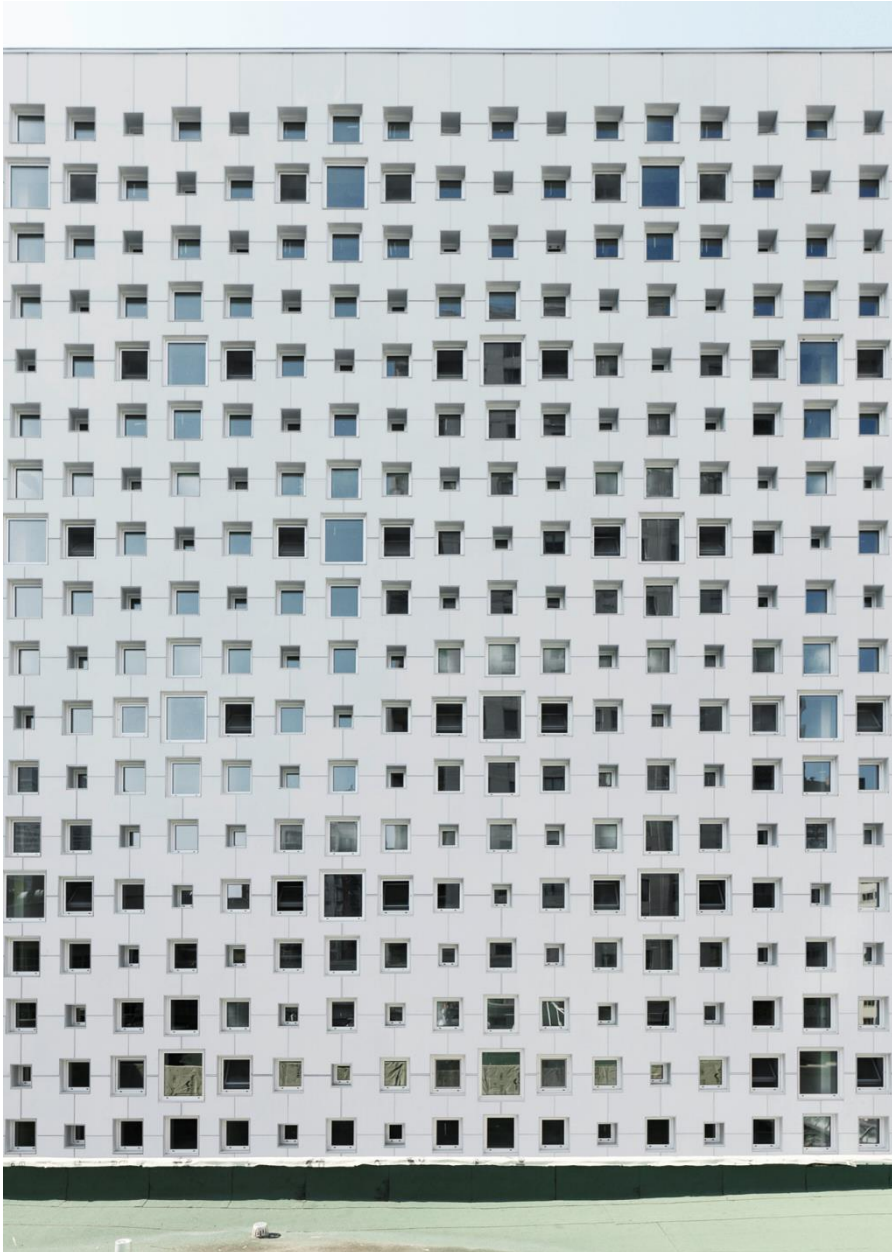


# concrete skin and öko skin

FIBREC GLASSFIBRE REINFORCED CONCRETE



With its range of innovative facade products, Rieder combines sustainability, aesthetics and intelligence on building shells.



*Registered under the scope  
of mutual recognition between  
UL Environment and  
Institut Bauen und Umwelt e.V.*



**RIEDER**

fibreC – the name is an acronym of the words “glassfibre” and “concrete” – is a glassfibre-reinforced concrete panel that unites the advantages of both glassfibres and concrete.

Concrete is a natural product and Rieder sees it as such, with all its vital signs and characteristics. Natural raw materials are used for the production to ensure the authenticity of this sustainable product. Lively surfaces with an interplay of color shades and light cloud effects are characteristic of fibreC. The structure of fibreC, which is typical for concrete, gives the material a honest character.

Rieder pursues a holistic approach that covers the entire range of sustainability and meets the high demands of ambitious modern architecture. Rieder is committed to making an active contribution to the energy turnaround through continuous research and further development of its products and production processes.



# ENVIRONMENTAL PRODUCT DECLARATION



**RIEDER**

Rieder Smart Elements GmbH  
concrete skin and öko skin

According to EN 15804 and ISO 14025  
Dual Recognition by UL Environment and Institut Bauen und Umwelt e.V.

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.




