



ENVIRONMENTAL PRODUCT DECLARATION

ROCKWOOL® Stone Wool Thermal Insulation for buildings

EPD according to EN 15804 and ISO 14025 and 3rd party verified
ROCKWOOL Group EPD rules and LCA model

Manufacturer: ROCKWOOL-NORTH LLC Russia

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Life Cycle Assessment study

This environmental product declaration is based on a Life Cycle Assessment (LCA) background study according to EN15804:2012 carried out by:
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Hovedgaden 584
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Denmark

Verification:

CEN standard EN 15804 serves as the core PCR	
Independent verification of the "Rules for LCAs / EPDs for ROCKWOOL products" and the underlying LCA model described in the rules, according to ISO 14025: 2010, and EN 15804: 2012+A1:2013, and in addition prEN 16783 serves as the PCR	Independent verification of the calculation for this declaration and the declaration, according to EN ISO 14025:2010
<input checked="" type="checkbox"/> external	<input checked="" type="checkbox"/> internal
Third-party verifier: Jane Anderson (Principal Consultant at thinkstep Ltd)  28 July 2015	Remark: this EPD is issued by ROCKWOOL International and internally reviewed by senior experts. The externally reviewed rules and model have been applied

Environmental Product Declarations (EPDs) from different suppliers may not be comparable if they do not comply with the EN15804:2012 Clause 5.3

Product

Declared unit

1 m² ROCKWOOL stone wool thermal insulation product with a thermal resistance of $R_D=1$ m² K/W.

Intended application of the Environmental Product Declaration

This EPD is intended to be available to ROCKWOOL customers throughout Finland. This EPD can also be used in other markets that receive products from the factory in Vyborg. Such markets include but are not limited to: Russia, Latvia, Lithuania, Estonia, Ukraine, Poland.

Product description

Stone wool is a widely used material commonly used to thermally insulate buildings. ROCKWOOL® insulation products contribute to the creation of energy-efficient and fire-safe buildings with good acoustics and a comfortable indoor climate.

Stone wool is available in various forms with different characteristics and properties to suit a wide range of applications, ranging from the insulation of roofs, lofts, walls, floors and HVAC systems in buildings to, fire-protection and noise reducing solutions and use in process industry. The ROCKWOOL® products considered in this EPD are boards or rolls used to provide thermal insulation in general building applications. The specific product referred to in the declared unit is 36 mm thick and has a density of 31 kg/m³. The thermal conductivity for this product has been measured at 10°C as per EN 12667:2001 to correspond with the declared unit with an $R_D=1$ m² K/W.

The packaging, such as PE film for packaging and palletizing, the pallet out of wood and the labels, are included in the assessment. Any facings, such as glass fleece, aluminium foil or other laminations, are excluded in this EPD. If relevant for a product, their environmental parameter values should be added.

Product specification

ROCKWOOL® stone wool insulation is a firesafe¹ 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 few percent resin binder (typically 2–3% w/w for external wall and pitched roof products and slightly more for flat roof products). The product is wrapped with PE-foil and placed on wooden - or stone wool pallets for further distribution.

The binder is a water-based phenol-formaldehyde resin which is polymerized into solid resin during production of the final stone wool product.

Reference service life

The reference service life of the insulation products in the building is not relevant in this EPD since the use stage of the building is not considered.

ROCKWOOL® products are durable and usually fulfil their function as thermal insulation as long as the building or construction lasts.

For calculation purposes a reference service life of 50 years has been agreed to as a basis for the EN13162, but could be adapted if a longer service life is assumed for the building's wall and roof in which ROCKWOOL® insulation products are applied. In some calculations, a service life equivalent to the building part life or building lifetime can be applied.

Technical information

The product standard that applies is EN13162:2015 Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification.

