

ENVIRONMENTAL PRODUCT DECLARATION

ROCKFON® EDUCATION STANDARD

ROCKFON® NORTH AMERICA

ROCKFON® EDUCATION STANDARD



Rockfon North America is Part of the ROCKWOOL Group, the world's leading stone wool manufacturer. Operating globally for over 80 years, the company is committed to enriching the lives of everyone. Our products span everything from high performing acoustic ceiling solutions to horticultural systems.

The United Nations Sustainable Departmental Goals (SDGs) steer our ambitions. We committed to 10 out of the 17 SDGs – pursuing the goals where we can have the greatest impact and that are the most aligned with our business competencies.

Rockfon is dedicated to offering sustainable ceiling products that promote healthy indoor environments. Our ceiling solutions provide excellent acoustics and are naturally resistant to the growth of mold and mildew, increasing our positive impact on people and society by maximizing our positive impact and minimizing our operational footprint.

Our Environmental Product Declaration for our stone wool ceiling products is another element of our commitment to serving our customers and the industry's requirements for sustainable solutions.



Rockfon® Education Standard stone wool products benefit from High Acoustic Absorption, Class A Fire Rated Performance, Moisture and Sag Resistance, Smooth Modern Aesthetics

ENVIRONMENTAL PRODUCT DECLARATION



ROCKFON® NORTH AMERICA
ROCKFON® EDUCATION STANDARD

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment	www.ul.com
DECLARATION HOLDER	Rockfon North America	
DECLARATION NUMBER	4787277886.101.1	
DECLARED PRODUCT	Rockfon® Education Standard	
REFERENCE PCR	Mineral Panels 12.2018 IBU	
REFERENCE PCR STANDARD	<input type="checkbox"/> EN 15804 (2012) <input type="checkbox"/> ISO 21930 (2007) <input checked="" type="checkbox"/> ISO 21930 (2017)	
DATE OF ISSUE	January 10, 2021	
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CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications	
The PCR review was conducted by:	Institut Bauen und Umwelt PCR Review Panel info@ibu-epd.com	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
	Cooper McCollum, UL Environment	

ENVIRONMENTAL PRODUCT DECLARATION



ROCKFON® NORTH AMERICA
ROCKFON® CEILING TILES

According to ISO 14025

This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Dr. Frank Werner
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ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

Owner of the Declaration	Rockfon (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-20200018-CBD4-EN
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Valid to	09.03.2025




Rockfon Ceiling Tiles, Baffles, Islands and Wall Applications
Rockfon (part of ROCKWOOL Group)



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General Information

<p>Rockfon (part of ROCKWOOL Group)</p> <hr/> <p>Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-RWI-20200018-CBD4-EN</p> <hr/> <p>This declaration is based on the product category rules: Mineral panels, 12.2018 (PCR checked and approved by the SVR)</p> <hr/> <p>Issue date 01.10.2021</p> <hr/> <p>Valid to 09.03.2025</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)</p>	<p>Rockfon Ceiling tiles</p> <hr/> <p>Owner of the declaration Rockfon (part of ROCKWOOL Group) Hovedgaden 501D 2640, Hedehusene, Denmark</p> <hr/> <p>Declared product / declared unit 1 m² of installed ceiling tile.</p> <hr/> <p>Scope: The span of products covered under this declaration is synthetic resin-bonded stone wool materials, which are produced in the form of tiles in the density range from 70 up to 175kg/m³. The products are supplied in thicknesses of 12 up to 160 mm. The declared product in this declaration is Rockfon Arctic with a density of 100kg/m³ and a thickness of 15mm. For the rest of the products scaling factors are provided. For the facing and coating materials, information can be found in the attached Annex. The products included in this EPD are manufactured in Roermond (Netherlands), Cigacice (Poland), Saint Eloy (France), Vyborg (Russia) and Marshall County, Mississippi (USA). The EPD is based on weighted LCA inventory data from the 5 plants.</p> <p>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.</p> <p>The EPD was created according to the specifications of <i>EN 15804+A1</i>. In the following, the standard will be simplified as <i>EN 15804</i>.</p> <hr/> <p>Verification</p> <table border="1" style="width: 100%;"> <tr> <td colspan="2" style="text-align: center;">The standard <i>EN 15804</i> serves as the core PCR</td> </tr> <tr> <td colspan="2" style="text-align: center;">Independent verification of the declaration and data according to <i>ISO 14025:2010</i></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> internally</td> <td style="text-align: center;"><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dr. Frank Werner (Independent verifier)</p>	The standard <i>EN 15804</i> serves as the core PCR		Independent verification of the declaration and data according to <i>ISO 14025:2010</i>		<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally
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Independent verification of the declaration and data according to <i>ISO 14025:2010</i>							
<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally						

