

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2



The Norwegian
EPD Foundation

Owner of the declaration: Rockfon
(part of ROCKWOOL Group)

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3343-1979-EN

Registration Number:
NEPD-3343-1979-EN

Issue date: 23.03.2022
Valid to: 23.03.2027

ver-210223

Product Name

Rockfon® Chicago
Metallic™ grids

Metal grid load bearing system
for Rockfon ceiling tiles.

Manufacturer

Rockfon, part of ROCKWOOL
Group

ver-141024

General information

Product:

Chicago Metallic™ Grids

Program Operator:

The Norwegian EPD Foundation
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Declaration Number:

NEPD-3343-1979-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804+A2 serves as core PCR
NPCR 013:2021, Part B for Steel and Aluminium
Construction Products

Statements:

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

Declared unit:

1 kg of average Chicago Metallic™ metal grid system for ceiling tiles.

Declared unit with option:

-


Functional unit:

Not applicable

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal external



Jane Anderson, ConstructionLCA Ltd
Independent verifier approved by EPD Norway

Owner of the declaration:

Rockfon (part of ROCKWOOL Group)

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Manufacturer:

Rockfon, part of ROCKWOOL Group
Rockwool Belgium nv

Place of production:

Oud Sluisstraat 5, 2110 Wijnegem, Belgium

Management system:

ISO 14001, ISO 9001

Organisation no:

78416513

Issue date:

23.03.2022

Valid to:

23.03.2027


Year of study:

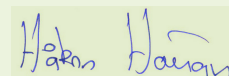
2021

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804+A2 and seen in a building context.

The EPD has been worked out by:

Tarisa Konthopoulos, ROCKWOOL International A/S  **ROCKWOOL**



Approved (Manager of EPD Norway)

Product

Product description:

Rockfon® Chicago Metallic™ grids are a metal grid system installed on the ceiling for a load bearing of ceiling tiles. The system consists of different components e.g. main runners, cross tees, etc. varying in length and height. Screws or other accessories such as clips, used to support the systems, are not provided together with the metal grids (as support accessories are not produced by Rockfon) and therefore are not part of this EPD.

Product specification:

Rockfon® Chicago Metallic™ grids area product made from cold rolled galvanised steel and from coated steel with average recycled content of 17,5 %.

Product materials (per 1 kg of average system)	kg	%
Hot dip galvanised steel	0,73	73
Galvanised pre-painted (coated) steel	0,27	27
Packaging materials	kg	%
Cardboard	0,0396	58,5
Plastic	0,0003	0,4
Wood	0,0278	41,1

Technical data:

All the Rockfon® Chicago Metallic™ grids system components have been assessed according the suspended ceiling harmonized standard: EN 13964:2014 Suspended ceilings - Requirements and test methods. The technical properties based on this standard are given in Table

Property	Value		Ref. Standard
Reaction to Fire	A1 / A2-s1,d0	depending on the exact product. For product specific information please see the DoP.	EN 13964:2014
Load Bearing capacity Admissible banding moment Adm M (Nm)	$15 \text{ Nm} \leq \text{Adm M} \leq 750 \text{ Nm}$	relevant for T15- T24 - T35 mainrunner and cross tees, Ultraline, Monolithic, bandrafter, I-profiles and Z-profiles - big variation depending on the exact product. For product specific information please see the DoP.	EN 13964:2014
Load Bearing capacity Admissible load Adm F (N)	$180 \text{ N} \leq \text{Adm F} \leq 400 \text{ N}$	relevant for L, W, J, F and C profiles - big variation depending on the exact product. For product specific information please see the DoP.	EN 13964:2014
Durability Class	B-C-D	depending on the exact product. For product specific information please see the DoP.	EN 13964:2014

Market:

The Rockfon® Chicago Metallic™ grids are supplied to Rockfon customers in Europe and Asia and in other export markets, excluding North America.

Reference service life, product:

Rockfon® Chicago Metallic™ grids are durable products and provide performance for a lifetime of the building. For the purpose of this EPD reference service life is considered 50 years, which is a usual assumption for the lifetime the building where the system is installed. Rockfon® Chicago Metallic™ grids system's components do not have to be replaced in the 50-year scenario. In practice, the life span will be longer than 50 years, assuming that the metal grids are only replaced due to loss of performance or building demolition. Replacement of metal grids due to replacement of ceiling tiles for aesthetics or interior design purposes is not accounted for.

