ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	**CALSITHERM** Silikatbaustoffe GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-CSP-20180010-IBC1-EN
ECO EPD Ref. No.	ECO-00000217
Issue date	20.04.2018
Valid to	19.04.2023

Microporous Calcium Silicate Insulating Materials
CALSITHERM Silikatbaustoffe GmbH

www.ibu-epd.com / https://epd-online.com

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1. General Information

CALSITHERM Silikatbaustoffe GmbH	Calcium silicate insulation panels
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** **CALSITHERM** Silikatbaustoffe GmbH Hermann-Löns-Strasse 170 33104 Paderborn
Declaration number EPD-CSP-20180010-IBC1-EN	**Declared product / declared unit** 1 t with an average bulk density of 259 kg/m³ valid for the Calsitherm products Silca, Silcal, Microcal-Calcium silicate panels;Calsitherm Klimaplatte; Redboard thermal panels. The panels are manufactured in the thickness range of 15 to 150 mm with bulk density of 170 to 550 kg/m³.
This declaration is based on the product category rules: Calcium silicate insulating materials, 07.2014 (PCR checked and approved by the SVR) **Issue date** 20.04.2018 **Valid to** 19.04.2023	**Scope:** This environmental product declaration relates to the following Calsitherm products from the Paderborn factory: Calsitherm Klimaplatte-F,-WF Redboard pro; Redboard basic Silcal-900; -1000; -1100; Silca 170 SB; -200; -250; -250 KM; -250 SB; -T300. It involves an average EPD for a Calsitherm product with an average bulk thickness; the product specific bulk thicknesses are given under "2.3 Technical Data". The owner of the declaration takes responsibility for the underlying information and proofs; a liability of the IBU in relation to the manufacturer information, LCA data and proofs is excluded. 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.
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	**Verification** The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ ☐ internally ☒ externally
Dr. Burkhart Lehmann (Managing Director IBU)	Angela Schindler (Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

Silca, Silcal, Microcal-Calcium silicate panels and Calsitherm thermal panels, Redboard (referred to as CSP hereafter) are white to light grey in colour and are insulation panels resistant to up to 1100 °C continuous temperature, made of calcium silicate hydrates with low embedded proportion (<0.6 vol -%) of cellulose. The products distinguish themselves with respect to their bulk density and the proportions of the same raw materials used.

For placing the product on the EU/EFTA market (with the exception of Switzerland), the provision (EN) no. 305/2011/ (CPR) and the following other harmonisation legislations /EN 14306:2010/,
Product norm /DIBt/: /ETA-15/0340/ dated 9th July 2015 and /ETA-19/0559/ dated 30th October *(added after publication)* apply. The product needs a declaration of performance pursuant to the CPR while considering the /EN 13172/ (monitoring of building materials, structural elements and construction types; General Principles) and the CE labelling.
The respective national regulations apply for the use.

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2.2 Application

Panels for high temperature insulation for thermo-technical systems.
Heat and fire protection panels for the entire building construction, especially fireplace and tiled stoves.
Panels for interior construction, restoration of old buildings, timbered houses and humidors. Here, especially for insulation and moisture control with mould-inhibiting effect.
Improvement of the moisture and heat balance in spaces used for a short time e.g. in schools, churches, conference rooms.
In the preservation of monuments for conservation of facade design, since it is internal insulation.

2.3 Technical Data

Structural data

Name	Value	Unit
Gross density /EN 1094-4/	170 - 550	kg/m³
Compressive strength /EN 1094-5/	≥ 1	N/mm²
Flexural strength /EN 12089/, length	≥ 0,5	N/mm²
Thermal conductivity /EN 12939/, at RT	0.06 - 0.1	W/(mK)
Thermal conductivity /EN 12939/, at 800 °C	0,12 - 0,15	W/(mK)
Water vapour diffusion resistance factor /EN 12086/, µ-Value	3 - 6	-
Water absorption Wip (24h) /EN 12087/, at 20 mm thickness	17	kg/m²
Open porosity /EN 1094-4/	≥ 80	Vol.-%
Mass related moisture content /EN ISO 12571/, (at 23°C; 80 % humidity)	approx. 7,5	Mass-%
Sound absorption coefficient /EN 140-16/; reference wall +50 mm CSP; Rw-value	57	dB

The maximum application temperature is up to 1100 °C. A shrinkage of ≤ 2% at the maximum application temperature should be anticipated. All declared products belong to the building material class A1 according to /EN 13501/, part 1, non-flammable.

