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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Rockwool Rockfon Norway
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-340-229-EN
Issue date:	06.07.2016
Valid to:	06.07.2021

Average ceiling tile in the density range 91-131 kg/m^3

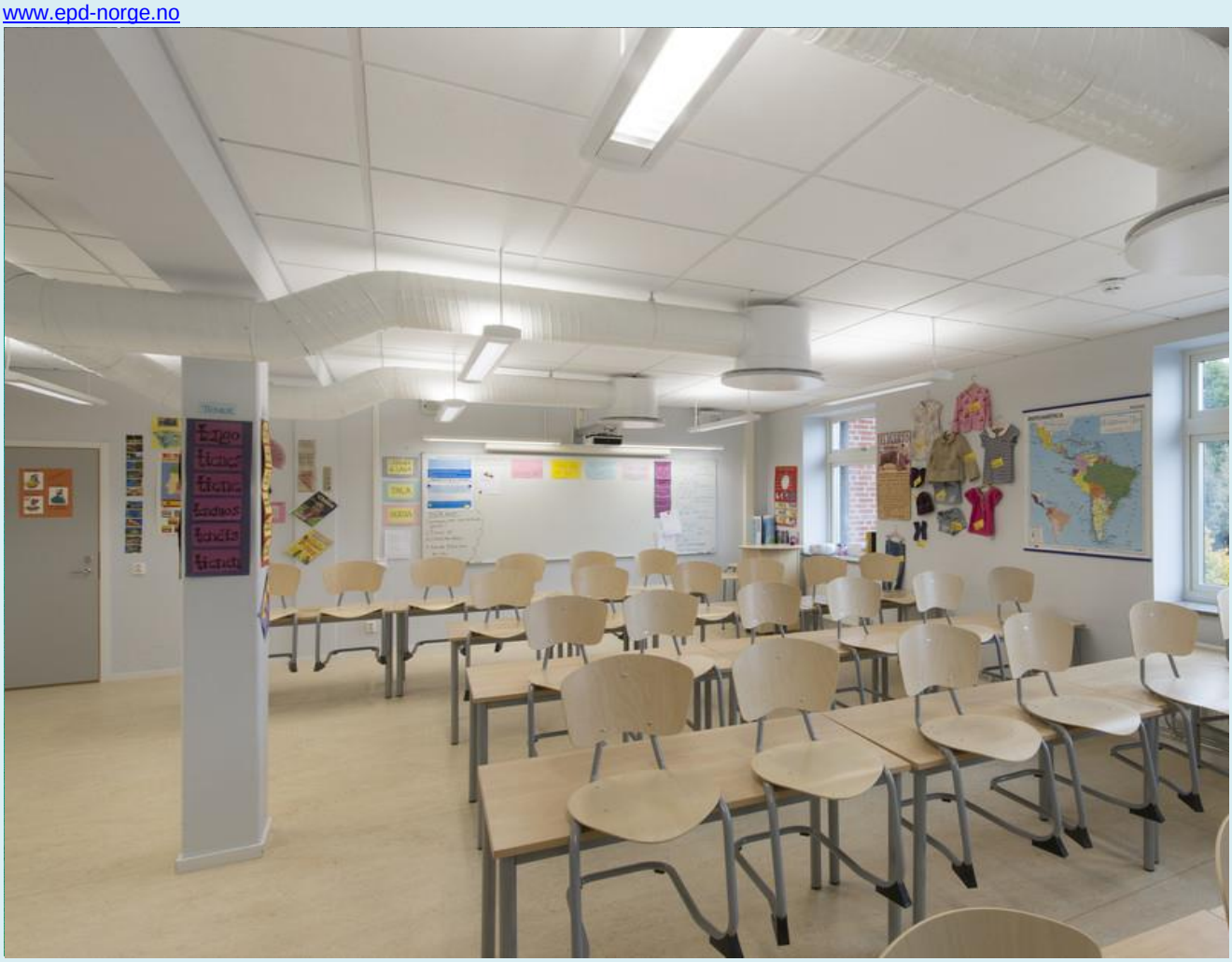
with the results representing a 20 mm thick and 2.1 kg/m^2 product

The declared values represent an average product for the declared range. Product names included in the density range (91-131 kg/m3) are Koral, Polar, Color-all, Hygienic, Hygienic Plus, Industrial, Fibral Multiflex Baffel, Koral Tenor, Medicare, Medicare Plus, Medicare air, Cosmos, Samson*, Boxer* but are not limited to those.

* The environmental impact of speciality facings not included in the assessments.

