

VELOSIT GmbH & Co. KG
Industriepark 7
32805 Horn-Bad Meinberg

Test Report No. 53633-001 III

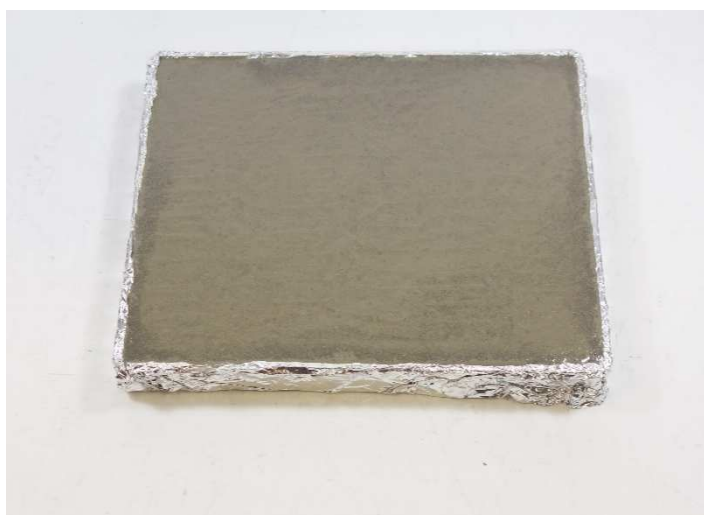
Test objective:	Evaluation according to AgBB-scheme 2018
Sample description by client:	Velosit SC 244
Sampled by:	Michael Herold, VELOSIT GmbH & Co. KG
Date of sampling:	12.09.2018
Location of sampling:	at the client
Date of production:	12.09.2018
Date of arrival of sample:	18.09.2018
Test period:	18.09.2018 - 23.10.2018
Date of report:	30.10.2018
Number of pages of report:	19
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln except ‡ subcontracted # outside accreditation
Test objective fulfilled:	✓

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Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A001	Velosit SC 244	without objection	floating screed



A001: Velosit SC 244

Expert Evaluation

The product **Velosit SC 244** has been tested on behalf of **VELOSIT GmbH & Co. KG**.

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 2018).

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⁾	1.9 mg/m ³	≤ 10 mg/m ³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m ³	≤ 0.01 mg/m ³	yes
Measurement time: 28 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI ¹⁾	0.15 mg/m ³	≤ 1 mg/m ³	yes
Sum SVOC without LCI (C ₁₆ -C ₂₂) ¹⁾	0.14 mg/m ³	≤ 0.1 mg/m ³	yes
R-Wert (dimensionless)	0.04	≤ 1	yes ²⁾
Sum VOC without LCI	0.027 mg/m ³	≤ 0.1 mg/m ³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m ³	≤ 0.001 mg/m ³	yes

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

2) Due to the rounding to 0.1 mg/m³, the result meets the requirements.

Summary evaluation

The product **Velosit SC 244** meets the emission requirements of the AgBB-Scheme.

Cologne, 30.10.2018

A handwritten signature in black ink, appearing to read 'Arne Herzog', written in a cursive style.

Arne Herzog
(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: 21.09.2018
Pre-treatment: Filling material given in an aluminium form;; mixing ratio sample A001 and water 10:1; Filling material given in an 12mm high aluminium Form
Masking of backside: not applicable
Masking of edges: no
Relationship of unmasked edges to surface: not applicable
Loading: related to area
Dimensions: 20 cm x 25 cm x 12mm

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

Chamber volume: 0.125 m³
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: 0.4 m²/m³
Specific air flow rate: 1.25 m³/(m² · h)
Air sampling: 3 days after test chamber loading
28 days after test chamber loading

Analytcs

Aldehydes and Ketones | DIN ISO 16000-3
Limit of determination: 2 µg/m³
Volatile Organic Compounds | DIN ISO 16000-6
Limit of determination: 1 µg/m³ (1,4-Cyclohexanedimethanol, Diethylene glycol, 1,4-Butanediol, Linalyl acetate, BIT: 5 µg/m³)
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: Velosit SC 244

