

INFORME No.: 068436-1

CLIENTE:	INDUSTRIA ESPAÑOLA PARA EL DES E INV, S.A.
PERSONA DE CONTACTO:	Patricia Silva
DIRECCIÓN:	Pol. Ind. Poliviso. C/ Herreros, 84 41520 EL VISO DEL ALCOR (Sevilla)
OBJETO:	“Emission test according to the California Department of Public Health (CDPH) Standard Method v1.1–2010 (CA 01350)”
MUESTRA ENSAYADA:	Ecosphere Premium
FECHA DE RECEPCION:	05.07.2017
FECHAS DE ENSAYO:	11.07.2017 a 05.09.2017
FECHA DE EMISIÓN:	14.09.2017



Blanca Ruiz de Gauna
Jefe Laboratorio de Caracterización de
Materiales de Construcción
División Servicios Tecnológicos

* Los resultados del presente informe conciernen, única y exclusivamente al material ensayado.

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CARACTERISTICAS DE LAS MUESTRAS

Con fecha 05.07.2017 se recibió en Fundación Tecnalía R&I por parte de la empresa **“INDUSTRIA ESPAÑOLA PARA EL DES E INV, S.A.”** una muestra referenciada como:

- Ecosphere Premium

ENSAYO SOLICITADO

El ensayo solicitado es el siguiente:

- ◆ Ensayo de emisión según: California Department of Public Health (CDPH) Standard Method v1.1–2010 (CA 01350)”

ENSAYO REALIZADO

El ensayo se ha realizado en una cámara con las siguientes condiciones:

- Condiciones de la cámara de ensayo
 - Volumen: 0.125 m³
 - Temperatura y humedad relativa: 23°C al 50% HR.
 - Presión: atmosférica
 - Renovación del aire: 1,0 h⁻¹
 - Velocidad del aire: 0,3 m/s
 - Factor de carga: 0,495 m²/m³

Esta evaluación se basa en los criterios de ensayo de “California Department of Public Health (CDPH) standard method v1.2-2017 (CA 01350)”.

Las concentraciones de VOCs se calculan como la tasa de emisión específica (SERa). Para la "Concentración aérea estimada en una oficina privada estándar" el SERa se divide por el caudal referido al área específica para las pinturas de pared o revestimientos de pared en una oficina privada normalizada (0,62 m³/m²·h) (según el capítulo 4.3 "IAQ Concentration Modelling").

RESULTADOS

Los resultados plasmados en el informe de ensayo se evaluaron según "Target CREL VOCs, CS01350, Tabla 4-1)

No	Compuesto	CAS-No.	SERa 14d [µg/m ² h]	Concentración aérea estimada en una oficina normalizada * (SER 14d dividido por 0.62 [m ³ /m ² h]) [µg/m ³]	Concentración permisible en una oficina privada normalizada [µg/m ³]	Cumplimiento de requisito [si/no]
1-1	Toluene	108-88-3	< 2,02	< 3,3	150	Si
1-2	Ethylbenzene	100-41-4	< 2,02	< 3,3	1000	Si
1-3	p- Xylene, m- Xylene, o- Xylene, (suma)	106-42-3, 108-38-3, 95-47-6	< 2,02	< 3,3	350	si
1-25	Styrene	100-42-5	< 2,02	< 3,3	450	si
1-30	Naphthalene	91-20-3	< 2,02	< 3,3	4,5	si
2-2	n-Hexane	110-54-3	< 2,02	< 3,3	3500	si
4-3	Isopropanol	67-63-0	< 2,02	< 3,3	3500	si
5-1	Phenol	108-95-2	< 2,02	< 3,3	100	si
6-2	Ethylene glycol (Ethandiol)	107-21-1	< 2,02	< 3,3	200	si
6-8	1-Methoxy-2-propanol	107-98-2	< 2,02	< 3,3	3500	si
6-13	2-Methoxyethanol	109-86-4	< 2,02	< 3,3	30	si
6-14	2-Ethoxyethanol	110-80-5	< 2,02	< 3,3	35	si
6-20	2-Methoxyethyl acetate	110-49-6	< 2,02	< 3,3	45	si
6-21	2-Ethoxyethyl acetate	111-15-9	< 2,02	< 3,3	150	si
7-20	Acetaldehyde	75-07-0	< 2,02	< 3,3	70	si
7-22	Formaldehyde	50-00-0	< 2,02	< 3,3	9	si
10-3	Vinyl acetate	108-05-4	< 2,02	< 3,3	100	si
11-1	Tetrachlorethene	127-18-4	< 2,02	< 3,3	17,5	si
12-1	Dioxane (1.4-)	123-91-1	< 2,02	< 3,3	1500	si
-	Benzene	71-43-2	< 2,02	< 3,3	1,5	n.d.
-	1,4-Dichlorobenzene	106-46-7	< 2,02	< 3,3	400	si
-	Dimethylformamide (DMF)	68-12-2	< 2,02	< 3,3	40	si
-	Isophorone	78-59-1	< 2,02	< 3,3	1000	si
-	Trichlorethene	79-01-6	< 2,02	< 3,3	300	si
-	Carbon tetrachloride	56-23-5	< 2,02	< 3,3	20	si
-	Chlorobenzene	108-90-7	< 2,02	< 3,3	500	si
-	Chloroform	67-66-3	< 2,02	< 3,3	150	si
-	1,1-Dichlorethylene	75-35-4	< 2,02	< 3,3	35	si
-	Epichlorhydrin	106-89-8	< 2,02	< 3,3	1,5	n.d.
-	Methyl chloroform	71-55-6	< 2,02	< 3,3	500	si
-	Methylene chloride	75-09-2	< 2,02	< 3,3	200	si
-	Methyl-t-butylether	1634-04-4	< 2,02	< 3,3	4000	si
-	Carbon disulfide	75-15-0	< 2,02	< 3,3	400	si

