

ENVIRONMENTAL PRODUCT DECLARATION

ROCKWOOL® Stone Wool Thermal Insulation

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

Manufacturer: ROCKWOOL Limited

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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: Georg Schöner (georg.schoner@rockwool.com) ROCKWOOL® International A/S Hovedgaden 584 2640 Hedehusene Denmark

Verification:

CEN standard EN 15804 serves as the core PCR (product category rule)	
Independent verification of the ROCKWOOL “Rules for LCAs / EPDs for ROCKWOOL products” and the underlying LCA model described in the rules, in accordance with ISO 14025: 2010, EN 15804: 2012+A1:2013, with prEN 16783 serving as the PCR <input checked="" type="checkbox"/> external	Independent verification of the calculation and this declaration, in accordance with EN ISO 14025:2010 <input checked="" type="checkbox"/> internal
Third-party verifier: Jane Anderson (Principal Consultant at thinkstep Ltd) <i>Jane Anderson</i> 28 July 2015	Remark: this EPD is issued by ROCKWOOL International and has been internally reviewed by senior experts. The externally reviewed “Rules for LCAs / EPDs for ROCKWOOL products” and LCA 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 $R_D=1 \text{ m}^2 \text{ K/W}$.

A product of 22 kg/m³ density and a notional thickness of 44 mm thick fulfils the declared unit specification and provides a base dataset from which product specific data can be calculated.

Intended application of the Environmental Product Declaration

This EPD is intended to be available to ROCKWOOL UK customers. This EPD can also be used in other markets that receive products from the ROCKWOOL UK factory. Such markets include but are not limited to: Ireland, and continental Europe.

Product description

Stone wool is a widely used material and 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 44 mm thick and has a density of 22 kg/m³.

Any facings that may be applied to the products, 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 non-combustible¹ material for insulation against the effects of heat, cold, fire, vibrations and noise. ROCKWOOL stone wool is made from volcanic rock (typically basalt or dolomite), an increasing proportion of recycled material and a small amount of resin binder (less than 5%). ROCKWOOL products are typically packaged in PE-foil and placed on wooden pallets for distribution.

The binder used in the manufacture of ROCKWOOL stone wool products is a synthetic thermosetting polymer, which is transformed into solid resin during production of the final stone wool product.

Reference service life

As the in-use stage of the building is not considered in this EPD, reference service lives are not included.

However, ROCKWOOL products are extremely durable and usually provide effective performance for the lifetime of the building or host structure. A reference service life of 50 years has been agreed as the basis of EN 13162 (the product standard for stone wool thermal insulation) but this could be adapted if a longer service life is assumed for a particular building element. In some calculations, a service life equivalent to the lifetime of the building element can be applied.

Technical information

The relevant product standard 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:

- Stone wool insulation produced by ROCKWOOL UK is classified as non-combustible (Euroclass A1), the best reaction to fire class according to EN13501-1.
- ROCKWOOL stone wool products are often used because of their exceptional fire resisting and noise reducing properties.
- ROCKWOOL stone wool products are extremely durable and dimensionally stable and are able to provide effective thermal performance for the lifetime of a building.
- ROCKWOOL stone wool products are water repellent, vapour permeable and are not susceptible to mould or rot.

Further information on the properties of ROCKWOOL products can be found at www.rockwool.co.uk, together with access to technical support and guidance on use and installation.

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.co.uk.

ROCKWOOL® stone wool waste is classified as non-hazardous. ROCKWOOL® insulation waste is covered by the non-hazardous entry (17 06 04) in the List of Wastes of the European Waste Catalogue. ROCKWOOL insulation waste is categorised as “waste accepted at landfills for non-hazardous waste” in accordance with EC Decision 2003/33/EC (landfill acceptance criteria).

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%

¹ A1 when tested to EN 13501-1

How to use this EPD

Technical data

The environmental impacts given on pages 7 and 8 of this EPD are for 1 m² of product, providing a thermal resistance (R_D-value) of 1 m² KW (the declared unit). The reference product is 44 mm thick ROCKWOOL stone wool with a density of 22 kg/m³.

