

INFORME No.: 095296-5

CLIENTE:	INDUSTRIAS TITAN, S.A.U.
PERSONA DE CONTACTO	Maite Barrabes
DIRECCIÓN:	Pol. Ind. Pratense, calle 114, nº 21-23 08820 El Prat de Llobregat (Barcelona)
OBJETO:	Emisión de VOCs y clasificación según el esquema AgBB 2018
MUESTRA ENSAYADA:	«ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO»
FECHA DE RECEPCION:	21.06.2021
FECHAS DE ENSAYO:	29.06.2021 a 18.08.2021
FECHA DE EMISIÓN:	31.08.2021



Blanca Ruiz de Gauna
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CARACTERISTICAS DE LAS MUESTRAS

Con fecha 21.06.2021 se recibió en Fundación Tecnalía R&I por parte de la empresa **“INDUSTRIAS TITAN, S.A.U.”** una muestra referenciada como⁽¹⁾

- «ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO»

ENSAYOS SOLICITADOS

Los ensayos solicitados son los siguientes:

- ♦ Ensayo de emisión de VOC's (Compuestos orgánicos volátiles) según la norma EN 16516 para establecer una clasificación según los criterios establecidos en el esquema “Health-related Evaluation of Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products” del comité para la evaluación de aspectos de salud de los productos de la construcción (AgBB 2018). Los ensayos se han realizado en el laboratorio acreditado “eco-INITIUT” cuyo informe original se adjunta como Anexo I.

ENSAYOS REALIZADOS

El ensayo se ha realizado en una cámara con las siguientes condiciones, según la norma ISO 16000-9:

- Condiciones de la cámara de ensayo
 - Volumen: 0,125m³
 - Temperatura y humedad relativa: 23°C al 50% HR.
 - Presión: atmosférica
 - Renovación del aire: 0,5 h⁻¹
 - Velocidad del aire: 0,3 m/s

La determinación de las emisiones de VOC's se realiza según indica la norma EN 16516 y las analíticas según la norma ISO 16000-6:2006 para VOC's (El límite de detección de las técnicas empleadas es de 1 µg/m³) y según la norma ISO 16000-3 para aldehídos y cetonas (siendo el límite de detección para aldehídos y cetonas de 2 µg/m³).

RESULTADOS

Los resultados de Compuestos orgánicos volátiles (VOCs) obtenidos tras 3 días se resumen en las siguientes tablas:

Tabla I

No.	Substancia	Nº CAS.	RT [min] Tiempo de retención	Concentración + (aire cámara ensayo) Substancias ≥ 1 $\mu\text{g}/\text{m}^3$ 3 días [$\mu\text{g}/\text{m}^3$]	Equivalente tolueno Substancias ≥ 5 $\mu\text{g}/\text{m}^3$ 3 días [$\mu\text{g}/\text{m}^3$]	Clasificación CMR	LCI AgBB 2018 [$\mu\text{g}/\text{m}^3$]	Valor R
6	Glicoles, Éteres de glicol, Ésteres de glicol							
6-1	Propilenglicol (1,2-Dihidroxipropano)	57-55-6	7.07	6			2100	0.00
6-31	Monobutileno de dipropilenglicol éter	29911-28-2	17.96	74	77		810	0.09
6-38	Etildiglicol, (dietilenglicol éter monoetilico, 2-(2- Etoxietyl) etanol)	111-90-0	12.85	28	16		350	0.08
8	Cetonas							
8-1	Etilmetilcetona	78-93-3		2			20000	0.00
8-10	Acetona	67-64-1		3			1200	0.00
9	Ácidos							
9-8	Ácido n-heptanoico	111-14-8	14.11	4			2100	0.00
12	Otros							
12-7	n-Etil-2-pirrolidona	2687-91-4	15.28	3		Repr. 1B	400	0.01

+ Substancias identificadas y calibradas, substancias calculadas específicamente.

++ Clasificación según el reglamento (EC) N° 1272/2008: Categorías Carc. 1A y 1B, Muta. 1A y 1B, Repr. 1A y 1B, TRGS 905: K1 y K2, M1 y M2, R1 y R2, IARC: Grupo 1 y 2A, DFG (Lista MAK): Categoría III1 y III2

* Substancias no identificadas, calculadas como equivalente de tolueno referenciadas como los fragmentos másicos representativos expresados como relación masa/carga (m/z)

