SKINROCK®
created in switzerland

Technical Data Sheet

Skinrock® Basis

Use	Can be used inside and outside. Versatile, lightweight and easy to handle plate with a variety of surfaces and mounting options.
Product	The product: Skinrock® consists of a split layer of different natural stones and composite materials and a carrier of resin and glass fibre. The natural stone with its natural colors makes every square centimeter unique.
Surfaces	Slate: Fresh Earth, Golden Drops, Lime White, Mother Earth, Multi Pink, Purple Grey, Rooster Multi, South Grey, Steel Black, Wood Root Quartzite: Cooper Natural, Jungle Fire, Shining Hill, Shining, Leaves, Shining Tree, Sandstone: Swiss Grey Marble (raw): Arctic Storm, Desert Storm, Fantasy White, Mountain Line
Color deviation	All natural stones are an absolutely timeless, natural product that has evolved over millions of years. Deviations in the color scheme and structure may therefore occur. Colour and structure deviations from sample boards are to be expected.
Technical data	Weight per m² variable Natural Stone ca. 1.50 kg Resin 0.80 kg Fibreglass 0.50 kg **Total weight ca. 2.80 kg/m²** Thickness: 1 – 3
Expansion	0.5 – 0.8 mm with a temperature fluctuation of approx. 90°C
Test result according to ASTM C-121	Water absorption with unsealed surface + 2.50%
Fire Behavior	According to the standard DIN 4102 part 1 building material class B2 EN 13823 RF 2 (VKF guidelines) EN 13823 C-s2, d0 (Orienting)
Vapor permeability	According to the standard SN EN 1931
Frost and thaw salt resistance	According to the standard SIA 262/1:2013

SKINROCK AG
Capäls 6, CH-7240 Küblis
Phone +41 81 330 50 38
info@skinrock.ch, www.skinrock.ch, CHE-420.121.168

Health	Do not contain toxins Emission test according to AgBB 2015 Glue data sheet and declaration of non-objection are to be requested.
The specification of the characteristic values are average values or approx. Values. Due to the raw materials used in our products. These may differ slightly from the stated values of a single delivery without affecting the suitability of the product.	

Further information's

Delivery sizes	Standard size 1200 mm x 2500 mm / 1200 mm x 600 mm (Slate, quartzite, sandstone and marble raw) Special format on demand Packaging horizontal stacked Storage store in a dry Place
Processing	Processing temperatures between 18 and 25°C are recommended. Storage dry.
Surface protection	It is recommended to use the products of Skinrock® AG. Furthermore, it is recommended to use the surface sealers of Skinrock® AG.
HS-Code Skinrock	Quartzite 6802.9900 Slate 6803.0000 Sandstone 6802.9900 Marble 6802.9100

Terms and conditions are available on the homepage for download.

SKINROCK AG
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TÜV NORD GROUP

DAkkS
Deutsche
Akkreditierungsstelle
D-P1-11035-03-00

Test report

(Prüfbericht)

20641787-10b

Order number	20641787-10b, GS-BS-Mat/Man
Person responsible	Manthey
Customer	Skinrock AG* Trunstrasse 4 CH-7247 Saas i.P. Switzerland *) former Belcolor AG Flooring
Date of order	14.01.2014
Content of order	Report of a fire technical test of a wallcovering "Skinrock® Type S" for normal combustibility according to DIN 4102 part 1 - Baustoffklasse B2
Test method	DIN 4102 part 1 - Baustoffklasse B2: 1998-05
Specimen receipt	22.01.2014
Date of test	14.02.2014
Date of report	14.03.2014
Period of validity	28.02.2019

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1 Customer

Skinrock AG
Trunstrasse 4
CH-7247 Saas i.P.
Switzerland

2 Specimen indications

Manufacturer and place		:	See customer
Identification		:	Wall covering
Type		:	Skinrock® Type S
Structure		:	Skinrock® Type S (thickness: 2.5 mm) + Skinrock® Fix S (cement-like thin-bed mortar) + Gypsum-board (thickness: 10 mm)
Color:		:	Gold brown marmorate
Determined density	[g/cm³]	:	7.55

3 Specimen preparation, test setup and execution

Number of specimen	[Pcs.]	:	5 application of flame to the edge, 2 application of flame to the surface
Dimensions	[mm]	:	190 x 90 x 12.5 application of flame to the edge 230 x 90 x 12.5 application of flame to the surface
Weight per unit area	[kg/m²]	:	94.1
Flame impingement time	[s]	:	15

4 Results

Chart 1 Results of the test

Application of flame to the edge						
Specimen no.		1	2	3	4	5
Ignition after	[s]*)	6	5	5	5	7
Duration of burning with flames	[s]	14	15	15	15	13
Reaching of inflammation (0s – 20s)	Y / N	No	No	No	No	No
Point of time	[s]*)	/	/	/	/	/
Self extinguishing before reaching classification mark	Y / N	No	No	No	No	No
Point of time	[s]*)	/	/	/	/	/
Max. height of flames	[cm]	3	4	3	4	4
□ Burning material falling down □ Burning droplets falling down	**)	No	No	No	No	No

*) Point of time after starting the test

**) Ignition of filter paper within 20s or burning melted material (duration > 2s)

Note: Samples extinguished after > 20s test time.

Chart 2 Results of the test

Application of flame to the surface						
Specimen no.		1	2	3	4	5
Ignition after	[s]*)	/	/	-	-	-
Duration of burning with flames	[s]	/	/	-	-	-
Reaching of inflammation (0s – 20s)	Y / N	No	No	-	-	-
Point of time	[s]*)	/	/			
Self extinguishing before reaching classification mark	Y / N	Yes	Yes	-	-	-
Point of time	[s]*)	15	15			
Max. height of flames	[cm]	/	/	-	-	-
□ Burning material falling down	**)	No	No	-	-	-
□ Burning droplets falling down						

*) Point of time after starting the test

**) Ignition of filter paper within 20s or burning melted material (duration > 2s)

Note: Samples did not ignite.

5 Appraisal

The requirements according to DIN 4102 part 1, paragraph 6.2.2 for materials classified as B2 were fulfilled.

Hint:

This test report supersedes the former test report 20631787-10b GS-BS-Mat/Man, dated 24-02-2014.

The former test report is withdrawn and no longer valid.

Dortmund, 14.03.2014

DMT-Prüfstelle für Brandschutz DMT

(Mattausch) (Manthey)

Notes

The Results are referring to the tested object only.

This test report cannot be used for writing and "Allgemeines bauaufsichtliches Prüfzeugnis" (general certification for usage for construction authorities in Germany).

This test report has to be copied completely and unchanged only. The customer received 1 copy. Publishing requires the written acceptance of DMT GmbH & Co. KG Test Body for Fire Protection. In case of any doubts the german version of this report is valid.

tecnotest ag

Report About Conduct of Tests

G2970-01

STS 102

Customer	Skinrock AG Trunstrasse 4 7247 Saas i.P. * former Belcolor AG Flooring
Sample material	Skinrock *,golden shine'*, ,sand', *,multi waves'* and *,copper natural'*
Subject / purpose	vapour permeability (water vapour) pursuant to SN EN 1931

Table of contents

Consultant	Hansjörg Epple	This report has been drawn up and distributed with the use of the facilities for electronic data processing. Exclusively the original paper-print report is valid from a legal point of view.
Order dated	09th May 2014	
Date of the report	29th August 2014	

The report contains 4 pages and 4 pages of the annex.

1. ORDER

On 9th May 2014, Mr. Stiffler, Skinrock AG (former Belcolor AG Flooring), entrusted Tecnotest AG, Rüschlikon, with carrying out the vapour permeability test (water vapour) of the Skinrock plates, named *‚golden shine', ‚sand', ‚multi waves'* and *‚copper natural'* pursuant to the SN EN 1931 standard.

2. DOCUMENTATION

At the disposal, there was no documentation for research.

3. SAMPLES

3.1. Material of the samples

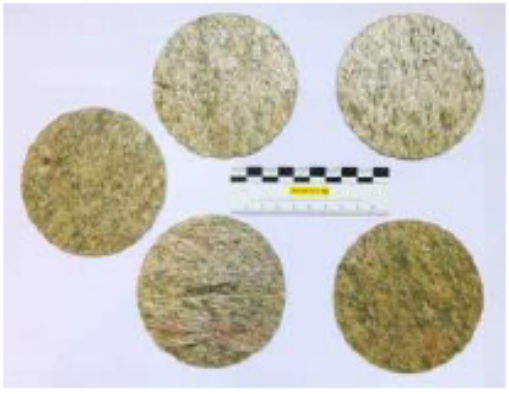
The Skinrock plates were delivered to Tecnotest AG as follows:

Sample material	Delivery form	Arrival	Number	Consigner
Skinrock golden shine	packaged	02nd April 2014	19156	Skinrock AG,
Skinrock sand	packaged	02nd April 2014	19156	Skinrock AG
Skinrock multi waves	packaged	02nd April 2014	19156	Skinrock AG
Skinrock copper natural	packaged	02nd April 2014	19156	Skinrock AG

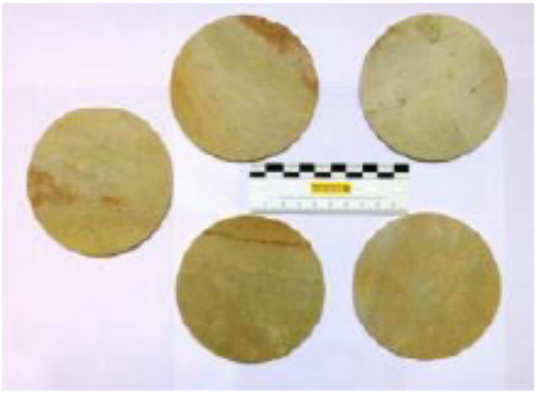
The results of tests, set forth in this report, exclusively concern the samples mentioned here.

3.2. Surface appearance of the samples under test

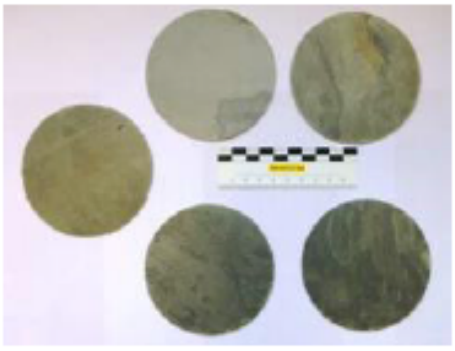
Samples of diameter 93 mm, intended for the tests, were cut out of the delivered Skinrock plates, named *‚golden shine', ‚sand', ‚multi waves'* and *‚copper natural',* by a punch.



Skinrock ‚golden shine'



Skinrock ‚sand'



Skinrock ‚multi waves'

Skinrock ‚copper natural'

4. TEST AT THE LABORATORY

4.1. Method of the tests

Vapour permeability (water vapour)
SN EN 1931 Tecnotest instruction on tests PA041, accredited test

5 samples of Ø 93 mm have been cut out of the Skinrock plates by a punch. The thickness at 3 places was measured on each round sample and the average value was calculated for each of them. Approximately 50 g of fresh-dried calcium chloride was poured in the form of sorbent into 3 testing cups. The fourth testing cup remained empty. The round samples were put into the testing cup, a retaining ring of internal Ø 79.8 mm was installed in the centre, and the intermediate space between the cup edge and the retaining ring was filled with paraffin. After the paraffin got cold, the cups were weighed (mass at the zero moment). Thereafter, the cups were weighed at regular intervals, and the results were recorded as the diagram of mass and time. The results of 4 one-by-one weighing procedures could deviate no more than by 5% of the laid compensatory straight line through these measuring points. Moisture flow density was calculated on the basis of four last measuring points.

