

The Good Plastic Company International Limited
85 Great Portland Street, First Floor
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UK

Test Report No. 58137-A001-BREEAM-L

Test objective:	Evaluation acc. to BREEAM-criteria: Hea 02 Indoor air quality
Article designation according to order:	TM Polygood
Date of report:	08/05/2023
Number of pages of report:	16
Testing / responsible laboratory:	eco- INSTITUT Germany GmbH, Köln
Test objective fulfilled:	<ul style="list-style-type: none">✓ Emission criteria✓ Exemplary Level criteria
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)

58137-A001

Photo of the test sample:

A001



Article designation according to order:

TM Polygood

Sample/batch number according to order:

28032023

Type of sample:

Construction material for wall, ceiling, and floor coverings.
Furniture, interior construction, and design elements.

Date of production:

22/03/2023

Sampling by:

The Good Plastic Company BV

Date of sampling:

28/03/2023

Location of sampling:

Keersluisweg 7, Hall 1 1332 EE Almere, The Netherlands

Receipt of sample / Condition upon delivery:

29/03/2023 / without objection



Statement of conformity with BREEAM criteria

The sample with the internal sample number 58137-A001 has been tested on behalf of **The Good Plastic Company International Limited**. The article description according to the order is **TM Polygood**.

This evaluation is based on the test criteria of BREEAM International New Construction 2018 (Technical Manual SD233 3.0, Hea 02 Indoor air quality).

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

Chemical Contaminant	Result	Emission Limit – Emissions from building products	Requirement hold [yes/no]
Emission analysis			
Measurement time: 28 days after test chamber loading			
Formaldehyde	< 0.002 mg/m ³	≤ 0.06 mg/m ³	yes
TVOC	0.008 mg/m ³	≤ 1.0 mg/m ³	yes
Carcinogenic substances, cat. 1A and 1B acc. to Regulation (EC) No. 1272/2008	< 0.001 mg/m ³	≤ 0.001 mg/m ³	yes

Chemical Contaminant	Result	Emission Limit – Exemplary Level Criteria	Requirement hold [yes/no]
Emission analysis			
Measurement time: 28 days after test chamber loading			
Formaldehyde	< 0.002 mg/m ³	≤ 0.01 mg/m ³	yes
TVOC	0.008 mg/m ³	≤ 0.3 mg/m ³	yes
TSVOC	< 0.005 mg/m ³	≤ 0.1 mg/m ³	yes
Carcinogenic substances, cat. 1A and 1B acc. to Regulation (EC) No. 1272/2008	< 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 ≥ 50 %. Similarly, a result slightly below the specification value also only has a probability of ≥ 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 BREEAM criteria

The sample with the internal sample number 58137-A001, article description according to order: **TM Polygood**, meets the emission requirements of BREEAM.

Cologne, 08/05/2023

A handwritten signature in black ink, appearing to read 'N. Rasch', is positioned above the printed name.

Nora Rasch,
(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 sample

Date: 31/03/2023
Sample preparation: not applicable
Masking of backside: no
Masking of edges: no
Relationship of unmasked edges to surface: not applicable
Loading reference unit: area-specific [m²]
Dimensions: 32.4 cm x 32.4 cm; thickness: 1.2 cm

A001, Test chamber conditions according to DIN EN ISO 16000-9:2008-04

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: 1.8 m²/m³
Specific air flow rate: 0.278 m³/(m² · h)
Starting time of the test (t₀): 31/03/2023
Air sampling: 28 days after test chamber loading

Analytics

Aldehydes and ketones | DIN ISO 16000-3:2013-01
Limit of quantification: 2 µg/m³
Volatile organic compounds | DIN ISO 16000-6:2022-03
Limit of quantification: 1 µg/m³ (1,4-Cyclohexanedimethanol, Diethylene glycol,
1,4-Butanediol: 5 µg/m³)
Note for analysis: not specified



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

Test result:

Internal sample number: | 58137-A001

No.	Substance	CAS No.	RT [min]	Concentration+ calib. substances ≥ 1 µg/m³ uncalib. substances ≥ 1 µg/m³ DNPH ≥ 2 µg/m³ [µg/m³]	Toluene- equivalent substances ≥ 5 µg/m³ [µg/m³]	CMR Classifi- cation++	LCI AgBB 2021 [µg/m³]	R-value
1	Aromatic hydrocarbons							
1-25	Styrene	100-42-5	11.3	9	8	Group 2A	250	0.04
7	Aldehydes							
7-20	Acetaldehyde	75-07-0		3	n. d.	Carc. 1B Muta. 2	300	0.01
8	Ketones							
8-10	Acetone	67-64-1		3	n. d.		120000	0.00
13	Other identified substances in addition to LCI list							
	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.99	2	< 5			
	not ident. VVOC, m/z 79*		4.65	1	< 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 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: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (sum)	9	2.5
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	< 0.28

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	8	2.2
Sum of VOC according to AgBB 2021	9	2.5
Sum of VOC according to eco-INSTITUT-Label	11	3.1
Sum of VOC according to DIN ISO 16000-6	17	4.8

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	< 1.4
Sum of SVOC without LCI according to AgBB 2021	< 5	< 1.4
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.28
Sum of SVOC with LCI according to AgBB 2021	< 5	< 1.4

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2021	< 5	< 1.4
Sum of VVOC according to eco-INSTITUT-Label	7	2