Reference service life, building:

Reference service life of a building is considered to be 50 years.

LCA: Calculation rules

Declared unit:

The declared unit is 1 kg of average Rockfon® Chicago Metallic™ grids load bearing system for ceiling tiles for a 50 years reference lifetime.

The impacts of the total installed metal grid system can be calculated by multiplying the results of the EPD with the total weight of the installed system. A table with the different products available in the portfolio and their respective weight per running meter is provided under 'additional technical information' section.

Data quality:

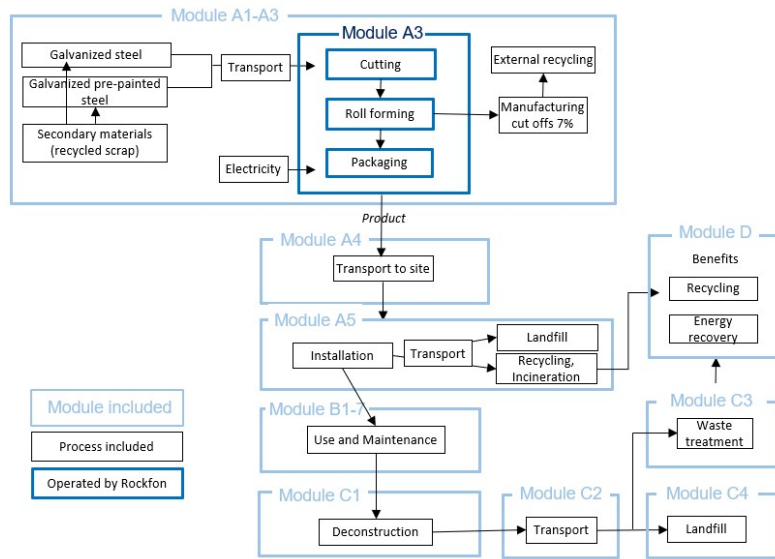
All data represents the applicable geography, time and technology for the specific and generic data, generally assessed as good and very good. Primary data is collected from respective production site in Belgium for the reference year 2020. Generic data is from GaBi database (version 2021) with GaBi Software version 10.0.1.92 used for calculations. The raw materials data is from reference year 2019 or 2020 according to the database documentation, while no data is older than 5 years.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Production activities, electricity and energy consumption and waste generation are allocated equally among all products from the production site through mass allocation.

System boundary:

The LCA is a cradle-to-grave study, addressing all life cycle stages identified in the EN15804. All major raw materials, energy, electricity use and waste are included for all life cycle modules, see flowchart below. There are no environmental impacts at use stage.



Cut-off criteria:

All major raw materials and all the essential energy are included. The production process for raw materials and energy flows that are included with very small amounts (<1% energy, mass, impact) are not included. This cut-off rule does not apply for hazardous materials and substances. Data sets are complete according to the system boundary within the limits set by the criteria for the exclusion of inputs and outputs. All relevant data, all applied materials according to the recipe and the energy used, originate from the production data and have been considered within the inventory analysis.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck, Euro 6	85 %	Truck-trailer, 28-34 t	810 km	Diesel: 0,0172 l/tkm	13,93 l/t
Ship	70 %	Ship container	143 km	Heavy fuel oil	

The distance in A4 is calculated based on weighted average from the transport statistics of the manufacturer in the reference year.

Assembly (A5)

	Unit	Value
Electricity consumption	kWh	0,03 kWh/kg
Product loss	kg	< 1%

Rockfon® Chicago Metallic™ grids are easy to install, using known construction techniques. The installation requires use of handheld tools, some of which are power tools that consume electricity (e.g. electric drill). The packaging waste from installation site is assumed to be treated according to average European statistics packaging waste treatment rates (Eurostat, 2019). Benefits from material recycling and energy recovery from incineration process of plastic and wood packaging are reported under Module D.