4.2. Results of the tests

The results of the tests are in annex 1 to the report.

The measured values, obtained during the conduct of tests, are compared in the table below:

Skinrock	Average thickness	Diffusion resistance factor μ*	Diffusion equivalent air layer thickness S_0
Golden Shine	1.9 mm	29'500	56 m
Sand	2.1 mm	55'000	116 m
Multi waves	1.9 mm	60'500	117 m
Copper natural	1.6 mm	55'000	88 m

* rounded to 500 in each case

The thickness of the layer in the individual samples under test is irregular. The average value of three samples under test was used for the calculation of the diffusion equivalent air layer thickness.

Rüschlikon, 29th August 2014

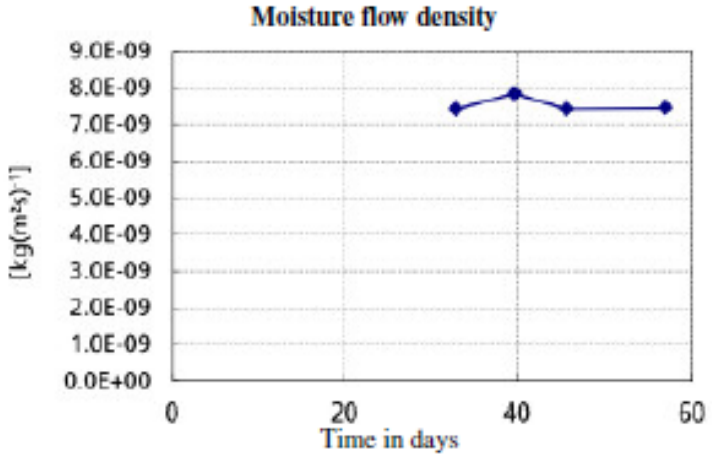
Consultant	Hansjörg Epple	*(signed)*
Manager of the testing laboratory	Aldo Rancati	*(signed)*

Vapour permeability test (water vapour)

Sheet with the results
Grounds SN EN 1931 Order: G2970-01
Tecnotest instruction on the conduct of tests PA041 Arrival of the goods: 19156

Sample under test: Skinrock 'golden shine'
Thickness: 1.90 mm Humidity in the testing cup: from the outside: 75% r.F.
Production date: 15.05.2014 inside: 0% r.F.
Surface under test: round, Ø = 79.8 mm Commencement of the measurement: 15th May 2014 15:46
Notes: absent

Time	Moisture flow density [kg(m²s)⁻¹]			
[d]	Sample under test 1	Sample under test 2	Sample under test 3	Average value
33.0	9.52E-09	5.84E-09	6.94E-09	7.43E-09
39.8	9.91E-09	6.41E-09	7.22E-09	7.85E-09
45.8	9.39E-09	6.03E-09	6.88E-09	7.43E-09
57.0	8.99E-09	6.25E-09	7.15E-09	7.46E-09
Average value	9.45E-09	6.13E-09	7.05E-09	



Time of preprocessing the results: 57 days

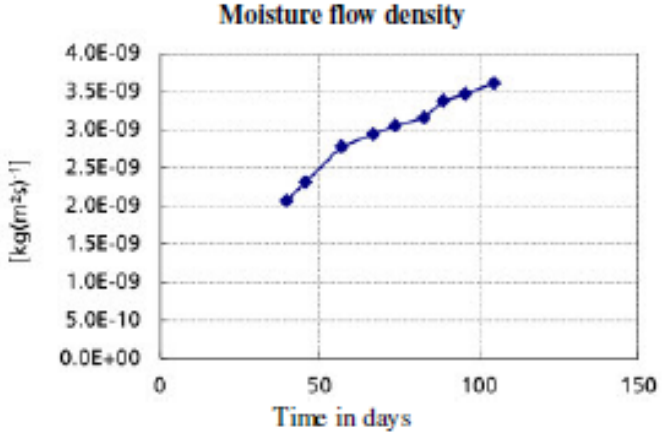
Moisture flow density ρ [kg(m²s)⁻¹]	Moisture permeability factor w_p [kg(m²sPa)⁻¹]	Diffusion resistance factor μ [-]	Diffusion equivalent air layer thickness S_0 [m]
7.46E-09	3.54E-12	29'381	56

Vapour permeability test (water vapour)

Sheet with the results
Grounds SN EN 1931 Order: G2970-01
Tecnotest instruction on the conduct of tests PA041 Arrival of the goods: 19156

Sample under test: Skinrock 'sand'
Thickness: 2.10 mm Humidity in the testing cup: from the outside: 75% r.F.
Production date: 15.05.2014 inside: 0% r.F.
Surface under test: round, Ø = 79.8 mm Commencement of the measurement: 15.05.2014 15:42
Notes: absent

Time	Moisture flow density [kg(m²s)⁻¹]			
[d]	Sample under test 1	Sample under test 2	Sample under test 3	Average value
39.8	1.88E-09	2.11E-09	2.20E-09	2.06E-09
45.8	2.10E-09	2.38E-09	2.45E-09	2.31E-09
57.0	2.59E-09	2.86E-09	2.87E-09	2.77E-09
66.9	2.76E-09	3.07E-09	2.98E-09	2.93E-09
73.8	2.90E-09	3.16E-09	3.07E-09	3.04E-09
82.7	3.01E-09	3.24E-09	3.20E-09	3.15E-09
88.8	3.24E-09	3.41E-09	3.48E-09	3.37E-09
95.7	3.29E-09	3.55E-09	3.54E-09	3.46E-09
104.7	3.44E-09	3.72E-09	3.63E-09	3.60E-09
Average value	2.80E-09	3.05E-09	3.05E-09	
Standard deviation	5.35E-10	5.30E-10	4.89E-10	



Time of preprocessing the results: 104.7 days

Moisture flow density ρ [kg(m²s)⁻¹]	Moisture permeability factor w_p [kg(m²sPa)⁻¹]	Diffusion resistance factor μ [-]	Diffusion equivalent air layer thickness S_0 [m]
3.60E-09	1.71E-12	55'155	116

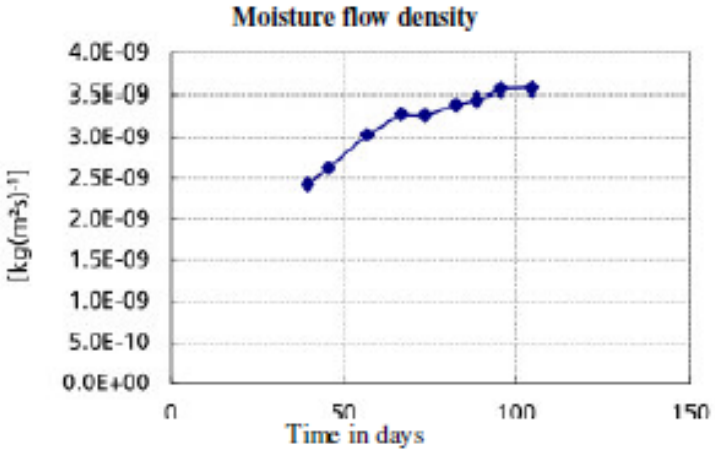
Vapour permeability test (water vapour)

Sheet with the results
Grounds SN EN 1931 Order: G2970-01
Tecnotest instruction on the conduct of tests PA041 Arrival of the goods: 19156

Sample under test: Skinrock 'multi waves'
Thickness: 1.93 mm Humidity in the testing cup: from the outside: 75% r.F.
Production date: 15th May 2014 inside: 0% r.F.
Surface under test: round, Ø = 79.8 mm Commencement of the measurement: 15.05.2014 15:50
Notes: Absent

Notes: Absent

Time	Moisture flow density [kg(m²s)⁻¹]			
[d]	Sample under test 1	Sample under test 2	Sample under test 3	Average value
39.8	2.48E-09	2.55E-09	2.24E-09	2.43E-09
45.8	2.72E-09	2.73E-09	2.42E-09	2.62E-09
57.0	3.05E-09	3.11E-09	2.93E-09	3.03E-09
66.9	3.28E-09	3.38E-09	3.18E-09	3.28E-09
73.8	3.27E-09	3.36E-09	3.17E-09	3.26E-09
82.7	3.41E-09	3.54E-09	3.21E-09	3.39E-09
88.8	3.49E-09	3.54E-09	3.30E-09	3.45E-09
95.7	3.62E-09	3.57E-09	3.50E-09	3.56E-09
104.7	3.62E-09	3.54E-09	3.56E-09	3.57E-09
Average value	3.22E-09	3.26E-09	3.06E-09	
Standard deviation	3.96E-10	3.81E-10	4.53E-10	



Time of preprocessing the results: 104.7 days

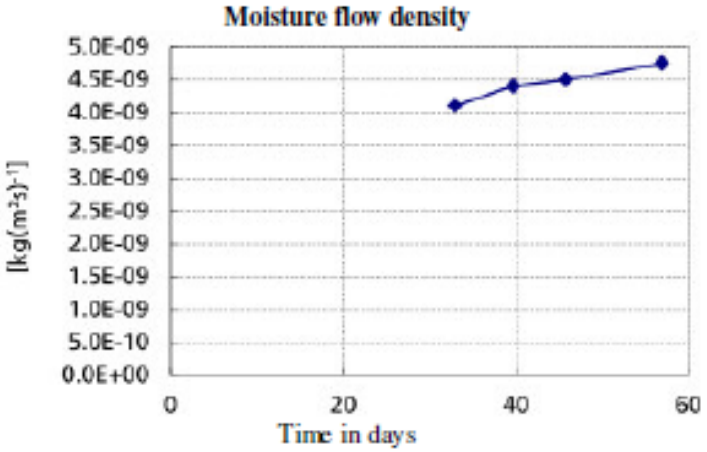
Moisture flow density ρ	Moisture permeability factor w_p	Diffusion resistance factor μ	Diffusion equivalent air layer thickness S_d
[kg(m²s)⁻¹]	[kg(m²sPa)⁻¹]	[-]	[m]
3.57E-09	1.70E-12	60'443	117

Vapour permeability test (water vapour)

Sheet with the results
Grounds SN EN 1931 Order: G2970-01
Tecnotest instruction on the conduct of tests PA041 Arrival of the goods: 19156

Sample under test: Skinrock 'copper natural'
Thickness: 1.60 mm Humidity in the testing cup: from the outside: 75% r.F.
Production date: 15.05.2014 inside: 0% r.F.
Surface under test: round, Ø = 79.8 mm Commencement of the measurement: 15.05.2014 15:55
Notes: absent

Time	Moisture flow density [kg(m²s)⁻¹]			
[d]	Sample under test 1	Sample under test 2	Sample under test 3	Average value
33.0	3.56E-09	4.80E-09	3.97E-09	4.11E-09
39.7	3.85E-09	5.09E-09	4.28E-09	4.41E-09
45.8	3.94E-09	5.24E-09	4.33E-09	4.51E-09
57.0	4.20E-09	5.52E-09	4.55E-09	4.76E-09
Average value	3.89E-09	5.16E-09	4.28E-09	



Time of preprocessing the results: 57 days

Moisture flow density ρ [kg(m²s)⁻¹]	Moisture permeability factor w_p [kg(m²sPa)⁻¹]	Diffusion resistance factor μ [-]	Diffusion equivalent air layer thickness S_d [m]
4.76E-09	2.26E-12	54'761	88

tecnotest ag

Report About Conduct of Tests

G2970

STS 102

Customer	Skinrock AG Trunstrasse 4 7247 Saas i.P. * former Belcolor AG Flooring
Structural element	Skinrock *‚golden shine'* (sanded reverse side) Skinrock *‚purple grey'* (reverse side reinforced with polyester fibres)
Subject / purpose	thaw salt and frost resistance pursuant to the SIA 262/1:2013standard

Table of contents

Consultant	Hansjörg Epple	This report has been drawn up and distributed with the use of the facilities for electronic data processing. Exclusively the original paper-print report is valid from a legal point of view.
Order dated	09th May 2014	
Date of the report	18th June 2014	

The report contains 4 pages and 2 pages of the annex.
This report cannot be published in a short form without the permission issued by Tecnotest AG in writing.

