

QLIMATE GmbH
Europastr. 12
77933 Lahr

Test Report No. 59927-A001-EUTAX-L

Test objective:	Evaluation according to EU Taxonomy product emission requirements for formaldehyde and other categories 1A and 1B carcinogenic volatile organic compounds
Article designation according to order:	Nr. 1: Kühldeckenmodul mit Graphit-Kupfer Aktivierung
Date of report:	19/05/2025
Number of pages of report:	16
Testing / responsible laboratory:	eco- INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓
Note:	The test results in the report refer exclusively to the test sample submitted by the manufacturer. The report is not permitted to be used in product and company advertising. The report may be published in full as technical documentation on the Internet with the written consent of eco- INSTITUT Germany GmbH. eco- INSTITUT Germany GmbH has recommended that the manufacturer repeats the test after 3 years at the latest. More information at www.eco-institut.de/en/advertising



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Sample View

Internal sample number (filled in by laboratory)

59927-A001

Photo of the test specimen: A001



Article designation according to order:
Sample/batch number according to order:
Type of sample:
Date of production:
Sampling by:
Date of sampling:
Location of sampling:
Receipt of sample / Condition upon delivery:

Nr. 1: Kühldeckenmodul mit Graphit-Kupfer Aktivierung
no information
Kühldeckenmodul mit Graphit-Kupfer Aktivierung
26/03/2025
Hans-Peter Weschle, Fa. QLIMATE GmbH
26/03/2025
Europastr. 12, 77933 Lahr
27/03/2025 / without objection



Statement of conformity with the EU Taxonomy regulations

The sample with the internal sample number 59927-A001 has been tested on behalf of **QLIMATE GmbH**. The article description according to the order is **Nr. 1: Kühldeckenmodul mit Graphit-Kupfer Aktivierung**.

This evaluation is based on the test criteria of the EU Taxonomy regulations (EU) 2021/2139 and (EU) 2023/2486 for product emission requirements for formaldehyde and other categories 1A and 1B carcinogenic volatile organic compounds.

The results documented in the test report were evaluated as follows.¹

Test parameter	Result	Requirement	Requirement hold [yes/no]
Emission analysis			
Measurement time: 28 days after test chamber loading			
Formaldehyde	0.034 mg/m ³	< 0.06 mg/m ³	yes
Carcinogenic substances, cat. 1A and 1B acc. to Regulation (EC) No. 1272/2008 (per substance)	< 0.001 mg/m ³	< 0.001 mg/m ³	yes

¹ If a measurement result that slightly exceeds the specification is assessed as “not fulfilled”, this is based on the agreement of the “shared risk of measurement uncertainty (shared risk approach)”. According to this, the probability that the statement is correct is $\geq 50\%$. Similarly, a result slightly below the specification value also only has a probability of $\geq 50\%$ of being compliant. I.e., the risk of making a false negative statement regarding the fulfilment of the specification is just as high as the risk of making a false positive statement (more information at https://www.eco-institut.de/en/2019/07/measurement_uncertainty/).



Summary statement of conformity with the EU Taxonomy regulations

The sample with the internal sample number 59927-A001, article description according to order: **Nr. 1: Kühldeckenmodul mit Graphit-Kupfer Aktivierung**, meets the product emission requirements for formaldehyde and other categories 1A and 1B carcinogenic volatile organic compounds of the EU Taxonomy regulations (EU) 2021/2139 and (EU) 2023/2486.

Cologne, 19/05/2025

A handwritten signature in black ink, appearing to read 'M. Pazda'.

Max Pazda, M.Sc.