*) Oficina privada estándar: Volumen 30,6 m³, Superficie del suelo 11,1 m², Velocidad de cambio de aire 0,68 h-1, n.d. = no determinable

CONCLUSIONES

El producto *Ecosphere Premium* cumple con los requisitos de emisión del método "Emission testing method for California Specification 01350 (02/2017)".

ANEXO

Tecnalia Research & Innovation
Mikeletegi Pasealekua, 2
20009 Donostia - San Sebastian
ES

Test Report No. 52360-001

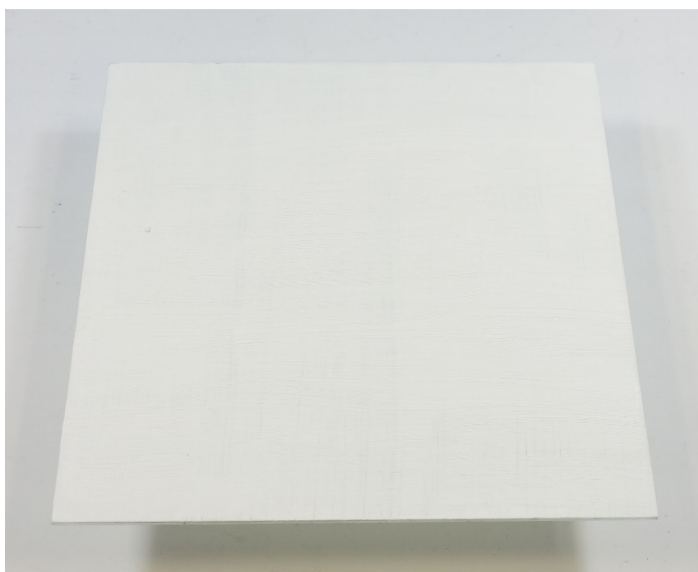
Test objective:	Emission test according to the California Department of Public Health (CDPH) Standard Method v1.1–2010 (CA 01350)
Sample description by client:	Ecosphere Premium
Sampled by:	Manufacturer
Date of sampling:	05.07.2017
Location of sampling:	at the client
Date of production:	not applicable
Date of arrival of sample:	18.07.2017
Test period:	18.07.2017 - 31.08.2017
Date of report:	05.09.2017
Number of pages of report:	14
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓

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Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A001	Ecosphere Premium	without objection	Paint



A001: Ecosphere Premium

Remark: The test results refer 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 authorization.

Expert Evaluation

The product **Ecosphere Premium** has been tested on behalf of **Tecnia Research & Innovation**.

This evaluation bases on the test criteria of the „ California Department of Public Health (CDPH) Standard Method v1.2–2017 (CA 01350)“.

The VOC concentrations are calculated as Specific Emission Rate (SER_a). For the “Estimated Airborne Concentration in a standard private office” the SER_a is divided by area-specific flow rate of 0,62 m³/m²h for wall paints, wall coverings in a standard private office (acc. to chapter 4.3 “IAQ Concentration Modeling”).