1. ORDER

On 9th May 2014, Mr. Stiffler, Skinrock AG (former Belcolor AG Flooring) entrusted Tecnotest AG, Rüschlikon, with carrying out the thaw salt and frost resistance test pursuant to the SIA 262/1:2013 standard with the sanded and not sanded reverse side

2. DOCUMENTATION

At the disposal, there was no documentation for research.

3. SAMPLES

3.1. Material of the samples

The Skinrock plates were delivered to Tecnotest AG as follows:

Sample material	Delivery form	Arrival	Number	Consigner
Skinrock golden shine	packaged	02nd April 2014	19156	Skinrock AG, Saas
Skinrock purple grey	packaged	02nd April 2014	19156	Skinrock AG, Saas
Christalit Multiflex	bag 25 kg	09th May 2014	19351	Skinrock AG, Saas

The results of tests, set forth in this report, exclusively concern the samples mentioned here.

3.2. Surface appearance of the samples under test

The delivered Skinrock plates of size 600 × 1200 mm, named *‚golden shine'* and *‚purple grey'*, consist of a thin layer of natural stone, pasted on the synthetic-resin underlining, reinforced with fibres (*golden shine*) and sanded (*purple grey*):

Skinrock ‚golden shine'

Skinrock ‚purple grey'

Reverse side of the Skinrock plate, *golden shine'* is fitted with synthetic resin reinforced with fibres. Reverse side of the Skinrock plate *‚purple grey'* is sanded.

Skinrock ‚golden shine': reverse side

Skinrock ‚purple grey': sanded reverse side

4. TEST AT THE LABORATORY

4.1. Method of the tests

Resistance to frost and thaw salt pursuant to the SIA 262/1:2013 standard, Annex C

Three samples under test of size 150 mm × 150 mm were pasted by the adhesive solution, furnished at disposal, on a concrete block of size 150 mm × 150 mm; they were cut out of the delivered Skinrock samples, golden shine and Skinrock purple grey, by a punch.

On pasting, the sample under test was stored during 7 days in the climatic conditions of the laboratory, and then side-pressurized by a framework so that the surface of a size no smaller than 130 mm × 130 mm could remain open.

The surface was covered with 3% solution of NaCl in distilled water for the test and subjected to the influence of the temperature cycles in a refrigerated cabinet as follows:

240 min.:	+15°C
90 min.:	freezing to -15°C
330 min.:	-15°C
60 min.:	defreezing to +15°C

28 cycles of freezing and defreezing is carried out in total. After 6, 14 and 28 cycles, the number of peels is measured for each sample under test and converted to g/m^2. If the number of peels < 10 g, the peels are indicated having been rounded to 1.

4.2. Results of the test

The results of the test are in annex 1.

4.3 Assessment

The measured number of the peels, making up 20g or 30g, is very small in both Skinrock plates. The resistance to frost and thaw salt is high.

Any visible change of the surface could not be noticed on both samples under test after 28 cycles of freezing and unfreezing with the use of thaw salt.

Skinrock ‚golden shine' after the test

Skinrock ‚purple grey' after the test

Rüschlikon, 18th June 2014

Consultant Hansjörg Epple

(signed)

Manager of the testing laboratory Aldo Rancati

(signed)

Thaw salt and frost resistance test

Sheet with the results
Order: G2970
Arrival of the goods: 19156

Grounds: SIA 262/1, Annex C
Tecnotest instruction on the conduct of tests PC042

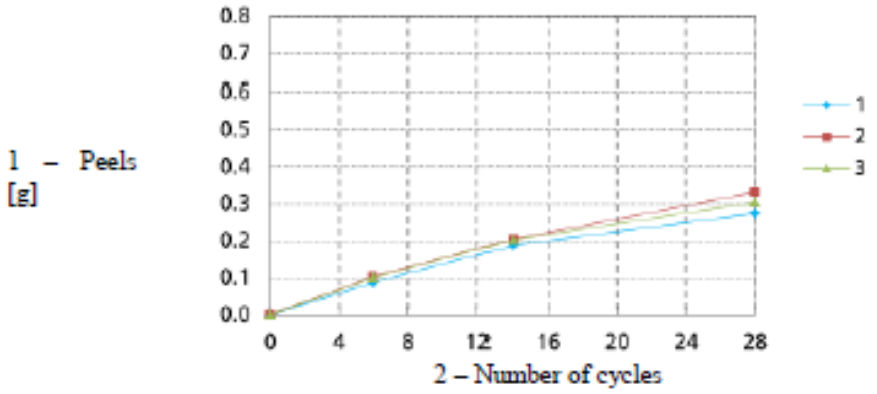
Structural element:	Skinrock ‚golden shine' 600/1200 mm, reverse side: reinforced with polyester fibres
Sample under test:	150/150 mm of the sample plate
Commencement of the test:	30th May 2014
Age:	Absence of data
Type of the surface:	rough, like slate
Water storage:	without (storage)
Test conditions:	1 change of temperature for 12 hours from -15 °C to +15 °C
Notes:	Skinrock was pasted on the concrete by using Christalit Multiplex

Name	Surface under test [cm^2]	Apparent density [kg/m^3]	Δm_6 [g]	Δm_{14} [g]	Δm_{28} [g]	Total [g]	m [g/m^2]
1	174.2		0.09	0.10	0.09	0.27	16
2	174.2		0.10	0.10	0.13	0.33	19
3	174.2		0.10	0.10	0.10	0.30	17

Length of the cube edge = 150 mm
m: peeled concrete mass after all 28 cycles

Δm_6: peeled concrete mass after 0-6 cycles
Δm_{14}: peeled concrete mass after 6-14 cycles
Δm_{28}: peeled concrete mass after 14-28 cycles

Resistance to frost and thaw salt



Average value	m	17 g/m^2
Rounded average value	**m**	**20 g/m^2**
Average value	Δm_{6+14}	0 g
Average value	Δm_{28}	0 g
Average value	surface under test	174.2 cm^2

Thaw salt and frost resistance test

Sheet with the results
Order: G2970
Arrival of the goods: 19156

Grounds: SIA 262/1, Annex C
Tecnotest instruction on the conduct of tests PC042

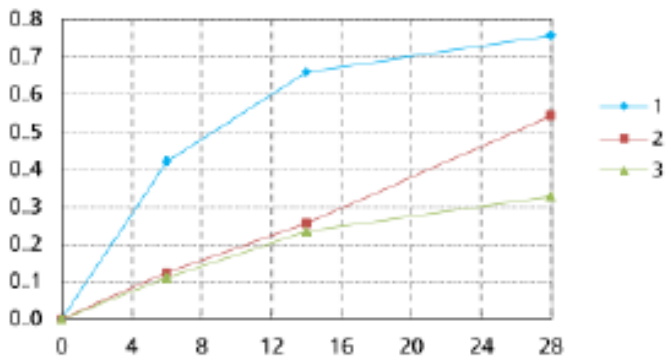
Structural element:	Skinrock purple grey 600/1200 mm: sanded reverse side
Sample under test:	150/150 mm of the sample plate
Commencement of the test:	30th May 2014
Age:	Absence of data
Type of the surface:	rough
Water storage:	without (storage)
Test conditions:	1 change of temperature for 12 hours from -15 °C to +15 °C
Notes:	Skinrock was pasted on the concrete by using Christalit Multiplex

Name	Surface under test [cm^2]	Apparent density [kg/m^3]	Δm_6 [g]	Δm_{14} [g]	Δm_{28} [g]	Total [g]	m [g/m^2]
1	174.2		0.42	0.24	0.10	0.76	43
2	174.2		0.12	0.13	0.29	0.54	31
3	174.2		0.11	0.12	0.12	0.33	19

Length of the cube edge = 150 mm
m: peeled concrete mass after all 28 cycles

Δm_6: peeled concrete mass after 0-6 cycles
Δm_{14}: peeled concrete mass after 6-14 cycles
Δm_{28}: peeled concrete mass after 14-28 cycles

Resistance to frost and thaw salt



Average value	m	31 g/m^2
Rounded average value	**m**	**30 g/m^2**
Average value	Δm_{6+14}	0 g
Average value	Δm_{28}	0 g
Average value	surface under test	174.2 cm^2

IFAS GmbH Institut für Qualitätssicherung
und angewandte Schadensanalyse GmbH
Untere Brinkstraße 69-73
44141 Dortmund

Test Report No. B 52376-001

This Test Report replaces the Test Report 52376-001 of 12.09.2017

Test objective:	**Evaluation according to AgBB-scheme 2015**
Sample description by client:	**Skinrock basis Schiefer; Chargen-Nr. 1**
Sampled by:	Friedrich Schenner, Skinrock AG
Date of sampling:	**14.07.2016**
Location of sampling:	at the client
Date of production:	KW 26 /2017
Date of arrival of sample:	28.07.2016
Test period:	28.07.2016 - 12.09.2017
Date of report:	01.03.2018
Number of pages of report:	23
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓

Content

Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A001	Skinrock basis Schiefer; Chargen-Nr. 1	without objection	natural stone slab

A001: Skinrock basis Schiefer; Chargen-Nr. 1

Expert Evaluation

The product **Skinrock basis Schiefer; Chargen-Nr. 1** has been tested on behalf of **IFAS GmbH Institut für Qualitätssicherung und angewandte Schadensanalyse GmbH**.

This evaluation is based on the test criteria of the Scheme "Health-related Evaluation of Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products" of the Committee for Health-Related Evaluation of Building Products (AgBB 2015).

The results documented in the test report were evaluated as follows.

Test parameter	Result	Requirement	Requirement hold [yes/no]
Emission analysis			
Measurement time: 3 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI [1)]	0.17 mg/m³	≤ 10 mg/m³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m³	≤ 0.01 mg/m³	yes
Measurement time: 28 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI [1)]	0.02 mg/m³	≤ 1 mg/m³	yes
Sum SVOC without LCI (C_{16}-C_{22}) [1)]	< 0.005 mg/m³	≤ 0.1 mg/m³	yes
R-Wert (dimensionless)	0.14	≤ 1	yes
Sum VOC without LCI	0.007 mg/m³	≤ 0.1 mg/m³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m³	≤ 0.001 mg/m³	yes

1) for Sum VOC (C6-C16) and Sum SVOC (C16-C22) only substances ≥ 5 µg/m³ are considered

Summary evaluation

The product **Skinrock basis Schiefer; Chargen-Nr. 1** meets the emission requirements of the AgBB-Scheme.