Tabla II

Componentes carcinógenos, mutagénicos y tóxicos para la reproducción*	Concentración tras 3 días [µg/m³]	SER_a [µg/m².h]
CMR 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A y 1B, Muta. 1A y 1B, Repr. 1A y 1B; - TRGS 905: K1, K2, M1, M2, R1, R2; - IARC: Grupo 1 y 2A; - DFG (lista MAK): Categorías III1, III2 (Suma)	3	30
C 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A u. 1B, (Suma)	<1	<10

Tabla III

TVOC, Compuestos Orgánicos Volátiles Totales	Concentración tras 3 días [µg/m³]	SER_a [µg/m².h]
Suma de VOC según DIN EN 16516	93	930
Suma de VOC según AgBB 2018 / DIBt	110	1100
Suma de VOC según eco-INSTITUT-Label	120	1200
Suma de VOC según ISO 16000-6	110	1100

Tabla IV

TSVOC, Compuestos Orgánicos Semivolátiles Totales	Concentración tras 3 días [µg/m³]	SER_a [µg/m².h]
Suma de SVOC según DIN EN 16516	<5	<50
Suma de SVOC sin LCI según AgBB 2018 / DIBt	<5	<50
Suma de SVOC sin LCI según eco-INSTITUT-Label	<1	<10
Suma de SVOC con LCI según AgBB 2018 / DIBt	<5	<50

Tabla V

TVVOC Compuestos Orgánicos Muy Volátiles Totales	Concentración tras 3 días [µg/m³]	SER_a [µg/m².h]
Suma de VVOC según AgBB 2018 / DIBt y regulación belga	<5	<50
Suma de VVOC según eco-INSTITUT-Label	3	30

* Excluyendo el formaldehído (Carc. 1B) debido a que se asume un "valor límite práctico" por el que no se prevé un riesgo carcinogénico significativo (ver Federal Institute for Risk Assessment (2006): Toxicological evaluation of formaldehyde and Federal Environment Agency (2016): Reference value for formaldehyde in indoor air). En el caso de una evaluación de emisión toxicológica se necesita un análisis individual de la concentración de formaldehído. En opinión del comité para los valores guía de aire interior (Ausschuss für Innenraumrichtwerte) de la Agencia Federal de Medioambiente, no debería excederse, tampoco para un periodo corto de tiempo, la concentración de 0.1 mg formaldehído/m³ de aire interior, basada en la medida durante media hora (Bundesgesundheitsblatt 2016 · 59: 1040-1044 DOI 10.1007 / s00103 -016-2389-5 © Springer-Verlag Berlin Heidelberg 2016).

Tabla VI

Suma de otros Compuestos Orgánicos Volátiles (VOC)	Concentración tras 3 días [µg/m³]	SER_a [µg/m².h]
Suma de otros VOC sin LCI según AgBB/DIBt y reglamento belga	<5	<50
Suma de otros VOC sin LCI según eco-INSTITUT-Label	<1	<10
CMR 2: VOC (incl. VVOC y SVOC) correspondientes a las categorías: - Reglamento (EC) No. 1272/2008: Categoría Carc. 2, Muta. 2, Repr. 2; - TRGS 905: K3; - IARC: Grupo 2B; - DFG (lista MAK): Categorías III3 (Suma)	<1	<10
Compuestos sensibilizantes categorizados como: DFG (lista MAK): Categoría IV, Lista German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Suma)	<1	<10
Terpenos bicíclicos	<1	<10
C9 - C14: Alcanos / Isoalcanos expresado como equivalentes de decano (Suma)	<1	<10
C4-C11 aldehídos, acíclicos, alifáticos (Suma)	<2	<20
C9-C15 Bencenos alquilados (Suma)	<1	<10
Cresoles (Suma)	<1	<10

Tabla VII

Valor de riesgo para evaluación de LCI	Valor R
Valor R según eco-INSTITUT-Label	0.19
Valor R según AgBB 2018 / DIBt	0.17
Valor R según regulación belga	0.17
Valor R según AFSSET	0.38

Nota:

Los valores de R pueden variar debido a los distintos requisitos de las distintas guías.

Los compuestos carbonílicos de cadena corta (C1-C5) se cuantifican mediante HPLC según DIN ISO 16000-3:2013-01.

Por lo tanto, no se dan equivalentes de tolueno para los COV. Estas sustancias se toman en consideración mediante su calibración específica de sustancias a través de la suma de COV según la norma DIN EN 16516:2018-01. Sin embargo, para los COV, la calibración específica de la sustancia se realiza mediante HPLC, mientras que el TVOC se calcula utilizando el equivalente de tolueno determinado mediante Tenax según la norma DIN EN 16516:2018-01.

