ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804*

Owner of the Declaration	Rockpanel (part of ROCKWOOL Group)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-RWI-20190158-CCC1-EN
Issue date	01/11/2019
Valid to	31/10/2024

Rockpanel ® Durable & A2 (FS-Xtra)
Rockpanel (part of ROCKWOOL Group)

General Information

Rockpanel (part of ROCKWOOL Group)	Durable and A2 (FS-Xtra)

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

Owner of the declaration
Rockpanel (member of ROCKWOOL Group)
Konstructieweg 2
JD Roermond
NL 6045
Netherlands

Declaration number
EPD-RWI-20190158-CCC1-EN

Declared product / declared unit
1 m² of Rockpanel (Durable or A2 (FS-Xtra)) cladding panel

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

Scope:
This declaration refers to Durable and A2 (FS-Xtra) cladding panels, produced by Rockpanel, a member of ROCKWOOL Group. The declared reference product in this EPD is 1m² Rockpanel Durable Cladding Panel for facade cladding, roof detailing, soffits and fascias.

The Rockpanel products presented in this declaration are produced in Roermond (Netherlands). For the Rockpanel A2 (FS-Xtra) cladding panel, the environmental impacts and indicators are determined by applying the appropriate scaling factor (please refer to section "Technical Data" for guidance).

The production data correspond to the full year 2017.

Issue date
01/11/2019

Valid to
31/10/2024

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

Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

Dr. Frank Werner
(Independent verifier appointed by SVR)

Product

Product description/Product definition
Rockpanel stone wool facade panels are prefabricated compressed mineral wool products with thermosetting binders.
They are traditionally made from volcanic rock (typically basalt or dolomite), and of recycled material and finished with a cured (waterborne) coating.
The unfaced and coated synthetic resin-bonded stone wool products described in this declaration are produced in the form of panels in densities of 1050 kg/m³ for the Durable and 1250 kg/m³ for the A2 (FS-Xtra) panel.

For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration:

- ETA-07/0141 from 15/12/2014 for Rockpanel Durable 8 mm finish Colours/Rockclad and Rockpanel Durable 8 mm finish ProtectPlus,
- ETA-08/0343 of 16/09/2014 Rockpanel Durable 6 mm finish Colours / Rockclad,
- ETA-13/0340 of 18/01/2018 Rockpanel A2 (FS-Xtra) 9 mm finish Colours/Rocklad, Rockpanel A2 (FS-Xtra) 9mm finish Structures and Rockpanel A2 (FS-Xtra) 9mm finish ProtectPlus,
- ETA-13/0648 of 02/11/2015 Rockpanel Natural Durable 8 mm and 10 mm / Rockpanel Natural Xtreme 8 mm and 10 mm.

- ETA-18/0883 of 2018/12/03 Rockpanel Premium A2.

For the application and use the respective national provisions apply.

Application

The Rockpanel Durable and A2 (FS-Xtra), which are contained in this EPD, are cladding panels for facade applications. The Rockpanel Durable is offered with a density of 1050 kg/m³ and thicknesses of 6, 8 and 10 mm. A2 (FS-Xtra) has a density of 1250 kg/m³ and thicknesses of 9 mm and 11 mm.

Product-specific environmental impacts are compiled by applying the relevant scaling factor (listed in the Scaling Factor table) in the Product Specific Scaling formula.

Product Name	scaling factor
Rockpanel Durable 8mm	1,0
Rockpanel Durable 6mm	0,75
Rockpanel Durable 10mm	1,25
Rockpanel A2 (FS-Xtra) 11mm	1,64
Rockpanel A2 (FS-Xtra) 9mm	1,34

Product Specific Scaling Formula: Environmental Impact per m^2 = Environmental Impact reference product * scaling factor

Please note that the scaling factors give a good indication of the impacts but they are not an exact measure as such.

Technical Data

For the products where the above declared properties apply, the performance data are in accordance with the declaration of performance with respect to its essential characteristics according to European Assessment Document (EAD) no. EAD 090001-00-0404 for Prefabricated compressed mineral wool boards with organic or inorganic finish and with specified fastening system, edition May 2014.

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 manufacturer's specifications, available online in http://www.rockpanel.com/.