Product

Product description/Product definition

Rockfon stone wool acoustic tiles are traditionally made from volcanic rock (typically basalt or dolomite), an increasing proportion of recycled material, and a low percentage of binder (in Rockfon acoustic tiles this is around 3-4%). The essential component of Rockfon tiles are stone wool fibres, which are monofilament synthetic mineral fibres of non-crystalline structure extracted from a silicate melt. The products described in this EPD are produced in the form of tiles in the density range from 70 up to 175 kg/m³. The products are supplied in thicknesses of 12 up to 160 mm. The acoustic tiles can have a glass fibre fleece facing and can be coated with water-based dispersion paint. Details for the environmental impacts of this type of facing can be found on the first page of the annex. The

additional facing of aluminium laminate may be applicable for some products. The environmental impacts of aluminium laminate are presented on the second page of the annex. Product-specific environmental impacts are compiled by applying the relevant scaling factor (listed in the table below) in the Product Specific Scaling formula.

Product Specific Scaling Formula:

Environmental Impact per m² product X-with facing = Environmental Impact reference product*scaling factor+Environmental Impact facing material. Please note that the scaling factors give the precise amount of material needed to produce the other product types.

Product Name	Scaling Factor	Product Name	Scaling Factor	Product Name	Scaling Factor	Product Name	Scaling Factor
Artic (15 mm)-reference product	1,0	Ekla Bas	1,3	Koral Tenor (25 mm)	1,2	Rockindus (30 mm)	1,4
Acoustimass	4,3	Ekla dB 41	3,5	Koral Wall	1,9	Rockindus (50 mm)	2,3
Alaska (20 mm)	2,0	Ekla dB 43	4,4	Krios A (20 mm)	1,1	Rockindus dB 40	3,0
Alaska (22 mm)	2,2	Ekla Th 40	1,7	Krios A (25 mm)	1,3	Rockindus dB 42	4,0
Alaska dB 35	2,0	Ekla Th 80	3,3	Krios D (20 mm)	2,0	Rocklux	2,2
Artic (20 mm)	1,3	Facett (20 mm)	1,2	Krios D (25 mm)	2,5	Rockshed (50 mm)	2,2
Artic (40 mm)	2,7	Facett (40 mm)	2,4	Krios E (20 mm)	1,6	Rockshed (75 mm)	3,3
Blanka A (20 mm)	1,2	Facett (50 mm)	3,0	Krios X (22 mm)	2,2	Royal A (€ 20 mm)	1,1
Blanka A (25 mm)	1,5	Facett (60 mm)	3,6	Krios X (25 mm)	2,5	Royal A (25 mm)	1,3
Blanka B/C/D/E/G/M/Z (20 mm)	2,0	Facett (80 mm)	4,8	Krios Bas	1,1	Royal E (15 mm)	1,2
Blanka B/C/D/E/G/M/Z (25 mm)	2,5	Facett (100 mm)	6,0	Krios O2	1,3	Royal E (20 mm)	1,6
Blanka X (22 mm)	2,2	Facett (120 mm)	7,2	Ligna	1,1	Royal Hygiene (20 mm)	1,1
Blanka Activity	4,0	Facett (140 mm)	8,4	Lithos New	1,2	Royal Hygiene (40 mm)	1,9