Specific characteristics and additional functionalities shall be taken into account when applying the EPDs in the building context:

- Most ROCKWOOL® stone wool material is classified as non-combustible (Euroclass A1), the best reaction to fire class according to EN13501-1.
- ROCKWOOL® stone wool products are often applied because of their acoustic properties. For example, a well-constructed wall using mineral wool insulation can reduce noise transmission by around 50dB [according to the local building norms]. Specific acoustic properties can be retrieved through the technical consultancy support.
- ROCKWOOL® stone wool products are durable without any ageing of the thermal performance. They are dimensional stable and both water repellent and moisture resistant. Moisture and nutrient are necessary conditions for mould growth. Since more than 95% of the mass of mineral wool products is inorganic, there is little nutrient source to allow fungi/mould growth [ref. Eurima-health-safety].

More specific product information can be found on www.rockwool.fi or through the local ROCKWOOL® sales organizations.

Guidance on safe and effective installation is also provided through the [local organization](#) and at the end of this EPD.

ROCKWOOL® stone wool is 97% recyclable. For information on how waste ROCKWOOL material that may be generated during installation or at end of life can be recycled through the ROCKWOOL RockCycle process and converted into raw materials for use in the ROCKWOOL production process, please contact ROCKWOOL at www.rockwool.fi.

ROCKWOOL® stone wool waste is classified as nonhazardous. ROCKWOOL® insulation waste is covered by the non-hazardous entry (17 06 04) in the List of Wastes of the European Waste Catalogue. Leaching tests of mineral wool waste by Eurima demonstrate that they comply with the criteria for acceptance of waste at a landfill for non-hazardous waste and with the criteria for acceptance of waste at a landfill for inorganic waste with low organic content [ref. Hjelmer 2004, Abdelghafour, 2004].

¹ A1 when tested according to EN 13501-1 (Euroclasses)

Technical data

The environmental impacts and indicators given in the section "Life Cycle Assessment: Results" of this EPD are for 1m² of product, providing a thermal resistance of R_D=1 m² K/W (the declared unit). The reference product is 36 mm thick ROCKWOOL® stone wool with a density of 31 kg/m³. For other specific ROCKWOOL® products, the environmental impacts and indicators are determined by applying the appropriate scaling factors and products R_D-value.

The R_D-values used for scaling give a very good indication of the amount of material needed to achieve the desired insulation effect of other product types, but it is not an exact measure.

Scaling factors for products sold as batts/slabs/matts¹

Products	Scaling Factor	Products	Scaling Factor	Products	Scaling Factor
Façade 1	1.9	Hardrock	4.2	TOPROCK Lamella 50	2.8
FacadeBatts	3.5	Hardrock 37	3.3	Underlay Roof Slab 40 (URS 40)	3.8
FLEXIBATTS	1.0	Slab 150	4.7	Underlay Roof Slab 60 (URS 60)	5.0
Spanrock L	4.2	Spanrock M	3.1	URS 36	3.1
Super A-Batts	1.6	TF Board	6.2	WPI Energy	2.9
TOPROCK Lamella 30	2.2				

¹ For all general building insulation products the mean temperature of thermal conductivity measurement is in 10°C as per EN 12667:2001.

² HVAC/Technical insulation products for which the lambda value varies according to the declared work temperatures. The assumed lambda correlates with the work temperature of 50°C. Please see the product specific websites for details.

³ Products with extra features such as facings out of wire netting, aluminum foil, fleece, paper, etc. These extra features are not included in the EPD-calculations.

