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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 AB, Parafon Production |
| Program operator: | The Norwegian EPD Foundation |
| Publisher: | The Norwegian EPD Foundation |
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Parafon Ceiling

PARAFON - Exclusive, Classic, Nordic, Royal, Direct, Vital, Classic Colortone, Palette, Step, Hygiene, Clinic, Clean, Prime, Royal Baffle, Singel, Circle, Buller FPS



www.epd-norge.no



General information

Product:

Parafon products;
Exclusive, Classic, Nordic, Royal, Direct, Vital, Classic
Colortone, Palette, Step, Hygiene, Clinic, Clean,
Prime, Royal Baffle, Singel, Circle, Buller FPS

Program operator:

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Declaration number:

POUØFG I E EP

ECO Platform reference number:

E

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR
NPCR 010 rev1, Building Boards

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.

Declared unit:

1 m² of installed ceiling tile

Declared unit with option:

1 m² of installed ceiling tile

Functional unit:

—

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:



Martin Erlandsson, IVL Swedish Env. Res. Inst.
(Independent verifier approved by EPD Norway)

Owner of the declaration:

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Manufacturer:

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www.parafon.com

Place of production:

Skövde, Sweden

Management system:

Organisation no:

SE556347915201

Issue date:

~~E EGF~~

Valid to:

~~E EGG~~ (validity extended to 31.03.2023)

Year of study:

2016

Comparability:

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

The EPD has been worked out by:

Christer Hammarberg



Approved



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

PARAFON products are sound absorbing tiles and panels for suspended ceilings and free hanging applications. The products core material are non combustible stone wool and facing material are pre painted glass fibre tissue with color, durability variations. PARAFON products are intended for use indoor and are certified according to EN 13964:2014 for Suspended Ceilings.

Product specification:

PARAFON products covered in this EPD are produced of a range of stone wool densities from 70-100 kg/m³ and with glass fibre facing thicknesses from 115-267 g/m². However, the values declared in the EPD are based on the *worst case product* of the products in this range. The product thicknesses vary from 15-50 mm and LCA scaling factors according to thickness can be found in table on page 7.

For more information, please visit:
<http://www.paroc.com/solutions-and-products/solutions/room-acoustics>



Technical data (of worst case product):

Weight: 0.66 kg

Size: 600x600x15 mm

For more information; see Bibliography, page 9

| Materials | kg | % |
|-------------------------------|------|---------|
| Mineral wool | 0.54 | 82% |
| Facings | 0.10 | 15% |
| Binder, coatings, dustbinding | 0.02 | 3% |
| Total product | 0.66 | 100% |
| Packaging | | 0.04 kg |
| Total: Product + Packaging | | 0.70 kg |

Reference service life, product:

The reference service lifetime of Parafon Acoustic Ceiling Tiles is 50 years.

Reference service life, building:

The reference service lifetime of 50 years has been assumed for the building in all calculations.

Market:

Main market areas are Scandinavia and Central and Eastern Europe. The scenarios beyond cradle-to-gate are based on Norwegian market .

| Interior White Ceiling Products | Edge profiles | Thickness (mm) |
|---------------------------------|---------------|----------------|
| PARAFON Exclusive | A, E | 15, 18, 25, 40 |
| PARAFON Classic | A, E | 15, 18, 25, 40 |
| PARAFON Royal | A | 30, 40, 50 |
| PARAFON Direct | A | 40 |
| PARAFON Nordic | A, E | 15, 18, 40 |
| PARAFON Vital | A | 12, 15 |

| Interior Colored Ceiling Products | | |
|-------------------------------------|------|----------------|
| PARAFON Classic Black | A | 15, 25, 40 |
| PARAFON Classic Cement | A | 15, 25, 40 |
| PARAFON Classic Metal | A | 15, 25, 40 |
| PARAFON Classic Navy | A | 15, 25, 40 |
| PARAFON Classic colortone, free NCS | A | 15, 25, 40 |
| PARAFON Royal Cement/Metal | A | 30, 40, 50 |
| PARAFON Palette | A, E | 15, 18, 25, 40 |
| PARAFON Step | A | 18, 25, 40 |

Hygiene/Washable Ceiling Products

| | | |
|----------------|------|--------|
| PARAFON Hygien | A | 18, 40 |
| PARAFON Clinic | A, E | 15 |
| PARAFON Prime | A | 18, 40 |
| PARAFON Clean | A, E | 15 |

Free Hanging products

| | | |
|----------------------|---|----|
| PARAFON Royal Baffle | A | 50 |
| PARAFON Singel | A | 40 |
| PARAFON Circle | A | 40 |

Industry White Ceiling product

| | | |
|----------------------|---|----|
| PARAFON Buller Bevel | B | 40 |
|----------------------|---|----|

LCA: Calculation rules

Declared unit:

1 m² of installed ceiling tile (thickness: 15 mm, weight per 1 m²: 1.82 kg - assembly fixtures are excluded)