No.	Substance	CAS No.	RT [min]	Concentration+ Substances ≥ 1 µg/m³ [µg/m³]	Toluene- equivalent Substances ≥ 5 µg/m³ [µg/m³]	CMR Classifi- cation++	LCI AgBB 2018 [µg/m³]	R- value
2	Aliphatic hydrocarbons (n-, iso- and cyclo-)							
2-10.3	n-Undecane	1120-21-4	14.90	2			6000	0.00
2-10.4	n-Dodecane	112-40-3	16.93	2			6000	0.00
4	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols							
4-6	1-Butanol	71-36-3	5.70	7			3000	0.00
4-10	2-Ethyl-1-hexanol	104-76-7	13.39	3			300	0.01
6	Glycols, Glycol ethers, Glycol esters							
6-1	Propylene glycol (1,2-Dihydroxypropane)	57-55-6	6.99	9			2100	0.00
6-2	Ethanediol (Ethylene glycol)	107-21-1	6.65	1500	160		3400	0.44
6-5	Diethylene glycol-monobutylether	112-34-5	16.80	1			670	0.00
6-8	1-Methoxy-2-propanol (Propylene glycol monomethyl ether)	107-98-2	5.91	1			7900	0.00
6-12	Dipropylene glycol monomethyl ether	34590-94-8	12.90	2			3100	0.00
6-14	2-Ethoxyethanol (Ethylene glycol monoethyl ether)	110-80-5	6.56	23	7	Repr. 1B	8	2.88
6-30	Dipropylene glycol mono-n-propyl ether	29911-27-1	16.01	2			740	0.00
6-38	Ethylidiglycol, (Diethylene glycol monoethyl ether, 2-(2-Ethoxyethoxy) ethanole)	111-90-0	12.81	120	73		350	0.34
6-41	Hexylene glycol (2-Methyl-2,4-pentanediole)	107-41-5	11.00	19	14		3500	0.01

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

No.	Substance	CAS No.	RT [min]	Concentration+	Toluene-equivalent	CMR Classification++	LCI AgBB 2018 [µg/m³]	R-value
				Substances ≥ 1 µg/m³ [µg/m³]	Substances ≥ 5 µg/m³ [µg/m³]			
7	Aldehyde							
7-19	Benzaldehyde	100-52-7	12.30	1			90	0.01
7-20	Acetaldehyde	75-07-0		9		Carc. 2	1200	0.01
7-22	Formaldehyde	50-00-0		6		Carc. 1B Muta. 2	100	0.06
8	Ketones							
8-8	Acetophenone	98-86-2	14.58	2			490	0.00
9	Acids							
9-1	Acetic acid	64-19-7	4.47	2			1200	0.00
13	Other identified substances in addition to LCI list							
	Diethylenglykolmonomethylether (DEGME)	111-77-3	11.27	4		Repr. 2		
	2-Propylenglykol-1-ethylether (2PG1EE)	1569-02-4	7.26	1				
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.36	1				
	Glycol, unsaturated*		9.29	1				
	Glycol ethers*		13.00	2				
	Glycol ethers*		14.27	8	8			
	not identified*		16.93	3				
	Glycol ethers*		18.74	26	26			
	Glycol ethers*		20.29	17	17			
	Cluster of unidentified VOC compounds*		22.0-24.9	130	130			
	Cluster of unidentified SVOC compounds*		25.0-31.0	320	320			

+ 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: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A, DFG MAK-list: Kategorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

Carcinogenic, mutagenic and reproductive toxic components*	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
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)	23	29
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 1.25

TVOC, Total volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	440	540
Sum of VOC according to AgBB 2018 / DIBt	1900	2300
Sum of VOC according to eco-INSTITUT-Label	1900	2400
Sum of VOC according to ISO 16000-6	530	660

TSVOC, Total semi volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of SVOC according to DIN EN 16516	320	400
Sum of SVOC without LCI according to AgBB 2018 / DIBt	320	400
Sum of SVOC without LCI according to eco-INSTITUT-Label	320	400
Sum of SVOC with LCI according to AgBB 2018 / DIBt	< 5	< 6.25

TVVOC, Total very volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2018 / DIBt and Belgian regulation	15	19
Sum of VVOC according to eco-INSTITUT-Label	15	19

*Excluding formaldehyde (Carc. 1B) due to an assumed "practical threshold" under which a significant carcinogenic risk is no longer to be expected (see Federal Institute for Risk Assessment (2006): Toxicological evaluation of formaldehyde and Federal Environment Agency (2016): Reference value for formaldehyde in indoor air). In the case of a toxicological emission assessment, a single-substance analysis of the formaldehyde concentration is necessary. In the opinion of the committee for Indoor Air Guide Values (Ausschuss für Innenraumrichtwerte) of the Federal Environment Agency, the concentration of 0.1 mg formaldehyde/m³ indoor air, based on a measurement period of half an hour, should not be exceeded, also for a short time (Bundesgesundheitsblatt 2016 · 59: 1040-1044 DOI 10.1007 / s00103 - 016-2389-5 © Springer-Verlag Berlin Heidelberg 2016).

