SIA Silk Plaster Group
Balta iela 27
1055 Riga
LV

Test Report No. 52602-001

Test objective:	**Evaluation according to AgBB-scheme 2015**
Sample description by client:	**Silk Plaster Prestige**
Sampled by:	Nikolay Arutyunov, SIA Silk Plaster Group
Date of sampling:	06.09.2017
Location of sampling:	at the client
Date of production:	06.09.2017
Date of arrival of sample:	06.10.2017
Test period:	06.10.2017 - 04.12.2017
Date of report:	04.12.2017
Number of pages of report:	18
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln except ‡ subcontracted # outside accreditation
Test objective fulfilled:	✓

Content

Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A001	Silk Plaster Prestige	without objection	interior wall covering

A001: Silk Plaster Prestige

Expert Evaluation

The product **Silk Plaster Prestige** has been tested on behalf of **SIA Silk Plaster Group**.

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)]	0,071 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)]	0,041 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)	0,03	≤ 1	yes
Sum VOC without LCI	< 0,005 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 **Silk Plaster Prestige** meets the emission requirements of the AgBB-Scheme.

Cologne, 04.12.2017

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

Laboratory report

1 Emission analysis

Test method

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

A001, Preparation of test sample

Date:	26.10.2017
Pre-treatment:	Application on glass surface smoothed with a straight trowel; mixing ratio sample A001 and water 1:6; mixed by hand and left for 12h; application thickness: 2 mm; transfer of the test specimen into the test chamber immediately after preparation
Masking of backside:	not applicable
Masking of edges:	no
Relationship of unmasked edges to surface:	not applicable
Loading:	related to area
Dimensions:	2 x [25 cm x 25 cm]; thickness 2 mm

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: Silk Plaster Prestige

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 Clas-sifi-ca-tion++	LCI AgBB 2015 [µg/m³]	R-va-lue
5	**Aromatic alcohols**							
5-3	Benzyl alcohol	100-51-6	12,18	2		Group 3	440	
6	**Glycols, Glycol ethers, Glycol esters**							
6-1	Propylene glycol (1,2-Dihydroxypropane)	57-55-6	6,87	5			2500	
6-2	Ethanediol (Ethylene gly-col)	107-21-1	6,02	8			260	0,03
6-5	Diethylene glycol-mo-nobutylether	112-34-5	16,72	2			670	
7	**Aldehyde**							
7-22	Formaldehyde	50-00-0		7		Carc. 1B Muta. 2	100	0,07
8	**Ketones**							
8-10	Acetone	67-64-1		3			1200	
9	**Acids**							
9-1	Acetic acid	64-19-7	4,53	58	27		1250	0,05
13	**Other identified sub-stances in addition to LCI list**							
	Glycole*		23,52	3				
	Not identified SVOC*		28,73	4				

+ 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]**	**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**	**< 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]**	**SERa [µg/(m² ▪ h)]**
Sum of VOC according to prEN 16516	**27**	**14**
Sum of VOC according to AgBB 2015 / DIBt	**71**	**36**
Sum of VOC according to eco-INSTITUT-Label	**78**	**39**
Sum of VOC according to ISO 16000-6	**70**	**35**

TSVOC, Total semi volatile organic compounds	**Concentration after 3 days [µg/m³]**	**SERa [µg/(m² ▪ h)]**
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	**4**	**2**
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]**	**SERa [µg/(m² ▪ h)]**
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	**7**	**3,5**
Sum of VVOC according to eco-INSTITUT-Label	**10**	**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.“

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)	**< 5**	**< 2,5**
VOC without LCI according to eco-INSTITUT-Label (Sum)	**3**	**1,5**
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)	**7**	**3,5**
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	**7**	**3,5**
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	**0,15**
R-value according to AgBB 2015 / DIBt	**0,15**
R-value according to Belgian regulation	**0,08**
R-value according to AFSSET	**1,00**

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: Silk Plaster Prestige

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 Clas-sifi-ca-tion++	LCI AgBB 2015 [µg/m³]	R-va-lue
6	**Glycols, Glycol ethers, Glycol esters**							
6-1	Propylene glycol (1,2-Dihydroxypropane)	57-55-6	6,86	1			2500	
6-2	Ethanediol (Ethylene gly-col)	107-21-1	6,04	4			260	0,02
7	**Aldehyde**							
7-22	Formaldehyde	50-00-0		2		Carc. 1B Muta. 2	100	0,02
8	**Ketones**							
8-10	Acetone	67-64-1		3			1200	
9	**Acids**							
9-1	Acetic acid	64-19-7	4,53	41	20		1250	0,03