- Performance values of the product are equivalent to the declaration of performance according to the CPR in relation to its essential features as per /DIN EN 14306:2016-03/ or /DIBt: ETA-15/0340/ dated 9th July 2015.
- Redboard /DIBt: ETA-19/0559/ dated 30th October 2019
- Performance values of the product as per the harmonised norms specified based on the other harmonisation legislations.
- Optional details for the product: see chapter 7.3 and 7.4

2.4 Delivery status

Length: up to 3000 mm
Width: 1250 mm
Thickness: 15 - 150 mm
Tolerance according to /ISO 2768-1/

2.5 Base materials / Ancillary materials

Following basic materials are indicated in M.-%:

Calcium hydroxide [Ca(OH)2]	36 - 60
Sand [SiO2]	15 - 40
Flue ash	15 - 35
Siliceous additives	0 - 15
Cellulose	1 - 5

The mixing takes place with a 0.1% water/cellulose suspension.
According to the recipe, no SVHC are used (/REACH/)

2.6 Manufacture

The calcium silicate panels are produced by the method of post autoclaving. The starting materials are dosed using balances and mixed by adding water. Here, the water level controls the bulk density of the generate panels - apart from the grain size distribution of the starting material, the operating temperature and the grouting.
A pre-reaction takes place in the reactors through which the first calcium silicate hydrate (CSG)-phases are already formed. The emerging gel-like suspension is partially dehydrated using a sieve belt press and formed into individual panels.
The "greenpanels" emerging from the pressing are then exposed in an autoclave to a saturated steam atmosphere with pressures of 10 to 20 bar for 15 to 25 hours. Here, the crystallisation strengthens the raw materials used in calcium silicate hydrates at temperatures between 150 °C and 200 °C. Thereafter, the panels are dried up to a prescribed residual moisture of under 10%. After that, they can be polished and sawed. The grinding dust arising during the polishing is again used as starting material (see Acceptance for the evaluation in chapter 3.3).
Certification by /DIN EN ISO 9001:2015/ available.

2.7 Environment and health during manufacturing

The dust produced during the manufacturing is vacuumed off in compliance with the workplace threshold values (AWG), and flows back into the production. Further exhaust air purification is not required.
The process air is free of dust much below the statutory limit values of AWG values.
Natural gas is used as an energy source for the steam curing.
The condensate water of autoclaving and water from the pressing again partially flows back in the production process in the process water circulation. Surplus alkaline water is neutralised with combustion gases and then introduced in the municipal sewer system. Previously filtered solid contents are continuously brought back to the production cycle.
Noise level measurements have shown that all the values determined within and beyond the production plants lie much below the required values of technical norms due to the sound insulation measures taken.

2.8 Product processing/Installation

Calcium silicate panels are generally installed in the requested / supplied sizes. The cutting at the coupling and connection points takes place with commercially cutting tools.

Depending on the field of use, the panels are dowelled in dry construction or laid with special glue.
The panels can be attached or fitted on components that are made of other standardised and permitted building materials. The joining is generally by gluing or screw fitting.
The products can be made water repellent, plastered, coated with lime putty plaster or lime plaster on site.
While selecting structurally required additional products (such as adhesive), it must be ensured that they do not negatively influence the described environmental and health compatibility properties of the specified construction products mentioned.

2.9 Packaging

The dried panels are packaged in cartons using a packing machine or shrink wrapped in polyethylene film, and stacked on wooden pallets. Hard fibre and press panels are partly used for reinforcing the casing. The polyethylene shrink films and cartons can be recycled. Hard fibre and press panels can be disposed of while utilising the energy. Packaging waste is collected at Calsitherm for material recycling.

