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ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	ROCKWOOL International A/S (ROCKWOOL Nordics)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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ROCKWOOL stone wool thermal insulation

ROCKWOOL International A/S (ROCKWOOL Nordics)

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

General Information

ROCKWOOL International A/S (ROCKWOOL Nordics)

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-RWI-20190050-CBD1-EN

This declaration is based on the product category rules:
Mineral insulating materials, 12.2018
(PCR checked and approved by the SVR)

Issue date
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Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Head of Board IBU)

ROCKWOOL stone wool Thermal Insulation

Owner of the declaration
ROCKWOOL International A/S (ROCKWOOL Nordics)
Hovedgaden 501
DK-2640 Hedehusene
Capital Region of Denmark

Declared product / declared unit
1m^2 of stone wool thermal insulation product with a thermal resistance of R=1 m^{2}K/W.

Scope:
The spectrum of products, which are contained in this EPD refer to thermal insulation products, for use in building applications with a range of densities from 25 to 285 kg/m^3. The declared reference product in this EPD is 1m^2 B-plate stone wool slab for insulation of new and existing buildings in walls, attics, joints, partitions etc. It has a thermal resistance of R_D=1 m^2 K/W. The corresponding thermal conductivity has been measured at a mean temperature of 10°C as per EN 12939.

The ROCKWOOL thermal products presented in this declaration are produced in Moss (Norway), Trondheim (Norway), Vamdrup (Denmark) and Doense (Denmark). The properties of the ROCKWOOL products from the different production sites are identical. The EPD is based on LCA inventory data from the 4 plants. The reference flow is a weighted average based on the distribution of production capacity between the 4 plants. For additional information, all 4 plants are certified *with ISO 14001:2015 Environmental management systems -- Requirements with guidance for use*. Applicability for ISO 14001:2015 is development, production, sale and supply of Rockwool. Certificates will be sent on request.

For other specific ROCKWOOL products, the environmental impacts and indicators are determined by applying the appropriate scaling factors and products' R_D value (please refer to section "Technical Data" for guidance).

The LCA results of the facings are listed in the Annex, accompanying this EPD. 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.

Verification

The standard /EN 15804/ serves as the core PCR
Independent verification of the declaration and data according to /ISO 14025:2010/
☐ internally ☒ externally

Dr. Frank Werner
(Independent verifier appointed by SVR)

Product

Product description / Product definition
ROCKWOOL stone wool thermal 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.
The unfaced and uncoated synthetic resin-bonded stone wool thermal insulation materials described in this declaration are produced in the form of slabs, granulate, rolls or shade articles in the density range from 25 up to 285 kg/m³.
For other products please refer to the scaling factors and products R_D value. The scaling factors, presented in the tables below, show how much to multiply the impacts by, in order to obtain a thermal resistance of R_D=1 m² K/W with other ROCKWOOL products.

Stone wool insulation products marked with an asterix (*) in the table are sold with extra features for special applications e.g. with a fleece, aluminium foil etc. The extra features are demonstrated in the 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 $_{\text{facing material}}$
Note that, for different R values (where the thickness is not equal with the thermal conductivity) the final scaling factor is given by multiplication with the real R value. This can be explained below:
Environmental Impact $_{\text{Rreal}}$ = Environmental impact $_{\text{R=1}}$ * R_{real}