Constructional data

In the table below the first value refers to Durable and the second refers to A2 (FS-Xtra):

Name	Value	Unit
Thermal conductivity acc. to EN 10456	0.37 - 0.55	W/(mK)
Maximum board size	3050x1250	mm x mm
Density (nominal) acc. to EN 323	1050/1250	kg/m³
Mass (nominal)	8.40/11.25	kg/m²
Characteristic bending strength acc. to EN 3120; EN 1058	length and width f□□ greater than or equal to 27/25,5 (N/mm2)	N/mm²
Modulus of elasticity acc. to EN 310	4015/4740	N/mm²
Vapour transmission Sd at	1.8 - 3.5	m
23°C and 65% RH acc. to ISO 12572:2016		
Dimensional Stability acc. to EN 438-2	11x10□³/10x10□³	mm/(m°K)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to the following:

- ETA-07/0141 from 15/12/2014 for Rockpanel Durable 8 mm finish Colours/Rockclad and Rockpanel Durable 8 mm finish ProtectPlus,
- ETA-08/0343 of 16/09/2014 Rockpanel Durable 6 mm finish Colours / Rockclad,
- ETA-13/0340 of 18/01/2018 Rockpanel A2 (FS-Xtra) 9 mm finish Colours/Rockclad, Rockpanel A2(FS-Xtra) 9mm finish structures and Rockpanel A2 (FS-Xtra) 9 mm finish ProtectPlus,
- ETA-13/0648 of 02/11/2015 Rockpanel Natural Durable 8 mm and 10 mm / Rockpanel Natural Xtreme 8 mm and 10 mm,
- ETA-18/0883 of 2018/12/03 Rockpanel Premium A2.

Base materials/Ancillary materials

The average composition used for this EPD is the following (based on the average factory consumption figures for Rockpanel production):

- non-scarce natural stone [18%]
- cement [10%]
- slags and other secondary materials or waste materials [56%]
- mineral oil and bonding agent [0,4%]
- binder [12%]
- coating [3,6%]

Packaging represents 5% 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, secondary materials and by-products from other industries such as slags, alumina and wool waste and cement. The binder is a phenol formaldehyde resin which is polymerized into solid resin during the production of the final stone wool product. The coating is a waterborne acrylic coating and an additional (optional) PU coating.

This product/article/at least one partial article contains substances listed in the candidate list (ECHA PR/19/12) (date: 16.07.2019) exceeding 0.1 percentage by mass: no.

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). ROCKWOOL 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 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 under www.euceb.org.

Reference service life
Assumed intended working life of the Rockpanel boards is 60 years, provided that they are subject to appropriate use and maintenance. This is in line with the results of an independent accelerated durability test, done by Bouw Technologie and available from

Rockpanel Group upon request. It is expected that under normal use conditions the actual service life will be considerably longer without major degradation affecting the essential requirements. Indications given as to the working life of the boards cannot be interpreted as a guarantee given by ROCKWOOL B.V. / Rockpanel.

LCA: Calculation rules

Declared Unit
The specific product referred to in the declared unit is 1 m² of Rockpanel Durable cladding panel. The reference product has a thickness of 8 mm and a density of 1050 kg/m³.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Gross density	1050	kg/m³
Surface	1	m^2
Weight	8,4	kg
Conversion factor to 1 kg	0.119	-

System boundary
EPD type: **Cradle to gate with options, modules C1–C4, and module D.** The modules considered in the life cycle assessment as per system boundaries are described as follows:

Production
The product stage A1-A3 includes:
Provision of preliminary products and energy and relevant upstream processes;
- Transporting the raw materials and preliminary materials to ROCKWOOL production facilities;
- Production process in the ROCKWOOL production facilities including energy inputs and emissions;
- Electricity consumption, from purchased Renewable Energy Certificates (REC);
- Waste processing up to the end-of-waste state or disposal of waste residues, during the production stage;
- Production of packaging material;
- Manufacturing of products and co-product.

The environmental impact of co-products from the steel and coal fired electricity production (slags, alumina and ashes entering the system as inputs to the manufacturing) is accounted for and economic allocation is applied.
Recycled stone wool comes free of environmental burden, as it enters the product system as waste. Their transport to the factory is accounted for.
Modules A1, A2 and A3 are declared as an aggregated module A1-A3.

Construction/Installation
The Construction Stage A4-A5 includes:
- A4 transport to the building site

- A5 installation to the building

The transport in A4 is modelled based on the amount of panels that fit in the truck.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 5% and according to the modularity principle of EN 15804, its impacts are fully allocated to A5.
The A5 stage, according to EN 15804 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 default assumption here for installation waste is 100% landfill.

Building Use
The use-stage B1-B7, related to the building fabric includes:
- B1 use or application of the installed product- not part of this EPD;
- B2 maintenance;
- B3 repair;
- B4 replacement;
- B5 refurbishment;
- B6 – Operational energy use:
- B7 – Operational water use:

Rockpanel Stone wool cladding panel is installed permanently in the structure and does not require maintenance, repair, replacement or refurbishment under normal use conditions. Similarly, Rockpanel has no operational energy or water use. Rockpanel Durable waterborne coating used on the Rockpanel Durable panel requires re-coating after 15 years. ProtectPlus coating requires maintenance intervals every 25 years. The conservative scenario, in which both coatings are applied, is considered here, even though in reality we have application of only one of them.