Los resultados de Compuestos orgánicos volátiles (VOCs) obtenidos tras 28 días se resumen en las siguientes tablas:

Tabla VIII

No.	Substancia	Nº CAS.	RT [min] Tiempo de retención	Concentración + (aire cámara ensayo) Substancias ≥ 1 $\mu\text{g}/\text{m}^3$ 28 días [$\mu\text{g}/\text{m}^3$]	Equivalente tolueno Substancias $\geq 5 \mu\text{g}/\text{m}^3$ 28 días [$\mu\text{g}/\text{m}^3$]	Clasificación CMR	LCI AgBB 2018 [$\mu\text{g}/\text{m}^3$]	Valor R
6	Glicoles, Éteres de glicol, Ésteres de glicol							
6-31	Monobutileno de dipropilenglicol éter	29911-28-2	13.38	18	14		810	0.02
7	Aldehídos							
7-22	Formaldehído	50-00-0		2		Carc. 1B Muta. 2	100	0.02

+ Sustancias identificadas y calibradas, sustancias calculadas específicamente.

++ Clasificación según el reglamento (EC) N° 1272/2008: Categorías Carc. 1A y 1B, Muta. 1A y 1B, Repr. 1A y 1B, TRGS 905: K1 y K2, M1 y M2, R1 y R2, IARC: Grupo 1 y 2A, DFG (Lista MAK): Categoría III1 y III2

* Sustancias no identificadas, calculadas como equivalente de tolueno referenciadas como los fragmentos másicos representativos expresados como relación masa/carga (m/z)

Tabla IX

Componentes carcinógenos, mutagénicos y tóxicos para la reproducción*	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
CMR 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A y 1B, Muta. 1A y 1B, Repr. 1A y 1B; - TRGS 905: K1, K2, M1, M2, R1, R2; - IARC: Grupo 1 y 2A; - DFG (lista MAK): Categorías III1, III2 (Suma)	<1	<10
C 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A u. 1B, (Suma)	<1	<10

Tabla X

TVOC, Compuestos Orgánicos Volátiles Totales	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
Suma de VOC según DIN EN 16516	14	140
Suma de VOC según AgBB 2018 / DIBt	18	180
Suma de VOC según eco-INSTITUT-Label	18	180
Suma de VOC según ISO 16000-6	16	160

Tabla XI

TSVOC, Compuestos Orgánicos Semivolátiles Totales	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
Suma de SVOC según DIN EN 16516	<5	<50
Suma de SVOC sin LCI según AgBB 2018 / DIBt	<5	<50
Suma de SVOC sin LCI según eco-INSTITUT-Label	<1	<10
Suma de SVOC con LCI según AgBB 2018 / DIBt	<5	<50

Tabla XII

TVVOC Compuestos Orgánicos Muy Volátiles Totales	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
Suma de VVOC según AgBB 2018 / DIBt y regulación belga	<5	<50
Suma de VVOC según eco-INSTITUT-Label	2	20

* Excluyendo el formaldehído (Carc. 1B) debido a que se asume un "valor límite práctico" por el que no se prevé un riesgo carcinogénico significativo (ver Federal Institute for Risk Assessment (2006): Toxicological evaluation of formaldehyde and Federal Environment Agency (2016): Reference value for formaldehyde in indoor air). En el caso de una evaluación de emisión toxicológica se necesita un análisis individual de la concentración de formaldehído. En opinión del comité para los valores guía de aire interior (Ausschuss für Innenraumrichtwerte) de la Agencia Federal de Medioambiente, no debería excederse, tampoco para un periodo corto de tiempo, la concentración de 0.1 mg formaldehído/m³ de aire interior, basada en la medida durante media hora (Bundesgesundheitsblatt 2016 – 59: 1040-1044 DOI 10.1007 / s00103 -016-2389-5 © Springer-Verlag Berlin Heidelberg 2016).

Tabla XIII

Suma de otros Compuestos Orgánicos Volátiles (VOC)	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
Suma de otros VOC sin LCI según AgBB/DIBt y reglamento belga	<5	<50
Suma de otros VOC sin LCI según eco-INSTITUT-Label	<1	<10
CMR 2: VOC (incl. VVOC y SVOC) correspondientes a las categorías: - Reglamento (EC) No. 1272/2008: Categoría Carc. 2, Muta. 2, Repr. 2; - TRGS 905: K3; - IARC: Grupo 2B; - DFG (lista MAK): Categorías III3 (Suma)	2	20
Compuestos sensibilizantes categorizados como: DFG (lista MAK): Categoría IV, Lista German Federal Institute for Risk Assessment lists: Cat A, TRGS 907 (Suma)	2	20
Terpenos bicíclicos	<1	<10
C9 - C14: Alcanos / Isoalcanos expresado como equivalentes de decano (Suma)	<1	<10
C4-C11 aldehídos, acíclicos, alifáticos (Suma)	<2	<20
C9-C15 Bencenos alquilados (Suma)	<1	<10
Cresoles (Suma)	<1	<10