Product Name		Scaling Factor
A-Batts		1,1
A-Murbatts		1,1
A-Pladebatts 10		2,1
A-Plate		1,2
A-Rullebatts		1,2
A-Takstolplate m/papir		1,1
BD-60 FLEXIBATTS		1,3
BETONELEMENTSBATTS 34/BETONGELEMENTPLATE 34		2,4
BLÅSEULL *	60 kg/m³	2,3
	65 kg/m³	2,5
	70 kg/m³	2,7
B-Plate		1,0
Brannplate 50		1,9
Bygg 100		3,5
Bygg 90		3,2
BYGGRULLE M VINDSKYDD		1,1
CONCRETE LAMELLA 39		2,5
Drensplate		4,1
Duo Energy		5,4
Facadelamel Energy		2,9
Fallplate 0-50		5,7
Fallunderlagsplate/Fallunderlag		4,1
FasadBatts		3,3
FlexEkstrem 33		1,7
FLEXI	Flexi 35L Plate	1,2
	Flexi A-Plate	1,1
	Flexi A-Plate papir	1,1
	Flexibatts	1,2
	Flexibatts 32	2,1
	Flexibatts 34	1,4
	Flexibatts 35/Flexi 35 A-Plate	1,3
	Flexibatts 37	1,2
Floorrock	SE 15-5	3,4
	TE	3,6
GRANULAT PRO *	28 kg/m³	1,1
	50 kg/m³	1,9
	35 kg/m³	1,3
	43 kg/m³	1,6

Product Name		Scaling Factor
Hardkile / HardRock Energy Takfall / HardRock Takfall		6,8
Hardkile 50/65 / HardRock Energy Takfall 50/65 / HardRock Takfall 50/65		5,1
Hardkile 65/80 / HardRock Energy Takfall 65/80 / HardRock Takfal 65/80		4,9
Hardkile Kehl /Hardrock Takfall Kileplate / Hardrock Takfall Kilskiva		6,8
Hardrock Elementbatts		2,2
Hardrock Energy	180mm	3,6
	150mm	3,7
	120mm	3,9
	100mm	4,0
	80mm	4,1
	50mm	4,7
Hardrock Fasad/ Hardrock Fasad HFS/ Hardrock Fasadeplate / Facadebatts	180mm	3,7
	190mm	3,7
	200mm	3,7
	150mm	3,8
	170mm	3,8
	120mm	3,9
	100mm	4,0
	70mm	4,1
	80mm	4,1
	60mm	4,2
Hardrock Fasad/ Hardrock Fasad HFS/ Hardrock	50mm	4,3
	30mm	5,2
	25 mm	7,0
HULRUMSFYLD *	60 kg/m³	2,2
	65 kg/m³	2,4
I-Plate A		1,1
Kasserendekile / TF-Renneplate / Fallränna TF		6,8
Kondensplade		6,8
Lafteremse		1,5
Lett-Tak 35L		1,2
Lett-Tak 37		1,1
Lindab Plate Base		3,5
Lindab Plate Plus		5,6
LYDABSORPSJON STAV		1,1
Lydplate		1,9
Lydunder lagsplade/ Ljudunder lagsskiva/ Lydunder lagsplate		3,8

Product Name		Scaling Factor
Løsull *	28 kg/m³	1,2
	60 kg/m³	2,3
	65 kg/m³	2,5
	70 kg/m³	2,7
Markplate /Markskiva		5,0
Murbatts	32	2,1
	34	1,4
	37	1,1
MURKRONEPLADE TW1		4,1
Murplate		1,5
Nivell -/Subfloor-Skiva		1,5
OEM A-BATTS		1,1
OEM Flexi A-Batts		1,2
Panelbatts **	125	5,6
	85	3,5
PLÅTUNDERLAGSSKIVA 80		2,8
Rafteplate		1,0
REDAir BATTS		2,6
REDAir PLATE		2,6
Regelskiva med vindskydd		1,1
ROCKFILL *	28kg/m³	1,1
	35kg/m³	1,3
	43kg/m³	1,6
	50kg/m³	1,9
ROCKORBIT		2,0
Rockprofil Batts	180mm	1,9
	190mm	1,9
RockTorv	100mm	4,0
	150mm	3,8
	180mm	3,8
	50mm	4,4
ROCKVEGG 33		2,3
Roxremsa		1,5
Roxull Vindsull 45kg/m³		1,9
RP-KGD		6,2
SKALMURSSKIVA		1,9
Skillevægsbatts		1,2
Sonorock Plus		1,1
SONOROCK WLG35		1,4
STØPEPLATE PLUSS	100mm	3,8
	150mm	3,7
	50mm	4,3
	80mm	4,0