(Project management)

Laboratory report

1 Emission analysis

Test method

DIN EN 16516:2020-10 | Testing and evaluation of the release of dangerous substances;
determination of emissions into indoor air

A001, Preparation of test specimen

Date: | 11/04/2025
Test specimen preparation: | not applicable; transfer of the test specimen into the test chamber
immediately after preparation
Masking of backside: | yes
Masking of edges: | yes, 100 %
Relationship of unmasked
edges to surface: | not applicable
Arrangement in test chamber: | on tripod
Loading reference unit: | area-specific [m²]
Dimensions: | 20.0 cm x 25.0 cm x 5.0 cm

A001, Test chamber conditions according to DIN EN ISO 16000-9:2024-08

Chamber volume: | 0.125 m³
Temperature: | 23 °C ± 1 °C
Relative humidity: | 50 % ± 5 %
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)
Starting time of the test (t₀): | 11/04/2025
Air sampling: | 09/05/2025 (28 days after test chamber loading)

1.1 Sample A001, Volatile organic compounds after 28 days

Test objective:

Volatile organic compounds (VOC), test chamber, air sampling 28 days after test chamber loading

Method description / Analytics:

Formaldehyde and other carbonyl compounds:	DIN ISO 16000-3:2023-12 (DNPH method, HPLC-DAD)
Limit of quantification:	2 µg/m ³
Volatile organic compounds:	DIN ISO 16000-6:2022-03 (Tenax TA®, TD-GC-MS)
Limit of quantification calibrated substances:	1 µg/m ³ (1,4-Cyclohexanedimethanol, Diethylene glycol, 1,4-Butanediol: 5 µg/m ³)
Limit of quantification non-calibrated substances:	1 µg/m ³

Test result:

Internal sample number: | 59927-A001

	Substance	CAS No.	RT [min]	Concentration+ calib. substances ≥ 1 µg/m ³ uncalib. substances ≥ 1 µg/m ³ DNPH ≥ 2 µg/m ³ [µg/m ³]	Toluene- equivalent substances ≥ 5 µg/m ³ [µg/m ³]	SER+ [µg/(m ² ·h)]	CMR Classifi- cation++	LCI AgBB 2024 [µg/m ³]	R-value
	Aromatic hydrocarbons								
VOC	Toluene	108-88-3	8.27	1	< 5	1.3	Repr. 2	2900	0.00
	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols								
VOC	1-Butanol	71-36-3	5.88	1	< 5	1.3		3000	0.00
	Glycols, Glycol ethers, Glycol esters								
VOC	Propylene glycol (Propane-1,2- diol)	57-55-6	7.24	2	< 5	2.5		2100	0.00
	Aldehydes								
VVOC	Formaldehyde	50-00-0		34	n. d.	43	Carc. 1B Muta. 2	100	0.34
	Ketones								
VVOC	Acetone	67-64-1		2	n. d.	2.5		120000	0.00
	Other identified substances in addition to LCI list								
VVOC	m/z 41*		3.72	4	< 5	5			

+ identified and calibrated substances, substance specific calculated

++ classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A, 1B and 2, Muta. 1A, 1B and 2, Repr. 1A, 1B and 2, TRGS 905: K1A, K1B, K2, M1A, M1B, M2, R1A, R1B, R2; IARC: Group 1, 2A, 2B and 3, DFG MAK-list: Kategorie III1 to III5

* unidentified substances, calculated as toluene equivalent reported with significant mass fragments as mass-to-charge ratio (m/z)

n. d.: not determined

Carcinogenic, mutagenic, and reproductive toxic compounds*	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: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (sum)	< 1	< 1.3
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B; TRGS 905: K1A, K1B (sum)	< 1	< 1.3

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	< 5	< 6.3
Sum of VOC according to AgBB 2024	< 5	< 6.3
Sum of VOC according to eco-INSTITUT-Label	4	5
Sum of VOC according to DIN ISO 16000-6	8	10

TSVOC, Total semi volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of SVOC according to DIN EN 16516	< 5	< 6.3
Sum of SVOC without LCI according to AgBB 2024	< 5	< 6.3
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 1.3
Sum of SVOC with LCI according to AgBB 2024	< 5	< 6.3

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2024	34	43
Sum of VVOC according to eco-INSTITUT-Label	40	50

*Excluding formaldehyde and acetaldehyde (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 and protocol of the 11th meeting of 'Ausschusses für Innenraumrichtwerte' (AIR), 11/2020). In the case of a toxicological emission assessment, a single-substance analysis of the concentrations 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).