Use stage (B1, B2, B3, B4, B5, B6, B7)

There are no consumables, maintenance, repair, replacements or refurbishments related to the use of the metal grids for the period of the reference service life. Rockfon® Chicago Metallic™ grids do not use energy or water during their operational life. There are no emissions released from the product during the use. Replacement of the product due to aesthetic reasons (change of interior design) and not related to the loss of performance is not taken into account. Therefore, modules B1-B7 have zero impacts.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0
Recycling	kg	0,98
Energy recovery	kg	0
To landfill	kg	0,02

For steel, a 98% recovery rate is assumed, with 2% assumed to be landfilled. Reuse of metal grids is not included in this scenario.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck, Euro 6	50%	Truck-trailer, 28-34 t	100 km	Diesel: 0,03 l/tkm	2,95 l/t

The distance represents an average distance to the landfill or waste treatment facility.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Net scrap steel	kg	0,81
Cardboard packaging	kg	0,032
Plastic packaging	kg	0,00024
Wood packaging	kg	0,022

Quantities of packaging materials include both recycled materials and materials sent for energy recovery.

Additional technical information

Below there is a list of all the products in Rockfon's portfolio, together with their weight by running meter. The weight of each product can be used to calculate the weight of the installed system and to estimate the impacts of the entire system.

Row Labels	Average weight (kg/m)
Bandraster 100 mm	1,1
Bandraster 125 mm	1,4
Bandraster 150 mm	1,6
Bandraster 50 mm	0,8
Bandraster 75 mm	1,0
C-bandraster main runner 100 mm	1,1
Cross tee T15 Click / Hook	0,3
Cross tee T24 Click / Hook	0,33
C-section 15x11x13 mm	0,14
C-wall angle 20x40x20 mm	0,33
F Profile	0,4
Galvanised C-wall angle 30x40.5x30 mm	0,35
I-runner 50 mm	2,42
J-wall angle	0,26
L-wall angle	0,37

Row Labels	Average weight (kg/m)
Main runner T15 Click / Hook	0,34
Main runner T24 Click / Hook	0,39
Monolithic furring channel	0,42
Omega channel 50 mm	0,70
Primary C-channel 12x38x12 mm	0,42
Primary I-runner	0,78
Screenline profile	0,34
Spacer bars	0,17
Spanfast™ main runner	0,52
Stepped Z-section 19 mm	0,20
T24 x 75 mm system	0,77
T35 system	0,46
Ultraline	0,35
W-wall angle	0,35
Z-section	0,40
T35x75 mm system	0,80

LCA: Results

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

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
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	X	X	X	X	X	X	X	X	X	X	X	

The results are calculated based on declared unit of 1 kg of average Rockfon® Chicago Metallic™ grid system. The impacts of the total installed metal grid system can be calculated by multiplying the results of the EPD with the total weight of the installed system.

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B*	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,94E+00	4,34E-02	5,22E-02	0	1,20E-02	8,95E-03	0	9,78E-04	-1,37E+00
GWP-fossil	kg CO2 eq.	2,98E+00	4,29E-02	1,35E-02	0	1,19E-02	8,88E-03	0	9,77E-04	-1,40E+00
GWP-biogenic	kg CO2 eq.	-3,99E-02	1,36E-04	3,87E-02	0	9,29E-05	0,00E+00	0	0,00E+00	2,97E-02
GWP-LULUC	kg CO2 eq.	8,26E-04	3,44E-04	2,01E-05	0	2,00E-05	7,30E-05	0	9,77E-07	1,49E-04
ODP	kg CFC11 eq.	9,20E-13	8,42E-18	8,79E-12	0	2,90E-16	1,14E-18	0	2,31E-18	-6,37E-15
AP	mol H ⁺ eq.	9,57E-03	8,05E-05	3,37E-05	0	2,16E-05	8,86E-06	0	3,11E-06	-2,54E-03
EP-freshwater	kg P eq.	1,89E-06	1,25E-07	1,14E-07	0	3,81E-08	2,65E-08	0	7,43E-10	-4,95E-07
EP-marine	kg N eq.	2,16E-03	2,28E-05	1,25E-05	0	5,79E-06	2,83E-06	0	7,72E-07	-3,97E-04
EP-terrestrial	mol N eq.	2,30E-02	2,62E-04	9,79E-05	0	6,06E-05	3,38E-05	0	8,47E-06	-3,90E-03
POCP	kg NMVOC eq.	7,14E-03	6,37E-05	3,14E-05	0	1,53E-05	7,70E-06	0	2,43E-06	-1,97E-03
ADP-M&M	kg Sb eq.	1,60E-05	3,76E-09	3,56E-09	0	3,71E-09	6,78E-10	0	6,74E-11	-3,01E-06
ADP-fossil	MJ	3,09E+01	5,73E-01	2,31E-01	0	2,21E-01	1,19E-01	0	1,42E-02	-1,23E+01
WDP	m ³	1,21E+00	3,92E-04	3,75E-03	0	1,80E-03	7,74E-05	0	-1,16E-05	-2,73E-01

GWP-total: Global Warming Potential; **GWP-fossil:** Global Warming Potential fossil fuels; **GWP-biogenic:** Global Warming Potential biogenic; **GWP-LULUC:** Global Warming Potential land use and land use change; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, Accumulated Exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption.

Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009.

*There is no activity in any of the B modules, as described under the Use Stage previously. All the B modules are zero, thus the result is presented in a single column B in all the tables.

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
PM	Disease inc.	1,42E-07	9,37E-10	2,79E-10	0	1,79E-10	5,25E-11	0	3,37E-11	-4,68E-08
IRP	kBq U235 eq.	5,81E-02	1,51E-04	5,10E-03	0	3,05E-03	2,06E-05	0	2,32E-05	3,38E-02
ETP-fw	CTUe	5,87E+00	4,25E-01	1,11E-01	0	8,53E-02	8,57E-02	0	4,18E-03	-8,22E-02
HTP-c	CTUh	1,03E-09	8,58E-12	3,30E-12	0	2,71E-12	1,73E-12	0	4,86E-13	4,64E-10
HTP-nc	CTUh	8,67E-08	4,44E-10	1,85E-10	0	9,61E-11	8,97E-11	0	4,88E-11	-1,90E-08
SQP	Dimensionless	1,05E+01	1,93E-01	6,89E-02	0	8,37E-02	4,07E-02	0	1,05E-03	-4,94E+00

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **HTP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality.

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	Acidification potential, Accumulated Exceedance (AP)	None
ILCD type / level 2	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2
<p>Disclaimer 1 – 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.</p> <p>Disclaimer 2 – 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</p>		

Resource use

Parameter	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
RPEE	MJ	9,01E-01	3,23E-02	9,66E-01	0	1,00E-01	6,62E-03	0	1,03E-03	7,25E-01
RPEM	MJ	1,17E+00	0,00E+00	-8,69E-01	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
TPE	MJ	2,06E+00	3,23E-02	9,76E-02	0	1,00E-01	6,62E-03	0	1,03E-03	7,25E-01
NRPE	MJ	3,09E+01	5,75E-01	2,43E-01	0	2,21E-01	1,19E-01	0	1,42E-02	-1,23E+01
NRPM	MJ	1,54E-02	0,00E+00	-1,16E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
TRPE	MJ	3,09E+01	5,75E-01	2,31E-01	0	2,21E-01	1,19E-01	0	1,42E-02	-1,23E+01
SM	kg	1,75E-01	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
W	m ³	3,01E-02	3,70E-05	1,38E-04	0	4,94E-05	7,58E-06	0	1,47E-07	-6,21E-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	B	C1	C2	C3	C4	D
HW	kg	2,81E-08	2,98E-11	5,84E-11	0	6,59E-11	5,98E-12	0	2,52E-12	3,17E-09
NHW	kg	1,55E-01	8,95E-05	9,67E-03	0	1,79E-04	1,76E-05	0	2,00E-02	1,45E-01
RW	kg	1,87E-04	1,03E-06	3,13E-05	0	3,31E-05	1,44E-07	0	1,62E-07	-1,48E-05

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

End of life – output flow

Parameter	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
CR	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
MR	kg	7,77E-02	0,00E+00	4,41E-02	0	0,00E+00	9,80E-01	0	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
EEE	MJ	2,42E-03	0,00E+00	2,75E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
ETE	MJ	5,55E-03	0,00E+00	4,83E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00

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

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in the accompanying packaging	kg C	1,20E-02

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase
National 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 process(A3).

National electricity grid	Unit	Value
BG: Electricity grid mix (production mix), Sphera (GaBi)	kg CO2 -eq/kWh	0,735

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator for GWP has been sub-divided into the following:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation
GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

In addition, EP-freshwater shall also declared as PO4 eq.