Cologne, 09.10.2017

Marc-Anton Dobaj, M.Sc. Crystalline Materials
(Project Manager)

Laboratory report

1 Emission analysis

Test method

DIN EN 16516	Testing and evaluation of the release of dangerous substances; determination of emissions into indoor air

A001, Preparation of test sample

Date:	11.08.2017
Pre-treatment:	not applicable;
Masking of backside:	yes
Masking of edges:	yes, 100 %
Relationship of unmasked edges to surface:	not applicable
Loading:	related to area
Dimensions:	35.3 cm x 35.3 cm

A001, Test chamber conditions according to DIN ISO 16000-9

Chamber volume:	0.125 m^3
Temperature:	23°C ± 1°C
Relative humidity:	50 % ± 1 %
Air pressure:	normal
Air:	cleaned
Air change rate:	0.5 h^{-1}
Air velocity:	0.3 m/s
Loading:	1 m^2/m^3
Specific air flow rate:	0.5 $m^3/(m^2 \cdot h)$
Air sampling:	3 days after test chamber loading 28 days after test chamber loading

Analytics

Aldehydes and Ketones	DIN ISO 16000-3
Limit of determination:	2 µg/m^3
Volatile Organic Compounds	DIN ISO 16000-6
Limit of determination:	1 µg/m^3 (BIT: 5 µg/m^3)
Note for analysis:	not specified

1.1 Sample A001, Volatile Organic Compounds after 3 days

Test objective:
Volatile Organic Compounds (VOC), test chamber, air sampling 3 days after test chamber loading

Test result:

Sample:	A001: Skinrock basis Schiefer; Chargen-Nr. 1

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 3 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 3 days [µg/m³]	CMR Classifi-cation++	LCI AgBB 2015 [µg/m³]	R-value
1	**Aromatic hydrocarbons**							
1-25	Styrene	100-42-5	10.78	2		Repr. 2	250	0.01
6	**Glycols, Glycol ethers, Glycol esters**							
6-2	Ethanediol (Ethylene glycol)	107-21-1	6.20	43	4		260	0.17
6-3	Ethylene glycol-monobutylether (2-Butoxyethanol)	111-76-2	10.80	10	10	Group 3	1100	0.01
6-5	Diethylene glycol-monobutylether	112-34-5	17.03	1			670	
6-39	Dipropylene glycol dimethyl ether	111109-77-4	13+13.31	21	21		1300	0.02
7	**Aldehyde**							
7-19	Benzaldehyde	100-52-7	12.45	35	27		90	0.39
7-20	Acetaldehyde	75-07-0		2		Carc. 2	1200	
7-22	Formaldehyde	50-00-0		5		Carc. 1B Muta. 2	100	0.05
8	**Ketones**							
8-1	Ethylmethylketone	78-93-3		4			5000	
8-5	Cyclohexanone	108-94-1	10.84	2		III3B	410	
8-8	Acetophenone	98-86-2	14.73	3			490	0.01
8-10	Acetone	67-64-1		3			1200	

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 3 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 3 days [µg/m³]	CMR Classifi-cation++	LCI AcBB 2015 [µg/m³]	R-value
9	**Acids**							
9-1	Acetic acid	64-19-7	4.56	16	6		1250	0.01
9-3	Isobutyric acid	79-31-2	7.03	1			370	
9-4	Butyric acid	107-92-6	7.61	1			370	
9-10	2-Ethylhexanoic acid	149-57-5	15.12	6	7	Repr. 2	150	0.04
10	**Esters**							
10-6	2-Methoxy-1-methylethyl acetate	108-65-6	9.72	4			2700	
12	**Others**							
12-8	Triethyl phosphate	78-40-0	15.31	4			75	0.05
13	**Other identified substances in addition to LCI list**							
	Tetramethylsuccinonitrile (TMSN)	3333-52-6	13.62	4				
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.49	1				
	Dimethylphthalate	131-11-3	22.92	8	7			
	Acetonitrile*		3.40	3				
	various not identified*		5.7-5.9	2				
	dimethyl sulfoxide DMSO)*		9.20	4				

No.	Substance	CAS No.	RT	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 3 days	Toluene-equivalent Substances ≥ 5 µg/m³ 3 days	CMR Classifi-cation++	LCI AcBB 2015	R-value
			[min]	[µg/m³]	[µg/m³]		[µg/m³]	
	Propyleneglycol monomethyl ether acetate*		7.72	3				
	branched alcohol*		12.70	1				
	not identified*		13.67	2				
	not identified*		15.39	1				
	various not identified*		15.9-16.8	8	8			
	Alkane and/or Alcohol*		17.10	7	7			
	various not identified*		17.6-18.8	18	18			
	Isoalkanes >C16*		25.5-26.4	8				

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG MAK-list: Categorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Carcinogenic, mutagenic and reproductive toxic components *	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
CMR 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (Sum)	< 1	< 0.5
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 0.5

TVOC, Total volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of VOC according to prEN 16516	110	56
Sum of VOC according to AgBB 2015 / DIBt	170	86
Sum of VOC according to eco-INSTITUT-Label	210	110
Sum of VOC according to ISO 16000-6	200	100

TSVOC, Total semi volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of SVOC according to prEN 16516	8	4
Sum of SVOC without LCI according to AgBB 2015 / DIBt	8	4
Sum of SVOC without LCI according to eco-INSTITUT-Label	8	4
Sum of SVOC with LCI according to AgBB 2015 / DIBt	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	5	2.5
Sum of VVOC according to eco-INSTITUT-Label	13	6.5

Other sums of VOC	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	**41**	**21**
VOC without LCI according to eco-INSTITUT-Label (Sum)	**59**	**30**
CMR 2: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	**17**	**8.5**
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	**5**	**2.5**
Bicyclic Terpenes (sum)	**< 1**	**< 0.5**
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	**< 1**	**< 0.5**
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	**< 2**	**< 1**
C9 - C15 Alkylated benzenes (Sum)	**< 1**	**< 0.5**
Kresoles (Sum)	**< 1**	**< 0.5**

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	**0.76**
R-value according to AgBB 2015 / DIBt	**0.69**
R-value according to Belgian regulation	**0.63**
R-value according to AFSSET	**2.29**

Note: Due to different requirements in the respective guidelines, the calculation of TVOC, TVVOC, TSVOC and R-value may result in different values.

1.2 Sample A001, Volatile Organic Compounds after 28 days

Test objective:
Volatile Organic Compounds (VOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A001: Skinrock basis Schiefer; Chargen-Nr. 1

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 28 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 28 days [µg/m³]	CMR Classifi-cation++	LCI AgBB 2015 [µg/m³]	R-value
6	**Glycols, Glycol ethers, Glycol esters**							
6-3	Ethylene glycol-monobutylether (2-Butoxyethanol)	111-76-2	10.87	2		Group 3	1100	
6-39	Dipropylene glycol dimethyl ether	111109-77-4	12.98+13.29	2			1300	
7	**Aldehyde**							
7-19	Benzaldehyde	100-52-7	12.42	13	9		90	0.14
7-20	Acetaldehyde	75-07-0		2		Carc. 2	1200	
7-21	Propanal	123-38-6		17				
7-22	Formaldehyde	50-00-0		4		Carc. 1B Muta. 2	100	0.04
8	**Ketones**							
8-1	Ethylmethylketone	78-93-3		2			5000	
8-10	Acetone	67-64-1		2			1200	
9	**Acids**							
9-1	Acetic acid	64-19-7	4.48	4			1250	
9-10	2-Ethylhexanoic acid	149-57-5	15.06	3		Repr. 2	150	0.02

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 28 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 28 days [µg/m³]	CMR Classifi-cation++	LCI AgBB 2015 [µg/m³]	R-value
13	**Other identified substances in addition to LCI list**							
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.46	2				
	Dimethylphthalate	131-11-3	22.92	2				
	various not identified*		17.6-18.8	7	7			
	Alkane and/or Alcohol *		17.08	1				
	not identified *		10.77	3				
	Ester*		17.08	1				

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG MAK-list: Categorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Carcinogenic, mutagenic and reproductive toxic components *	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
CMR 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (Sum)	< 1	< 0.5
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 0.5

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of VOC according to prEN 16516	16	8
Sum of VOC according to AgBB 2015 / DIBt	20	10
Sum of VOC according to eco-INSTITUT-Label	42	21
Sum of VOC according to ISO 16000-6	55	28

TSVOC, Total semi volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of SVOC according to prEN 16516	< 5	< 2.5
Sum of SVOC without LCI according to AgBB 2015 / DIBt	< 5	< 2.5
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.5
Sum of SVOC with LCI according to AgBB 2015 / DIBt	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	17	8.5
Sum of VVOC according to eco-INSTITUT-Label	25	13

Other sums of VOC	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	7	3.5
VOC without LCI according to eco-INSTITUT-Label (Sum)	16	8
CMR 2: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	9	4.5
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	4	2
Bicyclic Terpenes	< 1	< 0.5
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 0.5
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 1
C9 - C15 Alkylated benzenes (Sum)	< 1	< 0.5
Kresoles (Sum)	< 1	< 0.5

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.20
R-value according to AgBB 2015 / DIBt	0.14
R-value according to Belgian regulation	0.14
R-value according to AFSSET	2.27

Note: Due to different requirements in the respective guidelines, the calculation of TVOC, TVVOC, TSVOC and R-value may result in different values.

2 Odour

Test parameter:
Odour, Intensity and Hedonic

Test method:

Analytics:	DIN EN ISO 16000-28 i.A., VDI 4302

Test conditions

Test chamber	see 1 Emission analysis
Air sampling [days]	3
Probands	9
therefrom female	1
Evaluation	
Intensity	starting at 0 pi (perceived intensity)
Hedonic	Scale from -4 (most unpleasant) to +4 (most pleasant)

Test Result:

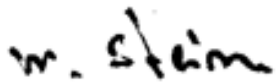
Sample:	A001: Skinrock basis Schiefer; Chargen-Nr. 1

	Intensity	Hedonic tone
Arithmetical mean	4.0	0.3

	Intensity	Hedonic tone
Arithmetical mean (background)	1.3	1.2
Standard deviation	3.6	1.9
half width of the 90 % confidence range	2.2	1.2

Test person	Evaluation (Sample)		Evaluation (Test Room)	
	Intensity	Hedonic tone	Intensity	Hedonic tone
Test person 01	1	0	0	0
Test person 02	3	0	1	0
Test person 03	0	4	0	3
Test person 04	4	1	2	2
Test person 05	7	1	2	0
Test person 06	12	-3	3	3
Test person 07	3	-1	2	2
Test person 08	2	1	0	0
Test person 09	4	0	2	1

Cologne, 01.03.2018



Michael Stein, Dipl.-Chem.
(Deputy Technical Manager)

Appendix

I Sampling sheet

Produktprüfung Pr
Zertifizierung Certi
Beratung Consultir

Probeneingang

Bearbeiter: InH
Datum: 20.07.2017
Firma: Skinrock AG
Ansprr.: Friedrich Schenner
Proben: S1-1
Skinrock basis Schiefer,
Produktion KW26/2017

IFAS

Auftrags-Nr:
0163/0317

eco INSTITUT

Probenahmebegleitblatt*

Projektnummer eco-INSTITUT / wird vom Labor ausgefüllt

52376-001

Prüflabor	eco-INSTITUT Germany GmbH Schanzenstr. 6-20, D-51063 Köln Tel. +49 (0)221 - 931245-0 Fax +49 (0)221 - 931245-33	**Probenehmer** (Name, Firma, Telefon)	Friedrich Schenner Skinrock AG +41 79 287 21 27
Name des Herstellers / Händlers am Probenahmeort (Adresse / Stempel)	Skinrock AG Trunstrasse 4 CH-7247 Saas i.P. Schweiz	**Auftraggeber/ Rechnungsempfänger** (falls abweichend vom Herstellernamen)	
Produktname	Skinrock basis Schiffer	**Probeart** (z.B. Holzwerkstoff, Bodenbelag)	Natursteinplatte
Modell / Programm/ Serie	basis schiffer	**Chargen-Nr.**	1
Artikel-Nr.	S1-	**Produktionsdatum der Charge**	KW 26 / 2017
Probe wird gezogen ...	☐ aus der laufenden Produktion ☒ aus Lagerbeständen	**Datum der Probenahme**	14.07.17
		Uhrzeit	13:30
Wo wurde das Produkt vor Probenahme gelagert?	☒ Fertigung ☒ Lager ☐ Sonstiges Lagerort: Werk Saas i. P.	**Wie wurde das Produkt vor Probenahme gelagert?**	☒ offen ☐ verpackt Verpackungsmaterial:
Besonderheiten (mögliche negative Einflüsse durch Emissionen am Probenahmeort (z.B. Benzin-Abgase, Lösemittelemissionen aus der Fertigung), Unklarheiten, Fragen, etc.)	Keine		

Bestätigung

Hiermit bestätigt der Unterzeichner die Richtigkeit der oben gemachten Angaben. Die Probe wurde eigenhändig gemäß Probenahmeanleitung ausgewählt, gezogen und verpackt.

