

# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

Owner of the Declaration	Rieder Sales GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-RSE-20180069-IAD3-EN
Issue date	29.10.2018
Valid to	28.10.2024

## Glasfaserbeton concrete skin und öko Skin Rieder Sales GmbH

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ECO PLATFORM

**EPD**  
VERIFIED

## 1. General Information

### Rieder Sales GmbH

**Programme holder**

IBU – Institut Bauen und Umwelt e.V.  
 Hegelplatz 1  
 10117 Berlin  
 Germany

**Declaration number**

EPD-RSE-20180069-IAD3-EN

**This declaration is based on the product category rules:**

Fibre cement / Fibre concrete, 01.08.2021  
 (PCR checked and approved by the SVR)

**Issue date**

29.10.2018

**Valid to**

28.10.2024



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



Florian Pronold  
 (Managing Director Institut Bauen und Umwelt e.V.)

### Glasfaserbeton concrete skin und öko Skin

**Owner of the declaration**

Rieder Sales GmbH  
 Glemmerstrasse 21  
 5751 Maishofen  
 Austria

**Declared product / declared unit**

The declaration relates to 1 t of glass-fibre-reinforced facade sheet - 'concrete skin' and 'öko skin'

**Scope:**

The life-cycle assessment (LCA) is based upon Rieder Sales GmbH data from the production-year 2016. The study's subject matter is the glass-fibre-reinforced sheets manufactured at Rieder Faserbeton-Elemente GmbH in Kolbermoor, Germany; these products are declared to be an average product; the average refers to the span of production quantities that emerged throughout the year referred-to.


The declaration's owner shall hold liability for the information and items of proof that form the basis for it; it is ruled out for there to be any liability on the part of IBU, in relation to manufacturer information, LCA data, or items of proof.

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.

The EPD was created according to the specifications of EN 15804+A1. In the following, the standard will be simplified as *EN 15804*.

**Verification**

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2011	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Dr.-Ing. Andreas Ciroth,  
 (Independent verifier)

## 2. Product

### 2.1 Product description/Product definition

'concrete skin' and 'öko skin' are facade sheets made from the material named 'fibreC' glass-fibre-reinforced concrete. The reinforcement consists of textile and fibre made of alkali-resistant glass (AR glass). The sheet is dyed throughout. The standard thickness comprises 13 mm. The declaration is valid for the 'ferro,' 'ferro light,' and 'matt' surfaces respectively, and also for all 12 Colours. For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration /DIN EN 12467:2016/, 'Fibre-Cement Flat Sheets – Product Specification and Test Methods' and the CE-marking. For the application and use the respective national provisions apply. Additional proof of use, for application in Germany, is provided through the approval by the construction supervisory body. Approval No. Z-31.4-166, from the DIBt (Deutsches Institut für Bautechnik).

### 2.2 Application

The sheets, made of fibreC glass-fibre-reinforced concrete, serve as cladding material for back-ventilated pre-hung facades, as an indoor and outdoor cladding, and also as a floor covering.

### 2.3 Technical Data

#### Data on construction technology

Name	Value	Unit
Thermal conductivity	2	W/(mK)
Gross density	2000 - 2400	kg/m <sup>3</sup>
Flexural strength	> 18	N/mm <sup>2</sup>
Modulus of elasticity	10000	N/mm <sup>2</sup>
Coefficient of thermal expansion	10	10 <sup>-6</sup> K <sup>-1</sup>

The data of the Declaration of Performance apply.

### 2.4 Delivery status

Standard dimensions:  
3600/1200/13 3100/1200/13 2500/1200/13 or individually cut  
Material thickness: 13 mm as standard Weight: 26-31.5 kg/m<sup>2</sup>  
The sheets are available in 12 standard colours, each version offers 3 surface-types respectively.

Colours: polar white, off-white, ivory, silvergrey, chrome, anthracite, liquid black, sahara, sandstone, terra, terracotta, green.

Surfaces: ferro, ferro light, matt

### 2.5 Base materials/Ancillary materials

fibreC glassfibre concrete comprises 90% sand and cement; the remaining 10% comprises glass fibres, pigments and concrete additives.

### 2.6 Manufacture

The glass-fibre-reinforced exposed-concrete sheets are manufactured in a special extrusion procedure.