Blanka Bass	2,0	Facett (160 mm)	9,6	Logic	0,8	Samson (incl. Wall)	2,4
Blanka dB 35	2,0	Fibral (20 mm)	1,1	MediCare Air	1,5	Scholar (20 mm)	1,2
Blanka dB 41	3,5	Fibral (25 mm)	1,3	MediCare Block	1,3	Scholar (incl. Wall) (40 mm)	2,4
Blanka dB 43	4,4	Fibral Multiflex Baffle	2,3	MediCare Plus A (20 mm)	1,2	Soft New	0,9
Blanka dB 46	5,0	Fusion Blanka/Sonar	2,0	MediCare Plus A (25 mm)	1,5	Sonar A/B/C/D/E/G/M/Z (20 mm)	2,0
Boxer (€ 25 mm)	1,3	Humitec Baffle	2,3	MediCare Plus E (20 mm)	1,6	Sonar A/D/E/M/X (25 mm)	2,5
Boxer (40 mm CIG)	2,4	Hydroclean 12/52	1,1	MediCare Plus X	2,2	Sonar X (22 mm)	2,2
Boxer (40 mm ROE & SEL)	1,9	Hygienic (20 mm)	1,2	MediCare Royal A (20 mm)	1,1	Sonar Activity	4,0
Boxer Wall	2,4	Hygienic (40 mm)	1,9	MediCare Royal E (20 mm)	1,6	Sonar Bas	2,0
Cinema Black	1,2	Hygienic Baffle	2,3	MediCare Standard (12 mm)	0,8	Sonar Cut-to	2,5
Color-all (€ 20 mm)	1,2	Hygienic Plus (20 mm)	1,2	MediCare Standard A (15 mm)	0,9	Sonar dB 35	2,0
Color-all (25 m)	1,3	Hygienic Plus (40 mm)	1,9	MediCare Standard E (15 mm)	1,2	Sonar dB 40	3,0
Color-all A (40 mm)	1,9	Industrial Baffle	2,3	Mono Acoustic Elegant / Ready-Mix (incl. Direct and Flecto)	3,6	Sonar dB 41	3,5
Color-all B (40 mm)	4,0	Industrial Baffle	2,3	Opal Multiflex Baffle	2,3	Sonar dB 42/43	4,4
Color-all D/E	2,0	Industrial Black/Nature/Opal (30 mm)	1,4	Pacific	1,0	Sonar dB 44/46	5,0
Color-all X	2,2	Industrial Black/Nature/Opal (50 mm)	2,3	Pagos Galaxie / Oris	1,1	Soundstop 30 dB	4,4
Color-all Wall	1,9	Industrial Black/Nature/Opal (100 mm)	3,7	Pallas	1,1	Soundstop 21 dB	3,0
Contour	4,0	Industrial Black/Nature/Opal (100 mm)	4,7	Pallas HP	1,3	Soundstop 33 dB	4,8
Cosmos Grey/White (40 mm)	2,7	Industriebatts (25 mm)	1,2	Plafolaine Feu	2,0	Swing	1,6
Cosmos Grey/White (50 mm)	3,3	Industriebatts (50 mm)	2,3	Plafolaine Feu	3,6	Tabique Plenum	3,7
Cosmos Grey(60 mm)	4,0	Koral A (15 mm)	0,9	Rockbaffle Deco	1,7	Tropic A (15 mm)	0,9
Cosmos Grey(80 mm)	5,3	Koral A (20 mm)	1,2	Rockfon Metal	0,9	Tropic A (20 mm)	1,4
Cosmos Grey (100 mm)	6,7	Koral A (40 mm)	1,9	Rockfon Metal dB 41	3,0	Tropic A (40 mm)	1,9
Eclipse (incl.Wall)	4,0	Koral E (15 mm)	1,2	Rockfon Metal dB 44	4,0	Tropic E (15 mm)	1,2
Education Standard (16 mm)	1,3	Koral E (40 mm) and EI 30	3,2	Rockfon Metal dB 46	5,0	Tropic E (20 mm)	1,6
Education Plus (20 mm)	1,6	Koral 100 mm	4,7			Tropic dB 42	4,4
Education Premium (25 mm)	2	Koral Flectoline	1,2			Universal Baffle	2,3
Ekla (90 kg/ m3)	1,2	Koral Tenor (15 mm)	0,9			VertiQ	3,2
Ekla (120 kg/m3)	1,6					VertiQ Metal	1,7

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN 13964:2014 or EN 13162+A1:2015 and the CE-marking.