For other specific ROCKWOOL products, the environmental impacts are determined by applying the appropriate scaling factors and thermal resistance (R_D-value) of the sold product.

For example if a customer purchases the product "CAVITY BATT 1200x455x100", then for example the 1.4 kg CO₂ eqv. for the global warming potential (see page 7) need to be multiplied with the scaling factor 1.5 (see table below) and the R-value of the sold batt 3.1 (see sold product specifications).

These 'scaling' calculations can be carried out by ROCKWOOL on request and, where required, the results are provided as attachments to this EPD.

Approximate scaling factors are provided in the table below. However, it should be noted that use of these factors will not provide exact declarations of performance. For accurate declarations of performance, it is necessary for ROCKWOOL to undertake more detailed calculations.

Scaling factors ^{1 & 2}

Products	Thickness	Scaling Factor	Products	Thickness	Scaling Factor
Hardrock Multi-Fix (DD)	50mm	6.9	Acoustic Rockfloor	25-40mm	8.3
	60mm	6.8	Sound Insulation Slab	50-120mm	1.4
	85mm	6.5	Thermal Insulation Slab	25-200mm	1.5
	105-135mm	6.4	Flexi	50-120mm	1.4
	150-185mm	6.3		140-200mm	1.8
Hardrock Multi-Fix (DD) Underlay	50mm	6.9	Roll and Twin Roll	100-220mm	1
	120-140mm	6.4	Rollbatt	100-220mm	1
	150-170mm	6.3	RW3	23-200mm	2.1
Hardrock Recovery Board (Plain)	30-40mm	7.1	RW4	25-250mm	2.8
Hardrock Recovery Board (Multi-Fix)	30-50mm	7.1	RW5	25-200mm	3.5
Rainscreen Duo-slab (Plain, Tissue, Foil)	50mm	2.1	RW6	30-120mm	5.1
	<80mm	2.1	RW7	25-100mm	7.6
	90-110mm	1.8	RWA45	50-230mm	1.6
	>125mm	1.7		25-50mm	2.2
Cladding Roll (Plain, Foil)	<60mm	1.2	HP Partial Fill Cavity Slab	50-80mm	2.1
	>60mm	1.1		90-115mm	1.8
External Wall (DD)	50mm	4.4		120-135mm	1.7
	60mm	4.3	Thermal Rockfloor	50mm	6.2
	70mm	4.2		60mm	5.9
	80-90mm	4.1		70mm	5.8
	100mm	4.1		80mm	5.7
	110-130mm	4		90-120mm	5.6
	140-250mm	3.9		150mm	5.4
Façade Ultra 100	80-180mm	4.9			

¹ Extra features such as facings out of wire netting or aluminum foil are not included in the EPD-calculations.

² HVAC products, meaning all industrial insulation products from the ProRox product range are not included in this table, but can be provided by ROCKWOOL on request.