After being hardened accordingly, the sheets are passed on for further processing (surface, cuts, drilling of holes, etc.)

### 2.7 Environment and health during manufacturing

QM system /DIN EN ISO 9001:2015/

EM system /DIN EN ISO 14001:2015/

Throughout the manufacturing process, there is no necessity to use health-protection measures that go beyond those established in law for organisations running a Business.

### 2.8 Product processing/Installation

Usually the sheets are delivered to the building site already cut to size and drilled. In principle it is possible to process the product in situ on the building site.

The sheets are mounted onto a sub-structure made of metal or wood. There are the following options for fastening:

- Rivets (visible)
- Screws (visible)
- Undercut anchor (not visible)
- Rieder Power Anchor (not visible)
- Adhesion (not visible)

### 2.9 Packaging

The sheets made of fibreC glass-fibre-reinforced concrete are packed at the manufacturer's facility.

Wooden pallets and transport boxes are reusable.

### 2.10 Condition of use

Non-water-permeable according to /DIN EN 12467:2016/

Resistant to interchangeable exposure to heat and rain respectively, according to /DIN EN 12467:2016/

Frost-resistance according to /DIN EN 12467:2016/

Resistance of the colouring pigments to UV, according to /DIN EN 12878:2014/

Resistant to interchangeable exposure to wet and dry conditions, according to /DIN EN 12467:2016/

### 2.11 Environment and health during use

Interactions whereby the product, the environment and health exert an effect upon one another are not known.

### 2.12 Reference service life

The technical characteristics of fibreC glass-fibre-reinforced concrete remain effective for a calculated duration of over 50 years. The normal manifestations of wear-and-tear and the gradual nature of optical effects, due to environmental influences, do not restrict either the panels' safety or those mechanical characteristics for which assurances are given.

### 2.13 Extraordinary effects

#### Fire

Fire protection:

Building-Materials Class A1 – non-flammable according to /DIN EN 13501-1:2010/ Building-materials Classification A2-s1, d0 – non-flammable according to /DIN EN 13501-1:2010/

#### Water

No environmental consequences are to be expected in this context. fibreC glass-fibre-reinforced concrete sheets constitute facade sheets that hold approval from the supervisory authority for building-activities (German general supervisory approval for building-activities: Z-31.4-166, from the Deutsches Institut für Bautechnik /DIBt/, Berlin)

#### Mechanical destruction

This aspect is not of relevance.

### 2.14 Re-use phase

fibrec glass-fibre reinforced concrete consists of mineral raw materials sourced from minerals; it can be used in shredded form as a filling material for construction work, used in dam-construction and road-Building.

### 2.15 Disposal

FibreC glass-fibre reinforced concrete is approved for storage on landfills for construction waste-materials and mass waste material, according to the Landfill Ordinance

(Deponieverordnung /BGBI 164/1996/), provided that this material is made available in disposal or refurbishment activities.

/Waste-code according to European Waste Catalogue/: 17 01 01 Concrete

### 2.16 Further information

You can obtain further information at [www.rieder.cc](http://www.rieder.cc)

## 3. LCA: Calculation rules

### 3.1 Declared Unit

The declaration pertains to the declared unit of 1 t, according to the IBU-PCR Instructions Text, Part B, for the product group 'fibre cement / fibre concrete.'

What is taken into consideration is an average product for the Kolbermoor facility in Germany. fibreC glass-fibre-reinforced concrete has a thickness of 13 mm; its average surface-area weight comprises 28.73 kg/m<sup>2</sup>

#### Declared unit

Name	Value	Unit
Declared unit	1	t
Conversion factor to 1 kg	0.001	-

### 3.2 System boundary

This LCA addresses that life-cycle stage of product manufacture called 'Cradle to factory gate'.

This production stage comprises these modules: A1 (Provision of raw materials), A2 (Transport), A3 (Manufacture) according to /DIN EN 15804:2014/

### 3.3 Estimates and assumptions

Because the product declared is manufactured in Germany, background data for Germany (as the reference area) was used for the LCA (e.g. provision of electrical energy).

If no data-sets specific to Germany were available, global or European data-sets were used.