Other sums of VOC	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
VOC without LCI according to AgBB 2024 (sum)	< 5	< 6.3
VOC without LCI according to eco-INSTITUT-Label (sum)	< 1	< 1.3
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: K2, M2, R2; IARC: Group 2B; DFG (MAK list): Category III3 (sum)	35	44
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (sum)	34	43
Bicyclic Terpenes (sum)	< 1	< 1.3
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (sum)	< 1	< 1.3
C4 - C11 Aldehydes, acyclic, aliphatic (sum)	< 2	< 2.5
C9 - C15 Alkylated benzenes (sum)	< 1	< 1.3
Cresols (sum)	< 1	< 1.3

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.34
R-value according to AgBB 2024	0.34
R-value according to Belgian regulation	0.34
R-value according to EU-LCI	0.34

Note:

Due to different requirements in the respective guidelines, the calculation of TVOC, TVVOC, TSVOC and R-value may result in different values. Short-chain carbonyl compounds (C1-C5) are quantified via HPLC acc. to DIN ISO 16000-3:2013-01. Therefore, no toluene equivalents are given for VVOC. These substances are taken into concern by means of their substance specific calibration via the sum of VVOC acc. to DIN EN 16516:2020-10. For VOC however, the substance specific calibration takes place via HPLC whereas the TVOC is calculated using the toluene equivalent determined via Tenax acc. to DIN EN 16516:2020-10.

Cologne, 15/05/2025

Michael Stein, Dipl.-Chem.
(Laboratory Management)



Appendix

Sampling sheet



Probenahmebegleitblatt

Bitte möglichst alle Felder ausfüllen. Sind die mit einem * gekennzeichneten Felder nicht ausgefüllt, können die Prüfstücke nicht zur Laborprüfung angenommen werden.

59927-001

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

Auftragserteilung durch*	QLIMATE GmbH Hans-Peter Weschle Europastr. 12 77933 Lahr	Prüflabor	eco-INSTITUT Germany GmbH Schanzenstr. 6-20, Carlswerk 1.19 D - 51063 Köln Tel. +49 (0)221 - 931245-0 Fax +49 (0)221 - 931245-33
<input checked="" type="checkbox"/> Name des Herstellerbetriebes	QLIMATE GmbH Europastr. 12 77933 Lahr	Probenahme durch* (Name, Firma, Telefon)	Hans-Peter Weschle QLIMATE GmbH 07821 / 5095807
Name des Vertriebs (wenn abweichend vom Herstellerbetrieb)		Probenahmeort*	Europastr. 12 77933 Lahr
Prüfstück-/ Artikelbezeichnung	Nr.1 Kühldeckenmodul mit Graphit-Kupfer-Aktivierung	Probenart (z.B. Holzwerkstoff, Bodenbelag)	
Artikel-Nr.		Proben-/Chargen-Nr.*	
Modell / Programm / Serie		Produktionsdatum der Charge*	26.03.2025
Probe entnommen aus	<input checked="" type="checkbox"/> Fertigung <input type="checkbox"/> Lager <input type="checkbox"/> Sonstiges	Datum der Probenahme*	26.03.2025
Lagerort		Lagerung vor der Probenahme	<input type="checkbox"/> offen <input type="checkbox"/> verpackt
		Verpackungsmaterial	

ggf. zusätzliche Angaben / Besonderheiten zur Probenahme / Unklarheiten, Fragen, mögliche negative Einflüsse durch Emissionen am Probenahmeort - z.B. Kontaminationen während der Produktion/Lagerung

Bestätigung*
 Hiermit wird durch die Unterzeichnung (**Probenahme**) die Richtigkeit der oben gemachten Angaben bestätigt.