Tabla XIV

Valor de riesgo para evaluación de LCI	Valor R
Valor R según eco-INSTITUT-Label	0.04
Valor R según AgBB 2018 / DIBt	0.02
Valor R según regulación belga	0.02
Valor R según AFSSET	0.07

Nota:

Los valores de R pueden variar debido a los distintos requisitos de las distintas guías.

Los compuestos carbonílicos de cadena corta (C1-C5) se cuantifican mediante HPLC según DIN ISO 16000-3:2013-01.

Por lo tanto, no se dan equivalentes de tolueno para los COV. Estas sustancias se toman en consideración mediante su calibración específica de sustancias a través de la suma de COV según la norma DIN EN 16516:2018-01. Sin embargo, para los COV, la calibración específica de la sustancia se realiza mediante HPLC, mientras que el TVOC se calcula utilizando el equivalente de tolueno determinado mediante Tenax según la norma DIN EN 16516:2018-01.

Evaluación de resultados:

El producto **«ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO»** se ha ensayado y se evalúa en base a los criterios de ensayo del esquema “Health-related Evaluation of Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products” del comité para la evaluación de aspectos de salud de los productos de la construcción (AgBB 2018):

Tabla XV. Evaluación de resultados			
Parámetro de ensayo	Resultado	Requisito	Cumplimiento (Si/No)
Tiempo de medida: 3 días después de introducir el producto en la cámara			
Suma VOC (C6-C16) incluyendo SVOCs con LCI ⁽¹⁾	0.11 mg/m ³	≤10 mg/m ³	Si
Suma sustancias carcinógenas (EU cat. 1A y 1B)	<0.001 mg/m ³	≤0.01 mg/m ³	Si
Tiempo de medida: 28 días después de introducir el producto en la cámara			
Suma VOC (C6-C16) incluyendo SVOCs con LCI ⁽¹⁾	0.018 mg/m ³	≤1 mg/m ³	Si
Suma SVOC sin LCI (C16-C22) ⁽¹⁾	<0.005 mg/m ³	≤0.1 mg/m ³	Si
Valor R-Wert (adimensional)	0.02	≤1	Si
Suma de VOC sin LCI	<0.005 mg/m ³	≤0.1 mg/m ³	Si
Suma sustancias carcinógenas (EU cat. 1A y 1B)	<0.001 mg/m ³	≤0.001 mg/m ³	Si

⁽¹⁾ Para la suma de VOC (C6-C16) y SVOCs (C16-C22) solo se consideran sustancias ≥5µg/m³

ANEXO

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

Test Report No. 56509-001-AgBB-L

Test objective:	Evaluation according to AgBB-scheme 2018
Name of test sample/item by client:	ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO (01T)
Sample/batch by client:	no information
Sampled by:	INDUSTRIAS TITAN, S.A.U, 08820 Prat de Llobregat, Barcelona
Date of sampling:	21.06.2021
Location of sampling:	INDUSTRIAS TITAN, S.A.U, 08820 Prat de Llobregat, Barcelona
Date of production:	no information
Date of arrival of sample:	29.06.2021
Test period:	29.06.2021 - 18.08.2021
Date of report:	18.08.2021
Number of pages of report:	19
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