The results documented in the test report were evaluated as follows (acc. to Target CREL VOCs, CS01350, Table 4-1):

No	Compound Name	CAS-No.	SER _a 14d [µg/m ² h]	Estimated Air- borne Concen- tration in standard pri- vate office* (SER 14d di- vided by 0.62 [m ³ /m ² h]) [µg/m ³]	Allowable Concen- tration in stan- dard private office [µg/m ³]	Requirement hold [yes/no]
1-1	Toluene	108-88-3	< 2,02	< 3,3	150	yes
1-2	Ethylbenzene	100-41-4	< 2,02	< 3,3	1000	yes
1-3	p- Xylene, m- Xylene, o- Xylene, (sum)	106-42-3, 108-38-3, 95-47-6	< 2,02	< 3,3	350	yes
1-25	Styrene	100-42-5	< 2,02	< 3,3	450	yes
1-30	Naphthalene	91-20-3	< 2,02	< 3,3	4,5	yes
2-2	n-Hexane	110-54-3	< 2,02	< 3,3	3500	yes
4-3	Isopropanol	67-63-0	< 2,02	< 3,3	3500	yes
5-1	Phenol	108-95-2	< 2,02	< 3,3	100	yes
6-2	Ethylene glycol (Ethandiol)	107-21-1	< 2,02	< 3,3	200	yes
6-8	1-Methoxy-2-propanol	107-98-2	< 2,02	< 3,3	3500	yes
6-13	2-Methoxyethanol	109-86-4	< 2,02	< 3,3	30	yes
6-14	2-Ethoxyethanol	110-80-5	< 2,02	< 3,3	35	yes
6-20	2-Methoxyethyl acetate	110-49-6	< 2,02	< 3,3	45	yes
6-21	2-Ethoxyethyl acetate	111-15-9	< 2,02	< 3,3	150	yes
7-20	Acetaldehyde	75-07-0	< 2,02	< 3,3	70	yes
7-22	Formaldehyde	50-00-0	< 2,02	< 3,3	9	yes
10-3	Vinyl acetate	108-05-4	< 2,02	< 3,3	100	yes
11-1	Tetrachlorethene	127-18-4	< 2,02	< 3,3	17,5	yes

Remark: The test results refer 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 authorization.

No	Compound Name	CAS-No.	SER _a 14d [µg/m ² h]	Estimated Air- borne Concen- tration in standard pri- vate office* (SER 14d di- vided by 0.62 [m ³ /m ² h]) [µg/m ³]	Allowable Concen- tration in stan- dard private office [µg/m ³]	Requirement hold [yes/no]
12-1	Dioxane (1.4-)	123-91-1	< 2,02	< 3,3	1500	yes
-	Benzene	71-43-2	< 2,02	< 3,3	1,5	n.d.
-	1,4-Dichlorbenzene	106-46-7	< 2,02	< 3,3	400	yes
-	Dimethylformamide (DMF)	68-12-2	< 2,02	< 3,3	40	yes
-	Isophorone	78-59-1	< 2,02	< 3,3	1000	yes
-	Trichlorethene	79-01-6	< 2,02	< 3,3	300	yes
-	Carbon tetrachloride	56-23-5	< 2,02	< 3,3	20	yes
-	Chlorbenzene	108-90-7	< 2,02	< 3,3	500	yes
-	Chloroform	67-66-3	< 2,02	< 3,3	150	yes
-	1,1-Dichlorethylene	75-35-4	< 2,02	< 3,3	35	yes
-	Epichlorhydrin	106-89-8	< 2,02	< 3,3	1,5	n.d.
-	Methyl chloroform	71-55-6	< 2,02	< 3,3	500	yes
-	Methylene chloride	75-09-2	< 2,02	< 3,3	200	yes
-	Methyl-t-butylether	1634-04-4	< 2,02	< 3,3	4000	yes
-	Carbon disulfide	75-15-0	< 2,02	< 3,3	400	yes

*) Standard private office: Volume 30,6 m³, Floor surface 11,1 m², Air change rate 0,68 h⁻¹,

n.d. = not determinable

Summary evaluation

The product **Ecosphere Premium** fulfills the emission requirements of the "Emission testing method for California Specification 01350 (02/2017)".

Cologne, 05.09.2017



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

Remark: The test results refer 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 authorization.