Datum: 14.07.17 Unterschrift (Stempel)

Skinrock AG
Trunstrasse 4
7247 Saas im Prättigau
Schweiz

* Bitte pro Probe ein Probenahmebegleitblatt ausfüllen! Die Probenahmeanleitung ist unbedingt einzuhalten!

Beauftragung **(Bitte Angebotsnummer eintragen bzw. falls nicht vorhanden, Untersuchungsziel angeben)**	Emissionsanalyse

II Definition of terms

VOC (volatile organic compounds)	All individual compounds with a concentration ≥ 1 µg/m³ in the retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane)
TVOC	Total volatile organic compounds
TVOC according to prEN 16516	Sum of all VOC ≥ 5 µg/m³ in the retention range C_6 to C_{16}, calculated as toluene equivalent
TVOC according to AgBB/DIBt	Sum of all identified and calibrated VOC ≥ 5 µg/m³, SVOC ≥ 5 µg/m³ with LCI and not calibrated VOC ≥ 5 µg/m³ calculated as toluene equivalent
TVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VOC ≥ 1 µg/m³, SVOC ≥ 5 µg/m³ with LCI and not calibrated VOC ≥ 1 µg/m³ calculated as toluene equivalent
TVOC according to ISO 16000-6	Total area of chromatogram in the retention range C_6 to C_{16}, calculated as toluene equivalent
TVOC without LCI according to AgBB/DIBt and Belgian regulation	Sum of all VOC without NIK ≥ 5 µg/m³ in the retention range C_6 to C_{16}
TVOC without LCI according to eco-INSTITUT-Label	Sum of all VOC without NIK ≥ 1 µg/m³ in the retention range C_6 to C_{16}
CMR-VOC (carcinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)	All individual substances with the following categories: Regulation (EC) No. 1272/2008: Category Car.1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK lists): Category III1and III2
VVOC (very volatile organic compounds)	All individual substances with a concentration ≥ 1 µg/m³ in the retention range < C_6
TVVOC	Total very volatile organic compounds
TVVOC according to AgBB/DIBt and Belgian regulation	Sum of all identified and calibrated VVOC ≥ 5 µg/m³ with LCI
TVVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VVOC ≥ 1 µg/m³ with LCI
SVOC (semi volatile organic compounds)	All individual substances ≥ 1 µg/m³ in the retention range C_{16} to C_{22}
TSVOC	Total semi volatile organic compounds
TSVOC according to prEN 16516	Sum of all SVOC in the retention range C_{16} to C_{22}, calculated as toluene equivalent
TSVOC without LCI according to AgBB/DIBt	Sum of all SVOC ≥ 5 µg/m³ without LCI
TSVOC without LCI according to eco-INSTITUT-Label	Sum of all SVOC ≥ 1 µg/m³ without LCI
TSVOC with LCI according to AgBB/DIBt	Sum of all identified and calibrated SVOC ≥ 5 µg/m³ with LCI
SER	Specific emission rate (see appendix IV)

LCI value	Lowest Concentration of Interest; calculated value for the evaluation of VOC, established by the Committee for Health-related Evaluation of Building Products (Ausschuss zur gesundheitlichen Bewertung von Bauprodukten - AgBB)
R value	The quotient of the concentration and the LCI value is generated for every substance which is detected in the test chamber air. The sum of the calculated quotients results in the R value.
R value according to eco-INSTITUT-Label	R value for all identified and calibrated VOC ≥ 1 µg/m³ with LCI, established by the AgBB in 2015
R value according to AgBB 2015/DIBt	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by the AgBB in 2015
R value according to Belgian regulation	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by the Belgian regulation
R value according to AFSSET	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by ANSES (French National Agency on Food Safety, Environment, and Workplace Security)
RT (retention time)	Time for a particular analyte to pass through the system (from the column inlet to the detector)
CAS No. (Chemical Abstracts Service)	International unique numerical identifier for a chemical substance
Toluene equivalent	Concentration, calculated as toluene equivalent

III List of calibrated Volatile Organic Compounds (VOC)

Aromatic hydrocarbons
Toluene
Ethylbenzene
p-Xylene
m-Xylene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,2,3-Trimethylbenzene
2-Ethyltoluene
1-Isopropyl-2-methylbenzene
1-Isopropyl-4-methylbenzene
1,2,4,5-Tetramethylbenzene
n-Butylbenzene
1,3-Diisopropylbenzene
1,4-Diisopropylbenzene
Phenyloctane
1-Phenyldecane[2]
1-Phenylundecane[2]
4-Phenylcyclohexene
Styrene
ß-Methylstyrene
Phenylacetylene
2-Phenylpropene
Vinyltoluene
Naphthalene
Indene
Benzene
1-Methylnaphthalene
2-Methylnaphthalene
1,4-Dimethylnaphthalene
3-Propyltoluene
2-Propyltoluene

Saturated aliphatic substances
2-Methylpentane[1]
3-Methylpentane[1]
n-Hexane
Cyclohexane
Methylcyclohexane
n-Heptane
n-Octane
n-Nonane
n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane
n-Hexadecane
Methylcyclopentane
1,4-Dimethylcyclohexane
2,2,4,6,6-Pentamethylheptane

Terpenes
δ-3-Caren
α-Pinene
β-Pinene
Limonene
Longifolene
β-Caryophyllene
α-Phellandrene
Myrcene
Camphene
α-Terpinene
Longipinene
trans-β-Farnesene
cis-β-Farnesene

Aliphatic alcohols and ether
1-Propanol[1]
2-Propanol[1]
1-Butanol
1-Pentanol
1-Hexanol
tert-Butanol
Cyclohexanol
2-Ethyl-1-hexanol
2-Methyl-1-propanol
1-Octanol
4-Hydroxy-4-methyl-2-pentanone
1-Heptanol
1-Nonanol
1-Decanol
1,4-Cyclohexandimethanol

Aromatic alcohols (phenoles)
Phenol
BHT (2,6-Di-tert-butyl-4-methylphenol)
Benzyl alcohol
Cresols

Glycols, Glycol ether, Glycol ester
Propyleneglycol (1,2-Dihydroxypropane)
Ethyleneglycol (Ethandiol)
Ethylene glycol monobutyl ether
Diethylene glycol
Diethylene glycol-monobutyl ether
2-Phenoxyethanol
Ethylene carbonate
1-Methoxy-2-propanol
2-Methoxy-1-propanol
2-Methoxy-2-propyl acetate
Texanol
Glycolic acid butylester
Butyl diglycol acetate
Dipropylene glycol monomethyl ether
2-Methoxyethanol
2-Ethoxyethanol
2-Propoxyethanol
2-Methylethoxyethanol
2-Hexoxyethanol
1,2-Dimethoxyethane
1,2-Diethoxyethane
2-Methoxyethyl acetate
2-Ethoxyethyl acetate
2-(2-Hexoxyethoxy)ethanol
1-Methoxy-2-(2-methoxy-ethoxy)ethane
Propylene glycol diacetate
Dipropylene glycol
Dipropylene glycol monomethylether acetate
Dipropylene glycol n-propyl ether
Di(propylene glycol) tert-butylether
1,4-Butanediol
Tri(propylene glycol) methyl ether
Triethylene glycol dimethyl ether
Propylene glycol dimethyl ether
TXIB (Texanol isobutyrate)
Ethyldiglycol
Dipropylene glycol dimentylether
Propylene carbonate
Hexyleneglycol
3-Methoxy-1-butanol
Propylene glycol n-propyl ether
Propylene glycol n-butyl ether
Diethylene glycol phenyl ether
Neopentyl glycol
Diethylene glycol methyl ether
1-Ethoxy-2-propanol
tert-Butoxy-2-propanol

Aldehydes
Butanal[1,3]
3-Methyl-1-butanal
Pentanal[3]
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal[3]
2-Pentenal[3]
2-Hexenal
2-Heptenal
2-Octenal
2-Nonenal
2-Decenal
2-Undecenal
Furfural
Ethanedial (Glyoxal)[1,3]
Glutaraldehyde
Benzaldehyde
Acetaldehyde[1,3]
Formaldehyde[1,3]
Propanal[1,3]
Propenal[1,3]
Isobutenal[3]

Ketones
Ethylmethylketone[3]
3-Methyl-2-butanone
Methylisobutylketone
Cyclopentanone
Cyclohexanone
Acetone[1,3]
2-Methylcyclopentanone
2-Methylcyclohexanone
Acetophenone
1-Hydroxyacetone
2-Heptanon

Acids
Acetic acid
Propionic acid
Isobutyric acid
Butyric acid
Pivalic acid
Valeric acid
Caproic acid
Heptanoic acid
Octanoic acid
2-Ethylhexanoic acid

Esters and Lactones
Methylacetate[1]
Ethyl acetate[1]
Vinyl acetate[1]
Isopropyl acetate
Propyl acetate
2-Methoxy-1-methylethyl acetate
n-Butyl formate
Methylmethacrylate
Isobutylacetate
1-Butyl acetate
2-Ethylhexyl acetate
Methyl acrylate
Ethyl acrylate
n-Butyl acrylate
2-Ethylhexyl acrylate
Adipic acid dimethylester
Fumaric acid dibutylester
Succinic acid dimethylester
Glutaric acid dimethylester
Hexandioldiacrylate
Maleic acid dibutylester
Butyrolactone
Glutaric acid diisobutylester
Succinic acid diisobutylester
Dimethylphthalate
Diethylphthalate[2]
Dipropylphthalate[2]
Dibutylphthalate[2]
Diisobutylphthalate[2]
Texanol
Dipropyleneglycoldiacrylate

Chlorinated hydrocarbons
Tetrachlorethene
1,1,1-Trichlorethane
Trichlorethene
1,4-Dichlorbenzene

Others
1,4-Dioxane
Caprolactam
N-Methyl-2-pyrrolidone
Octamethylcyclotetrasiloxane
Hexamethylcyclotrisiloxane
Methenamine
2-Butanonoxime
Triethyl phosphate
Tributyl phosphate
5-Chlor-2-methyl-4-isothiazolin-3-one (CIT)
2-Methyl-4-isothiazolin-3-one (MIT)
Triethylamine
Decamethylcyclopentasiloxane
Dodecamethylcyclohexasiloxane
Tetrahydrofuran (THF)
1-Decene
1-Octene
2-Pentylfurane
2-Methylfurane
Isophorone
Tetramethyl succinonitrile
Dimethylformamide (DMF)
Tributyl phosphate
N-Ethyl-2-pyrrolidone
Aniline
4-Vinylcyclohexene
Dimethoxymethane
Dichlormethane
Carbon tetrachloride
Chlorobenzene
trans-Decahydronaphthalene
cis-Decahydronaphthalene
Linalyl acetate
Chloroform
Chloroprene (monomer)
Acetamide
Formamide
1,3-Dichlor-2-propanol
2-n-Octyl-4-isothiazolin-3-one (OIT)
1,2-Benzylisothiazolin-3-one (BIT)

1 VVOC
2 SVOC
3 Analysis according to DIN ISO 16000-3

IV Commentary on emission analysis

Test method

Measurement of the volatile organic compounds takes place in the test chamber in conditions similar to those applying in practice. Standardized test conditions are defined for the test chamber regarding loading, air exchange, relative humidity, temperature and incoming air, based on the type of test specimen and the required guideline. These conditions and the underlying standards are to be found in the section on test methods in the laboratory report.