For the application and use the respective national provisions apply. They meet the requirements of the regulation (EU) Nr. 1272/2008/EU.

Application

Rockfon products include acoustic ceiling tiles, baffles, islands and wall applications. They are available with different coatings and facings in a variety of shapes, thicknesses, and densities and positively contribute to a healthy indoor environment.

Technical Data

The technical specifications listed below cover the range of all the products declared in this EPD. For information regarding specific products please visit <https://www.rockfon.co.uk> and access the provided Declarations of Performance (DoP).

Constructional data (acc. to EN 13964)

Name	Value	Unit
Gross density	70 - 175	kg/m ³
Reaction to Fire acc. to EN 13964	A1	

Sound absorption coefficient (α _w) acc. to EN 13964	up to 1.00	
Susceptibility to the growth of harmful micro-organisms, as dampness acc. to EN 13964	A - not susceptible	
Thermal conductivity acc. to EN 13964	0.04	W/(mK)
Susceptibility to the growth of harmful micro-organisms, through thermal insulation acc. to EN 13964	A	
Durability acc. to EN 13964	Class 1/C/ON	
Sound absorption class	A	
Light reflection	up to 87%	%
Light diffusion	up to >99%	%
Humidity and sag resistance	up to 100% RH and no visible deflection	%
Airborne sound reduction acc. to EN ISO 10848-2 and EN ISO 717-1	up to 42	dB

Performance data of the Rockfon stone wool products are in accordance with the declaration of performance

with respect to its essential characteristics according to *EN 13964:2014*.

Emission tests according to *EN 16516:2018* are available from national technical managers.

Base materials/Ancillary materials

Composition Rockfon stone wool product:

- non-scarce natural stone and cement [59%]
- slags and other secondary materials or waste materials [19,5%]
- mineral oil and bonding agent [<0,2%]
- binder, a thermoset inert polymer resin [5%]
- Non-woven glass wool facing (optional) [1-15%]
- water-based paints [0-16,5%]

Packaging represents less than 6% of the final product delivered to the customer. The raw materials are non-scarce natural stones, secondary materials and briquettes, which are made of mineral wool waste, secondary materials and by-products from other industries such as slags and cement. The binder is a thermoset inert polymer resin which is polymerized into a solid resin during the production of the final stone wool product. The coating is a waterborne acrylic coating and an additional (optional) polyurethane (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 stone wool is registered with REACH under the following definition: "Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide ($\text{Na}_2\text{O}+\text{K}_2\text{O}+\text{CaO}+\text{MgO}+\text{BaO}$) 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

A reference service life according to *ISO 15686* is not declared for this EPD. Instead, a service life is declared according to *BBSR table*. According to this table, mineral panels have a service life of more than 50 years in a building. For this EPD the declared value is therefore 50 years.

This is the service life that is used in most existing PCRs and EPDs in the Dutch, German, US and Canadian markets. The mineral wool core in Rockfon products is tested to maintain its properties for at least 50 years. Also, Rockfon products are tested to maintain flatness even in high temperature/ high humidity environments (40°C / 95 % relative humidity). Given this, there is no doubt that Rockfon ceiling tiles could have a technical lifespan of more than 50 years in a normal indoor environment.

Some owners will replace the Rockfon product due to renovations or aesthetics, but not for functional performance reasons. Replacements typically do not happen due to technical failure but are more likely the result of vandalism, accidents, visual appearance, minor refurbishments (e.g. painting an office, changing of tenants) or major refurbishments.