*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 2021 (sum)	< 5	< 1.4
VOC without LCI according to eco-INSTITUT-Label (sum)	2	0.56
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)	3	0.84
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (sum)	< 1	< 0.28
Bicyclic Terpenes (sum)	< 1	< 0.28
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (sum)	< 1	< 0.28
C4 - C11 Aldehydes, acyclic, aliphatic (sum)	< 2	< 0.56
C9 - C15 Alkylated benzenes (sum)	< 1	< 0.28
Cresols (sum)	< 1	< 0.28

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.05
R-value according to AgBB 2021	0.04
R-value according to Belgian regulation	0.04
R-value according to EU-LCI	0.04

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, 08/05/2023

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



Appendix

Sampling sheet



Chain of Custody Sheet

Please fill in all fields. If the fields marked * are not filled in, the test piece cannot be accepted for laboratory testing.

58137-001

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

Order by*	UL GmbH	Testing laboratory	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 of production plant	The Good Plastic Company Ukraine LLC	Sampling by* (name, company, phone)	The Good Plastic Company BV
<input type="checkbox"/> Name of distribution (if different from production)		Sampling location*	Keersluisweg 7, Hall 1 1332 EE Almere, The Netherlands
Name of test sample/ item*	TM Polygood	Product type (e.g. parquet, floor covering)	Construction material for wall, ceiling, and floor coverings. Furniture, interior construction, and design elements.
Article number Model / Program / Series	28032023	Sample/ Batch*	28032023
Plant name and location	The Good Plastic Company Ukraine LLC, 58032 Chernivtsi, Chernivtsi region, Golovna street 246B, Ukraine	Production date of batch*	March 22nd, 2023
Sample taken from	<input checked="" type="checkbox"/> current production <input type="checkbox"/> storage <input type="checkbox"/> other	Sampling date*	March 28nd, 2023
Storage location	58032 Chernivtsi, Chernivtsi region, Golovna street 246B, Ukraine	Storage conditions before sampling	<input checked="" type="checkbox"/> open <input type="checkbox"/> packaged
		Packaging material	cardboard, LDPE package film.

Additional information, if applicable / Special issues
 Uncertainties, questions, possible negative effects through emissions at place of sampling - e.g. contaminations during production/storage

Validation*
 By signing the accuracy of the above-mentioned statements (**sampling**) is affirmed.

Date
 (dd/mm/yyyy) 28/03/2023

Signature

eco-INSTITUT Germany GmbH / Schanzenstrasse 6-20 / Carlswerk 1.19 / 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 / Volksbank Rhein-Erft-Köln eG, IBAN: DE60370623651701900010, BIC: GENODE33HAN

Remark: It is not permitted to publish extracts of this report and the comments on the first page of this report apply.

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)
 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-Phenyloctane
 1-Phenyldecane²
 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
 2,2,4,6,6-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 (phenols) (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)^{1,3}
 Isobutenal (Methacrolein)³
 2-Butenal³
 2-Pentenal³
 2-Hexenal
 2-Heptenal
 2-Octenal



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

Ketones (14)

Acetone^{1,3}
1-Hydroxyacetone
Ethylmethylketone³
Methylisobutylketone
3-Methyl-2-butanone
Cyclopentanone
2-Methylcyclopentanone
Cyclohexanone
2-Methylcyclohexanone
2-Hexanone
2-Heptanone
Acetophenone
Isophorone
Benzophenone²

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 (31)

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
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

Chlorinated hydrocarbons (17)

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

Cyclic siloxanes (5)

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

Others (41)

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-Butanonoxime⁴
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)^{2,4}
Formamide
Dimethylformamide (DMF)
Acetamide
N-Nitrosopyrrolidine⁴
N-Methyl-2-pyrrolidone
N-Ethyl-2-pyrrolidone
N-Butyl-2-pyrrolidone
Aniline
4-Chloroaniline⁴
2-Nitroanisole⁴
Cyclohexyl isocyanate
p-Cresidine⁴
Diethyl sulfate⁴
Epichlorohydrin⁴

1 VVOC

2 SVOC

3 Analysis acc. to DIN ISO 16000-3:2013-01 (DNPH)

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

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)
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")
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)
VOC (volatile organic compound)	Organic compound eluting in the retention range from C6 (n-hexane) to C16 (n-hexadecane)
TVOC	Sum of the concentrations of all identified and unidentified volatile organic compounds eluting in the retention range from C6 (n-hexane) to C16 (n-hexadecane)
TVOC according to DIN EN 16516	Sum of all VOC $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C6 to C16, 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 C6 - C16 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)
VVOC (very volatile organic compound)	Organic compound eluting in the retention range $< \text{C6}$ (n-hexane)



TVOC	Sum of the concentrations of all identified and unidentified very volatile organic compounds eluting in the retention range < C6 (n-hexane)
TVOC 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)
TVOC 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)
SVOC (semi volatile organic compound)	Organic compound eluting in the retention range > C16 (n-hexadecane) to C22 (docosane)
TSVOC	Sum of the concentrations of all identified and unidentified semi volatile organic compounds eluting in the retention range > C16 (n-hexadecane) to C22 (docosane)
TSVOC according to DIN EN 16516	Sum of all SVOC $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TSVOC without LCI according to AgBB	Sum of all SVOC without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (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 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)
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)

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 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 derivatized 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 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 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.