System boundary:

The table below identifies the modules included in this study:

The production stage (module A1-A3) covers the following steps:

- Raw materials production (e.g. diabase, dolomite etc., including 13% secondary materials entering the system burden-free)
- Binder components production (e.g. resin)
- Transports of raw materials and pre-products to manufacturing plant
- Product manufacturing (power, thermal energy, auxiliaries, emissions)
- Production of packaging materials

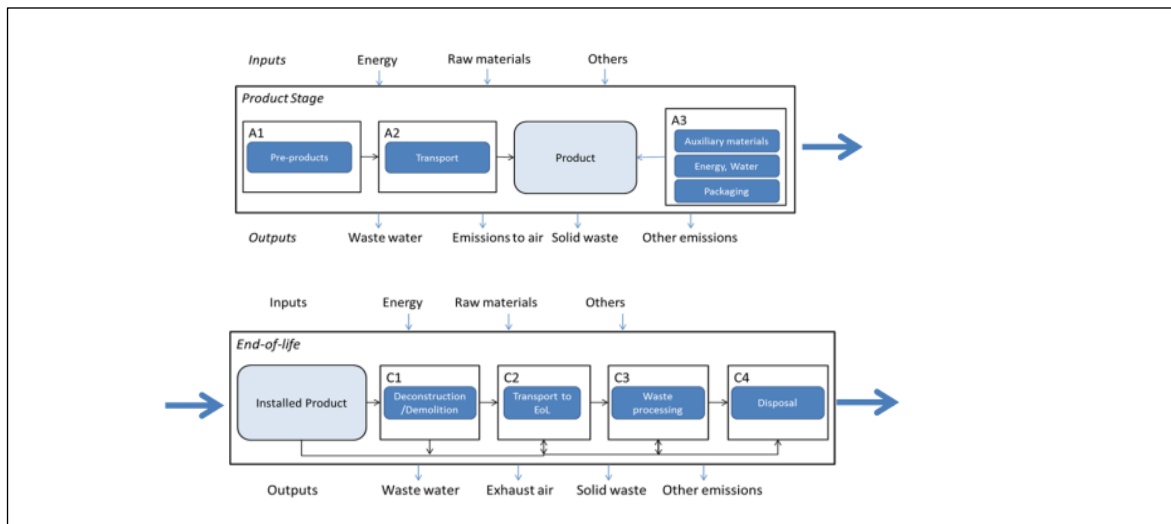
- Waste management, water treatment, end-of-life of residues

With the exception of Modules A1 to A3 (describing the manufacturing of stone wool) all other modules are calculated on the basis of assumptions or scenarios.

The following scenarios were considered in this study:

- module C4 (landfill).

Figure 1. Schematic representation of LCA system boundaries for the production module (A1-A3) and the End-of-Life (C1-C4). In this study, only in the end-of-life of the product, only C4 was considered.



Data quality:

The stone wool production data is site specific from PAROC plants Hässleholm and Hällekis in Sweden. The acoustics ceiling tiles are made of refined stone wool at PARAFON plant in Skövde, Sweden. Foreground data refer to the year 2015.

For life cycle modeling the GaBi ts Software System for Life Cycle Assessment, developed by thinkstep AG, is used (/GaBi ts 2016/). All relevant background datasets are taken from the GaBi ts software database. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.

Background data refer to the years 2012 till 2015 (/GaBi ts 2016/) with a country specific scope as far as available, e.g. for raw material extraction and production, transportation, fuels and energy supply.

All relevant processes (foreground and background) have been considered when modelling stone wool production. The process data and the used background data are consistent. The data quality can be qualified as good.

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.

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.

LCA: Scenarios and additional technical information

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

End of Life (C2, C3, C4)

| | Unit | Value |
|---------------------------------------|------|-------|
| Hazardous waste disposed | kg | 0 |
| Collected as mixed construction waste | kg | 0 |
| Reuse | kg | 0 |
| Recycling | kg | 0 |
| Energy recovery | kg | 0 |
| To landfill | kg | 1.82 |

The share of biogenic CO₂ in the mineral wool board is very low (0.46%) and covered with glass fibre facing, why the landfill emissions have been neglected during the analyse period of 100 years.

Paroc maintains and offers its customers a used product take-back system called "Paroc Re-Wool" to enable the recycling of old stone wool/acoustic boards. More information can be found via <http://www.paroc.com/about-paroc/paroc-stories/paroc-rewool>



Benefits and loads beyond the system boundaries (D)

As module A5 is not declared (including product installation and packaging disposal) and from module C4 (product disposal on landfill) no potential benefits arise module D is not declared.

LCA: Results

Life Cycle Impact Assessment results represent the environmental impacts for the life cycle of Parafon Acoustic Board from cradle to gate - with options. The results refer to the variant Parafon Clinic Edge E with 100 kg/m³, 15 mm of thickness, grammage of glass fibre facing: 0.267 g/m² which was chosen as representative product following a worst case approach.