Datum
 (dd/mm/yyyy) 26/03/2025

Unterschrift Hans-Peter Weschle

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List of calibrated Volatile Organic Compounds (VOC)

Aromatic hydrocarbons (31)

Benzene⁴
 1,2,3-Trimethylbenzene
 1,2,4-Trimethylbenzene
 1,3,5-Trimethylbenzene
 1-Isopropyl-2-methylbenzene
 1-Isopropyl-4-methylbenzene
 1,2,4,5-Tetramethylbenzene
 Ethylbenzene
 n-Propylbenzene
 Isopropylbenzene (Cumene)⁴
 1,3-Diisopropylbenzene
 1,4-Diisopropylbenzene
 n-Butylbenzene
 1-Propenylbenzene (beta-Methylstyrene)
 Toluene
 2-Ethyltoluene
 Vinyltoluene
 o-Xylene
 m-/p-Xylene
 Styrene
 Phenylacetylene
 2-Phenylpropene (alpha-Methylstyrene)
 4-Phenylcyclohexene
 1-Phenylcyclohexane
 1-Phenyldecanol
 1-Phenylundecane²
 1-Phenylundecane²
 Indene
 Naphthalene
 1-Methylnaphthalene
 2-Methylnaphthalene
 1,4-Dimethylnaphthalene

Aliphatic hydrocarbons (23)

2-Methylpentane¹
 3-Methylpentane¹
 Methylcyclopentane
 n-Hexane
 Cyclohexane
 Methylcyclohexane
 1,4-Dimethylcyclohexane
 n-Heptane
 2,2,4,4,6,6-Pentamethylheptane
 n-Octane
 n-Nonane
 n-Decane
 n-Undecane
 n-Dodecane
 n-Tridecane
 n-Tetradecane
 n-Pentadecane
 n-Hexadecane
 Decahydronaphthalene
 1-Octene
 1-Decene
 1-Dodecene
 4-Vinylcyclohexene

Terpenes (12)

delta-3-Carene
 alpha-Pinene
 beta-Pinene
 alpha-Terpinene
 Longipinene
 Limonene
 Longifolene
 Isolongifolene
 beta-Caryophyllene
 alpha-Phellandrene
 Myrcene
 Camphene

Aliphatic alcohols and ether (18)

Ethanol¹
 1-Propanol¹
 2-Propanol¹
 2-Methyl-1-propanol
 1-Butanol
 tert-Butanol
 1-Pentanol
 1-Hexanol
 Cyclohexanol
 2-Ethyl-1-hexanol
 1-Heptanol
 1-Octanol
 1-Nonanol
 1-Decanol
 1,4-Cyclohexandimethanol
 4-Hydroxy-4-methyl-pentan-2-one
 (Diacetone alcohol)
 Methyl-tert-butyl ether (MTBE)¹
 Tetrahydrofuran (THF)

Aromatic alcohols (phenoles) (8)

Furfuryl alcohol
 Benzyl alcohol
 Phenol
 2-Phenylphenol (oPP)
 BHT (2,6-Di-tert-butyl-4-methylphenol)
 o-Cresol
 m-/p-Cresol
 4-Chloro-3-methylphenol (Chlorocresol)

Glycols, Glycol ether, Glycol ester (49)

Ethyleneglycol (Ethan-1,2-diol)
 Propylenglycol (Propane-1,2-diol)
 Diethylene glycol
 Dipropylene glycol
 Neopentyl glycol
 Hexyleneglycol
 Ethyldiglycol
 Ethylene glycol monobutyl ether
 Diethylene glycol methyl ether
 Diethylene glycol monobutyl ether
 Diethylene glycol phenyl ether
 Dipropylene glycol-dimethyl ether