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

Other sums of VOC	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	180	230
VOC without LCI according to eco-INSTITUT-Label (Sum)	190	240
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)	19	24
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	7	8,8
Bicyclic Terpenes (sum)	< 1	< 1.25
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	4	5
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 2.5
C9 - C15 Alkylated benzenes (Sum)	< 1	< 1.25
Cresols (Sum)	< 1	< 1.25

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	9.13
R-value according to AgBB 2018 / DIBt	3.74
R-value according to Belgian regulation	0.90
R-value according to AFSSET	5.16

Note:

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

For short-chain carbonyl compounds (C₁-C₅), which are quantified by HPLC according to DIN ISO 16000-3, no indication of the toluene equivalent is specified. Therefore, these substances are considered with their substance-specific Quantification in the TVVOC acc. DIN EN 16516.

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

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: Velosit SC 244

No.	Substance	CAS No.	RT [min]	Concentration+	Toluene-equivalent	CMR Classifi- cation++	LCI AgBB 2018	R-value
				Substances ≥ 1 µg/m³ [µg/m³]	Substances ≥ 5 µg/m³ [µg/m³]		[µg/m³]	
4	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols							
4-6	1-Butanol	71-36-3	5.71	1			3000	0.00
6	Glycols, Glycol ethers, Glycol esters							
6-2	Ethanediol (Ethylene glycol)	107-21-1	6.15	120	13		3400	0.04
6-38	Ethyldiglycol, (Diethylene glycol monoethyl ether, 2-(2-Ethoxyethoxy) ethanole)	111-90-0	12.76	3			350	0.01
7	Aldehyde							
7-20	Acetaldehyde	75-07-0		2		Carc. 2	1200	0.00
7-22	Formaldehyde	50-00-0		2		Carc. 1B Muta. 2	100	0.02
9	Acids							
9-1	Acetic acid	64-19-7	4.48	2			1200	0.00
13	Other identified substances in addition to LCI list							
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.35	1				
	Cluster of unidentified VOC compounds*		22.0-24.9	27	27			
	Cluster of unidentified SVOC compounds*		25.0-31.0	140	140			

+ 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: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A, DFG MAK-list: Kategorie III1 and III2

* unidentified substance, calculated as toluene equivalent

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

Carcinogenic, mutagenic and reproductive toxic components*	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
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	< 1.25
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 1.25

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	40	50
Sum of VOC according to AgBB 2018 / DIBt	150	180
Sum of VOC according to eco-INSTITUT-Label	150	190
Sum of VOC according to ISO 16000-6	26	33

TSVOC, Total semi volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of SVOC according to DIN EN 16516	140	180
Sum of SVOC without LCI according to AgBB 2018 / DIBt	140	180
Sum of SVOC without LCI according to eco-INSTITUT-Label	140	180
Sum of SVOC with LCI according to AgBB 2018 / DIBt	< 5	< 6.25

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2018 / DIBt and Belgian regulation	< 5	< 6.25
Sum of VVOC according to eco-INSTITUT-Label	4	5

*Excluding formaldehyde (Carc. 1B) due to an assumed "practical threshold" under which a significant carcinogenic risk is no longer to be expected (see Federal Institute for Risk Assessment (2006): Toxicological evaluation of formaldehyde and Federal Environment Agency (2016): Reference value for formaldehyde in indoor air). In the case of a toxicological emission assessment, a single-substance analysis of the formaldehyde concentration is necessary. In the opinion of the committee for Indoor Air Guide Values (Ausschuss für Innenraumrichtwerte) of the Federal Environment Agency, the concentration of 0.1 mg formaldehyde/m³ indoor air, based on a measurement period of half an hour, should not be exceeded, also for a short time (Bundesgesundheitsblatt 2016 · 59: 1040-1044 DOI 10.1007 / s00103 - 016-2389-5 © Springer-Verlag Berlin Heidelberg 2016).