Primary data were not present in /GaBi ts/ for dyes and other basic materials. Estimates were used, based on the security data sheets.

For the combustion process, the generic background data-set "Thermic Energy from Natural Gas" was used. The order of magnitude of the emissions supplied was comparable with the available GaBi data-set.

### 3.4 Cut-off criteria

In producing the LCA results, all data was taken into account that came from the registration of company operating data, i.e. all relevant starting materials deployed according to the product formula, the thermic energy applied, and also the electricity required and all direct waste generated in production. This took into account all raw-material flows and energy flows that had a proportion exceeding 0.1 %. It can be taken as the basis that the sum of the processes not taken into account does not

exceed 5 % of the categories that do indeed exert an effect. Machines, facilities and infrastructure required in manufacture were ignored. All transport processes were taken into account.

### 3.5 Background data

The background were obtained from the GaBi databanks of /GaBi ts/. The documentation can be viewed online.

### 3.6 Data quality

In order to model the product stage of the 'fibrec' glass-fibre-reinforced panels, Rieder's primary data was used. All other relevant background-datasets no more than five years old were obtained from the database of the /GaBi ts/ Software.

### 3.7 Period under review

The period under consideration is the year 2016.

### 3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Germany

### 3.9 Allocation

The data was obtained exclusively for the product declared. Therefore, no co-product allocation was necessary.

In this study, factors included in 'Allocation in the Case of Multi-Input Processes' include the following: the disposal of residual waste in the waste-incineration facility, and the disposal of the loam rubble in the landfill (landfill for inert material at the facility in Kolbermoor).

Credits that emerge as a consequence of the electrical and thermal energy substitution are directly allocated to the relevant product stage. This is possible because the quantity credited is not larger than the energy demand generated on the input side, for supply of energy in production and in pre-product manufacture. The energy under consideration is of consistently high Quality.

### 3.10 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. Die verwendete Hintergrunddatenbank ist /GaBi ts/ The background-database used is /GaBi ts/.

## 4. LCA: Scenarios and additional technical information

In accordance with /DIN EN 15804:2014/ no scenarios are indicated for the fibreC glass-fibre-reinforced panels referred to;

this is because only the obligatory modules - A1, A2 and A3 (Production stage) - were taken into account.

## 5. LCA: Results

The following tables follow contain the results of the LCA for 1 tonne of glass-fibre-reinforced concrete sheet from the company Rieder Sales GmbH, sourced from the Kolbermoor facility in Germany, relating to the declared stages in the product's life.

**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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 tonne concrete skin und öko Skin

Parameter	Unit	A1-A3
Global warming potential (GWP)	kg CO <sub>2</sub> eq	723.9
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.02E-08
Acidification potential of land and water (AP)	kg SO <sub>2</sub> eq	1.89E+00
Eutrophication potential (EP)	kg PO <sub>4</sub> <sup>3</sup> eq	1.9E-01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg Ethen eq	8.69E-02
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	3.24E-03
Abiotic depletion potential for fossil resources (ADPF)	MJ	8.19E+03

### RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 tonne concrete skin und öko Skin

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier (PERE)	MJ	1.6E+03
Renewable primary energy resources as material utilization (PERM)	MJ	0
Total use of renewable primary energy resources (PERT)	MJ	1.6E+03
Non renewable primary energy as energy carrier (PENRE)	MJ	8.78E+03
Non renewable primary energy as material utilization (PENRM)	MJ	24
Total use of non renewable primary energy resources (PENRT)	MJ	8.8E+03
Use of secondary material (SM)	kg	0
Use of renewable secondary fuels (RSF)	MJ	0
Use of non renewable secondary fuels (NRSF)	MJ	0
Use of net fresh water (FW)	m <sup>3</sup>	2.88

### RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 tonne concrete skin und öko Skin

Parameter	Unit	A1-A3
Hazardous waste disposed (HWD)	kg	3.05E-05
Non hazardous waste disposed (NHWD)	kg	180.2
Radioactive waste disposed (RWD)	kg	0.24
Components for re-use (CRU)	kg	0
Materials for recycling (MFR)	kg	0
Materials for energy recovery (MER)	kg	0
Exported electrical energy (EEE)	MJ	0
Exported thermal energy (EET)	MJ	0

#### Information on the calorific value of the product, including the packaging:

In accordance with the product formula, the products taken into account in this study contain no flammable resources. Nonetheless the packaging materials used (polypropylene, polyethylene and polystyrene) contain raw materials made from fossil resources (calorific value / PP, PE 44 MJ/kg; calorific value / polystyrene: 40 MJ/kg).