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2.10 Condition of use

Calcium silicate panels are resistant to decay, ageing and, due to the basic pH value, to rot, and to insects and rodents (conclusion after years of study of exterior conditions).

2.11 Environment and health during use

Based on the stable calcium silicate hydrate (CSH) binding and the rigid structure, emissions are not possible. There are no adverse health effects in normal use in accordance with the described proper use of product. There can arise no hazards for water, air and soil when the product is used properly.

2.12 Reference service life

The reference usage duration of the panels is 80 years.
According to the latest knowledge, the product is indestructible, therefore the lifespan of the product is clearly longer than the lifespan of buildings.

The board does not burn and does not rot. Only if it got into acids would, it convert in the long term into amorphous silica and from calcium hydroxide ($Ca(OH)_2$) to calcium carbonate ($CaCO_3$).

2.13 Extraordinary effects

Fire

The products named meet the requirements of building material class A1, "non-flammable" according to /EN 13501-1/.Due to the heat generated by adjacent building components burning, traces of combustion gases (similar to those from combustion of pure paper) may be released due to the low proportion of cellulose (<0.6 Vol.-%).

Fire protection

Name	Value
Building material class	A1
Burning droplets	absent
Smoke gas development	absent

Water

No relevant emission of water soluble substances. The indicated products are structurally stable and are not subject to change of shape through the influence of water and drying.

Mechanical destruction

No relevant effects on the environment.

2.14 Re-use phase

Calcium silicate panels can be easily collected separately in case of a reconstruction or termination of the life phase of a building in case of a selective dismantling.

Following the selective demolition of such buildings, the materials can be used again corresponding to their original purpose of use in view of their durability.
After grinding, a reuse of the unmixed materials is possible as filler, e.g. for high temperature bulk seal or insulation.

2.15 Disposal

If the above mentioned recycling options are not practicable, the scraps emerging at the processing site and break-off of the indicated products can be easily disposed of and pose no extraordinary load for the environment. The material can be disposed of as building rubble corresponding to /EAK/ code: /170101/ (concrete) / /170107/ (concrete parts up to 2 m edge length).

For the end of life, except for the scenario (waste dump) assessed in chapter 5, another scenario is textually given as to which are the current options for material recycling. The first option is the substitution of a usual pore-forming agent for production of bricks (inferior use). The second option is the addition to clay insulation plasters (superior use): for this, the calcium silicate insulation panels must not be separated from adhering materials such as: lime glue and lime plaster during dismantling. These materials have no influence on their indicated use. The calcium silicate insulation panels are first mechanically crushed. This is possible without additional energy consumption, since the coarse crushing is possible with a shovel, as a result of which, the panels can be suspended in barrels filled with water). Then, the calcium silicate replaces the clay in ecological insulation plasters since it is admixed to a certain percentage with the clay insulation plasters. Thanks to this mixing, crack formation is minimised and the heat insulation maximised so that the clay plaster is upgraded.

2.16 Further information

You can find more information about our products at www.calsitherm.de.

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3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 t CSP with an average weighted bulk density of 259 kg/m³. The bulk densities of both the main products SILCAL (including MICROCAL). KLIMAPLATTE and REDBOARD (joint sales share 95%) were used for the averaging. The bulk densities of SILCA and MICROCAL are also indicated below:

SILCAL	250-260 kg/m³
KLIMAPLATTE	170-250 kg/m³
REDBOARD	170-250 kg/m³
MICROCAL	240 kg/m³
SILCA	180-550 kg/m³

Deklarierte Einheit

Name	Value	Unit
Declared unit	1	t
Gross density	259	kg/m³
Conversion factor to 1 kg	1	-

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representatively and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

3.2 System boundary

EPD type: Inception to factory gate with options. The LCA considers the raw material and energy production, raw material transports and the actual product manufacturing (Modules A1-A3), and the installation in the building (Module A5), only the packaging recycling comes up here) and the end of life or disposal stage (Modules C and D). The disposal of calcium silicate panels is declared in module C4, and the utilisation potentials resulting from A5 beyond the system limit are declared in module D.