Rockwool Rockfon Norway

www.epd-norge.no



General information

Product:

Average ceiling tile in the density range (91-131 kg/m^3) with the results representing a 20 mm thick and 2.1 kg/m^2 product

Owner of the declaration:

ROCKFON
AS ROCKWOOL
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Manufacturer:

ROCKFON
ROCKWOOL International A/S

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Declaration number:

NEPD-340-229-EN

Place of production:

Products are produced in Cigacice (Poland) and in Roermond (Netherlands). A weighted average is declared.

ECO Platform reference number:

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Management system:

ISO 14001
CIG: EMS570949
ROE: RQA653573

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR
NPCR10 Building boards rev1

Organisation no:

No. 923 828 583

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Issue date:

06.07.2016

Valid to:

06.07.2021

Declared unit:

1 m² of installed ceiling tile with the results being representative for a 20 mm thick and 2.1 kg/m^2 product

Year of study:

2013

Declared unit with option:

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Functional unit:

1 m² of installed ceiling tile with a reference service life of 50 years

The EPD has been worked out by:

Joep P.R. Meijer

theRightenvironment

Verification:

The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

Third party verifier:

IVAM

Harry van Ewijk
(Independent verifier approved by EPD Norway)

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

ROCKFON acoustic panels are intended for indoor use.
The panels consist of a fire safe mineral wool core with a colored or painted facing. With no or little organic material, ROCKFON panels will stay flat in humid conditions and are naturally resistant towards microorganisms. Please see manufactures literature for more information

Product specification:

ROCKFON acoustic panels are intended for indoor use.
The panels consist of a fire safe mineral wool core with a colored or painted facing. With no or little organic material, ROCKFON panels will stay flat in humid conditions and are naturally resistant towards microorganisms. Please see manufactures literature for more information.

Materials	%
Mineral wool core incl. resin	73-97
Facing	1-15
Coatings	0-16

Technical data:

Product range: 91-131 kg/m^3 (97 kg/m^3 for the declared unit).
Tile sizes range from 300 mm wide to 2400 mm long (1 m^2 for the declared unit)
Weight: 1.7- 9.3 kg/m^2 (2.1 kg/m^2 for the declared unit)
Technical datasheets: www.rockfon.no

Market:

Norway. The declared values represent an average product for the declared range. Product names included in the density range (91-131 kg/m^3) are Koral, Polar, Color-all, Hygienic, Hygienic Plus, Industrial, Fibral Multiflex Baffel, Koral Tenor, Medicare, Medicare Plus, Medicare air, Cosmos, Samson*, Boxer* but are not limited to those.
* The environmental impact of speciality facings not included in the assessments.

A direct extrapolation of the EPD results by using the thickness and density of the mineral core is not possible because it does not reflect the variations in the facing and coatings. These variations do not scale to mass or density. The variation of the EPD results due to product variations for the declared range is greater than +/- 10%. Therefore, if scaling is performed by the Rockfon customer according to the specifically purchased thickness and weight according to the declared unit (20 mm and 2.1 kg/m^2), the results can be considered a best guess. If you are a Rockfon customer and require SKU specific results please contact infomail.no@rockfon.com

Reference service life, product:

50 years

Reference service life, building:

n.a.

LCA: Calculation rules

Declared unit:

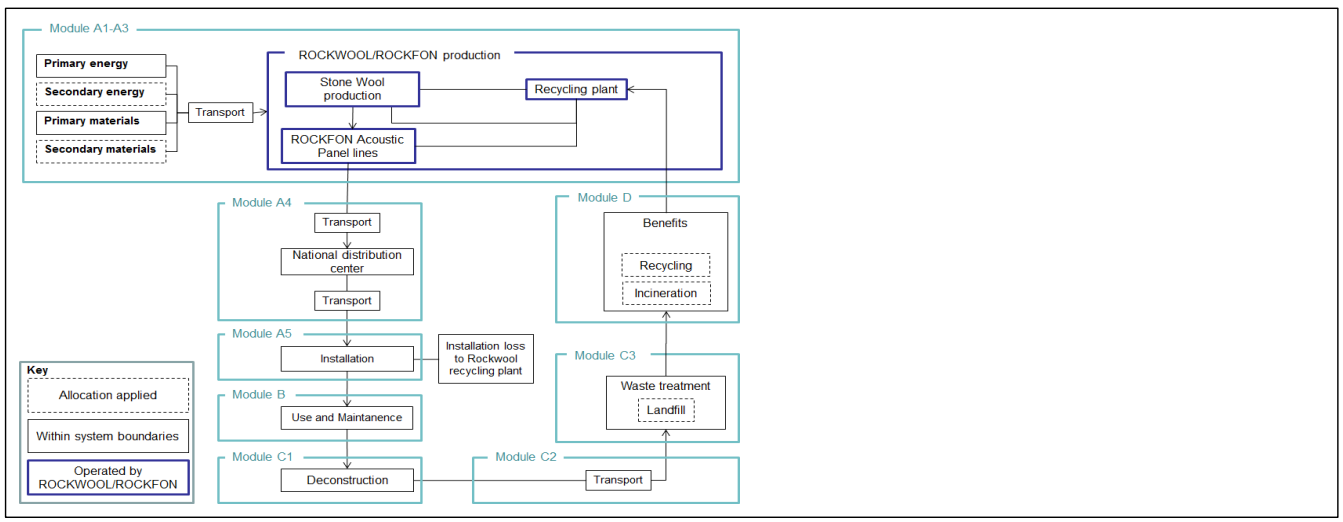
1 m² of installed ceiling tile with a reference service life of 50 years with the results being representative for a 20 mm thick and 2.1 kg/m^2 heavy product.