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	7,42E-04	5,49E-05	1,36E-05	0	2,67E-06	1,30E-06	0	2,71E-07	-1,20E-04
GWP-IOBC	kg CO2 eq.	2,98E+00	4,34E-02	1,35E-02	0	1,19E-02	8,95E-03	0	9,78E-04	-1,40E+00
GWP-BC	kg CO2 eq.	-3,99E-02	0,00E+00	3,87E-02	0	9,29E-05	0,00E+00	0	0,00E+00	2,97E-02
GWP	kg CO2 eq.	2,94E+00	4,34E-02	5,22E-02	0	1,20E-02	8,95E-03	0	9,78E-04	-1,37E+00

EP-freshwater* Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO4 eq. **GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation. **GWP-BC** Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module. **GWP** Global warming potential

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- 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 (Avfallsforsiften, Annex III), see table.

Indoor environment

Not relevant for this product category.

Carbon footprint

Carbon footprint of the 1 kg of Rockfon® Chicago Metallic™ grid system is 3,06 kg CO₂ eq (including Module A1-C4). This is elaborated per module in the results section.

Additionally, carbon footprint estimated according to EN15804+A1, is 2,94 kg CO₂ eq (Module A1-C4). The results are elaborated in the Additional Results acc. EN15804+A1.

Additional LCA Results according to EN 15804+A1

Results in this section communicate LCA results developed for this EPD in the format described in EN15804+A1:2013, in order to accommodate a need in the transition period between the two standard revisions.

Environmental impacts

Indicator	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
GWP	kg CO2-eq.	2,83E+00	4,34E-02	4,55E-02	0	1,18E-02	8,73E-03	0	9,14E-04	-1,30E+00
ODP	kg CFC11-eq.	1,23E-12	1,31E-17	1,15E-11	0	3,86E-16	1,52E-18	0	3,08E-18	-8,50E-15
AP	kg SO2-eq.	7,84E-03	4,90E-04	2,64E-05	0	1,70E-05	6,50E-06	0	2,49E-06	-2,17E-03
EP	kg PO43--eq.	7,42E-04	5,49E-05	1,36E-05	0	2,67E-06	1,30E-06	0	2,71E-07	-1,20E-04
POCP	kg ethene-eq.	1,10E-03	2,48E-05	6,34E-06	0	1,51E-06	-1,47E-07	0	2,30E-07	-6,63E-04
ADPE	kg Sb-eq.	1,57E-05	4,19E-09	3,47E-09	0	3,92E-09	6,79E-10	0	6,84E-11	-2,93E-06
ADPF	MJ	2,89E+01	7,36E-01	1,51E-01	0	1,33E-01	1,18E-01	0	1,38E-02	-1,06E+01

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	B	C1	C2	C3	C4	D
RPEE	MJ	9,01E-01	3,23E-02	9,66E-01	0	1,00E-01	6,62E-03	0	1,03E-03	7,25E-01
RPEM	MJ	1,17E+00	0,00E+00	-8,69E-01	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
TPE	MJ	2,06E+00	3,23E-02	9,76E-02	0	1,00E-01	6,62E-03	0	1,03E-03	7,25E-01
NRPE	MJ	3,09E+01	5,75E-01	2,43E-01	0	2,21E-01	1,19E-01	0	1,42E-02	-1,23E+01
NRPM	MJ	1,54E-02	0,00E+00	-1,16E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
TRPE	MJ	3,09E+01	5,75E-01	2,31E-01	0	2,21E-01	1,19E-01	0	1,42E-02	-1,23E+01
SM	kg	1,75E-01	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
W	m ³	3,01E-02	3,70E-05	1,38E-04	0	4,94E-05	7,58E-06	0	1,47E-07	-6,21E-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	B	C1	C2	C3	C4	D
HW	kg	2,81E-08	2,98E-11	5,84E-11	0	6,59E-11	5,98E-12	0	2,52E-12	3,17E-09
NHW	kg	1,55E-01	8,95E-05	9,67E-03	0	1,79E-04	1,76E-05	0	2,00E-02	1,45E-01
RW	kg	1,87E-04	1,03E-06	3,13E-05	0	3,31E-05	1,44E-07	0	1,62E-07	-1,48E-05

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





End of life – output flow

Parameter	Unit	A1-A3	A4	A5	B	C1	C2	C3	C4	D
CR	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
MR	kg	7,77E-02	0,00E+00	4,41E-02	0	0,00E+00	9,80E-01	0	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
EEE	MJ	2,42E-03	0,00E+00	2,75E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00
ETE	MJ	5,55E-03	0,00E+00	4,83E-02	0	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00

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

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