) and mandrel wound pipe sections from European factories
are CE marked in accordance with the CPR (Construction Products Regulation) (/Regulation no. 305/2011/), based on the harmonised product standard /EN 14303/: “Thermal insulation products for
building equipment and industrial installations, factory made mineral wool (MW)
products – specification".

For SeaRox products and ProRox LF970 the performance data of
the product with respect to its characteristics are in accordance with the
relevant technical provision (no CE-marking).

Base materials/Ancillary materials

The raw materials are non-scarce natural stone,briquettes and secondary raw materials in a percentage up to 95%. The briquettes are made of rock mineral wool waste and cement. The binder is a water-based phenol-formaldehyde resin which is polymerized into solid resin during production of the final stone wool product and is contained in lower than 3%. Additionally, quantities of max. 0.2% aliphatic mineral oil and max. 0.1% bonding agent (aminosilane) are included. Packaging material is less than 2% of the product. No other auxiliaries or additives are used for the unfaced/uncoated products.
The raw materials, the production process and the facing options do not contain any substances of very high concern (SVHC),

Mineral wool fibers produced by ROCKWOOL are classified as **non-hazardous** under /REACH/ (Regulation (EC) No 1272/2008 of the European parliament and of the council of 16 December 2008 on classification, labeling and packaging of substances and mixtures). ROCKWOOL are registered with REACH under the following definition: “Man-made vitreous (silicate) fibers with random orientation with alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content greater than 18% by weight and fulfilling one of the Note Q conditions”. The products in this declaration do **not** contain substances listed in the candidate list (date: 10.09.2018) exceeding 0.1 percentage by mass.
ROCKWOOL products produced in Europe fulfil the Note Q requirements. This is certified by the independent certification body EUCEB (European Certification Board for mineral wool products).
More information on EUCEB can be found at /www.euceb.org/.
The International Agency for Research on Cancer (IARC), part of the World Health Organization, revised its classification of mineral wool in October 2001, including them in Group 3 as an agent “not classifiable as to its carcinogenicity to humans”.

Environment and health during use

Reference service life

When used correctly, the service life of ROCKWOOL stone wool is only limited by the service life of the equipment where it is placed. A reference service life according to /ISO 15686/ does not need to be declared. For the purpose of this EPD the proposed service life is considered to be 50 years.

LCA: Calculation rules

Declared Unit

The specific product referred to in the declared unit is 1m2 of ProRox LF 970 stone wool mat with a thermal resistance of RD=1 m2 K/W.
The reference product
is 40 mm thick ROCKWOOL stone wool with a density of 30 kg/m^3.
For the calculation of the results in this declaration averages are formed on the basis of the production volumes at the plants. The unfaced and uncoated stone wool products do not display any differences in terms of the production process or production technology. For certain applications, the insulation materials are provided with a functional facing on one or both sides. For the environmental impacts of the facing options please refer to Annex. If the product comes with a functional facing, the environmental impacts of the unfaced product and the facing option shall be aggregated.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Gross density	30	kg/m^3
Surface	1	m^2
Weight	1.2	kg
Conversion factor to 1 kg	0.833	-

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representativeness and the influence of background data and preliminary products compared to the environmental impacts caused by actual

production.

System boundary

The type of this EPD is **cradle to grave.**
The modules considered in the life cycle assessment as per system boundaries, outlined in section 5.5. of the /PCR/ Part A:"Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report" are described as follows:
The product stage **A1-A3** includes:

- Provision of preliminary products and energy and relevant upstream processes
- Transporting the raw materials and preliminary materials to the plant
- Production process in the plant including energy inputs and emissions
- Electricity consumption
- waste processing up to the end-of-waste state or disposal of waste residues, during the production stage.
- Production of packaging
- manufacturing of products and co-product

In the product system under assessment, the slags, alumina and ashes are considered by-products from the steel and coal fired electricity production respectively with the application of economic allocation so their environmental impact is accounted for. Recycled stone wool comes free of environmental burden, as it enters the product system as waste. Recycled fuels also come free of environmental burden, but their transport to the factory is accounted for.
During the melting of raw materials pig iron is created in the cupola furnace. Pig iron is a co-product, which is subsequently sold to the market and economic allocation is applied.
ROCKWOOL supplies district heating in some of the factories. The amount of excess heat to district heating, was substituted by using the energy content as the substitution key. The emissions associated with energy production have been substituted in
the same way.
Modules A1, A2 and A3 are be declared as an aggregated Module A1-3
The Construction Stage **A4-A5** includes:

- A4 transport to the building site
- A5 installation to the buidling

The transport in A4 is modeled by volume, as the most conservative approach. The default vehicle is the truck and all the values are based on annual average delivery data
In A5 the default installation is assumed to be manual, therefore no energy consumption or anicllary equipment is needed. The product waste from installation is assumed to be 2% and according to the modularity principle of /EN15804/ its impacts are fully allocated to A5. The A5 stage includes also waste processing up to the end-of-waste state or disposal of final residues during the construction process stage and impacts and aspects related to product losses during installation.
Finally, the A5 module includes also the corresponding end-of-life considerations for packaging. The credits from heat and electricity recovery from incineration, or material recycling from module A5 are attributed to module D.
The use-stage **B1-B7**, related to the building fabric includes:

- B1 use or application of the installed product;
- B2 maintenance; ROCKWOOL products do not require maintenance during use in standard conditions and if correctly applied (according to manufacturer instructions). The default environmental impacts are in this case
assumed to be zero;
- B3 repair; ROCKWOOL products are not repaired during use in standard conditions and if correctly applied (according to manufacturers' instructions). The default environmental impacts are in this case assumed
to be zero;
- B4 replacement; ROCKWOOL Group products will not be replaced
during use in standard conditions and if correctly applied (according to manufacturers' instructions). The default environmental impacts are in this case assumed to be zero;
- B5 refurbishment; ROCKWOOL products are not refurbished during use in standard
conditions and if correctly applied (according to manufacturers' instructions). The default environmental impacts are in
this case assumed to be zero.
- B6
– Operational energy use: ROCKWOOL products do not use energy during use of the building.
The default environmental impacts are zero.
- B7 –
Operational water use: ROCKWOOL products do not use water during use of the building. The default environmental impacts are zero.

The End-of-life stage **C1-C4** includes:

- C1 de-construction, demolition;
- C2 transport to waste processing;
- C3 waste processing for reuse, recovery and/or recycling;
- C4 disposal.

These stages also include provision and all transport, provision of all materials, products and related energy and water use. Manual deconstruction is assumed for C1, therefore no impacts are assigned. The credits from disposal (heat or electricity recovery) are assigned to module D.

Module D includes reuse, recovery and/or recycling potentials expressed as net impacts and benefits. Here the credits for the packaging disposal in A5 and the recycling potential of ROCKWOOL material in C are considered.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The used software for the development of the declaration was /GaBi/, version 8.0.1.257 by thinkstep.

LCA: Scenarios and additional technical information

The following technical information for the declared modules can be used for scenario development in a building context.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel /volumetric transport formula considered/	38	l/100km
Transport distance /weighted average from factory specific distances/	400	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	40	kg/m^3

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	-	kWh
Material loss	2	%

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	50	a
Selected declared properties (*declared as relevant for intended use)	EN 14303/ “Thermal insulation products for building equipment and industrial installations, factory made mineral wool (MW) products – specification" and the CE-marking	
Design Application parameters, including references to the appropriate practices	See installation guidelines. Installation to be conducted in accordance with manufacturers guidelines	
Quality of work assumption when installed in accordance with the manufacturers instructions	It is assumed that the manufacturer’s instructions are clear and followed. In case of any uncertainty the manufacturer should be contacted for instructions	
Outdoor environment, e.g. weathering, pollutants, UV and wind	When used outdoor products should be shielded as per application guidelines	
Indoor Environment, e.g. temperature, moisture etc.	Not in direct contact with indoor environment, except if specifically stated on the product.	
Usage conditions, e.g. frequency of use, mechanical exposure etc.	No usage conditions, except if specifically stated on the product. Please follow manufacturer’s guidelines	
Maintenance, e.g. required frequency, type and quality of replacement components	Please refer to manufacturer guidelines. In case of any uncertainty the manufacturer should be contacted for instructions.	

For design applications, please refer to the manufacturer's guidelines. The life span value applies only under the assumption
of proper installation and use conditions under the manufacturers
specification.