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Other sums of VOC	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	27	34
VOC without LCI according to eco-INSTITUT-Label (Sum)	28	35
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)	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)	2	2,5
Bicyclic Terpenes	< 1	< 1.25
C9 - C14: Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 1.25
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 2.5
C9 - C15 Alkylated benzenes (Sum)	< 1	< 1.25
Cresols (Sum)	< 1	< 1.25

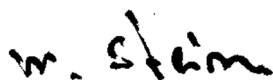
Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.49
R-value according to AgBB 2018 / DIBt	0.04
R-value according to Belgian regulation	0.04
R-value according to AFSSET	0.30

Note:

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

For short-chain carbonyl compounds (C₁-C₅), which are quantified by HPLC according to DIN ISO 16000-3, no indication of the toluene equivalent is specified. Therefore, these substances are considered with their substance-specific Quantification in the TVVOC acc. DIN EN 16516.

Cologne, 30.10.2018



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

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Appendix

I Sampling sheet

Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting



Probenahmebegleitblatt*

Projektnummer
eco-INSTITUT /
wird vom Labor
ausgefüllt

53633-001

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) <i>Michael Herold Velosit GmbH & Co KG 05233 - 9517303</i>
Name des Herstellers / Händlers am Probenahmeort (Adresse / Stempel) <i>Velosit GmbH & Co KG Industriepark 7 32805 Horn-Bad Meinberg</i>	Auftraggeber/ Rechnungsempfänger (falls abweichend vom Herstelleramen)

Produktname <i>Velosit SC 244</i>	Probart (z.B. Holzwerkstoff, Bodenbelag) <i>Fließestrich</i>
Modell / Programm/ Serie Artikel-Nr. <i>02 44 0025</i>	Chargen-Nr. <i>80912008</i> Produktionsdatum der Charge <i>12.9.18</i>

Probe wird gezogen ... <input checked="" type="checkbox"/> aus der laufenden Produktion <input type="checkbox"/> aus Lagerbeständen	Datum der Probenahme <i>12.9.18</i> Uhrzeit <i>8:20</i>
Wo wurde das Produkt vor Probenahme gelagert? <input checked="" type="checkbox"/> Fertigung <input type="checkbox"/> Lager <input type="checkbox"/> Sonstiges Lagerort:	Wie wurde das Produkt vor Probenahme gelagert? <input type="checkbox"/> offen <input checked="" type="checkbox"/> Verpackt Verpackungsmaterial:

Besonderheiten (mögliche negative Einflüsse durch Emissionen am Probenahmeort (z.B. Benzin-Abgase, Lösemittlemissionen aus der Fertigung), Unklarheiten, Fragen, etc.)

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

Datum: <i>12.9.18</i>	Unterschrift:(Stempel) 	 VELOSIT GmbH & Co. KG Industriepark 7 D-32805 Horn-Bad Meinberg Tel.: + 49 (0) 5233 - 95 17 300 Fax: + 49 (0) 5233 - 95 17 301 info@velosit.de www.velosit.de
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* Bitte pro Probe ein Probenahmebegleitblatt ausfüllen! Die Probenahmeanleitung ist unbedingt einzuhalten!

Beauftragung (Bitte Angebotsnummer eintragen bzw. falls nicht vorhanden, Untersuchungsziel angeben)	<i>02224</i>
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II Definition of terms

VOC (volatile organic compounds)	All individual compounds with a concentration $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C ₆ (n-Hexane) to C ₁₆ (n-Hexadecane)
TVOC	Total volatile organic compounds
TVOC according to DIN EN 16516	Sum of all VOC $\geq 5 \mu\text{g}/\text{m}^3$ 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 $\geq 5 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ calculated as toluene equivalent
TVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ 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 $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C ₆ to C ₁₆
TVOC without LCI according to eco-INSTITUT-Label	Sum of all VOC without NIK $\geq 1 \mu\text{g}/\text{m}^3$ 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 III1 and III2
VVOC (very volatile organic compounds)	All individual substances with a concentration $\geq 1 \mu\text{g}/\text{m}^3$ 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 $\geq 5 \mu\text{g}/\text{m}^3$ with LCI
TVVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ with LCI
SVOC (semi volatile organic compounds)	All individual substances $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C ₁₆ to C ₂₂
TSVOC	Total semi volatile organic compounds
TSVOC according to DIN EN 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 $\geq 5 \mu\text{g}/\text{m}^3$ without LCI
TSVOC without LCI according to eco-INSTITUT-Label	Sum of all SVOC $\geq 1 \mu\text{g}/\text{m}^3$ without LCI
TSVOC with LCI according to AgBB/DIBt	Sum of all identified and calibrated SVOC $\geq 5 \mu\text{g}/\text{m}^3$ 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 $\geq 1 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to AgBB 2018/DIBt	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to Belgian regulation	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the Belgian regulation
R value according to AFSSET	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ 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
Phenyltoluene
1-Phenyldecane²
1-Phenylundecane²
4-Phenylcyclohexene
Styrene
β-Methylstyrene
Phenylacetylene
2-Phenylpropene
Vinyltoluene
Naphthalene
Indene
Benzene
1-Methylnaphthalene
2-Methylnaphthalene
1,4-Dimethylnaphthalene
3-Propyltoluene
2-Propyltoluene