Product specification**Composition of delivered product**

Material	% of total weight
Non-scarce natural stone and secondary raw materials	89%
Binder (resin)	3%
Oils	<0,2%
Packaging	8%

Life Cycle Assessment: Calculation rules

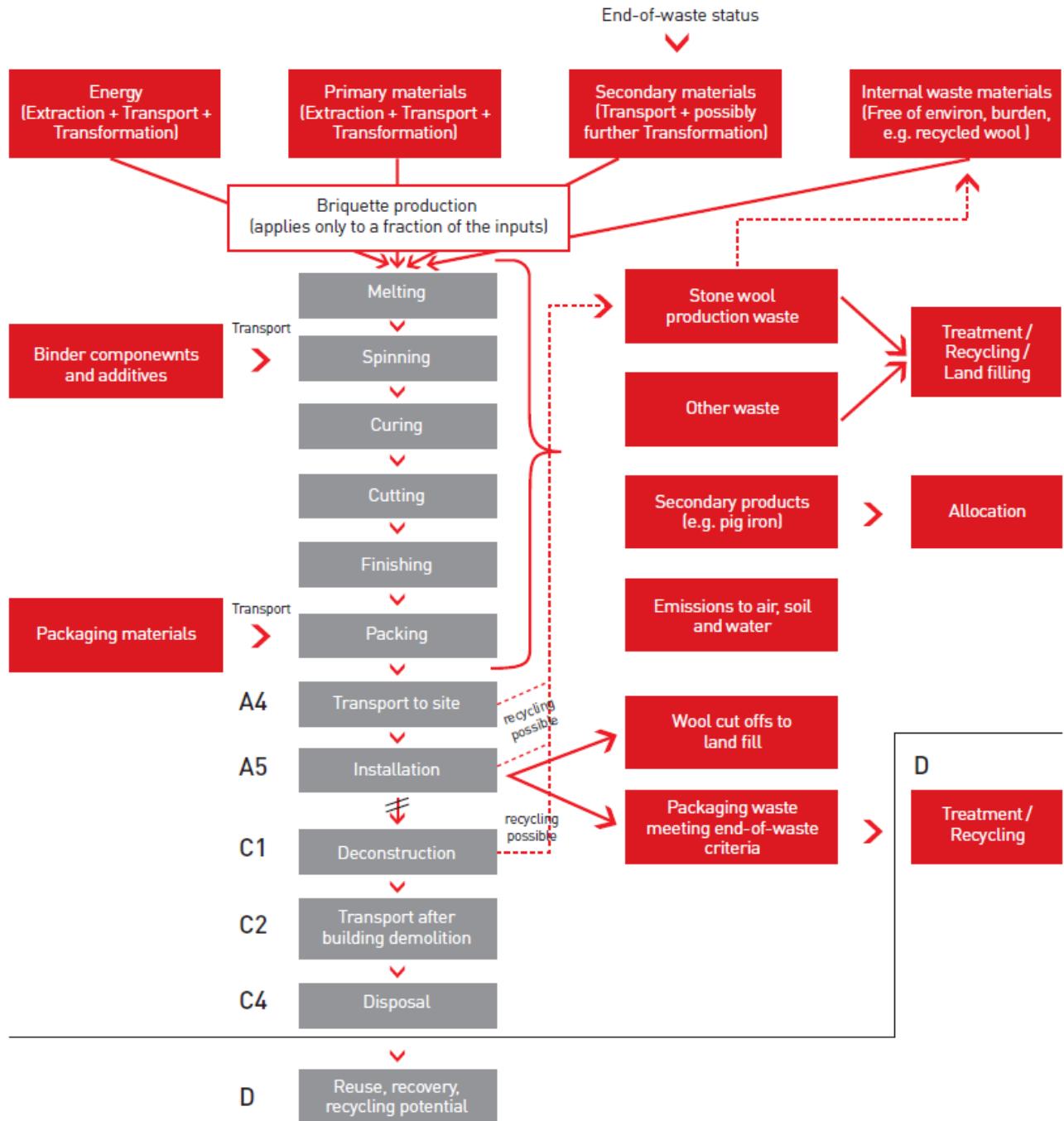
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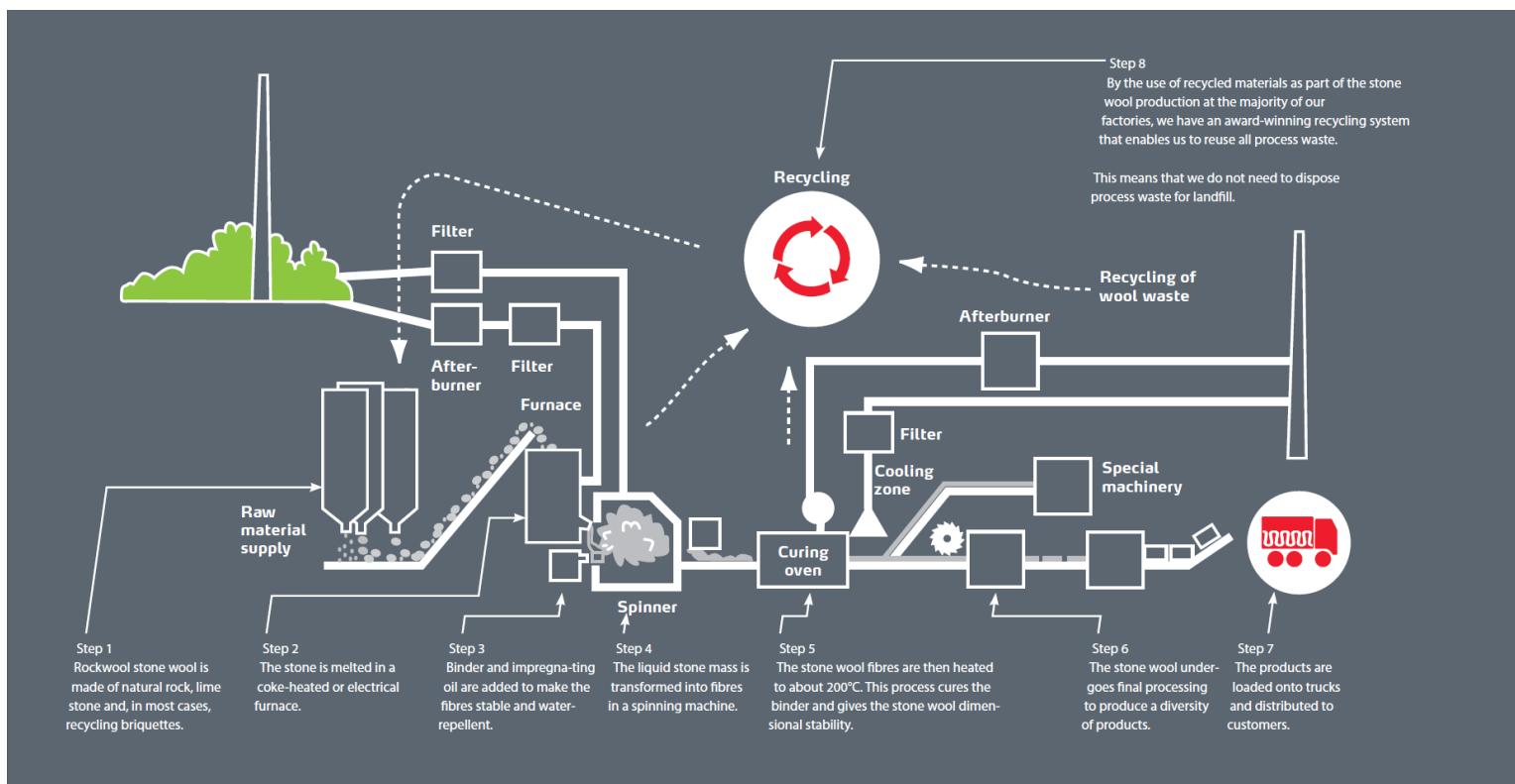
Cradle-to-grave. Included are all relevant life cycle stages.