Air samples are taken from the test chamber at defined points in time during the continuously running test. To this end, approximately 5 L of air are collected from the test chamber with an air flow rate of 100 mL/min for Tenax and approx. 100 L with an air flow rate of 0.8 L/min for DNPH (dinitrophenylhydrazine).

After thermal desorption, the substances adsorbed on Tenax are analysed using gas chromatographic separation and mass spectrometric determination. The gas chromatographic separation is performed with a slightly polar capillary column of 60 m in length.

The substances derivatized with DNPH for the determination of formaldehyde and other short-chain carbonyl compounds (C1 - C6) are analysed using high-performance liquid chromatography.

Over 200 compounds, including volatile organic compounds (C6 - C16), semi-volatile organic compounds (C16 - C22) and – insofar as possible with this method – also very volatile organic compounds (less than C6) are determined and quantified individually.

All other substances – insofar as is possible – are identified through comparison with a library of spectra. The quantification of these substances and non-identified substances is performed through a comparison of their signal area with the toluene signal.

The concentrations of substances that have been determined are corrected based on the recovery rate for an internal standard (d8 toluene). Identification and quantification of the substances is limited to 1 µg per m^3 for substances adsorbed on Tenax and 2 µg/m^3 for DNPH-derivatized substances (limit of quantification).

Quality assurance

The eco-INSTITUT Germany GmbH is granted flexible scope of accreditation pursuant to DIN EN ISO/IEC 17025. The accreditation covers the analytical determination of all volatile organic compounds, including the test chamber method.

In each analysis the analytical system is checked using an external standard based on the specifications in standard prEN 16516. The stability of the analytical systems is documented based on the test standard using control charts.

Laboratory performance is assessed at least once a year in inter-laboratory comparisons by comparing the results with those obtained by other laboratories for identical samples.

A blank is run prior to introducing the test specimen into the test chamber to check for the possible presence of volatile organic compounds.

V Explanation of Specific Emission Rate SER

Emission measurements are accomplished in test chambers under defined physical conditions (temperature, relative humidity, room loading, air change rate etc.).

Test chamber measurement results are directly comparable only if the investigations were accomplished under the same basic conditions.

If the differences of the physical conditions refer only to the change of air rate and/or the loading, the "SER" or "specific emission rate" can be used for comparability of the measurement results. The SER indicates how many volatile organic compounds (VOC) are released by the sample for each material unit and hour (h).

The SER can be calculated using the formula below for each proven individual component of the VOC from the data in the test report.

As material units the following are applicable:

l = unit of length (m)	relation between emission and length
a = unit area (m^2)	relation between emission and surface
v = unit volume (m^3)	relation between emission and volume
u = piece unit (unit = piece)	relation between emission and complete unit

From this the different dimensions for SER result:

length-specific	SER_l	in µg/(m·h)
surface-specific	SER_a	in µg/(m^2·h)
volume-specific	SER_v	in µg/(m^3·h)
unit specific	SER_u	in µg/(u·h)

SER thus represents a product specific rate, which describes the mass of the volatile organic compound, which is emitted by the product per time unit at a certain time after beginning of the examination.

$$SER = q \cdot c$$

q specific air flow rate (quotient from change of air rate and loading)

c concentration of the measured substance(s)

The result can be indicated in milligrams (mg) in place of micro grams (µg), whereby 1 mg = 1000 µg.

IFAS GmbH Institut für Qualitätssicherung
und angewandte Schadensanalyse GmbH
Untere Brinkstraße 69-73
44141 Dortmund

Test Report No. 52376-004

Test objective:	**Evaluation according to AgBB-scheme 2015**
Sample description by client:	**Skinrock basis Quarzit; Chargen-Nr. 1**
Sampled by:	Friedrich Schenner, Skinrock AG
Date of sampling:	14.07.2017
Location of sampling:	at the client
Date of production:	KW 26 / 2017
Date of arrival of sample:	28.07.2016
Test period:	28.07.2016 - 12.09.2017
Date of report:	01.03.2018
Number of pages of report:	22
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓

Content

Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A004	Skinrock basis Quarzit; Chargen-Nr. 1	without objection	natural stone slab

A004: Skinrock basis Quarzit; Chargen-Nr. 1

Expert Evaluation

The product **Skinrock basis Quarzit; Chargen-Nr. 1** has been tested on behalf of **IFAS GmbH Institut für Qualitätssicherung und angewandte Schadensanalyse GmbH**.

This evaluation is based on the test criteria of the Scheme "Health-related Evaluation of Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products" of the Committee for Health-Related Evaluation of Building Products (AgBB 2015).

The results documented in the test report were evaluated as follows.

Test parameter	Result	Requirement	Requirement hold [yes/no]
Emission analysis			
Measurement time: 3 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI [1]	0.2 mg/m³	≤ 10 mg/m³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m³	≤ 0.01 mg/m³	yes
Measurement time: 28 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI [1]	0.12 mg/m³	≤ 1 mg/m³	yes
Sum SVOC without LCI (C_{16}-C_{22}) [1]	< 0.005 mg/m³	≤ 0.1 mg/m³	yes
R-Wert (dimensionless)	0.70	≤ 1	yes
Sum VOC without LCI	0.013 mg/m³	≤ 0.1 mg/m³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m³	≤ 0.001 mg/m³	yes

1) for Sum VOC (C6-C16) and Sum SVOC (C16-C22) only substances ≥ 5 µg/m³ are considered

Summary evaluation

The product **Skinrock basis Quarzit; Chargen-Nr. 1** meets the emission requirements of the AgBB-Scheme.

Cologne, 01.03.2018

Marc-Anton Dobaj, M.Sc. Crystalline Materials
(Project Manager)

Laboratory report

1 Emission analysis

Test method

DIN EN 16516	Testing and evaluation of the release of dangerous substances; determination of emissions into indoor air

A004, Preparation of test sample

Date:	11.08.2017
Pre-treatment:	not applicable;
Masking of backside:	yes
Masking of edges:	yes, 100 %
Relationship of unmasked edges to surface:	not applicable
Loading:	related to area
Dimensions:	35.3 cm x 35.3 cm

A004, Test chamber conditions according to DIN ISO 16000-9

Chamber volume:	0.125 m^3
Temperature:	23°C ± 1°C
Relative humidity:	50 % ± 1 %
Air pressure:	normal
Air:	cleaned
Air change rate:	0.5 h^{-1}
Air velocity:	0.3 m/s
Loading:	1 m^2/m^3
Specific air flow rate:	0.5 $m^3/(m^2 \cdot h)$
Air sampling:	3 days after test chamber loading 28 days after test chamber loading

Analytics

Aldehydes and Ketones	DIN ISO 16000-3
Limit of determination:	2 µg/m^3
Volatile Organic Compounds	DIN ISO 16000-6
Limit of determination:	1 µg/m^3 (BIT: 5 µg/m^3)
Note for analysis:	not specified

1.1 Sample A004, Volatile Organic Compounds after 3 days

Test objective:
Volatile Organic Compounds (VOC), test chamber, air sampling 3 days after test chamber loading

Test result:

Sample:	A004: Skinrock basis Quarzit; Chargen-Nr. 1

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 3 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 3 days [µg/m³]	CMR Classification++	LCI AgBB 2015 [µg/m³]	R-value
1	**Aromatic hydrocarbons**							
1-25	Styrene	100-42-5	10.79	4		Repr. 2	250	0.02
4	**Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols**							
4-6	1-Butanol	71-36-3	5.81	1			3000	
6	**Glycols, Glycol ethers, Glycol esters**							
6-2	Ethanediol (Ethylene glycol)	107-21-1	6.20	17	2		260	0.07
6-34	Tripropylene glycol monomethyl ether	20324-33-8	19.61	4			2000	
6-39	Dipropylene glycol dimethyl ether	111109-77-4	13.0+13.31	13	13		1300	0.01
7	**Aldehyde**							
7-19	Benzaldehyde	100-52-7	12.45	62	46		90	0.69
7-20	Acetaldehyde	75-07-0		5		Carc. 2	1200	
7-22	Formaldehyde	50-00-0		24		Carc. 1B Muta. 2	100	0.24
8	**Ketones**							
8-1	Ethylmethylketone	78-93-3		10	5		5000	
8-5	Cyclohexanone	108-94-1	10.87	3		III3B	410	0.01
8-8	Acetophenone	98-86-2	14.73	4			490	0.01
8-10	Acetone	67-64-1		4			1200	

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 3 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 3 days [µg/m³]	CMR Classifi-cation++	LCI AgBB 2015 [µg/m³]	R-value
9	**Acids**							
9-1	Acetic acid	64-19-7	4.65	61	25		1250	0.05
9-2	Propionic acid	79-09-4	5.87	2			310	0.01
10	**Esters**							
10-6	2-Methoxy-1-methylethyl acetate	108-65-6	9.72	4			2700	
12	**Others**							
12-8	Triethyl phosphate	78-40-0	15.31	3			75	0.04
13	**Other identified substances in addition to LCI list**							
	Tetramethylsuccinonitrile (TMSN)	3333-52-6	13.62	3				
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.44	2				
	Dimethylphthalate	131-11-3	22.92	5				
	not identified*		5.80	2				
	Alcohol*		12.70	1				
	not identified*		15.10	1				
	not identified*		15.38	1				
	various not identified*		15.9-16.7	6				
	Ester*		17.10	6				
	various not identified*		17.5-18.7	19				
	various not identified*		19-20	4				
	phosphoric acid ester*		23.53	1				

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG MAK-list: Categorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Carcinogenic, mutagenic and reproductive toxic components *	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
CMR 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (Sum)	< 1	< 0.5
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 0.5

TVOC, Total volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of VOC according to prEN 16516	89	45
Sum of VOC according to AgBB 2015 / DIBt	200	100
Sum of VOC according to eco-INSTITUT-Label	240	120
Sum of VOC according to ISO 16000-6	200	100

TSVOC, Total semi volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of SVOC according to prEN 16516	< 5	< 2.5
Sum of SVOC without LCI according to AgBB 2015 / DIBt	< 5	< 2.5
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.5
Sum of SVOC with LCI according to AgBB 2015 / DIBt	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	29	15
Sum of VVOC according to eco-INSTITUT-Label	33	17

Other sums of VOC	Concentration after 3 days [µg/m³]	SER_a [µg/m²h]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	36	18
VOC without LCI according to eco-INSTITUT-Label (Sum)	51	26
CMR 2: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	36	18
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	24	12
Bicyclic Terpenes (sum)	< 1	< 0.5
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 0.5
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 1
C9 - C15 Alkylated benzenes (Sum)	< 1	< 0.5
Kresoles (Sum)	< 1	< 0.5

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	1.15
R-value according to AgBB 2015 / DIBt	1.06
R-value according to Belgian regulation	0.82
R-value according to AFSSET	3.41

Note: Due to different requirements in the respective guidelines, the calculation of TVOC, TVVOC, TSVOC and R-value may result in different values.