Product Name		Scaling Factor
Stålregelskiva	37	1,1
	40	1,1
Stålstenderplate		1,1
Stålunderlag Energy	50mm	4,1
	60mm	3,6
	80mm	4,2
Super A-Batts DANHAUS		1,6
Super Venti-Batts	100mm	2,2
	125mm	2,1
	150mm	2,1
	175mm	2,1
	200mm	2,0
	250mm	2,0
	75mm	2,3
	Takkil	5,7
Terrænbatts Erhverv/TERRA ENBATTS ERHV	200mm	3,6
	125mm	3,8
	100mm	3,8
	75mm	4,0
	50mm	4,3
Tetteremse		1,5
TF-Kile / TF-Fallplate / Ränndalskil TF		6,8
TF-Plade (20-30mm) / TF-Plate (20-30) / Takboard (20-30mm)		6,8
TF-Plade (31-100mm) / TF-Plate (31-100) Takboard (31-100mm)		6,4
TF-Skotrendekile / TF-Takkile / Ränndalskil 180		6,8
THERM 321 SKIVA		2,9
Topplate TP 50		5,4
TOPROCK CTF Lamella		2,5
TOPROCK Lamella		2,5
TOPROCK TERRACE Lamella		6,6
TOPROCK TERRACE Topboard		12,0
TOPROCK Topboard		6,4
Trapetsstav / Trapetsstavar		2,8
TRINLYDSBATTS		5,0
Trinnlydplate / STEGLJUDSSKIVA		5,7
Tung Plate 150		4,7
Underlag Energy		3,3
VÄGGBOARD		5,7
Västkustskiva		3,9

For the placing on the market of the products covered in this EPD, as presented in the table above, the Regulation /(EU) No. 305/2011 Construction Products Regulation (CPR)/ applies in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland). The product needs a declaration of performance taking into consideration /EN 13162:212+A1:2015/: "Thermal insulation products for buildings. Factory made mineral wool (MW) products - Specification" and the CE-marking. Small exceptions are the products with (*) on the table above, where /EN 14064-1:2010/: "Thermal insulation products for buildings. In-situ formed loose-fill mineral wool (MW) products - Specification for the loose-fill products before installation" and the CE-marking apply. For the application and use the respective national provisions apply.

Finally, for the products with (**) on the table above the respective national provisions at the place of use apply for the use and application of the product.

Application
The spectrum of products, which are contained in this EPD refer to thermal insulation products, in the form of slabs, rolls, granulate or shade articles for use in building applications with a range of densities from 25 to 285 kg/m³.

Technical Data
For the products where the above range of declared properties apply, the performance data are in accordance with the declaration of performance with respect to its essential characteristics according to /EN 13162:2012+A1:2015/, "Thermal insulation products

for buildings – Factory made mineral wool (MW) products – Specification".
The technical specifications for the products described in the EPD are given by the range below based on the reference standards. For the product specific characteristics please refer to the manufacturers' specifications, available online in https://www.rockwoolgroup.com/.

Technical data

Name	Value	Unit
Thermal conductivity /EN 12939 and EN 12667/	0.032 - 0.047	W/(mK)
Thickness Class /EN 823, EN 12431/	T1-T8	
Fire Class /EN 13501-1:2007+A1:2009/	A1, A2-s1, d0	
Length and width /EN 822/	≤Length ±2%, ≤Width ±1.5 %	
Compressive Strength /EN 826/	CS(10)10 to CS(10)250	
Dynamic Stiffness /EN 29052-1/	SD30 to SD90	
Dimension Stability at spec. temperature and humidity /EN 1604/	DS(70,90)	
Tensile strength perpendicular to faces /EN1607/	TR7.5 to TR10	
Water vapour diffusion resistance factor /EN12086/	MU1	
Point Load /EN12430/	PL(5)250 to PL(5)2000	