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:	28.07.2017
Pre-treatment:	Application on glass with a brush; 1 st layer: application quantity 112 µg/m ² ; interim drying between 1 st and 2 nd layer: 2 hours 2 nd layer: application quantity 112 µg/m ²
Masking of backside:	not applicable
Masking of edges:	no
Relationship of unmasked edges to surface:	not applicable
Loading:	related to area
Dimensions:	25 cm x 25 cm [6,93g / application]

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:	1.0 h ⁻¹
Air velocity:	0,3 m/s
Loading:	0.495 m ² /m ³
Specific air flow rate:	2.02 m ³ /(m ² · h)
Air sampling:	11 days after test chamber loading 12 days after test chamber loading 14 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 11 days

Test objective:

Volatile Organic Compounds (VOC), test chamber, air sampling 11 days after test chamber loading

Test result:

Sample: A001: Ecosphere Premium

Total volatile organic compounds (Toluene equivalent DIN ISO 16000-6)	Concentration (test chamber air) [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$]
TVOC _{11d}	4	8,1

Substance	Concentration (test chamber air) [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$]
Formaldehyde	2	4

1.2 Sample A001, Volatile Organic Compounds after 12 days

Test objective:

Volatile Organic Compounds (VOC), test chamber, air sampling 12 days after test chamber loading

Test result:

Sample: A001: Ecosphere Premium

Total volatile organic compounds (Toluene equivalent DIN ISO 16000-6)	Concentration (test chamber air) [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$]
TVOC _{12d}	3	6,1

Substance	Concentration (test chamber air) [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$]
Formaldehyde	< 2	< 2

1.3 Sample A001, Volatile Organic Compounds after 14 days

Test objective:

Volatile Organic Compounds (VOC), test chamber, air sampling 14 days after test chamber loading

Test result:

Sample: A001: Ecosphere Premium

No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air)	Toluene- equivalent	CMR	CREL	SER
				Substances ≥ 1 µg/m³ 14 days [µg/m³]	Substances ≥ 5 µg/m³ 14 days [µg/m³]	Classifi- cation++	CDPH [µg/m³]	[µg/m³]
8	Ketones							
8-10	Acetone	67-64-1		2			6	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: Kategorie III1 and III2

* unidentified substance, calculated as toluene equivalent

TVOC, Total volatile organic compounds	Concentration after 14 days [µg/m³]	SER _a [µg/m²h]
Sum of VOC according to ISO 16000-6	3	6,1

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

Remark: The test results refer 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 authorization.

1.4 Carbon disulfide (CS₂, test chamber)

Test parameter:

Carbon disulfide (CS₂)

Test method:

Analytics: | DIN ISO 16000-6
Limit of determination: | µg/m³

Test result:

Sample	Parameter	Measurement time [days]	Concentration (test chamber) [µg/m ³]
A001: Ecosphere Pre- mium	Carbon disulfide CS ₂	14	< 1

Cologne, 05.09.2017



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

Appendix

I Sampling sheet

Produktprüfung Product testing
 Zertifizierung Certification
 Beratung Consulting



Sampling Sheet*

Testing laboratory	eco-INSTITUT Germany GmbH Schanzenstr. 6-20, D-51063 Cologne Germany Tel. +49 (0)221 - 931245-0 Fax +49 (0)221 - 931245-33	Sampler	Same as manufacturer. (Name, Company, Phone number)
Name of manufacturer / distributor at place of sampling (Address / Stamp)	Industria Española para el desarrollo y la investigación, S.A. (IEDISA) Pol. Ind. Poliviso, C\Herreros,8 41520 Viso del Alcor, Sevilla (Spain)	Customer/ Invoice recipient (if different from manufacturer)	TECNALIA CIF: G48975767 Parque Científico y Tecnológico de Bizkaia C\Geldo, Edificio 700 E-48160 Derio (Bizkaia) Spain

Product name	Ecosphere Premium	Product type	Paint (e.g. parquet, floor covering)
Model / programme / series	--	Batch	--
Article number	--	Production date of batch	--

Samples are taken from	<input type="checkbox"/> current production <input checked="" type="checkbox"/> storage	Sampling date	05.07.17
Storage location before sampling	<input type="checkbox"/> in production <input checked="" type="checkbox"/> storage <input type="checkbox"/> other	Storage conditions before sampling	<input type="checkbox"/> open <input checked="" type="checkbox"/> packaged
Storage location:	Manufacturer location	Packaging material:	Plastic

Special features (possible negative effects through emissions at place of sampling (e.g. benzine, exhaust fumes), unclarities, questions etc.)	Application 6-9m2/l (2 coats) (worst case 223g/m2) Mineral formulation.
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Validation
 Hereby the signer affirms the accuracy of the above-mentioned statements. The sample was chosen, sampled and packaged according to the sampling guidelines.

Date: 11.07.17 Signature:  Inspiring Business
 (Company stamp)
 Fundación TECNALIA Research & Innovation

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

Order	068436
(Please insert quote number, or - if not available, please enter the desired analysis)	Tecnalia internal order: spc17-06658

Remark: The test results refer 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 authorization.

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 prEN 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 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 $\geq 5 \mu\text{g}/\text{m}^3$ 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 2015
R value according to AgBB 2015/DIBt	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2015
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 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 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 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.

IV 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.