3.3 Estimates and assumptions

The raw material micro silica was modelled without environmental impacts in the manufacturing, since it is used as secondary raw material, before the use of which no processing is needed. The raw material “sulphate pulp” was estimated with the data set for cellulose. Wooden panels are considered as circulation pallets and therefore ignored here. The grinding dust arising during the polishing is used again as starting material, but is given in the waste dump as worst case in the model here.

3.4 Cut-off criteria

All material flows that enter the system and add >1% to total mass or >1% to primary energy consumption are included on the input side. All the material flows leaving the system whose environmental impacts are >1% of the impacts of one impact category were considered on the output side.

3.5 Background data

All the background data relevant for the panel manufacturing and disposal was taken from the /GaBi 8/ database.

3.6 Data quality

The data quality can be considered as high. The manufacture of CSP was modelled with the primary data of Calsitherm.
Relevant background data sets were present in the GaBi database for all the relevant primary products used. The latest revision of the data used is at the most 4 years back.

3.7 Period under review

Annual mean values are ascertained for the quantities of raw materials, energy, auxiliary materials and consumable at the Paderborn-Sennelager site. Calsitherm has confirmed that the data continues to be valid even in 2017 because since the data collection in the year 2011, there were no significant changes related to:

- the product composition,
- the production related energy consumption and the energy source used,
- the direct process emissions e.g. in the air,
- the types and quantities of waste and
- the production technology.

The production site is also the same.

3.8 Allocation

The assignment of input and output flows of a LCA module on the investigated product system is understood as allocation under /EN ISO 14040/. During the data collection, the factory data must be assigned to the declared products: The raw materials used were distributed on the basis of masses. On the contrary, the distribution of the power consumption and the disposal of packaging residues, building rubble, etc. are weighed by the volumes of the panels.

3.9 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.

The background database used is /GaBi database 2017 version SP34/. The characterisation factors used are CML 2001, update 2012.

4. LCA: Scenarios and additional technical information

The following technical information is the foundation for the declared modules.

Installation in the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Produktverpackung)	7,33	kg

End the life (C1-C4)

Name	Value	Unit
Collected separately	1000	kg
Landfilling	1000	kg

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5. LCA: Results

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	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 t Micro-porous calcium silicate heat insulators

Parameter	Unit	A1-A3	A5	C4	D
Global warming potential	[kg CO_2-Eq.]	2.01E+3	1.78E+1	1.61E+1	-9.74E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.45E-9	1.43E-12	1.52E-11	-1.96E-11
Acidification potential of land and water	[kg SO_2-Eq.]	2.40E+0	1.76E-3	9.54E-2	-1.07E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	4.90E-1	3.65E-4	1.30E-2	-1.69E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	2.05E-1	1.18E-4	7.51E-3	-1.08E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	4.41E-4	1.82E-7	5.79E-6	-2.84E-6
Abiotic depletion potential for fossil resources	[MJ]	2.18E+4	2.81E+0	2.09E+2	-1.24E+2

RESULTS OF THE LCA - RESOURCE USE: 1 t Micro-porous calcium silicate heat insulators

Parameter	Unit	A1-A3	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	8.20E+3	4.75E+1	3.99E+2	-2.84E+1
Renewable primary energy resources as material utilization	[MJ]	4.21E+2	-4.70E+1	-3.74E+2	0.00E+0
Total use of renewable primary energy resources	[MJ]	8.62E+3	5.19E-1	2.52E+1	-2.84E+1
Non-renewable primary energy as energy carrier	[MJ]	2.33E+4	7.52E+1	2.16E+2	-1.44E+2
Non-renewable primary energy as material utilization	[MJ]	7.20E+1	-7.20E+1	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	2.34E+4	3.18E+0	2.16E+2	-1.39E+2
Use of secondary material	[kg]	3.15E+2	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m³]	6.05E+0	4.14E-2	4.10E-2	-1.93E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:
1 t Micro-porous calcium silicate heat insulators