Base materials / Ancillary materials
The average composition used for this EPD is the following (based on average factory consumption figures for raw materials as a conservative approach):

- non-scarce natural stone and cement [75%]
- slags and other secondary or waste materials [17,5%]
- mineral oil and bonding agent [0,3%]
- binder [7,2%]

Packaging represents 7% of the final product delivered to the customer. The raw materials are non-scarce stones, secondary materials and briquettes, which are made of rock mineral wool waste, other secondary materials 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 4% for general building insulation 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, labelling 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”. ROCKWOOL products produced in Europe fulfill 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/.
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Reference service life
When used correctly, the service life of ROCKWOOL stone wool is only limited by the service life of the building component where it is placed. For the purpose of this EPD the reference service life is considered to be minimum 60 years, which is usually the assumption about the lifetime of the building where this is installed.

LCA: Calculation rules

Declared Unit
The specific product, referred to in the declared unit is 1m2 of B-Plate stone wool batt with a thermal resistance RD=1m2K/W.
The reference product is a 40mm thick ROCKWOOL stone wool board with a density of 25kg/m3.
For the calculation of the results in this declaration averages are formed on the basis of the production volumes at the plants. . This approach is considered conservative, as it contains increased binder composition as contained in higher density and speciality products. 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 the 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	25	kg/m^3
Surface	1	m^2
Weight	1	kg
Conversion factor to 1 kg	1	-

System boundary
<u>The type of this EPD is cradle to grave.</u>
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 co-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 the two factories in Denmark (Doense, Vamdrup) and in the factory in Trondheim (Norway). For the Danish factories, 7% and 20% of the heating energy consumed, respectively, is supplied and therefore allocated to district heating. 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 to be declared as an aggregated Module A1-3.

The Construction Stage **A4-A5** includes:

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

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 ancillary 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.

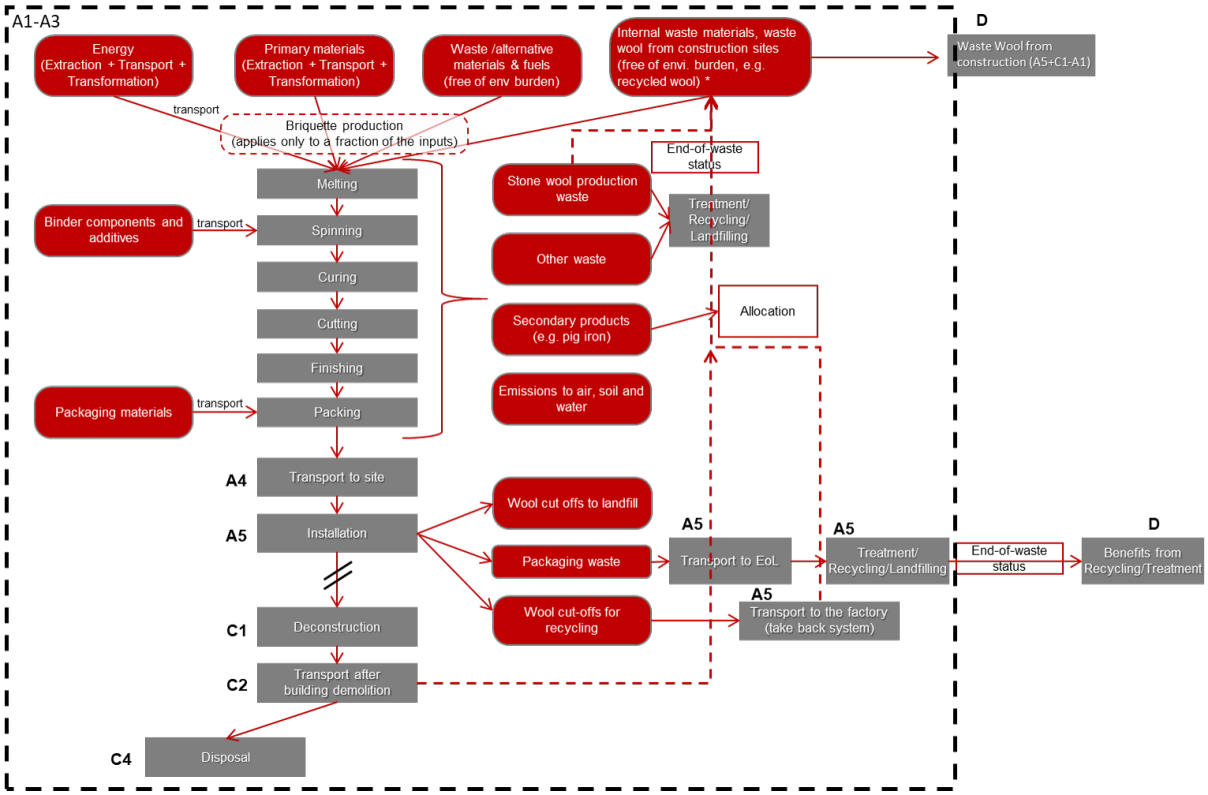
The End-of-life stage **C1-C4** includes:

- 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.

The product system with the system boundaries is presented in the graph below:



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 considered/	38	l/100km
Transport distance /weighted average from factory specific distances/	225	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	25	kg/m^3

The transport of the materials to the customer is modeled as a volumetric transport, meaning that the truck reaches its capacity with volume before its reaches it with mass. The same conservative approach is followed for all the products of this EPD, even for the ones with high density.

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	0	kWh
Material loss	2	%

Reference service life

Name	Value	Unit
Reference service life (according to ISO 15686-1, -2, -7 and -8)	60	a

declared product properties	Product standards: EN 13162 "Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specifications" EN 16783:2017 PCR for thermal insulation products EN 14064 "Thermal insulation products for buildings - In-situ formed loose-fill mineral wool (MW) products - Part 1 and 2"	
design application parameters including references to the approproate 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	Not for outdoor application, except if specifically stated on the product, External Wall Insulation Systems (EWIS) and External Thermal Insulation	

	Cladding System (ETICS).	
Indoor Environment 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	No maintenance is generally required, unless specifically stated on the product. Please refer to manufacturer guidelines	

End of life (C1 - C4)

Name	Value	Unit
Recycling	0.03	kg
Landfilling	0.97	kg
Transport to recycling	150	km
Transport to landfill	50	km
Utilisation rate	50	%

ROCKWOOL insulation products are fully recyclable. Currently ROCKWOOL has successfully established a recycling program in 5 countries including in the Nordics (Denmark, Sweden and Norway) and aims at increasing the number of countries in the future /ROCKWOOL Sustainability Report/. The benefits from recycling program are not thereby depicted in the assessment and the conservative approach of landfill is considered here.

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 of packaging is 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)

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	X	X	MNR	MNR	MNR	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m2 of thermal insulation product with an R=1m2K/W

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	1.11E+0	1.24E-1	1.37E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.77E-3	0.00E+0	1.56E-2	-6.89E-2
ODP	[kg CFC11-Eq.]	2.98E-9	4.12E-14	1.99E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.25E-15	0.00E+0	1.58E-14	-5.30E-14
AP	[kg SO_2-Eq.]	5.97E-3	1.13E-4	1.53E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.60E-6	0.00E+0	9.26E-5	-1.95E-4
EP	[kg $(PO_4)^{3-}$-Eq.]	9.64E-4	2.36E-5	3.26E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.66E-7	0.00E+0	1.26E-5	-1.49E-5
POCP	[kg ethene-Eq.]	3.89E-4	5.38E-7	1.24E-5	1.04E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.72E-8	0.00E+0	7.28E-6	-2.66E-5
ADPE	[kg Sb-Eq.]	3.29E-7	9.86E-9	9.19E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.00E-10	0.00E+0	5.61E-9	-1.13E-8
ADPF	[MJ]	1.35E+1	1.70E+0	4.25E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.16E-2	0.00E+0	2.02E-1	-1.85E+0