System boundary:

The system boundaries are presented in the flow diagram below. It shows that all processes for manufacturing, delivery, installation and end-of-life are included. Module D includes the recovery of recycled materials from module A3 and A5. For recycling substitution is applied for recovered materials.

Most of the waste from the manufacturing and packaging material from the construction site is recycled and the substitution of materials, adjusted for a recycling efficiency factor, is declared in Module D

Figure 1. System boundaries



Data quality:
Specific data have been used for all processes operated by ROCKWOOL for they year 2013. Suppliers have been contacted. Missing data and generic data have been included from Ecoinvent 3.1. using SimaPro.

Allocation:
The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Cut-off criteria:
All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.
Products are either delivered through central distribution locations. Final delivery is made from these locations.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	80%	88m3 trailer	1396	0,43 l/tkm	60
Boat	1000 tons per load	ferry	10	0,01 l/tkm	0,083

The product is applied directly into the ceiling using a suspended grid (which is not included). Average installation losses are 6% and included in this EPD.

Assembly (A5)

	Unit	Value
Auxiliary	kg	0
Water consumption	m^3	0
Electricity consumption	kWh	0
Other energy carriers	MJ	0
Material loss	%	6
Output materials from waste treatment	kg	0,52
Dust in the air	kg	0

There is no maintenance necessary other than regular indoor building cleaning.

Maintenance (B2)/Repair (B3)

	Unit	Value
Maintenance cycle*	Year	0
Auxiliary	kg	0
Other resources	kg	0
Water consumption	m^3	0
Electricity consumption	kWh	0
Other energy carriers	MJ	0
Material loss	kg	0

There is no operation energy or water consumption

Operational energy (B6) and water consumption (B7)

	Unit	Value
Water consumption	m^3	0
Electricity consumption	kWh	0
Other energy carriers	MJ	0
Power output of equipment	kW	0

The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E.

Use (B1)

	Unit	Value
No impacts	-	-

There are no replacements necessary from a technical perspective.

Replacement (B4)/Refurbishment (B5)

	Unit	Value
Replacement cycle*	Year	0
Electricity consumption	kWh	0
Replacement of worn parts	0	0

* Number or RSL (Reference Service Life)

Products can be removed manually for recycling. The percentage assumed is 5%. Most is collected as part of mixed construction waste that goes to landfill. Mineral wool products can be recycled and are typically not reused. With no or little organic content, energy recovery is irrelevant.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0,02
Collected as mixed construction waste	kg	1,87
Reuse	kg	0,00
Recycling	kg	0,10
Energy recovery	kg	0,00
To landfill	kg	1,87

Transport to landfill, which is the major end of life waste treatment is assumed to be within 50km of the building site.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	50%	7.5-15 ton truck	50	0,04 l/tkm	2,0

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Plastic	kg	0,01
Cardboard	kg	0,13
Pallets	kg	0,01
Steel	kg	0,12

Most of the waste from the manufacturing and packaging material from the construction site is recycled and the substitution of materials, adjusted for a recycling efficiency factor, is declared in Module D