Parameter	Unit	A1-A3	A5	C4	D
Hazardous waste disposed	[kg]	6.70E-5	1.84E-8	3.42E-6	-5.28E-8
Non-hazardous waste disposed	[kg]	1.02E+2	1.22E-1	1.00E+3	-7.25E-2
Radioactive waste disposed	[kg]	6.37E-1	1.44E-4	2.92E-3	-6.06E-3
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	3.04E+1	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	6.86E+1	0.00E+0	0.00E+0

**Note on integrated CO_2 in the product: The cellulose integrated in the product (33 kg) leads to an integration of 15.4 kg biogenic CO_2 in A1-A3. This is not significant for the GWP since it corresponds to 0.7% of 2.010 kg CO_2-Eq. in the EoL (C4), the cellulose is no longer used (neither thermally nor materially) and therefore the biogenic CO_2 (15.4 kg) integrated with it remains in the product. Today it can be assumed that this CO_2 remains in the product due to its composition and is not released in the atmosphere, within the environmental category relevant for the GWP for 100 years*

6. LCA: Interpretation

<u>Indicators of material balance:</u>

Primary energy use
The primary energy use for 1 t average CSP (for bulk density see chapter 3) adds approx. 23,400 MJ/t from non-renewable primary energies (**PENRT**) A large part of it (83%) is consumed for manufacturing; 15% is needed for raw material provision and 1.6% spent on packaging.

Approximately 8,620 MJ/t is obtained from renewable primary energy (**PERT),** of which28% is consumed for manufacturing, approximately 70% for the raw material provision and close to 2% for the packaging.

<u>Indicators of impact assessment:</u>

Global warming potential
In the global warming potential (**GWP**) from the product cycle of 1 t CSP 66% stems from manufacturing, 34% from raw material provision and close to 0.5% from packaging. The largest shares from

manufacturing are allotted with approx. 41% to the thermal energy for drying, with approx. 32% to power and with 25% to the process steam.
The largest part of raw material provision comes with 84% from lime. The quartz sand adds only 2% to **GWP**; the siliceous supplements add only 1.6%.

Ozone depletion potential
The manufacturing contributes approximately 67% to the ozone depletion potential (**ODP**), the raw material provision 30% and the packaging contributes 3%. Within manufacturing, 97% come from the power mix. This is again to be attributed mainly to the FCKWs used for cooling in nuclear power plants almost exclusively – 99.9% - of R 114 (dichlorotetrafluoroethane). Within raw material provision, 52% come from the siliceous supplements and 25% from the sulphate pulp used which needs relatively more power in its manufacturing.

Acidification potential
The acidification potential (**AP**) from the product cycle of 1 t CSP dominates 47% from manufacturing, 52% from raw material provision and 1% from packaging. From manufacturing, in turn, the power contributes a large share to AP with 50% since there are inorganic emissions in the air, sulphur dioxide with 61%, nitrogen oxides with 31% and hydrogen sulphide with 5% are of consequence here.

Eutrophication potential
In the eutrophication potential (**EP**) from the product cycle of 1 t CSP 47% stems from manufacturing, 52% from raw material provision, which predominantly results from the cellulose and calcium hydroxide production and approximately 1% from packaging.

7. Requisite evidence

7.1 Radioactivity
Measurement place: Universität Gesamthochschule Paderborn, Fachbereich 6 – Physik, 33095 Paderborn.
Measurement method: Testing for radioactive contamination with Berthold LB 1210 B, calibrated with strontium 90 (65 Becquerel) and Frieseke/Hoepfner FH 407 V measured in comparison to natural background radiation.
Test report, date: Universität Paderborn, Prof. Dr. J. Mimkes dated 08/06/1994.
Result: In the indicated products, increased values in comparison to the natural radioactivity (5 Bq) could not be found. The products Silcal 900, Silcal 1100 and Silcal T300 are thus not contaminated. This generally applies to products that are made from the same (raw) materials such as the indicated products.