Dipropylene glycol mono-n-butyl ether
 Dipropylene glycol mono-tert-butyl ether
 Dipropylene glycol monomethyl ether
 Dipropylene glycol mono-n-propyl ether
 Tripropylene glycol monomethyl ether
 Triethylene glycol dimethyl ether
 1,2-Propylene glycol dimethyl ether
 1,2-Propylene glycol-n-propyl ether
 1,2-Propylene glycol-n-butyl ether
 Butyl glycolate
 2-Methoxyethanol
 2-Ethoxyethanol
 2-Methylethoxyethanol
 2-Propoxyethanol
 2-Hexoxyethanol
 2-(2-Hexoxyethoxy)ethanol
 2-Phenoxyethanol
 1-Methoxy-2-propanol
 2-Methoxy-1-propanol
 1-Ethoxy-2-propanol
 1-tert-Butoxy-2-propanol
 3-Methoxy-1-butanol
 1,4-Butanediol
 1,2-Dimethoxyethane
 1,2-Diethoxyethane
 1-Methoxy-2-(2-methoxy-ethoxy)ethane
 Ethylene carbonate
 Propylene carbonate
 2-Methoxy-1-propyl acetate
 Diethylene glycol monomethyl ether acetate
 2-Methoxyethyl acetate
 2-Ethoxyethyl acetate
 2-Butoxy ethyl acetate
 Dipropylene glycol monomethyl ether acetate
 Propylene glycol diacetate
 Texanol
 TXIB (Texanol isobutyrate)

Aldehydes (26)

Formaldehyde^{1,3,4}
 Acetaldehyde^{1,3,4}
 Propanal^{1,3}
 Butanal^{1,3}
 3-Methyl-1-butanal
 Pentanal
 Hexanal
 2-Ethylhexanal
 Heptanal
 Octanal
 Nonanal
 Decanal
 Propenal (Acrolein)¹
 Isobutanal (Methacrolein)³
 2-Butenal
 2-Pentenal³
 2-Hexenal
 2-Heptenal
 2-Octenal

2-Nonenal
2-Decenal
2-Undecenal
Ethanedial (Glyoxal)^{1,3}
Glutaraldehyde
Furfural
Benzaldehyde

Ketones (15)

Acetone^{1,3}
1-Hydroxyacetone
Ethylmethylketone³
Methylisobutylketone
3-Methyl-2-butanone
Cyclopentanone
2-Methylcyclopentanone
Cyclohexanone
2-Methylcyclohexanone
2-Hexanone
2-Heptanone
Acetophenone
Isophorone
Benzophenone⁴
4-Methylbenzophenone²

Acids (11)

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

Esters and Lactones (33)

Methyl acetate¹
Ethyl acetate¹
Vinyl acetate¹
Propyl acetate
Isopropyl acetate
2-Methoxy-1-methylethyl acetate
n-Butyl acetate
Isobutylacetate
2-Ethylhexyl acetate
n-Butyl formate

Methyl acrylate
Methyl methacrylate
Butyl methacrylate
Ethyl acrylate
n-Butyl acrylate
2-Ethylhexyl acrylate
2-Ethylhexyl methacrylate
Hexanediol diacrylate
Dipropylene glycol diacrylate
Dimethyl succinate
Dimethyl glutarate
Dimethyl adipate
Dibutyl fumarate
Dibutyl maleate
Diisobutyl succinate
Diisobutyl glutarate
Butyrolactone
Dimethyl phthalate
Diethyl phthalate²
Dipropyl phthalate²
Dibutyl phthalate²
Diisobutyl phthalate²
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate

Chlorinated hydrocarbons (18)

Dichloromethane¹
Trichloromethane (Chloroform)⁴
Tetrachloromethane
1,2-Dichloroethane⁴
1,1,1-Trichloroethane
2-Chloropropane
1,2,3-Trichloropropane⁴
Trichloroethene⁴
Tetrachloroethene
trans-1,3-Dichloropropene⁴
cis-1,3-Dichloropropene⁴
Chloroprene⁴
1,3-Dichloro-2-propanol⁴
Chlorobenzene
1,4-Dichlorobenzene
alpha-Chlorotoluene⁴
alpha,alpha,alpha-Trichlorotoluene⁴
1,1-Dichloroethene¹