ROCKWOOL stone wool insulation products do not require maintenance (B2), repair (B3), replacement (B4), or refurbishment (B5) during use in standard conditions. They do not use energy (B6) or water (B7) during use of the building.

Flow diagram system boundaries

System boundaries (A1-D)





Description of production process

Stone wool is produced as follows:

Raw materials, mainly basaltic rocks and secondary raw materials and coke are weighed and led into the cupola oven where they are melted. The melted mass from the cupola then goes through a spinning machine in order to create fibres. At this stage also, binder is applied and fibres are formed. This "wet" pack of stone wool (uncured binder) is fed into the curing oven where the binder is polymerized. Once removed from the oven, the products are cooled down and go through a series of confectioning stages in order to give each product its final dimensions before packaging.

For cleaning the air of the melting process and the curing oven several after-burners, installations and filters (made of stone wool) are used. Off-cuts and stone wool air filters are all recycled back into the production.

The collected data reflects the actual stone wool produced by the ROCKWOOL® plant in Vyborg, Russia. Throughout its factories, ROCKWOOL® stone wool products are manufactured with the same underlying technology and pass through the same production processes in different production plants.

Cut-off criteria

Included are all the basic materials used as per formulation, utilized thermal energy, internal fuel consumption and electric power consumption, all packaging materials (plastic wrapping, pallets, labels), any direct production waste, and all emission measurements available. Machines and facilities required during production are treated as capital goods and their production is therefore not included in the LCA.

Allocation

Besides stone wool, pig iron is produced during the melting process of raw materials and sold. The iron is considered to be a co-product. Iron as a co-product is allocated by economic value. This is in line with EN15804.

Data quality

The quality of the data of this specific EPD is assessed as good and appropriate by internal experts. The data gathering approach for all EPDs is assessed as good and appropriate by the external verifier. Data was collected consistently and based on the financial year 2016.

Adjusted secondary LCIs are taken from the DEAM, Plastics Europe and ecoinvent databases.

Life Cycle Assessment: Results

Limitations

Conservative choices are made in the LCA as described in the ROCKWOOL® Group LCA rules. Therefore, the results can be considered to be conservative and worst case.

Description of the system boundaries

(x=included, MNA = Module not assessed)

Product stage			Construction installation stage		Use stage						End-of-life stage				Benefits and loads 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	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
x	x	x	x	x	x	MNA	MNA	MNA	MNA	MNA	MNA	MNA	x	MNA	x	D

ROCKWOOL® stone wool thermal insulation product for buildings

1 m² of 36 mm thick stone wool insulation product with a density of 31 kg/m³ and a thermal resistance of R=1 m² K/W. The corresponding thermal conductivity has been measured at 10°C as per EN 12667:2001.

Environmental impact

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	
Global warming	kg CO ₂ eqv	1.5E+00	3.2E-01	4.2E-02	0	3.4E-03	7.5E-03	D
The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.								
Ozone depletion	kg CFC11 eqv	5.0E-08	2.2E-07	5.7E-09	0	2.3E-09	2.3E-09	
Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.								
Acidification	kg SO ₂ eqv	1.0E-02	1.9E-03	2.5E-04	0	2.0E-05	4.5E-05	
Acid depositions have negative impacts on natural ecosystems and the man-made environment incl, buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.								
Eutrophication	kg PO ₄ ³⁻ eqv	8.0E-04	4.8E-04	6.5E-05	0	5.0E-06	1.1E-05	
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.								
Photochemical ozone creation	kg Ethene eqv	1.3E-03	1.4E-04	3.3E-05	1.2E-10	1.5E-06	1.9E-05	
Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.								
Depletion abiotic resources -- elements	kg Sb eqv	3.0E-07	2.9E-10	6.7E-09	0	3.0E-12	5.7E-09	
Depletion abiotic resources – fossil fuels	MJ	2.1E+01	4.0E+00	5.1E-01	0	4.1E-02	1.9E-01	
Consumption of non-renewable resources, thereby lowering their availability for future generations.								