End of Life
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 and no impacts are assigned. The benefits from disposal (heat or electricity recovery) are assigned to module D.

Module D includes reuse, recovery and/or recycling potentials expressed as net loads and benefits. Here the loads from the packaging disposal in A5 and from electricity generation on landfill are considered. The product system with the system boundaries is presented in the graph below:
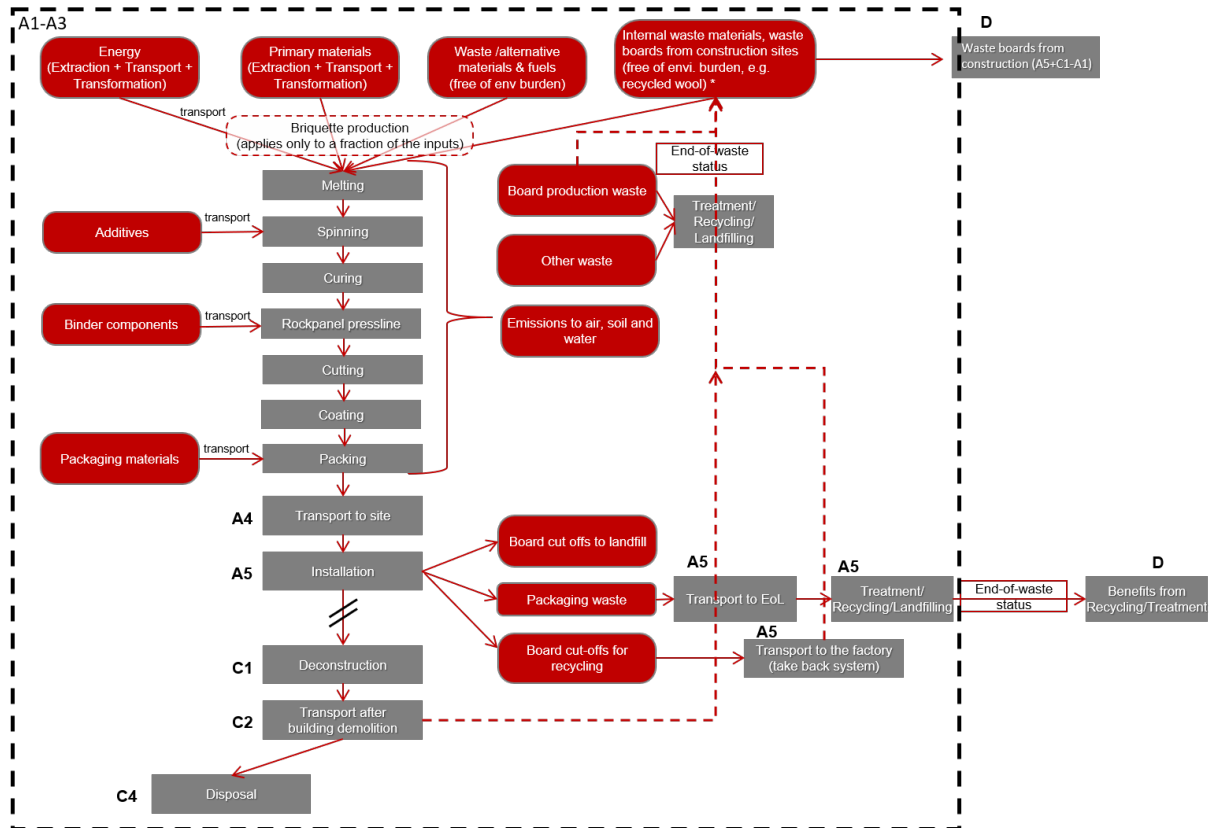

figure: product system with system boundaries

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.

LCA results across EPDs can be calculated with different background databases, modelling assumptions, geographic scope and time periods, all of which are valid and acceptable according to Product Category Rules (PCR) and ISO standards. Caution should be used when attempting to compare EPD results.. 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.

Material loss	5	%

Maintenance (B2)

Name	Value	Unit
Information on maintenance	Re-application of Rockpanel waterborne coating	-
Maintenance cycle	3	Number/RSL
Information on maintenance (2)	Re-application of ProtectPlus coating	
Maintenance cycle (2)	2	Number/RSL

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	-	l/100km
Transport distance	353	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	1050	kg/m^3

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	0	kWh

Reference service life

Name	Value	Unit
Reference service life (according to ISO 15686-1, -2, -7 and -8)	60	a
Declared product properties (at the gate) and finishes	According to product standards: EAD 090001-01-0404 "Prefabricated compressed mineral wool boards with organic or inorganic finish and with specified fastening system"; According to Accelerated durability testing report from Bouw Technologie	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	See installation guidelines. Installation to be conducted in accordance with manufacturers guidelines and the appropriate Declaration of Performance	-
An assumed quality of work, when installed in accordance with the manufacturer's 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, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Product is designed for outdoor application. The performance of the product is declared in the Declaration of Performance.	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	Product is primarily designed for outdoor application	-
Usage conditions, e.g. frequency of use, mechanical exposure	No usage conditions, except if specifically stated on the product or in the Declaration of Performance. Please follow the manufacturer's guidelines.	-
Maintenance e.g. required frequency, type and quality and replacement of components	The boards should be cleaned occasionally with a cleaning solution such as car shampoo or an all-purpose cleaner. Please refer to manufacturer guidelines.	-

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 occur in stages A5 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 benefits from electricity production from landfill gas recovery are included in module D.