Cyclic siloxanes (5)

Hexamethylcyclotrisiloxane (D3)
Octamethylcyclotetrasiloxane (D4)
Decamethylcyclopentasiloxane (D5)
Dodecamethylcyclohexasiloxane (D6)
Tetradecamethylcycloheptasiloxane (D7)

Others (42)

1,4-Dioxane⁴
1,2-Dibromoethane⁴
2-Nitropropane⁴
2,3-Dinitrotoluene⁴
2,4-Dinitrotoluene⁴
2,6-Dinitrotoluene⁴
3,4-Dinitrotoluene^{2,4}
o-Anisidine⁴
o-Toluidine⁴
4-Chloro-o-toluidine⁴
5-Nitro-o-toluidine²
Acrylonitrile^{1,4}
2,2'-Azobisisobutyronitrile
Tetramethylsuccinonitrile
Azobenzene^{2,4}
Caprolactam
Furan^{1,4}
2-Methylfuran
2-Pentylfuran
Methenamine
Triethylamine
2-Butanoxime⁴
Triethyl phosphate
Tributyl phosphate²
5-Chloro-2-methyl-4-isothiazolin-3-one (CIT)
2-Methyl-4-isothiazolin-3-one (MIT)
2-n-Octyl-4-isothiazolin-3-one (OIT)
Formamide
Dimethylformamide (DMF)
Acetamide
N-Nitrosopyrrolidine⁴
N-Methyl-2-pyrrolidone
N-Ethyl-2-pyrrolidone
N-Butyl-2-pyrrolidone
Aniline⁵
4-Chloroaniline⁴
2-Nitroanisole⁴
Cyclohexyl isocyanate
p-Cresidine⁴
Diethyl sulfate⁴
Epichlorohydrin⁴
5-Ethyl-1,3-dioxan-5-methanol

1 VVOC

2 SVOC

3 Analysis acc. to DIN ISO 16000-3:2023-12 (DNPH)

4 Carcinogens, category 1A and 1B according to Regulation (EC) No 1272/2008 and TRGS 905

5 When analysing with TD-GC-MS, aniline can occur as a thermal decomposition product of other substances (e.g. 1,3-Diphenylguanidine).
A cold analytical method is recommended to confirm the result.

(Status: August 2024)

Definition of terms

CAS No. (Chemical Abstracts Service)	International designation standard for chemical substances
CMR	VOCs, VVOCs and SVOCs classified as carcinogenic, mutagenic or toxic for reproduction according to Regulation (EC) No. 1272/2008, TRGS 905, IARC list and DFG (MAK list)
Limit of quantification (LOQ)	Lower limit of quantification in the analytical method within the defined measurement uncertainty
NIK / LCI	Lowest concentration of interest; substance-specific value for health assessment of emissions from products, indicated in $\mu\text{g}/\text{m}^3$
RT (retention time)	Total time required for an analyte to pass the column (time between injection and detection of the analyte)
R value	Sum of quotients of concentration and LCI value for all substances for which a LCI value is derived
R value according to AgBB	R-value for all substances $\geq 5 \mu\text{g}/\text{m}^3$ with LCI value, calculated according to the LCI list of the AgBB scheme
R-value according to Belgian regulation	R-value for all substances $\geq 5 \mu\text{g}/\text{m}^3$ with LCI-value, calculated according to the LCI-list of the Belgian regulation
R value according to eco-INSTITUT-Label	R-value for all substances $\geq 1 \mu\text{g}/\text{m}^3$ with LCI value, calculated according to the LCI list of the AgBB scheme
R value according to EU-LCI	R-value for all substances $\geq 5 \mu\text{g}/\text{m}^3$ with EU-LCI value, calculated according to the EU-LCI list of the European Commission
SER	Specific emission rate (see "Explanation of Specific Emission Rate SER")
SVOC (semi volatile organic compound)	Organic compound eluting in the retention range $> C_{16}$ (n-hexadecane) to C_{22} (docosane)
Toluene equivalent	Concentration of a substance quantified by the TIC response factor of toluene (calculation of the concentration by comparing the integral of the substance with the integral of toluene)
TSVOC	Sum of the concentrations of all identified and unidentified semi volatile organic compounds eluting in the retention range $> C_{16}$ (n-hexadecane) to C_{22} (docosane)
TSVOC according to DIN EN 16516	Sum of all SVOC $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TSVOC with LCI according to AgBB	Sum of all SVOC with LCI $\geq 5 \mu\text{g}/\text{m}^3$ (quantified substance-specific)
TSVOC with LCI according to eco-INSTITUT-Label	Sum of all SVOC with LCI $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific)
TSVOC without LCI according to AgBB	Sum of all SVOC without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TSVOC without LCI according to eco-INSTITUT label	Sum of all calibrated SVOC without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all non-calibrated SVOC without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TVOC	Sum of the concentrations of all identified and unidentified volatile organic compounds eluting in the retention range from C_6 (n-hexane) to C_{16} (n-hexadecane)