End of life (C1 - C4)

Name	Value	Unit
Recycling	0.04	kg
Landfilling	1.16	kg
Transport to landfill	50	km
Transport to Recycling	150	km
utilization rate	50	%

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Any declared benefits and loads from net flows leaving the product
system that have not been allocated as co-products and that have passed
the end-of-waste state are included in module D. Such declared benefits
can for ROCKWOOL products occur in stages A5, C3 and C4. The generated
energy, such as heat and electricity from waste incineration are assigned to module D. The benefits are calculated using current average
substitution processes. The heat is credited for with heat from natural
gas. The electricity is credited for with the specific country’s electricity mix. This is also applied for materials that are landfilled as
the avoided impact of electricity production and/or thermal energy
recovery from landfill gas recovery is included in module D. For the
recycling of stone wool it is important that no double counting occurs.
The outputs of waste stone wool from modules A5 and C1 are considered
linked to the inputs of waste stone wool into A1. Therefore only the net
output flow (output from A5 plus C1 minus input to A1) is considered as
a net output flow from the system and considered in Module D.

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	X	MNR	MNR	MNR	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m2 technical insulation product with RD=1 m2K/W

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
GWP	kg CO_2 eq	1.41E+00	2.36E-01	5.04E-02	IND	IND	IND	0	4.52E-03	0	1.88E-02	-4.14E-02
ODP	kg CFC11 eq	4.28E-09	7.85E-14	8.59E-11	IND	IND	IND	0	1.5E-15	0	1.9E-14	-7.55E-14
AP	kg SO_2 eq	8.34E-03	2.15E-04	1.87E-04	IND	IND	IND	0	4.32E-06	0	1.11E-04	-1.58E-04
EP	kg PO_4^3 eq	8.71E-04	4.5E-05	2.09E-05	IND	IND	IND	0	9.19E-07	0	1.51E-05	-1.02E-05
POCP	kg Ethen eq	5.19E-04	1.03E-06	1.16E-05	IND	IND	IND	0	-5.66E-08	0	8.74E-06	-2.14E-05
ADPE	kg Sb eq	5.65E-07	1.88E-08	1.63E-08	IND	IND	IND	0	3.6E-10	0	6.73E-09	-5.63E-09
ADPF	MJ	1.47E+01	3.23E+00	4.42E-01	IND	IND	IND	0	6.19E-02	0	2.43E-01	-1.31E+00

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

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m2 technical insulation product with RD=1 m2K/W

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2.85E+00	1.63E-01	2.82E-02	IND	IND	IND	0	3.12E-03	0	2.93E-02	-3.88E-02
PERM	MJ	2.33E-01	0	-2.28E-04	IND	IND	IND	0	0	0	0	0
PERT	MJ	3.08E+00	1.63E-01	2.8E-02	IND	IND	IND	0	3.12E-03	0	2.93E-02	-3.88E-02
PENRE	MJ	1.28E+01	3.24E+00	1.68E-01	IND	IND	IND	0	6.21E-02	0	2.52E-01	-1.4E+00
PENRM	MJ	2.59E+00	0	-5.71E-02	IND	IND	IND	0	0	0	0	0
PENRT	MJ	1.54E+01	3.24E+00	1.11E-01	IND	IND	IND	0	6.21E-02	0	2.52E-01	-1.4E+00
SM	kg	6.63E-02	0	0	IND	IND	IND	0	0	0	0	3.38E-02
RSF	MJ	0	0	0	IND	IND	IND	0	0	0	0	0
NRSF	MJ	0	0	0	IND	IND	IND	0	0	0	0	0
FW	m^3	8.85E-03	3.01E-04	6.4E-05	IND	IND	IND	0	5.77E-06	0	4.79E-05	-6.45E-04

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 = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m2 technical insulation product with RD=1 m2K/W

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
HWD	kg	5.75E-07	1.7E-07	1.65E-10	IND	IND	IND	0	3.26E-09	0	3.98E-09	-1.47E-10
NHWD	kg	1.28E-01	2.48E-04	5.5E-03	IND	IND	IND	0	4.75E-06	0	1.17E+00	-1.4E-03
RWD	kg	2.16E-04	4.43E-06	1.06E-05	IND	IND	IND	0	8.47E-08	0	3.43E-06	-9.59E-07
CRU	kg	0	0	0	IND	IND	IND	0	0	0	0	0
MFR	kg	0	0	2.27E-02	IND	IND	IND	0	0	3.24E-02	0	0
MER	kg	0	0	0	IND	IND	IND	0	0	0	0	0
EEE	MJ	0	0	7.73E-03	IND	IND	IND	0	0	0	0	0
EET	MJ	0	0	1.76E-02	IND	IND	IND	0	0	0	0	0

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

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