Resource use

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	2.1E+00	2.7E-03	4.3E-02	0	2.8E-05	1.5E-03	-5.9E-02
Use of renewable primary energy resources used as raw materials	MJ	IND*	IND*	IND*	0	IND*	IND*	IND*
Total use of renewable primary energy resources	MJ	2.1E+00	2.7E-03	4.3E-02	0	2.8E-05	1.5E-03	-5.9E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	3.5E+00	1.3E-05	7.1E-02	0	1.4E-07	0.0E+00	-2.1E-02
Use of non-renewable primary energy resources used as raw materials	MJ	1.8E+01	4.0E+00	4.4E-01	0	4.2E-02	1.9E-01	-1.4E+00
Total use of non-renewable primary energy resources	MJ	2.1E+01	4.0E+00	5.1E-01	0	4.2E-02	1.9E-01	-1.5E+00
Use of secondary materials	kg	3.0E-01	IND	IND	0	IND	IND	IND
Use of renewable secondary fuels	MJ	IND	IND	IND	0	IND	IND	IND
Use of non-renewable secondary fuels	MJ	IND	IND	IND	0	IND	IND	IND
Net use of fresh water	m ³	5.8E-03	3.8E-04	1.8E-04	0	4.0E-06	1.8E-04	-8.9E-05

* The heating value for stone fibers is "0" and therefore this cell intentionally left blank. Packaging material, facings and binder is not included here. The primary energy is calculated as product-related indicators. But within the modules A1–A3 the production of packaging materials is included.

Waste categories

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Hazardous waste disposed	kg	1.5E-04	9.0E-05	4.8E-06	0	9.4E-07	0.0E+00	-1.5E-07
Non-hazardous waste disposed	kg	9.7E-02	7.2E-04	2.0E-03	0	7.5E-06	0.0E+00	-1.7E-03
Radioactive waste disposed	kg	9.7E-10*	6.0E-12	2.0E-11	0	6.2E-14	0.0E+00	-3.0E-11

* There is never radioactive waste from a ROCKWOOL plant (A3), but potentially in its upstream chain (A1 & A2).

Output flows

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Component for re-use	kg	IND	IND	IND	IND	IND	IND	IND
Materials for recycling	kg	1.0E-03	IND	IND	IND	IND	IND	IND
Materials for energy recovery	kg	IND	IND	IND	IND	IND	IND	IND
Exported energy	MJ	IND	IND	IND	IND	IND	IND	IND

IND: indicator not declared

Other Information

Dangerous substances

ROCKWOOL® stone wool does not contain substances from the Candidate List of Substances of Very High Concern.

Mineral wool fibres 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). The ROCKWOOL® fibres are registered with REACH under the following definition: "Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content greater than 18% by weight and fulfilling one of the Note Q conditions".

ROCKWOOL® products produced by LLC ROCKWOOL-NORTH at Viborg factory fulfil the Note Q requirements [ref. Note Q]. This is certified by the independent certification body EUCEB. 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 fibres in October 2001, including them in Group 3 as an agent "not classifiable as to its carcinogenicity to humans".

Indoor air

ROCKWOOL® stone wool products fulfil the national demands in the EU with regard to emission to indoor climate. ROCKWOOL® stone wool products have small impact on emission levels in buildings. Salthammer et al. 2010 notes that "the presence of mineral wool had no influence on the formaldehyde level in the house".

Instruction for safe installation

Due to the well-known mechanical effect of coarse fibres, mineral wool products may cause temporary skin itching. Mineral wool fibres cannot cause a chemical or allergic reaction.

To diminish the mechanical effect of coarse fibres and avoid unnecessary exposure to mineral wool dust, information on good practice is available on the packaging of all mineral wool products with pictograms and/or written information (see pictograms on this page). Safe use instruction sheets are also available from www.rockwool.fi.

Cover exposed skin.

When working in unventilated area wear disposable face mask

Ventilate working area if possible



Rinse in cold water before washing



Waste should be disposed of according to local regulations



Clean area using vacuum equipment



Wear goggles when working overhead



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