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 (used i.a. for M1)
TVOC according to AgBB	Sum of all VOCs with LCI $\geq 5 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all VOCs without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent) (used i.a. for the Blue Angel)
TVOC according to eco-INSTITUT-Label	Sum of all calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all non-calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent) (used i.a. for natureplus)
TVOC according to ISO 16000-6	Total area of the chromatogram in the retention range $C_6 - C_{16}$ as toluene equivalent according to DIN ISO 16000-6, Annex A.1 item 3 (used i.a. for CDPH, BIFMA and the French VOC regulation)
TVOC without LCI according to AgBB	Sum of all VOCs without LCI $\geq 5 \mu\text{g}/\text{m}^3$ as toluene equivalent
TVOC without LCI according to eco-INSTITUT-Label	Sum of all calibrated VOCs without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all non-calibrated VOCs without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TVVOC	Sum of the concentrations of all identified and unidentified very volatile organic compounds eluting in the retention range $< C_6$ (n-hexane)
TVVOC according to AgBB	Sum of all VVOC with LCI $\geq 5 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all VVOC without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TVVOC according to eco-INSTITUT-Label	Sum of all calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ (substance-specific quantified) and all non-calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
VOC (volatile organic compound)	Organic compound eluting in the retention range from C_6 (n-hexane) to C_{16} (n-hexadecane)
VVOC (very volatile organic compound)	Organic compound eluting in the retention range $< C_6$ (n-hexane)

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. Standardised 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 at an air flow rate of 100 mL/min on Tenax and approx. 100 L at an air flow rate of 0.8 L/min on silica gel coated with DNPH (2,4-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 derivatised with DNPH for the determination of formaldehyde and other short-chain carbonyl compounds (C₁ - C₆) are analysed using high-performance liquid chromatography (HPLC).

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 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 toluene.

The determined substance concentrations are corrected using the recovery rate of the internal standard (toluene-d8). Identification and quantification of substances is carried out from a concentration (limit of quantification) of 1 µg per m³ test chamber air or 2 µg/m³ for DNPH-derivatised substances. In the case of highly loaded samples, the evaluation limit of non-calibrated substances is raised in some cases, as it is no longer possible to assign individual, small signals due to the large number of signals.

Quality assurance

The eco-INSTITUT Germany GmbH is granted flexible scope of accreditation pursuant to DIN EN ISO/IEC 17025:2018-03. 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 16516:2020-10. 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.

The expanded measurement uncertainty U for the analytical determination of all volatile organic compounds, including the test chamber method, is estimated to 41.7 %. The calculation is based on DIN ISO 11352:2013-03 (Nordtest).

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.