7.2 Leaching
Measurement place: Institute for food, water and environment technology, 33098 Paderborn.
Measurement method: According to the standard methods for water, waste water and sludge examination in Germany.
Test report, date: Institut für Lebensmittel-, Wasser- und Umwelttechnik, Dr. Warnecke dated 02/10/199.
Result: The eluate is uncontaminated. The examination revealed no contamination due to heavy metals (such as chromium, arsenic, cadmium, mercury among others), polycyclic aromatic compounds, total phenol, hydrocarbons, fluorides and cyanides. The concentrations documented in the test procedure show that they fall much below the required threshold values.

7.3 VOC / Volatile organic compounds
Measurement place: Eurofins Product Testing A/S, accredited institute for testing the product emissions according to Eurofins Indoor Air Comfort Gold, certification and quality assurance, DK-8464 Galten, Denmark
Test report, date: Test report no. G15034A dated 07.06.2012
Sampling: From the numerous trade names of the products - as they are listed in the header in the table below - Eurofins has chosen the product Silca T300, which represents all products that are manufactured from the same raw material, as representative for testing.
Result: The testing of overall VOC was carried out according to /DIN EN ISO -16000-3, -16000-6, -16000-9, 16000-11, ISO 16017-1, DIBt/AgBB-, Blue Angel/-test method/emission assessment.

Table: Emission values

Sample designation: SILCA T300 (CALSITHERM Klimaplatte–F and Klimaplatte-WF, Redboard basic and Redboard pro, Silcal-900, -1000, -1100, Silca 170SB, Silca 200, Silca 250, Silca 250KM and Silca 250SB)		
Result overview after 28 days	Measurement [µg/m³]	Criteria values
TVOC (C6 – C16)	< 5	100
VOC without NIK (C6 – C16)	< 5	50
Σ SVOC (> n-C16)	< 5	20
Σ Carcinogens	< 1	1
R value	< 1	1
Formaldehyde	< 3	10

Key: < means that all measurement values lie below the quantification threshold.

7.4 Quarz
Measurement place: Deutsches Institut für Feuerfest und Keramik GmbH, accredited institute for product testing according to /DIN EN ISO/IEC 17025/, Bonn, D
Test report, date: Test report no. 102-254-00-04 dated 26.07.2012 and 102-254-00-03 dated 27.07.2012
Result: In order to measure the overall bulk density range of the products with the trade name as listed under sample name in the VOC table above, the test on quartz was conducted on three products with different bulk densities. Since all products are manufactured from the same raw materials, these results are applicable for all products and are hence representative.
Corresponding to the agreement with the accredited test method 0031, no quartz could be proven on the products:
- Calsitherm KLIMAPLATTE-WF
- Redboard pro,

- Silca 200,
- Silca T300

since the values lie below the quantification limits.

8. References

/IBU 2016/
IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.
www.ibu-epd.de

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

GABi 8 2017: thinkstep AG; GaBi 8: Software and database for life cycle engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2017.

GaBi database 2017 version SP34: Documentation of GaBi 8 data sets of the database for life cycle engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2017. http://documentation.gabi-software.com/

DIBt: ETA-15/0340, Deutsches Institut für Bautechnik (German Institute for Structural Engineering): European Technical Evaluation

DIBt: ETA-19/0559, Deutsches Institut für Bautechnik (German Institute for Structural Engineering): European Technical Evaluation

DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures (ISO 14025:2006);

DIN EN 15804:2012-04, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

EAK: European Waste Catalogue, also AVV “Waste Catalogue Ordinance” dated 10th December 2001 (BGBI. I S. 3379), which was last changed by Article 2 of the ordinance dated 17th July 2017 (BGBI. I S. 2644)”

EN 1094-4:1995-09, Insulating refractory products - Part 4: Determination of bulk density and true porosity of shaped products

EN 1094-5:1995-09, Insulating refractory products - Part 5: Determination of cold crushing strength of shaped products

EN 12939:2001-2, Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – Thick products of high and medium thermal resistance

EN 12086:1997-08, Thermal insulating products for building applications – Determination of water vapour transmission properties

EN 12087:1997, Thermal insulating products for building applications – Determination of long term water absorption by immersion

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