The calculation for the PENRM indicator (non-renewable primary energy for use as materials) contains solely the packaging materials named, because the products themselves are non-flammable.

The PERM indicator (renewable primary energy for use as materials) is indicated as being zero, because the wooden pallets used (pallets in circulation) are considered to not constitute a burden (for the environment).

#### Remark about secondary fuels:

The secondary fuels indicated relate solely to the foreground system. Accordingly, no secondary fuels are deployed in the manufacture

of fibreC and Öko Skin. (By contrast, the preliminary activity chains in cement manufacture do indeed use secondary fuels.)

## 6. LCA: Interpretation

Generally speaking, it is the manufacture of the pre-products that exerts the greatest influence throughout all categories of impact; i.e. the manufacture of the cement, the glass fibres, the concrete-chuting foil, and the other pre-products. The use of electricity, thermal energy, packaging materials and transport are of little significance.

The **non-renewable primary-energy demand** is influenced, to a value of 72 %, through the provision of the pre-products (cement, glass fibres, concrete-chuting foil for post-treatment, etc.). When considering **renewable primary-energy consumption**, what is evident - apart from the share accounted for by manufacture of the other pre-products (primarily the preliminary activity chains in microsilica manufacture) - is likewise renewable energy's share in the electricity mix, indicated as being almost one-third.

### Greenhouse potential

The global-warming potential is influenced, to a value of approx. 66 %, by manufacture of the pre-products. The largest contributor among the pre-products is cement manufacture. Moreover, both the electricity demand and the waste treatment contribute approx. 12 % each respectively. The main reason for this is carbon-dioxide emissions made in providing the energy to produce the raw materials and electricity, in addition to carbon-dioxide emissions in the burning of waste.

### Ozone depletion potential (ODP)

To a value of approx. 96 %, the ODP is dominated by manufacture of the pre-products. In this context the largest contribution comes from the manufacture of the glass fibres. Here organic emissions into the air, containing halogen, are responsible for the ozone-depletion potential.

### Acidification potential

To a value of 73 %, the AP results from manufacture of the pre-products, primarily from supply of the other pre-products, such as microsilica. The factors responsible for the acidification potential are mainly emissions of sulphur-dioxide and nitrogen-oxide respectively. These come from the preliminary activity chains in the supply of energy.

### Eutrophication potential

As regards EP, which is primarily determined by NOx emissions, what is evident is the influence of the transport processes, at 24 %, and the manufacture of the pre-products, at 53%.

### Photo-chemical oxidant creation potential

What dominates in the POCP is the provision of pre-products, generated by emissions of NMVOC, nitrogen oxide and sulphur dioxide respectively, from their manufacturing-activity chains. Regarding POCP, a negative value is indicated for the transport activity. This results from the NO emissions of transport activities. NO counteracts the POCP.

### Abiotic resource-use on elementary level

The ADPE is almost entirely caused by provision of the pre-products. Here the main contribution made by the fibres (74 %) is primarily attributable to the use of colemanite ore in glass-fibre manufacture.

### Abiotic resource-use, fossil-based

The sub-systems' contributions to the ADPF are similar to those made to total non-renewable primary-energy consumption.

## 7. Requisite evidence

### Radioactivity

Place of issue: Seibersdorf Laboratories

Test report, date: Test report no. LR-RS127-1/11. Date of test: 9.4.2011. Test according to ÖNORM S 5200:2009 (Test A)  
Results:

Radioactivity of construction materials - cement

Nuclide (detection limit)

k-40: 6 Bq/kg

U-238 sec: 2 Bq/kg

Th-232 sec: 2 Bq/kg **Resource exhaustion**

Place of issue: Leopold Franzens-Universität Innsbruck, Faculty of Construction Engineering Sciences, 6020 Innsbruck, Austria.

Test report, date: B13/12 Saa.  
14.08.2012.