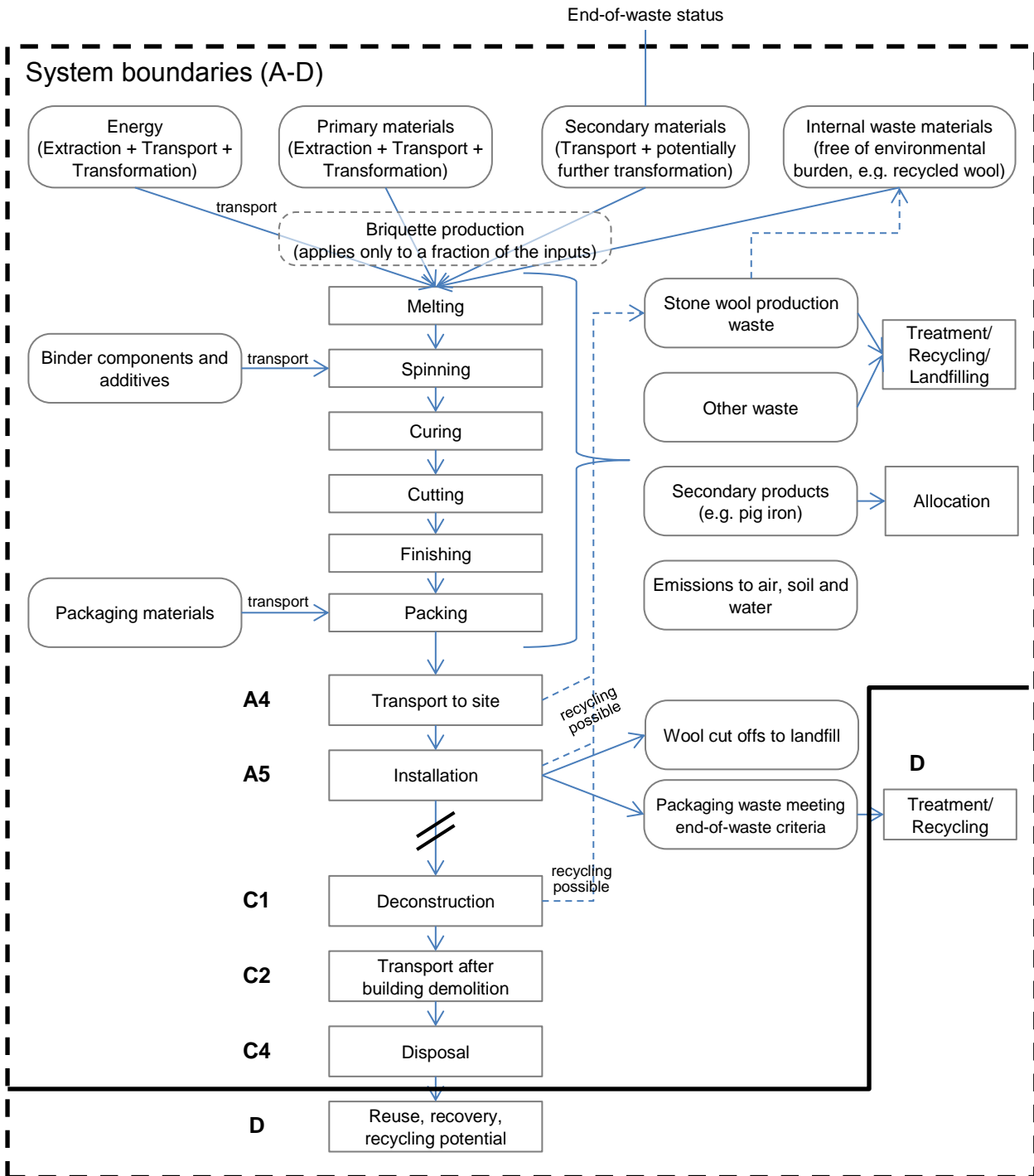
Life Cycle Assessment: Calculation rules