Additional technical information

ROCKFON acoustic panels are CE-labelled in accordance with EN13964 or EN 13162

LCA: Results

Relevant life cycle elements are the use of binder and energy (cokes and electricity) at Rockwool for the wool production. This makes the production losses from the wool to the finished product relevant. The Rockfon manufacturing includes the addition of fleeces shown under "facings" and coatings shown under "other resources". The emissions from the energy use of the wool production is a relevant prcoess parameter that shows up in the categories that reflect emissions of carbon dioxide (CO2), sulfur dioxide (SO2) and nitrogen oxides (NOx), or, global warming, eutrophication, acidification and photochemical smog formation. Packaging, delivery and waste treatment of installation losses are noticable but less relevant. The use of pallets as part of "packaging" includes the use of energy from biomass as feedstock, which is dominant for the parameter for renewable energy. Disposal at the end of life dominates the results for non-hazardous waste. Some of the benefits from recycling and combustion are noticeable.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assemby stage		Use stage							End of life stage				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	MNR	MNR	MNR	MNR	MNR	MNR	MNR	MNR	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D	
GWP	kg CO_2-eqv	3,5E+00	4,7E-01	6,2E-01	2,4E-02	3,2E-03	3,1E-02	4,3E-02	
ODP	kg CFC11-eqv	3,1E-07	8,4E-08	1,8E-08	4,2E-09	5,6E-10	7,0E-09	-1,9E-08	
POCP	kg C_2H_4-eqv	2,6E-02	1,9E-03	1,6E-03	9,4E-05	1,2E-05	1,6E-04	-1,5E-03	
AP	kg SO_2-eqv	3,5E-03	3,1E-04	2,6E-04	1,5E-05	2,0E-06	2,6E-05	-2,0E-04	
EP	kg PO_4^{3-}-eqv	2,5E-03	8,1E-05	1,6E-04	4,1E-06	5,4E-07	7,2E-06	-1,6E-04	
ADPM	kg Sb-eqv	5,8E-06	1,7E-06	4,3E-07	8,4E-08	1,1E-08	8,3E-08	-2,4E-07	
ADPE	MJ	6,3E+01	7,0E+00	3,4E+00	3,5E-01	4,6E-02	5,9E-01	-3,0E+00	

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Resource use

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D	
RPEE	MJ	4,7E+00	5,0E-02	-1,8E+00	2,5E-03	3,3E-04	3,8E-03	-6,8E-02	
RPEM	MJ	3,7E+00	4,6E-02	2,1E-01	2,3E-03	3,0E-04	7,2E-03	-4,2E+00	
TPE	MJ	8,4E+00	9,6E-02	-1,6E+00	4,8E-03	6,4E-04	1,1E-02	-4,3E+00	
NRPE	MJ	7,1E+01	7,1E+00	3,9E+00	3,6E-01	4,7E-02	6,0E-01	-3,4E+00	
NRPM	MJ	5,6E-01	0,0E+00	5,7E-03	0,0E+00	0,0E+00	0,0E+00	-3,7E-01	
TRPE	MJ	7,1E+01	7,1E+00	3,9E+00	3,6E-01	4,7E-02	6,0E-01	-3,7E+00	
SM	kg	1,3E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
RSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
NRSF	MJ	2,7E-02	0,0E+00	1,6E-03	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
W	m^3	6,2E-02	1,5E-03	3,6E-03	7,6E-05	1,0E-05	3,9E-04	-2,7E-03	

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D	
HW	kg	2,5E+00	1,4E-01	1,5E-01	6,9E-03	9,2E-04	9,9E-03	-3,7E-01	
NHW	kg	3,6E+00	2,7E-01	2,2E-01	1,3E-02	1,8E-03	1,9E+00	-3,7E-02	
RW	kg	1,3E-01	1,9E-03	6,8E-03	9,5E-05	1,3E-05	1,5E-04	-4,1E-03	

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D	
CR	kg	0,0E+00	0,00E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
MR	kg	2,7E-01	0,00E+00	1,6E-02	0,0E+00	0,0E+00	0,0E+00	2,6E-01	
MER	kg	0,0E+00	0,00E+00	1,6E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
EEE	MJ	0,0E+00	0,00E+00	2,2E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	
ETE	MJ	0,0E+00	0,00E+00	4,1E-01	0,0E+00	0,0E+00	0,0E+00	0,0E+00	

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 = $9,0*10^{-3}$ = 0,009

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase
Production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess(A3).

Data source	Amount	Unit
Econinvent v3 (june 2014) - Rockfon average	0,55	CO_2-eqv/kWh

Dangerous substances

- ☑ The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- ☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- ☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- ☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.

Name	CAS no.	Amount
None		

Indoor environment
The majority of ROCKFON products meet the requirements for low emissions (M1) according to EN15251: 2007 Appendix E. See manufacturers documentation for specific product emissions criteria

Carbon footprint
Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14044:2006	*Environmental management - Life cycle assessment - Requirements and guidelines*
EN 15804:2012+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
Meijer, 2015a	*MRPI EcoLink Dubo 6.0 2013 04-2015, spreadsheet*
Meijer, 2015b	*Rockfon product definition and results, spreadsheet*
Meijer, 2015c	*Life Cycle Assessment based on the EN15804 for Rockfon Acoustic Ceiling Tiles*
NPCR 010 rev1	*Building boards 2013*

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