Resource-exhaustion behaviour is determined for the fibreC concrete fibre sheets, taking as its orientation-point the LAGA

Directive EW 98 T. The outcome of assessment of the solid-material content, and also of the eluate content, is allocation to quality-class A; this is in accordance with the Federal Waste Management Plan 2011 for residual mass from construction activity, or respectively for construction materials for recycling.

Results:

The values determined in the examination report B13/12 Saa, dated 14.08.2012, are lower than the maximum permissible emission level; as a result, for all components the requirements are more than fulfilled.

### VOC emissions

Place of issue:

eco-Institut GmbH Sachsenring 69 50677 Cologne

Test report, date: No. 35964-001. Receipt of samples: 15.05.2012. Date of production of report: 19.6.2012

Analyses of emissions according to the principles applied to assessment of indoor construction products, from the health perspective, published by the Deutsches Institut für Bautechnik /DIBt/; status: October 2010

- Volatile organic compounds (VOC) after 3 days and 28 days respectively (according to /DIN ISO 16000-6/)
- Aldehydes and ketones, after 3 days and 28 days (according to /DIN ISO 16000-3/)

Results: (28 days)

a. TVOC (C6-C16) 251 ug/m<sup>3</sup>

- b.  $\Sigma$ SVOC (C16-C22) 0 ug/m<sup>3</sup>
- c. R (dimensionless) 0.904 ug/m<sup>3</sup>
- d. VOC or NIK 0 ug/m<sup>3</sup>
- e. Carcinogens: 0,000 ug/m<sup>3</sup>

All results comply with /AgBB/ requirements.

## 8. References

Waste Catalogue Ordinance, dated 10 December 2001 (Federal Law Gazette I, p. 3379), last amended by means of Article 2 of the Ordinance, dated 17 July 2017 (Federal Law Gazette I, p. 2644) AgBB Committee on Health Assessment of Construction Products Landfill Ordinance 1996 – Federal Law Gazette No. 164/1996 in the following version: Federal Law Gazette II, No. 49/2004 /DIN ISO 16000-6:2012/ Air impurities in indoor areas – Part 6: Determination of VOC values in indoor air and in test chambers, sampling on Tenax TA®, thermic desorption and gas chromatography using MS or MS-FID /DIN ISO 16000-3:2013/ Air impurities in indoor areas – Part 3: Measurement of formaldehyde and other carbonyl compounds in indoor air and in test chambers – sampling by use of a pump /DIN EN 12467:2016/ Fibre-cement flat sheets – Production specification and test Methods /DIN EN 12878:2014/ Pigments for the colouring of cement-bonded or lime-bonded building materials. Specifications for the test procedure; German-language version. EN 12878:2005 + AC:2006

/DIN EN 13501-1:2010/ Fire Classification of Construction Products and Construction Types

Part 1: Classification using data on reaction to fire tests

/DIN EN 14001:2015/ Environmental management systems – Requirements with guidance for use /DIN EN ISO 9001:2015/ Quality Management Systems – Requirements (ISO 9001:2015); bilingual version: EN ISO 9001:2015

/OHSAS 18001:2017/ Management Systems on Protection at Workplace – Series of Requirements on Assessment of Protection at the Workplace and Health Protection /GaBi ts/ GaBi Software System and Database for Life Cycle Engineering Copyright© 1992-2018 thinkstep AG, Version 8.2, SP33. Documentation: [www.gabisoftware.com/deutsch/databases/gabi-databases/](http://www.gabisoftware.com/deutsch/databases/gabi-databases/) /96/603/EG:2006/, Commission Decision dated 06.06.2003 on amendment of Decision 96/603/EC specifying a catalogue of products to be classified in Category A 'No contribution to fire', in accordance with Decision 94/611/EC on implementing Article 20 of Council Directive 89/106/EEC on construction products. PCR – Part A: Rules of calculation for the LCA and requirements for the background report; Institut Bauen und Umwelt e.V., [www.bau-umwelt.com](http://www.bau-umwelt.com), v.1.5, 2016 PCR – Part B: Requirements concerning the EPD for fibre cement / fibre concrete, Institut Bauen und Umwelt e.V., [www.bau-umwelt.com](http://www.bau-umwelt.com), v.1.6., November 2017



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Rieder

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