1.2 Sample A004, Volatile Organic Compounds after 28 days

Test objective:
Volatile Organic Compounds (VOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A004: Skinrock basis Quarzit; Chargen-Nr. 1

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 28 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 28 days [µg/m³]	CMR Classification++	LCI AgBB 2015 [µg/m³]	R-value
1	**Aromatic hydrocarbons**							
1-25	Styrene	100-42-5	10.76	2		Repr. 2	250	0.01
6	**Glycols, Glycol ethers, Glycol esters**							
6-34	Tripropylene glycol monomethyl ether	20324-33-8	19.64	2			2000	
6-39	Dipropylene glycol dimethyl ether	111109-77-4	12.98+13.29	1			1300	
7	**Aldehyde**							
7-19	Benzaldehyde	100-52-7	12.42	46	33		90	0.51
7-20	Acetaldehyde	75-07-0		4		Carc. 2	1200	
7-22	Formaldehyde	50-00-0		14		Carc. 1B Muta. 2	100	0.14
8	**Ketones**							
8-1	Ethylmethylketone	78-93-3	4.87	7	8		5000	
8-8	Acetophenone	98-86-2	14.71	4			490	0.01
8-10	Acetone	67-64-1		2			1200	
9	**Acids**							
9-1	Acetic acid	64-19-7	4.59	59	25		1250	0.05
12	**Others**							
12-8	Triethyl phosphate	78-40-0	15.29	1			75	0.01

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 28 days [µg/m³]	Toluene-equivalent Substances ≥ 5 µg/m³ 28 days [µg/m³]	CMR Classifi-cation++	LCI AgBB 2015 [µg/m³]	R-value
13	**Other identified substances in addition to LCI list**							
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.46	5				
	Dimethylphthalate	131-11-3	22.92	2				
	various not identified*		15-15.5	3				
	Ester*		17.07	2				
	various Alkane and / or Alcohols*		17.7-17.8	8	8			

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG MAK-list: Categorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Carcinogenic, mutagenic and reproductive toxic components *	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
CMR 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (Sum)	< 1	< 0.5
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 0.5

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of VOC according to prEN 16516	74	37
Sum of VOC according to AgBB 2015 / DIBt	120	63
Sum of VOC according to eco-INSTITUT-Label	140	72
Sum of VOC according to ISO 16000-6	120	60

TSVOC, Total semi volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of SVOC according to prEN 16516	< 5	< 2.5
Sum of SVOC without LCI according to AgBB 2015 / DIBt	< 5	< 2.5
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.5
Sum of SVOC with LCI according to AgBB 2015 / DIBt	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	14	7
Sum of VVOC according to eco-INSTITUT-Label	20	10

Other sums of VOC	Concentration after 28 days [µg/m³]	SER_a [µg/m²h]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	13	6.5
VOC without LCI according to eco-INSTITUT-Label (Sum)	22	11
CMR 2: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	20	10
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	14	7
Bicyclic Terpenes	< 1	< 0.5
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 0.5
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 1
C9 - C15 Alkylated benzenes (Sum)	< 1	< 0.5
Kresoles (Sum)	< 1	< 0.5

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.73
R-value according to AgBB 2015 / DIBt	0.70
R-value according to Belgian regulation	0.56
R-value according to AFSSET	2.15

Note: Due to different requirements in the respective guidelines, the calculation of TVOC, TVVOC, TSVOC and R-value may result in different values.

2 Odour

Test parameter:
Odour, Intensity and Hedonic

Test method:

Analytics:	DIN EN ISO 16000-28 i.A., VDI 4302

Test conditions

Test chamber	see 1 Emission analysis
Air sampling [days]	3
Probands	9
therefrom female	1
Evaluation	
Intensity	starting at 0 pi (perceived intensity)
Hedonic	Scale from -4 (most unpleasant) to +4 (most pleasant)

Test Result:

Sample:	A004: Skinrock basis Quarzit; Chargen-Nr. 1

	Intensity	Hedonic tone
Arithmetical mean	5,8	-1,0

	Intensity	Hedonic tone
Arithmetical mean (background)	1,3	1,2
Standard deviation	3,1	1,5
half width of the 90 % confidence range	1,9	0,9

Test person	Evaluation (Sample)		Evaluation (Test Room)	
	Intensity	Hedonic tone	Intensity	Hedonic tone
Test person 01	3	-1	0	0
Test person 02	5	-2	1	0
Test person 03	6	-1	0	3
Test person 04	3	1	2	2
Test person 05	9	1	2	0
Test person 06	12	-3	3	3
Test person 07	4	-1	2	2
Test person 08	3	-3	0	0
Test person 09	7	0	2	1

Cologne, 01.03.2018

Michael Stein, Dipl.-Chem.
(Deputy Technical Manager)

Appendix

I Sampling sheet

Produktprüfung Produc
Zertifizierung Certificati
Beratung Consulting

Probeneingang

Bearbeiter: InH
Datum: 20.07.2017
Firma: Skinrock AG
Anspr.: Friedrich Schenner
Proben: Q1-1
Skinrock static
Verbundplatte KW26/2017

IFAS
Auftrags-Nr:
0163/0317

eco INSTITUT

Projektnummer eco-INSTITUT / wird vom Labor ausgefüllt

52376-004

Probenahmebegleitblatt*

Prüflabor	eco-INSTITUT Germany GmbH Schanzenstr. 6-20, D-51063 Köln Tel. +49 (0)221 - 931245-0 Fax +49 (0)221 - 931245-33	**Probenehmer** (Name, Firma, Telefon)	Friedrich Schenner Skinrock AG +41 79 287 21 27
Name des Herstellers / Händlers am Probenahmeort (Adresse / Stempel)	Skinrock AG Trunstrasse 4 CH-7247 Saas i.P. Schweiz	**Auftraggeber/ Rechnungsempfänger** (falls abweichend vom Herstellernamen)	
Produktname	Skinrock basis Quarzit	**Probeart** (z.B. Holzwerkstoff, Bodenbelag)	Natursteinplatte
Modell / Programm/ Serie	basis Qarzit	**Chargen-Nr.**	1
Artikel-Nr.	Q1-	**Produktionsdatum der Charge**	KW 26 / 2017
Probe wird gezogen ...	☐ aus der laufenden Produktion ☒ aus Lagerbeständen	**Datum der Probenahme**	14.07.17
		Uhrzeit	13:30
Wo wurde das Produkt vor Probenahme gelagert?	☒ Fertigung ☒ Lager ☐ Sonstiges Lagerort: Werk Saas i. P.	**Wie wurde das Produkt vor Probenahme gelagert?**	☒ offen ☐ verpackt Verpackungsmaterial:
Besonderheiten (mögliche negative Einflüsse durch Emissionen am Probenahmeort (z.B. Benzin-Abgase, Lösemittelemissionen aus der Fertigung), Unklarheiten, Fragen, etc.)	Keine		

Bestätigung
Hiermit bestätigt der Unterzeichner die Richtigkeit der oben gemachten Angaben. Die Probe wurde eigenhändig gemäß Probenahmeanleitung ausgewählt, gezogen und verpackt.

Datum: 14.07.17 Unterschrift (Stempel)

Skinrock AG
Trunstrasse 4
7247 Saas im Prättigau
Schweiz

* Bitte pro Probe ein Probenahmebegleitblatt ausfüllen! Die Probenahmeanleitung ist unbedingt einzuhalten!

Beauftragung (Bitte Angebotsnummer eintragen bzw. falls nicht vorhanden, Untersuchungsziel angeben)	Emissionsanalyse

II Definition of terms

VOC (volatile organic compounds)	All individual compounds with a concentration ≥ 1 µg/m³ in the retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane)
TVOC	Total volatile organic compounds
TVOC according to prEN 16516	Sum of all VOC ≥ 5 µg/m³ in the retention range C_6 to C_{16}, calculated as toluene equivalent
TVOC according to AgBB/DIBt	Sum of all identified and calibrated VOC ≥ 5 µg/m³, SVOC ≥ 5 µg/m³ with LCI and not calibrated VOC ≥ 5 µg/m³ calculated as toluene equivalent
TVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VOC ≥ 1 µg/m³, SVOC ≥ 5 µg/m³ with LCI and not calibrated VOC ≥ 1 µg/m³ calculated as toluene equivalent
TVOC according to ISO 16000-6	Total area of chromatogram in the retention range C_6 to C_{16}, calculated as toluene equivalent
TVOC without LCI according to AgBB/DIBt and Belgian regulation	Sum of all VOC without NIK ≥ 5 µg/m³ in the retention range C_6 to C_{16}
TVOC without LCI according to eco-INSTITUT-Label	Sum of all VOC without NIK ≥ 1 µg/m³ in the retention range C_6 to C_{16}
CMR-VOC (carcinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)	All individual substances with the following categories: Regulation (EC) No. 1272/2008: Category Car.1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK lists): Category III1and III2
VVOC (very volatile organic compounds)	All individual substances with a concentration ≥ 1 µg/m³ in the retention range < C_6
TVVOC	Total very volatile organic compounds
TVVOC according to AgBB/DIBt and Belgian regulation	Sum of all identified and calibrated VVOC ≥ 5 µg/m³ with LCI
TVVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VVOC ≥ 1 µg/m³ with LCI
SVOC (semi volatile organic compounds)	All individual substances ≥ 1 µg/m³ in the retention range C_{16} to C_{22}
TSVOC	Total semi volatile organic compounds
TSVOC according to prEN 16516	Sum of all SVOC in the retention range C_{16} to C_{22}, calculated as toluene equivalent
TSVOC without LCI according to AgBB/DIBt	Sum of all SVOC ≥ 5 µg/m³ without LCI
TSVOC without LCI according to eco-INSTITUT-Label	Sum of all SVOC ≥ 1 µg/m³ without LCI
TSVOC with LCI according to AgBB/DIBt	Sum of all identified and calibrated SVOC ≥ 5 µg/m³ with LCI
SER	Specific emission rate (see appendix IV)