End of life (C1 - C4)

Name	Value	Unit
Landfilling	8.4	kg
Transport to landfill	50	km
Utilization rate	50	%

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: 1 m² Rockpanel Durable 8 mm

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	1.43E+1	2.10E-1	1.46E+0	2.47E+0	0.00E+0	0.00E+0	0.00E+0	3.15E-2	0.00E+0	2.46E-1	-3.32E-1
ODP	[kg CFC11-Eq.]	8.15E-8	3.49E-17	5.00E-9	2.21E-14	0.00E+0	0.00E+0	0.00E+0	5.21E-18	0.00E+0	7.57E-16	2.49E-13
AP	[kg SO_2-Eq.]	6.46E-2	1.78E-4	3.47E-3	1.02E-2	0.00E+0	0.00E+0	0.00E+0	2.87E-5	0.00E+0	7.86E-4	-1.14E-3
EP	[kg $(PO_4)^3$-Eq.]	2.23E-2	3.93E-5	1.20E-3	7.81E-4	0.00E+0	0.00E+0	0.00E+0	6.47E-6	0.00E+0	1.27E-4	-1.01E-4
POCP	[kg ethene-Eq.]	4.34E-3	6.68E-7	2.54E-4	9.37E-4	0.00E+0	0.00E+0	0.00E+0	-7.88E-7	0.00E+0	8.77E-5	-1.42E-4
ADPE	[kg Sb-Eq.]	1.03E-5	1.63E-8	5.16E-7	2.96E-6	0.00E+0	0.00E+0	0.00E+0	2.43E-9	0.00E+0	4.77E-8	-4.07E-8
ADPF	[MJ]	1.72E+2	2.86E+0	9.52E+0	4.62E+1	0.00E+0	0.00E+0	0.00E+0	4.27E-1	0.00E+0	1.87E+0	-8.84E+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 Rockpanel Durable 8 mm

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	9.27E+1	1.67E-1	8.59E+0	5.10E+0	0.00E+0	0.00E+0	0.00E+0	2.49E-2	0.00E+0	2.39E-1	-2.81E+0
PERM	[MJ]	4.26E+0	0.00E+0	-3.54E+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]	9.70E+1	1.67E-1	5.05E+0	5.10E+0	0.00E+0	0.00E+0	0.00E+0	2.49E-2	0.00E+0	2.39E-1	-2.81E+0
PENRE	[MJ]	1.41E+2	2.87E+0	1.02E+1	5.02E+1	0.00E+0	0.00E+0	0.00E+0	4.29E-1	0.00E+0	1.94E+0	-9.34E+0
PENRM	[MJ]	3.72E+1	0.00E+0	-1.62E-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
PENRT	[MJ]	1.78E+2	2.87E+0	1.00E+1	5.02E+1	0.00E+0	0.00E+0	0.00E+0	4.29E-1	0.00E+0	1.94E+0	-9.34E+0
SM	[kg]	5.49E+0	0.00E+0	2.74E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-5.49E+0
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
NRSF	[MJ]	1.51E+1	0.00E+0	7.53E-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
FW	[m³]	1.57E-2	2.58E-3	1.76E-3	1.36E-2	0.00E+0	0.00E+0	0.00E+0	4.21E-5	0.00E+0	4.76E-4	-3.97E-3
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 Rockpanel Durable 8 mm

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	5.58E-7	1.60E-7	3.94E-8	7.49E-8	0.00E+0	0.00E+0	0.00E+0	2.40E-8	0.00E+0	3.16E-8	4.21E-9
NHWD	[kg]	7.69E-1	2.34E-4	5.13E-1	6.79E-1	0.00E+0	0.00E+0	0.00E+0	3.49E-5	0.00E+0	8.55E+0	5.62E-1
RWD	[kg]	1.33E-3	3.90E-6	1.36E-4	1.58E-3	0.00E+0	0.00E+0	0.00E+0	5.82E-7	0.00E+0	2.60E-5	-1.71E-5
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
MFR	[kg]	0.00E+0	0.00E+0	1.65E-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
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
EEE	[MJ]	0.00E+0	0.00E+0	6.99E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.41E-2	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	2.08E+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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