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

| Product stage | | | Assembly 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 | MND | MND | MND | MND | MND | MND | MND | MNR | MNR | MND | MND | MND | X | MND | |

Environmental impact

| Parameter | Unit | A1-A3 | C4 |
|-----------|---------------------------------------|----------|----------|
| GWP | kg CO ₂ -eqv | 3.09* | 2.93E-02 |
| ODP | kg CFC11-eqv | 1.60E-09 | 3.25E-13 |
| POCP | kg C ₂ H ₄ -eqv | 9.72E-03 | 1.75E-04 |
| AP | kg SO ₂ -eqv | 1.43E-03 | 2.39E-05 |
| EP | kg PO ₄ ³⁻ -eqv | 6.34E-04 | 1.69E-05 |
| ADPM | kg Sb-eqv | 2.65E-05 | 1.01E-08 |
| ADPE | MJ | 3.18E+01 | 3.80E-01 |

*including 0.127 kg CO₂-eq uptake of biogenic carbon dioxide included in product (0.008) and packaging (0.158)

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 | C4 |
|-----------|----------------|----------|----------|
| RPEE | MJ | 9.41E+00 | 4.47E-02 |
| RPEM | MJ | 1.89E+00 | 0.00E+00 |
| TPE | MJ | 1.13E+01 | 4.47E-02 |
| NRPE | MJ | 3.91E+01 | 3.94E-01 |
| NRPM | MJ | 4.33E-02 | 0.00E+00 |
| TRPE | MJ | 3.92E+01 | 3.94E-01 |
| SM | kg | 2.41E-01 | 0.00E+00 |
| RSF | MJ | 0.00E+00 | 0.00E+00 |
| NRSF | MJ | 0.00E+00 | 0.00E+00 |
| W | m ³ | 1.84E-02 | 8.04E-05 |

Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009

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 | C4 |
|-----------|------|----------|----------|
| HW | kg | 1.38E-04 | 9.00E-09 |
| NHW | kg | 1.03E+00 | 1.83E+00 |
| RW | kg | 3.05E-03 | 5.51E-06 |

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

End of life - Output flow

| Parameter | Unit | A1-A3 | C4 |
|-----------|------|-------|----|
| CR | kg | 0 | 0 |
| MR | kg | 0 | 0 |
| MER | kg | 0 | 0 |
| EEE | MJ | 0 | 0 |
| ETE | MJ | 0 | 0 |

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

Scaling of these EPD results of the declared product to other products with different thicknesses in the same density range (see above) can be done by using the following multiplication factors. The results are conservative since the 15 mm alternative is used as basis for the scaling factor:

| Available thickness in Parafon AB product group | Scaling Factor of LCA results |
|---|-------------------------------|
| 15 mm | 1 |
| 18 mm | 1.2 |
| 25 mm | 1.67 |
| 30 mm | 2 |
| 40 mm | 2.67 |
| 50 mm | 3.33 |

| Key environmental indicators | Unit | Cradle to gate A1-A3 | Transport ***** |
|------------------------------|-------------------------|-------------------------|--------------------|
| Global warming | kg CO ₂ -eqv | 3.09 | 0.02 |
| Energy use | MJ | 50.5 | - |
| Dangerous substances | * | - | - |

* The product contains no substances from the REACH Candidate list of the Norwegian priority list

***** Transport from production site to central warehouse in Norway

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

National production mix (Sweden) 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).

| Data source | Amount | Unit |
|-------------------------------|--------|--------------------------|
| GaBi ts database SP 30 (2016) | 0.0431 | 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 (Avfallsforsikten, Annex III).

Transport

Transport from production site to central warehouse in Norway is: 245 km

Indoor environment




The product meets the requirements for low emissions (M1) according to EN 15251: 2007 Appendix E. PAROC stone wool products fulfil the most stringent requirement (M1) in the Finnish voluntary system for building material emissions developed by the Finnish Society of Indoor Air Quality and Climate in Finland. Our stone wool products are recognized as low emitting products, for which they have been tested since 1995. PAROC low emitting products are recognized by the M1 label

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

| | |
|-----------------------|--|
| ISO 14025:2010 | <i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i> |
| ISO 14040:2006 | <i>Environmental management - Life cycle assessment - Principles and framework</i> |
| ISO 14044:2006 | <i>Environmental management - Life cycle assessment - Requirements and guidelines</i> |
| EN 15804:2012+A1:2013 | <i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i> |
| EN 13964:2014 | <i>Suspended Ceilings - Requirements And Test Methods</i> |
| ISO 21930:2007 | <i>Sustainability in building construction - Environmental declaration of building products</i> |
| Paroc 2016 | <i>Background report for EPD of Paroc Parafon Acoustic Board, Dr. Iris Matzke and Yannick Bernard, December 2016</i> |
| PCR | <i>NPCR 010 rev1, Building Boards, The Norwegian EPD Foundation, 12/2013</i> |

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