+ 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]**	**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**	**< 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]**	**SERa [µg/(m² ▪ h)]**
Sum of VOC according to prEN 16516	**20**	**10**
Sum of VOC according to AgBB 2015 / DIBt	**41**	**21**
Sum of VOC according to eco-INSTITUT-Label	**46**	**23**
Sum of VOC according to ISO 16000-6	**36**	**18**

TSVOC, Total semi volatile organic compounds	**Concentration after 28 days [µg/m³]**	**SERa [µg/(m² ▪ h)]**
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]**	**SERa [µg/(m² ▪ h)]**
Sum of VVOC according to AgBB 2015 / DIBt and Belgian regulation	**< 5**	**< 2,5**
Sum of VVOC according to eco-INSTITUT-Label	**5**	**2,5**

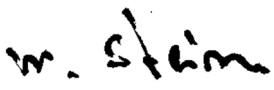
*Excluding formaldehyde (Carc. 1B) due to an assumed "practical threshold" under which a significant carcinogenic risk is no longer to be expected (see Federal Institute for Risk Assessment (2006): Toxicological evaluation of formaldehyde and
Federal Environment Agency (2016): Reference value for formaldehyde in indoor air). In the case of a toxicological emission assessment, a single-substance analysis of the formaldehyde concentration is necessary.“

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)	**< 5**	**< 2,5**
VOC without LCI according to eco-INSTITUT-Label (Sum)	**< 1**	**< 0,5**
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)	**2**	**1**
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Sum)	**2**	**1**
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	**0,07**
R-value according to AgBB 2015 / DIBt	**0,03**
R-value according to Belgian regulation	**0,03**
R-value according to AFSSET	**0,16**

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

Cologne, 04.12.2017



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

Appendix

I Sampling sheet

Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting

eco INSTITUT

eco-INSTITUT-Label
Sampling Sheet*

eco INSTITUT TESTED PRODUCT ID 0808 - 47110 - 001

Project number eco-INSTITUT / will be filled in by Laboratory: **52602-001**

Test laboratory	eco-INSTITUT Germany GmbH Schanzenstr. 6-20, D-51063 Cologne Tel. +49 (0)221 - 931245-0 Fax +49 (0)221 - 931245-33	**Sampler** (Name, Company, Phone)	NIKOLAY ARUTYUNOV SIA SILK PLASTER GROUP +371 660 65710.
Name of the producer / distributor at the place of sampling (Adress / Stamp)	SIA SILK PLASTER GROUP LV 1055, SPILVES 6, RIGA, LATVIA	**Customer/ Invoice recipient** (if different form the producer)	
Product name	SILK PLASTER	**Product type** (e.g. parquet, floor covering)	interior wall covering
Modell/Program /Series	PRESTIGE	**Batch**	
Article number	403	**Production date of the batch**	06.09.2017
Samples are taken ...	from current production X storage	**Sampling date**	06.09.2017
		Sampling time	16:15:05
Storage location before sampling	Production X Storage Others	**Storage conditions before sampling**	open X packaged
	Storage location: LV1055 SPILVES 6, RIGA, LATVIA		Packaging material: PE-PE

Special features (possible negative effects through emissions at the place of sampling (e.g. benzine, exhaust fumes), unclarities, questions etc.)

Validation

Hereby the signer affirms the accuracy of the above-mentioned statements. The sample was chosen, sampled and packaged according to the guide for taking samples. The signer guarantees keeping the formula, the used raw materials, the product composition and the production procedure during the entire production process of the product designated above.

Date: 02.10.17 Signature: (Stamp) NIKOLAY ARUTYUNOV

SABIEDRĪBA AR IEROBEŽOTU ATBILDĪBU SILK PLASTER GROUP

* Please take one sampling sheet for each sample! The sampling instruction must be strictly maintained.

Order
(Please insert the quote number, or - if not available please enter the desired analysis)

eco-INSTITUT Germany GmbH / Schanzenstrasse 6-20 / Carlswerk Kupferzug 5.2 / D-51063 Köln / Germany
Tel. +49 221.931245-0 / Fax +49 221.931245-33 / eco-institut.de / Geschäftsführer: Dr. Frank Kuebart, Daniel Tigges
HRB 17917 / USt-ID: DE 122653308 / Raiffeisenbank Frechen-Hürth, IBAN: DE60370623651701900010, BIC: GENODED1FHH

Nach DIN EN ISO/IEC 17025 akkreditiertes Prüflabor
DAkkS Deutsche Akkreditierungsstelle D-PL-20051-01-00

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.

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
Propylenglycol (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.