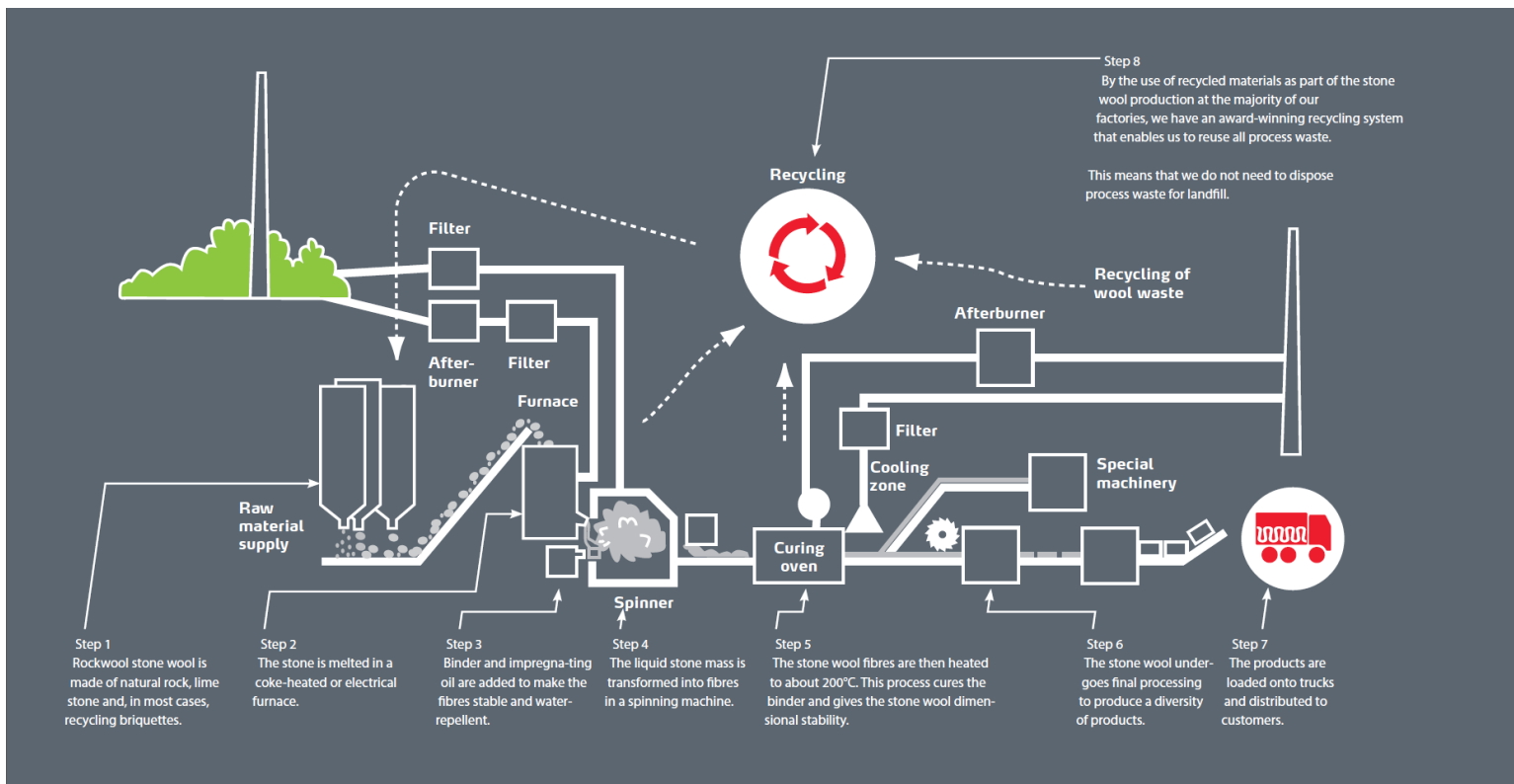
EPD type

Cradle-to-grave. All relevant life cycle stages are included.

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





Description of production process

Stone wool is produced as follows:

Raw materials, mainly basaltic rocks and secondary raw materials and coke are weighed and fed into the cupola oven where they are melted. The melted mass from the cupola then passes through a spinning machine in order to create fibres. At this stage, binder is also added. The uncured stone wool 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.

Filters made of stone wool are used to clean the air from the melting process and the curing oven after-burners. Off-cuts and stone wool air filters are all recycled back into the production process.

The data collected reflects the stone wool produced by the ROCKWOOL® UK plant. Throughout its factories, ROCKWOOL® stone wool products are manufactured using the same underlying technology and pass through the same production processes in each different production plant.

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 is 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 is based on the financial year 2014.

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	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	MNA	MNA	MNA	MNA	MNA	MNA	MNA	x	MNA	x	x	

ROCKWOOL® stone wool thermal insulation product for buildings

1 m² stone wool thermal insulation product with a thermal resistance of R_D=1 m² K/W (thickness of 44 mm; density of 22 kg/m³)