LCA: Calculation rules

Declared Unit

The declared unit refers to 1 m² of installed acoustic ceiling tile or wall panel (within the density range 70 – 175 kg/m³) with the results being representative for a 15 mm thick and 1,5 kg/m² heavy product. This weight per m² is applicable for the stone wool core without the facing. The declared product is Rockfon Arctic with a density of 100kg/m³ and a thickness of 15 mm.

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	1.5	kg/m ²
Thickness of the panels	15	mm
conversion factor [Mass/Declared Unit]	-	-
Conversion factor to 1 kg	0.667	-
conversion factor [Mass/Declared Unit]	-	-
Gross density	-	kg/m ³

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;
- 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 coming for example from the steel and electricity plants (e.g. 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. Its transport to the factory is accounted for. Modules A1, A2 and A3 are declared as an aggregated module A1-A3.

In two of the factories (Cigacice in Poland and Roermond in the Netherlands) we obtain Renewable Energy Certificates for the complete electricity consumption. For that purpose the electricity in those factories is modelled as renewable electricity.

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 tiles that fit in a truck that can hold 44 pallets. 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 7% and according to the modularity principle of *EN 15804*, its impacts are fully allocated to A5. The 7% assumption is used based on the "common scenarios for LCA" internal document from EURIMA (European Insulation Manufacturers Association) but can, in reality, be significantly lower.

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 assumption for installation waste for this calculation is that it is 100% landfilled but it often also is 100% closed-loop recycled through the Rockfon recycling service offering.

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:

Rockfon stone wool ceiling tiles are installed permanently in the structure and do not require maintenance, repair, replacement or refurbishment under normal use conditions. Similarly, Rockfon has no operational energy or water use.

End of Life

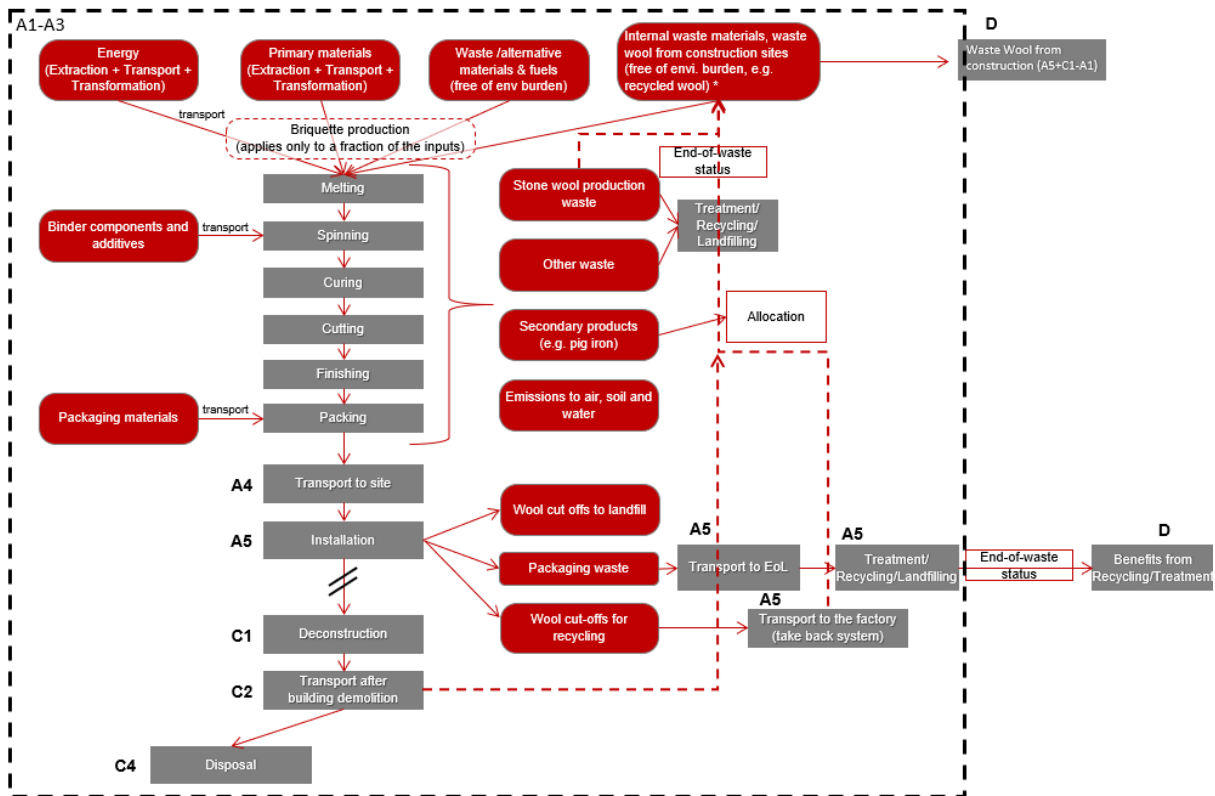
The End-of-life stage C1-C4 includes:

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

These stages also include the 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:



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 background datasets and database version have to be mentioned since they can have an influence on the final 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.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	38	l/100km
Transport distance	646	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	100	kg/m ³

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	0	kWh
Material loss	7	%

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	> 50	a

End of life (C1-C4)

Name	Value	Unit
Landfilling	15	kg
Transport to landfill	50	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 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.

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 of Rockfon ceiling tile

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO ₂ -Eq.]	1.32E+0	2.21E-1	2.58E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.79E-3	0.00E+0	2.16E-2	-6.97E-2
ODP	[kg CFC11-Eq.]	2.65E-9	3.66E-17	3.94E-10	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.93E-19	0.00E+0	1.26E-16	-1.34E-14
AP	[kg SO ₂ -Eq.]	7.60E-3	1.87E-4	5.81E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.38E-6	0.00E+0	1.30E-4	-1.85E-4
EP	[kg (PO ₄) ³⁻ -Eq.]	1.17E-3	4.13E-5	1.02E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.89E-7	0.00E+0	1.47E-5	-1.80E-5
POCP	[kg ethene-Eq.]	5.45E-4	7.02E-7	4.50E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.26E-7	0.00E+0	9.96E-6	-1.79E-5
ADPE	[kg Sb-Eq.]	5.26E-7	1.71E-8	3.55E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.70E-10	0.00E+0	7.96E-9	-2.12E-8
ADPF	[MJ]	1.56E+1	3.01E+0	1.40E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.51E-2	0.00E+0	3.03E-1	-1.42E+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 - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² of Rockfon ceiling tile

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.40E+0	1.75E-1	2.05E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.79E-3	0.00E+0	3.97E-2	-2.06E-1
PERM	[MJ]	2.20E+0	0.00E+0	1.63E+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]	5.60E+0	1.75E-1	4.22E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.79E-3	0.00E+0	3.97E-2	-2.06E-1
PENRE	[MJ]	1.53E+0	3.02E+0	1.58E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.53E-2	0.00E+0	3.14E-1	-1.53E+0
PENRM	[MJ]	2.27E+0	0.00E+0	-2.27E-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
PENRT	[MJ]	1.76E+0	3.02E+0	1.56E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.53E-2	0.00E+0	3.14E-1	-1.53E+0
SM	[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
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]	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]	6.19E-3	2.96E-4	8.11E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.40E-6	0.00E+0	7.90E-5	-4.23E-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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m² of Rockfon ceiling tile

Parameter	Unit	A1-A3	A4	A5	B2	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	3.59E-7	1.68E-7	3.77E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.65E-9	0.00E+0	5.35E-9	-1.70E-9
NHWD	[kg]	1.20E-1	2.45E-4	1.17E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.31E-6	0.00E+0	1.46E+0	-8.99E-4
RWD	[kg]	7.41E-4	4.09E-6	5.91E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.86E-8	0.00E+0	4.21E-6	-2.70E-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	3.42E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.05E-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
EEE	[MJ]	0.00E+0	0.00E+0	1.53E-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
EET	[MJ]	0.00E+0	0.00E+0	4.60E-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

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; EET = Exported thermal energy

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”.

This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential

comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”.

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

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