Caption	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 - RESOURCE USE: 1 m2 of thermal insulation product with an R=1m2K/W

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.42E+0	8.55E-2	9.37E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.60E-3	0.00E+0	2.44E-2	-2.61E-1
PERM	[MJ]	1.26E+0	0.00E+0	-9.04E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	3.68E+0	8.55E-2	3.37E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.60E-3	0.00E+0	2.44E-2	-2.61E-1
PENRE	[MJ]	1.15E+1	1.70E+0	2.19E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.18E-2	0.00E+0	2.10E-1	-1.97E+0
PENRM	[MJ]	2.47E+0	0.00E+0	-6.31E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.40E+1	1.70E+0	1.56E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.18E-2	0.00E+0	2.10E-1	-1.97E+0
SM	[kg]	2.86E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-8.27E-3
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	4.86E-3	1.58E-4	2.85E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.81E-6	0.00E+0	3.99E-5	-8.11E-4

Caption	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 – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m2 of thermal insulation product with an R=1m2K/W

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	3.29E-7	8.93E-8	2.24E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.72E-9	0.00E+0	3.31E-9	-6.20E-10
NHWD	[kg]	1.84E-1	1.30E-4	7.42E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.96E-6	0.00E+0	9.72E-1	-1.14E-3
RWD	[kg]	1.07E-4	2.32E-6	1.35E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.06E-8	0.00E+0	2.86E-6	-7.48E-6
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	2.81E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.70E-2	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	1.06E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	3.18E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	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; EEE = Exported thermal energy

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Annex 1

Self declaration from EPD owner

Specific Norwegian requirements

1 Applied electricity data set used in the manufacturing phase

The selection of the background data for the electricity generation is in line EN 15804. Within the different plants the country specific Danish or Norwegian power grid mix (reference year 2017) is applied.

<0,00985 kg CO2 eqv/MJ> (Norwegian power mix year according to GaBi 8.0 database)

<0,115 kg CO2 eqv/MJ> (Danish power mix year according to GaBi 8.0 database)

2 Content of dangerous substances

☒ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

☐ The product contains substances that are less than 0.1% by weight given by the REACH Candidate or the Norwegian priority list.

☐ The product contains dangerous substances more than 0.1% by weight given in the REACH candidate list or the Norwegian Priority List, concentrations is given in the EPD:

Dangerous substances from the REACH candidate list or the Norwegian Priority List	CAS No.	Quantity (concentration, wt%/FU(DU)).
Substance 1		
Substance n		

3 Transport from the place of manufacture to a central warehouse

Transport distance and CO_2-eqv./DU from transport of the product from factory gate to central warehouse in Oslo shall be given.

The transport distance here is set as a weighted average, based on the transport distances from all four Nordic factories to Oslo.

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use	Unit	Value (l/t)	CO_2-eqv./DU
Boat	48%	Container Ship	107	4,23E-04	Kg HFO/kg of cargo	0,346	1,34E-03
Truck*	13%	Truck, Euro 6, 17,3t payload	259	0,38	l/km	44,73	69,8E-03
Railway							
Total							

*The capacity utilization has been modelled based on volumetric capacity modelling for low density products as a conservative case. This means that the truck will be filled with volume before is filled with mass. For high density products the capacity utilization will be higher.

4 Impact on the indoor environment

☒ Indoor air emission testing has been performed; specify test method and reference:

The products meet the requirements for low emissions (M1) and requirements according to EN15251: 2007 Appendix E.

ROCKWOOL products are recognized by the M1 label. M1 certificates will be provided on request.

☐ No test has being performed

☐ Not relevant; specify _____