LCI value	Lowest Concentration of Interest; calculated value for the evaluation of VOC, established by the Committee for Health-related Evaluation of Building Products (Ausschuss zur gesundheitlichen Bewertung von Bauprodukten - AgBB)
R value	The quotient of the concentration and the LCI value is generated for every substance which is detected in the test chamber air. The sum of the calculated quotients results in the R value.
R value according to eco-INSTITUT-Label	R value for all identified and calibrated VOC ≥ 1 µg/m³ with LCI, established by the AgBB in 2015
R value according to AgBB 2015/DIBt	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by the AgBB in 2015
R value according to Belgian regulation	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by the Belgian regulation
R value according to AFSSET	R value for all identified and calibrated VOC ≥ 5 µg/m³ with LCI, established by ANSES (French National Agency on Food Safety, Environment, and Workplace Security)
RT (retention time)	Time for a particular analyte to pass through the system (from the column inlet to the detector)
CAS No. (Chemical Abstracts Service)	International unique numerical identifier for a chemical substance
Toluene equivalent	Concentration, calculated as toluene equivalent

III List of calibrated Volatile Organic Compounds (VOC)

Aromatic hydrocarbons
Toluene
Ethylbenzene
p-Xylene
m-Xylene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,2,3-Trimethylbenzene
2-Ethyltoluene
1-Isopropyl-2-methylbenzene
1-Isopropyl-4-methylbenzene
1,2,4,5-Tetramethylbenzene
n-Butylbenzene
1,3-Diisopropylbenzene
1,4-Diisopropylbenzene
Phenyloctane
1-Phenyldecane[2]
1-Phenylundecane[2]
4-Phenylcyclohexene
Styrene
ß-Methylstyrene
Phenylacetylene
2-Phenylpropene
Vinyltoluene
Naphthalene
Indene
Benzene
1-Methylnaphthalene
2-Methylnaphthalene
1,4-Dimethylnaphthalene
3-Propyltoluene
2-Propyltoluene

Saturated aliphatic substances
2-Methylpentane[1]
3-Methylpentane[1]
n-Hexane
Cyclohexane
Methylcyclohexane
n-Heptane
n-Octane
n-Nonane
n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane
n-Hexadecane
Methylcyclopentane
1,4-Dimethylcyclohexane
2,2,4,6,6-Pentamethylheptane

Terpenes
δ-3-Caren
α-Pinene
β-Pinene
Limonene
Longifolene
β-Caryophyllene
α-Phellandrene
Myrcene
Camphene
α-Terpinene
Longipinene
trans-β-Farnesene
cis-β-Farnesene

Aliphatic alcohols and ether
1-Propanol[1]
2-Propanol[1]
1-Butanol
1-Pentanol
1-Hexanol
tert-Butanol
Cyclohexanol
2-Ethyl-1-hexanol
2-Methyl-1-propanol
1-Octanol
4-Hydroxy-4-methyl-2-pentanone
1-Heptanol
1-Nonanol
1-Decanol
1,4-Cyclohexandimethanol

Aromatic alcohols (phenoles)
Phenol
BHT (2,6-Di-tert-butyl-4-methylphenol)
Benzyl alcohol
Cresols

Glycols, Glycol ether, Glycol ester
Propyleneglycol (1,2-Dihydroxypropane)
Ethyleneglycol (Ethandiol)
Ethylene glycol monobutyl ether
Diethylene glycol
Diethylene glycol-monobutyl ether
2-Phenoxyethanol
Ethylene carbonate
1-Methoxy-2-propanol
2-Methoxy-1-propanol
2-Methoxy-2-propyl acetate
Texanol
Glycolic acid butylester
Butyl diglycol acetate
Dipropylene glycol monomethyl ether
2-Methoxyethanol
2-Ethoxyethanol
2-Propoxyethanol
2-Methylethoxyethanol
2-Hexoxyethanol
1,2-Dimethoxyethane
1,2-Diethoxyethane
2-Methoxyethyl acetate
2-Ethoxyethyl acetate
2-(2-Hexoxyethoxy)ethanol
1-Methoxy-2-(2-methoxy-ethoxy)ethane
Propylene glycol diacetate
Dipropylene glycol
Dipropylene glycol monomethylether acetate
Dipropylene glycol n-propyl ether
Di(propylene glycol) tert-butylether
1,4-Butanediol
Tri(propylene glycol) methyl ether
Triethylene glycol dimethyl ether
Propylene glycol dimethyl ether
TXIB (Texanol isobutyrate)
Ethyldiglycol
Dipropylene glycol dimentylether
Propylene carbonate
Hexyleneglycol
3-Methoxy-1-butanol
Propylene glycol n-propyl ether
Propylene glycol n-butyl ether
Diethylene glycol phenyl ether
Neopentyl glycol
Diethylene glycol methyl ether
1-Ethoxy-2-propanol
tert-Butoxy-2-propanol

Aldehydes
Butanal[1,3]
3-Methyl-1-butanal
Pentanal[3]
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal[3]
2-Pentenal[3]
2-Hexenal
2-Heptenal
2-Octenal
2-Nonenal
2-Decenal
2-Undecenal
Furfural
Ethanedial (Glyoxal)[1,3]
Glutaraldehyde
Benzaldehyde
Acetaldehyde[1,3]
Formaldehyde[1,3]
Propanal[1,3]
Propenal[1,3]
Isobutenal[3]

Ketones
Ethylmethylketone[3]
3-Methyl-2-butanone
Methylisobutylketone
Cyclopentanone
Cyclohexanone
Acetone[1,3]
2-Methylcyclopentanone
2-Methylcyclohexanone
Acetophenone
1-Hydroxyacetone
2-Heptanon

Acids
Acetic acid
Propionic acid
Isobutyric acid
Butyric acid
Pivalic acid
Valeric acid
Caproic acid
Heptanoic acid
Octanoic acid
2-Ethylhexanoic acid

Esters and Lactones
Methylacetate[1]
Ethyl acetate[1]
Vinyl acetate[1]
Isopropyl acetate
Propyl acetate
2-Methoxy-1-methylethyl acetate
n-Butyl formate
Methylmethacrylate
Isobutylacetate
1-Butyl acetate
2-Ethylhexyl acetate
Methyl acrylate
Ethyl acrylate
n-Butyl acrylate
2-Ethylhexyl acrylate
Adipic acid dimethylester
Fumaric acid dibutylester
Succinic acid dimethylester
Glutaric acid dimethylester
Hexandioldiacrylate
Maleic acid dibutylester
Butyrolactone
Glutaric acid diisobutylester
Succinic acid diisobutylester
Dimethylphthalate
Diethylphthalate[2]
Dipropylphthalate[2]
Dibutylphthalate[2]
Diisobutylphthalate[2]
Texanol
Dipropyleneglycoldiacrylate

Chlorinated hydrocarbons
Tetrachlorethene
1,1,1-Trichlorethane
Trichlorethene
1,4-Dichlorbenzene

Others
1,4-Dioxane
Caprolactam
N-Methyl-2-pyrrolidone
Octamethylcyclotetrasiloxane
Hexamethylcyclotrisiloxane
Methenamine
2-Butanonoxime
Triethyl phosphate
Tributyl phosphate
5-Chlor-2-methyl-4-isothiazolin-3-one (CIT)
2-Methyl-4-isothiazolin-3-one (MIT)
Triethylamine
Decamethylcyclopentasiloxane
Dodecamethylcyclohexasiloxane
Tetrahydrofuran (THF)
1-Decene
1-Octene
2-Pentylfurane
2-Methylfurane
Isophorone
Tetramethyl succinonitrile
Dimethylformamide (DMF)
Tributyl phosphate
N-Ethyl-2-pyrrolidone
Aniline
4-Vinylcyclohexene
Dimethoxymethane
Dichlormethane
Carbon tetrachloride
Chlorobenzene
trans-Decahydronaphthalene
cis-Decahydronaphthalene
Linalyl acetate
Chloroform
Chloroprene (monomer)
Acetamide
Formamide
1,3-Dichlor-2-propanol
2-n-Octyl-4-isothiazolin-3-one (OIT)
1,2-Benzylisothiazolin-3-one (BIT)

1 VVOC
2 SVOC
3 Analysis according to DIN ISO 16000-3

IV Commentary on emission analysis

Test method

Measurement of the volatile organic compounds takes place in the test chamber in conditions similar to those applying in practice. Standardized test conditions are defined for the test chamber regarding loading, air exchange, relative humidity, temperature and incoming air, based on the type of test specimen and the required guideline. These conditions and the underlying standards are to be found in the section on test methods in the laboratory report.

Air samples are taken from the test chamber at defined points in time during the continuously running test. To this end, approximately 5 L of air are collected from the test chamber with an air flow rate of 100 mL/min for Tenax and approx. 100 L with an air flow rate of 0.8 L/min for DNPH (dinitrophenylhydrazine).

After thermal desorption, the substances adsorbed on Tenax are analysed using gas chromatographic separation and mass spectrometric determination. The gas chromatographic separation is performed with a slightly polar capillary column of 60 m in length.

The substances derivatized with DNPH for the determination of formaldehyde and other short-chain carbonyl compounds (C1 - C6) are analysed using high-performance liquid chromatography.

Over 200 compounds, including volatile organic compounds (C6 - C16), semi-volatile organic compounds (C16 - C22) and – insofar as possible with this method – also very volatile organic compounds (less than C6) are determined and quantified individually.

All other substances – insofar as is possible – are identified through comparison with a library of spectra. The quantification of these substances and non-identified substances is performed through a comparison of their signal area with the toluene signal.

The concentrations of substances that have been determined are corrected based on the recovery rate for an internal standard (d8 toluene). Identification and quantification of the substances is limited to 1 µg per m^3 for substances adsorbed on Tenax and 2 µg/m^3 for DNPH-derivatized substances (limit of quantification).

Quality assurance

The eco-INSTITUT Germany GmbH is granted flexible scope of accreditation pursuant to DIN EN ISO/IEC 17025. The accreditation covers the analytical determination of all volatile organic compounds, including the test chamber method.

In each analysis the analytical system is checked using an external standard based on the specifications in standard prEN 16516. The stability of the analytical systems is documented based on the test standard using control charts.

Laboratory performance is assessed at least once a year in inter-laboratory comparisons by comparing the results with those obtained by other laboratories for identical samples.

A blank is run prior to introducing the test specimen into the test chamber to check for the possible presence of volatile organic compounds.

V Explanation of Specific Emission Rate SER

Emission measurements are accomplished in test chambers under defined physical conditions (temperature, relative humidity, room loading, air change rate etc.).

Test chamber measurement results are directly comparable only if the investigations were accomplished under the same basic conditions.

If the differences of the physical conditions refer only to the change of air rate and/or the loading, the "SER" or "specific emission rate" can be used for comparability of the measurement results. The SER indicates how many volatile organic compounds (VOC) are released by the sample for each material unit and hour (h).

The SER can be calculated using the formula below for each proven individual component of the VOC from the data in the test report.

As material units the following are applicable:

l = unit of length (m)	relation between emission and length
a = unit area (m^2)	relation between emission and surface
v = unit volume (m^3)	relation between emission and volume
u = piece unit (unit = piece)	relation between emission and complete unit

From this the different dimensions for SER result:

length-specific	SER_l	in µg/(m·h)
surface-specific	SER_a	in µg/(m^2·h)
volume-specific	SER_v	in µg/(m^3·h)
unit specific	SER_u	in µg/(u·h)

SER thus represents a product specific rate, which describes the mass of the volatile organic compound, which is emitted by the product per time unit at a certain time after beginning of the examination.

$$SER = q \cdot c$$

q specific air flow rate (quotient from change of air rate and loading)

c concentration of the measured substance(s)

The result can be indicated in milligrams (mg) in place of micro grams (µg), whereby 1 mg = 1000 µg.