Environmental impact

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Global warming <small>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.</small>	kg CO ₂ eqv	1.4E+00	1.7E-01	3.6E-02	0	2.9E-03	6.5E-03	-4.0E-02
Ozone depletion <small>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.</small>	kg CFC11 eqv	2.3E-08	1.2E-07	3.0E-09	0	2.0E-09	2.0E-09	-2.6E-10
Acidification <small>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.</small>	kg SO ₂ eqv	7.0E-03	1.0E-03	1.7E-04	0	1.7E-05	3.9E-05	-1.8E-04
Eutrophication <small>Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.</small>	kg PO ₄ ³⁻ eqv	7.3E-04	2.6E-04	5.5E-05	0	4.3E-06	9.5E-06	-1.3E-05
Photochemical ozone creation <small>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.</small>	kg Ethene eqv	6.5E-04	7.7E-05	1.9E-05	1.0E-10	1.3E-06	1.6E-05	-9.0E-05
Depletion abiotic resources – elements	kg Sb eqv	1.7E-07	1.6E-10	4.1E-09	0	2.6E-12	5.0E-09	-4.9E-09
Depletion abiotic resources – fossil fuels <small>Consumption of non-renewable resources, thereby lowering their availability for future generations.</small>	MJ	2.2E+01	2.2E+00	5.0E-01	0	3.6E-02	1.7E-01	-1.3E+00

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	1.8E+00	1.5E-03	1.7E-04	0	2.4E-05	1.3E-03	-5.1E-02
Use of renewable primary energy resources used as raw materials	MJ	5.6E-01	4.8E-09	3.2E-11	0	7.8E-11	0.0E+00	-7.3E-04
Total use of renewable primary energy resources	MJ	2.3E+00	1.5E-03	4.7E-02	0	2.5E-05	1.3E-03	-5.3E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	4.5E+00	7.0E-06	9.0E-02	0	1.2E-07	0.0E+00	-1.8E-02
Use of non-renewable primary energy resources used as raw materials	MJ	1.4E+01	2.2E+00	3.4E-01	0	3.6E-02	1.7E-01	-1.3E+00
Total use of non-renewable primary energy resources	MJ	1.9E+01	2.2E+00	4.3E-01	0	3.6E-02	1.7E-01	-1.3E+00
Use of secondary materials	kg	2.3E-01	n/a	4.5E-03	n/a	n/a	n/a	n/a
Use of renewable secondary fuels	MJ	--*	--*	--*	--*	--*	--*	--*
Use of non-renewable secondary fuels	MJ	--*	--*	--*	--*	--*	--*	--*
Net use of fresh water	m ³	4.0E-03	2.1E-04	1.3E-04	0	3.5E-06	1.6E-04	-8.0E-05

* There are no renewable and no non-renewable secondary fuels used in A3. The minor use of secondary fuels as part of the background datasets is not accounted for.

Waste categories

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Hazardous waste disposed	kg	1.4E-04	4.9E-05	3.7E-06	0	8.1E-07	0.0E+00	-1.4E-07
Non-hazardous waste disposed	kg	1.5E-01	3.9E-04	2.9E-03	0	6.5E-06	0.0E+00	-1.5E-03
Radioactive waste disposed	kg	1.3E-09*	3.2E-12	2.7E-11	0	5.4E-14	0.0E+00	-2.7E-11

* There is never radioactive waste from a ROCKWOOL plant (A3), but there might be small amounts associated with the secondary LCI datasets used for the upstream chain (A1 & A2), which are taken into account here.

Output flows

Parameter	Unit	A1-3	A4	A5	B1	C2	C4	D
Component for re-use	kg	3.5E-02	n/a	7.0E-04	n/a	n/a	n/a	n/a
Materials for recycling	kg	1.3E-03	n/a	n/a	n/a	n/a	n/a	n/a
Materials for energy recovery	kg	1.2E-03	n/a	n/a	n/a	n/a	n/a	n/a
Exported energy	MJ	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Other Information

Dangerous substances

ROCKWOOL® stone wool does not contain substances from the REACH Candidate List of Substances of Very High Concern (SVHC) in concentrations >0.1% by weight. For more information please visit [REACH @ www.rockwool.co.uk](http://www.reach.europa.eu).

There is no hazard statement associated with this material. ROCKWOOL mineral wool is not classified as dangerous according to EU Directives 67/548/EEC and 1999/45/EC and its amendments (Regulation (EC) No 1272/2008) on classification, labelling and packaging of substances and mixtures.

Instructions for installation

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

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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