Saturated aliphatic substances

2-Methylpentane¹
3-Methylpentane¹
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
2,2,4,4,6,6-Pentamethylheptane

Terpenes

δ-3-Carene
α-Pinene
β-Pinene

Limonene
Longifolene
β-Caryophyllene
α-Phellandrene
Myrcene
Camphene
α-Terpinene
Longipinene
trans-β-Farnesene
cis-β-Farnesene
Isolongifolene

Aliphatic alcohols and ether

1-Propanol¹
2-Propanol¹
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)
Ethleneglycol (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-1-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-butylether
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)
Ethylidiglycol
Dipropylene glycol dimethylether
Propylene carbonate
Hexleneglycol
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
2-Butoxy ethyl acetate

Aldehydes

Butanal^{1,3}
3-Methyl-1-butanal
Pentanal³
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal³
2-Pentenal³
2-Hexenal
2-Heptenal
2-Octenal
2-Nonenal
2-Decenal
2-Undecenal
Furfural
Ethanediol (Glyoxal)^{1,3}
Glutaraldehyde
Benzaldehyde
Acetaldehyde^{1,3}
Formaldehyde^{1,3}
Propanal^{1,3}
Propenal^{1,3}
Isobutenal³

Ketones

Ethylmethylketone³
3-Methyl-2-butanone
Methylisobutylketone
Cyclopentanone
Cyclohexanone
Acetone^{1,3}
2-Methylcyclopentanone
2-Methylcyclohexanone

Acetophenone	Glutaric acid dimethylester	Dodecamethylcyclohexasiloxane
1-Hydroxyacetone	Hexandioldiacrylate	Tetrahydrofuran (THF)
2-Heptanon	Maleic acid dibutylester	1-Decene
Acids	Butyrolactone	Benzothiazole
Acetic acid	Glutaric acid diisobutylester	1-Octene
Propionic acid	Succinic acid diisobutylester	2-Pentylfuran
Isobutyric acid	Dimethylphthalate	2-Methylfuran
Butyric acid	Diethylphthalate ²	Isophorone
Pivalic acid	Dipropylphthalate ²	Tetramethyl succinonitrile
Valeric acid	Dibutylphthalate ²	Dimethylformamide (DMF)
Caproic acid	Diisobutylphthalate ²	Tributyl phosphate
Heptanoic acid	Dipropylene glycol diacrylate	N-Ethyl-2-pyrrolidone
Octanoic acid		Aniline
2-Ethylhexanoic acid		4-Vinylcyclohexene
	Chlorinated hydrocarbons	Dimethoxymethane
	Tetrachlorethene	Dichlormethane
	1,1,1-Trichlorethane	Carbon tetrachloride
	Trichlorethene	trans-Decahydronaphthalene
	1,4-Dichlorbenzene	cis-Decahydronaphthalene
	Chlorobenzene	Linalyl acetate
		Chloroform
	Others	Chloroprene (monomer)
	1,4-Dioxane	Acetamide
	Caprolactam	Formamide
	N-Methyl-2-pyrrolidone	1,3-Dichlor-2-propanol
	Octamethylcyclotetrasiloxane	2-n-Octyl-4-isothiazolin-3-one (OIT)
	Hexamethylcyclotrisiloxane	1,2-Benzylisothiazolin-3-one (BIT)
	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	

- 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 signal of the internal standard d8 toluene. As far as possible, identification and quantification limit of any substance shall be 1 µg per m³ for substances adsorbed on Tenax and 2 µg/m³ 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 DIN EN 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.

$$\text{SER} = q \cdot c$$

- 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.