By using this EPD, the user agrees to the UL ENVIRONMENT SUSTAINABLE PRODUCT GUIDE TERMS OF USE (<http://productguide.ulenvironment.com/TermsandConditions.aspx>), where this EPD is listed.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	Rieder Smart Elements GmbH
ULE DECLARATION NUMBER	4787371303.101.1
IBU DECLARATION NUMBER	EPD-RSE-2012111-C-EN
DECLARED PRODUCT	concrete skin and öko skin (fibreC glassfibre reinforced concrete)
REFERENCE PCR	Product Category Rules Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 2011-07 Product Category Rules Part B: Fibre cement and fibre concrete, 06.2011

DATE OF ISSUE	October 1, 2012
PERIOD OF VALIDITY	5 years

CONTENTS OF THE DECLARATION	General information Product / Product description LCA calculation rules LCA scenarios and further technical information LCA results References
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The PCR review was conducted by:	IBU – Institut Bauen und Umwelt e.V.
	PCR was approved by the Independent Expert Committee (IEC) of IBU
The CEN Norm EN 15804 serves as the core PCR. This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	
	Wade Stout, UL Environment
This life cycle assessment was independently verified in accordance with EN 15804 and the reference PCR by:	IBU – Institut Bauen und Umwelt e.V.





## General Information

### Rieder GmbH

#### Programme holder

IBU - Institut Bauen und Umwelt e.V.  
Panoramastr. 1  
10178 Berlin  
Germany

#### Declaration number

EPD-RSE-2012111-C-EN

#### This Declaration is based on the Product Category Rules:

Fibre cement / Fibre concrete, 06.2011  
(PCR tested and approved by the SVR)

#### Issue date

01.10.2012

#### Valid to

30.09.2017

Prof. Dr.-Ing. Horst J. Bossenmayer  
(President of Institut Bauen und Umwelt e.V.)

Prof. Dr.-Ing. Hans-Wolf Reinhardt  
(Chairman of the Expert Committee (SVR))

### fibreC glassfibre concrete panel and Öko Skin

#### Owner of the Declaration

Rieder Smart Elements GmbH  
Mühlenweg 22  
5751 Maishofen  
Austria

#### Declared product / Declared unit

fibreC glass fibre-reinforced fair-faced concrete panel and Öko Skin

#### Scope:

This Life Cycle Assessment is based on data provided by Rieder GmbH relating to production year 2011. The object of the analysis is the fibre concrete panels manufactured in the Kolbermoor plant in Germany which are declared as average products calculated on the basis of production volumes incurred during the year of reference. 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.

#### Verification

The CEN Norm /EN 15804/ serves as the core PCR

Independent verification of the declaration  
according to /ISO 14025/

internally  externally

Matthias Schulz  
(Independent verifier appointed by SVR)

## Product

### Product description

fibreC is a glass fibre-reinforced fair-faced concrete panel. Reinforcement is based on alkali-resistant glass fibres. The panel is dyed throughout. The standard thickness is 13 mm. This Declaration applies for Matt, Ferro and Ferro Light surfaces as well as for all colours.

### Application

fibreC panels serve as facing material for back-ventilated curtain façades, as cladding in interior and exterior applications and as floors.

### Technical Data

Name	Value	Unit
Thermal conductivity (standard for concrete)	approx. 2.0	W/mK
Gross density (DIN EN 12467:2006)	2.0 - 2.42	kg/dm <sup>3</sup>
Bending tensile strength (EN 12467:2006, Class 4)	> 18	N/mm <sup>2</sup> (MOR)
Modulus of elasticity (DIN EN 12467:2006)	approx. 10,000	N/mm <sup>2</sup>

Coefficient of thermal expansion (DIN 51045)	10*10 <sup>-6</sup>	1/°K
Building material class (DIN EN 1402:2004)	A1 - non-flammable	

### Base materials / Ancillary materials

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

### Reference service life

The technical properties of fibreC are retained over a calculated service life of more than 50 years. Natural signs of life and gradualism of appearance necessitated by environmental factors do not impair panel mechanical strength or safety.



## LCA: Calculation rules

### Declared Unit

This Declaration refers to the declared unit of one tonne in accordance with the IBU PCR text Part B for the fibre cement / fibre concrete product group /Product Category Rules for Building Products Part B/. An average product is analysed for the Kolbermoor location in Germany. fibreC is 13 mm thick; the average basis weight of the glassfibre concrete panel produced is 28.73 kg/m<sup>2</sup>.

### System boundary

This Life Cycle Assessment addresses the life cycle stage of product manufacturing from "cradle to gate".

The product stage comprises Modules A1 (Provision of raw materials), A2 (Transport), A3 (Manufacture) in accordance with DIN EN 15804:2012.

### 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.

## LCA: Scenarios and additional technical information

In accordance with DIN EN 15804:2012, no scenarios are indicated for the glassfibre concrete panel in question as only the obligatory Modules A1, A2 and A3 (Product stage) were reviewed.



## LCA: Results

The following tables depict the results of the indicators concerning impact estimates, use of resources as well as the waste and other output flows with reference to one tonne of glassfibre concrete panels manufactured by Rieder GmbH in the Kolbermoor plant in Germany. The results refer to one tonne of fibreC glassfibre concrete panels.

### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 tonne fibreC (CML 2001 – 2010 | GaBi SP 20)

Parameter	Unit	A1	A2	A3
Global warming potential	kg CO <sub>2</sub> eq	583	33	110
Depletion potential of the stratospheric ozone layer	kg CFC11 eq	4.18E-06	1.02E-08	1.94E-07
Acidification potential of land and water	kg SO <sub>2</sub> eq	1656	0.260	0.182
Eutrophication potential	kg (PO <sub>4</sub> ) <sup>3-</sup> eq	0.151	0.051	0.017
Formation potential of tropospheric ozone photochemical oxidants	kg ethene eq	0.250	-0.054	0.033
Abiotic depletion potential for non-fossil resources	kg Sb eq	5.83E-03	1.30E-06	2.40E-05
Abiotic depletion potential for fossil resources	MJ	5259	457	3103

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 tonne fibreC (TRACI 2.1| GaBi SP 28)

Parameter	Unit	A1	A2	A3
Global warming potential	kg CO <sub>2</sub> eq	5.94E+02	3.32E+01	1.00E+02
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq	4.86E-06	1.23E-10	5.25E-08
Acidification potential of land and water	kg SO <sub>2</sub> eq	1.68	3.21E-01	1.74E-01
Eutrophication potential	kg N eq	7.56E-02	2.49E-02	1.26E-02
Ground-level smog formation potential	kg O <sub>3</sub> eq	2.37E+01	6.97	2.72
Resources, Fossil fuels	MJ	4.91E+02	6.54E+01	4.16E+02

### RESULTS OF THE LCA - RESOURCE USE: 1 tonne fibreC

Parameter	Unit	A1	A2	A3
Renewable primary energy as energy carrier	MJ		1053	
Renewable primary energy resources as material utilization	MJ		0	
Total use of renewable primary energy resources	MJ	964	17	72
Non-renewable primary energy as energy carrier	MJ		8948	
Non-renewable primary energy as material utilization	MJ		647	
Total use of non-renewable primary energy resources	MJ	5920	459	3217
Use of secondary material	kg	0	0	0
Use of renewable secondary fuels	MJ	57	0.003	0.081
Use of non-renewable secondary fuels	MJ	533	0.034	0.452
Use of net fresh water	m <sup>3</sup>	598	1.631	70

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 tonne fibreC

Parameter	Unit	A1	A2	A3
Hazardous waste disposed (*)	kg	-	-	-
Non-hazardous waste disposed	kg	1438	2	295
Radioactive waste disposed	kg	2.68E-01	5.95E-04	4.62E-02
Components for re-use	kg	0	0	0
Materials for recycling	kg	0	0	0
Materials for energy recovery	kg	0	0	0
Exported electrical energy	MJ	0	0	0
Exported thermal energy	MJ	0	0	0

(\*) not declared - in accordance with the transition solution approved by the SVA on 4.10.2012



## References

**Institut Bauen und Umwelt e.V.**, Berlin (pub.):

**General Principles** for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2011-06

**Product Category Rules for Building Products, Part A:** Calculation rules for the Life Cycle Assessment and requirements on the background report, 2011-07

**Product Category Rules for Building Products, Part B:** Requirements on the EPD for fibre cement and fibre concrete, 2011-06  
[www.bau-umwelt.de](http://www.bau-umwelt.de)

**DIN EN ISO 9001:**2008-12, Quality Management Systems – Requirements (ISO 9001:2008); trilingual version EN ISO 9001:2008

**DIN EN ISO 14001:**2009-11, Environment Management Systems – Requirements with application instructions (ISO 14001:2004 + Cor. 1:2009); German and English version EN ISO 14001:2004 + AC:2009

**DIN EN ISO 14025:**2011-10, Environmental labels and declarations – Type III Environmental Declarations – Principles and methods (ISO 14025:2006); German and English version EN ISO 14025:2011

**DIN EN 15804:**2012-04, Sustainability of buildings – Environmental Product Declarations – Basic rules for the building products product category

**DIN EN 12467:**2006-12, Fibre cement panels – Product specifications and test methods

**DIN EN 12878:**2006-05, Pigments for dyeing cement- and/or lime-bound construction materials – Requirements and test methods; German version EN 12878:2005 + AC:2006

**DIN EN 1404:** 2004-01 Unshaped refractory products – Part 1: Introduction and classification; German version EN 1402-1:2003

**DIN EN 13501-1:**2010-01, Classification of building products and methods by fire performance – Part 1: Classification with the results of tests on fire performance of building products

**DIN EN ISO 9001:** 2008-12, Quality Management Systems - Requirements (ISO 9001:2008); trilingual version EN ISO 9001:2008

**OHSAS 18001:2007**, Occupational Health and Safety Management Systems – Requirements – Range for assessing occupational health and safety

**GaBi 5:** Software and data base for comprehensive analysis. LBP, University of Stuttgart and PE International, 2011

**96/603/EG: 2006-06**, Commission decision dated 6 June 2003 on amendment of decision 96/603/EG specifying a directory of products to be classified in category A: "No contribution to fire" in accordance with decision 94/611/EG on implementing Article 20 of the 89/106/EEG Guideline on building products

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