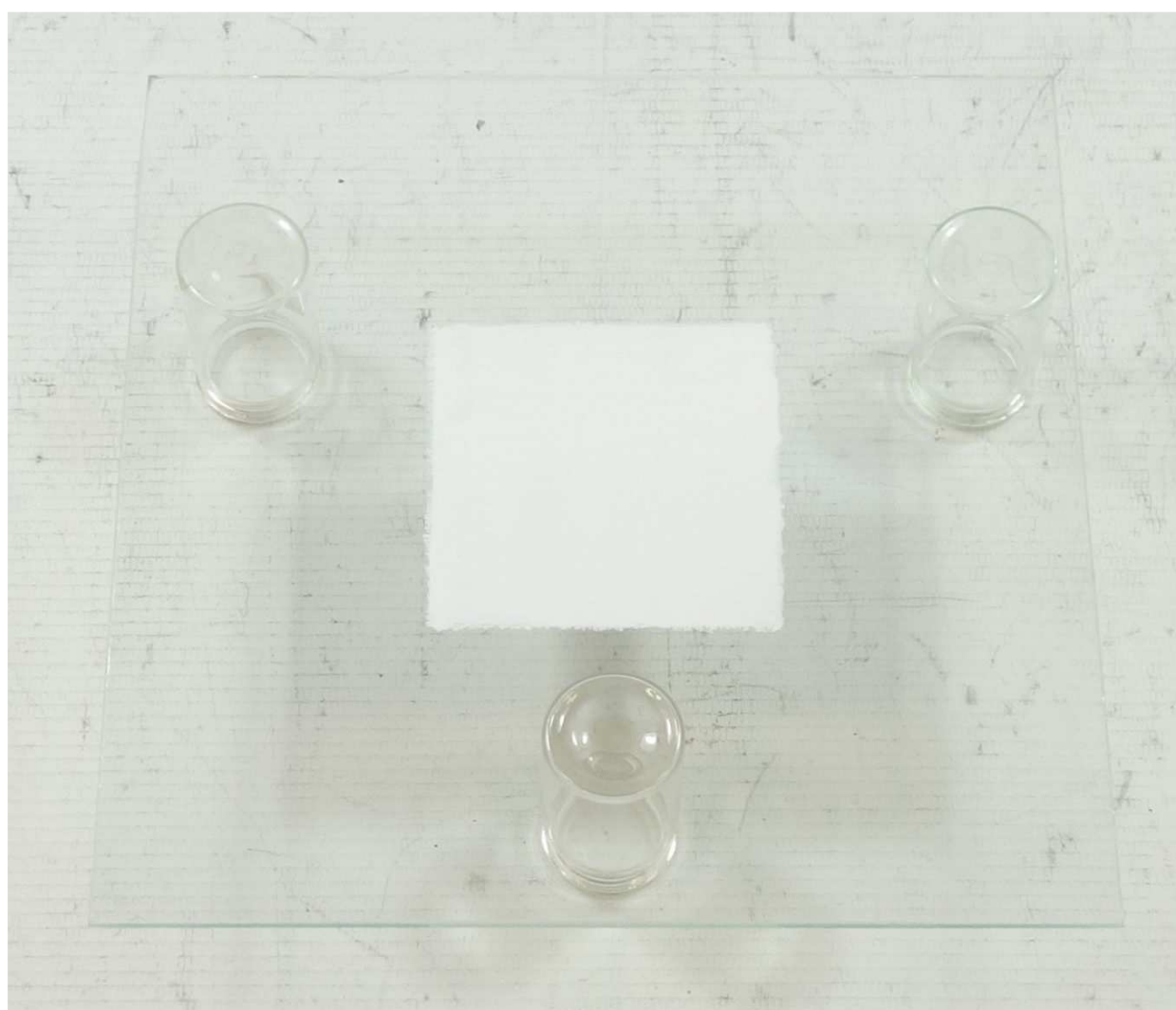
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¹ Testing laboratory: eco-INSTITUT Germany GmbH, Köln; except ‡ subcontracted, # outside accreditation

Sample View

Internal sample number (assigned by the laboratory)	Test sample/item by client	Sample/batch by client	Condition upon delivery	Type of sample
56509-A001	ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO (01T)	no information	without objection	for the protection and decoration of any surface in your home both indoors and outdoors. Furniture, doors, windows, radiators, garden furniture, machinery.



56509-A001

Statement of conformity with AgBB 2018

The sample with the internal sample number 56509-A001 has been tested on behalf of **Tecnalia Research & Innovation**. The article description according to the customer is **ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO (01T)**.

This evaluation is based on the test criteria of the Scheme “Health-related Evaluation of Emissions of Volatile Organic Compounds (VVOC, VOC and SVOC) from Building Products” of the Committee for Health-Related Evaluation of Building Products (AgBB 2018).

The results documented in the test report were evaluated as follows.²

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⁾	0.11 mg/m ³	≤ 10 mg/m ³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m ³	≤ 0.01 mg/m ³	yes
Measurement time: 28 days after test chamber loading			
Sum VOC (C6-C16) including SVOC with LCI ¹⁾	0.018 mg/m ³	≤ 1 mg/m ³	yes
Sum SVOC without LCI (C ₁₆ -C ₂₂) ¹⁾	< 0.005 mg/m ³	≤ 0.1 mg/m ³	yes
R-Wert (dimensionless)	0.02	≤ 1	yes
Sum VOC without LCI	< 0.005 mg/m ³	≤ 0.1 mg/m ³	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m ³	≤ 0.001 mg/m ³	yes

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

² 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 AgBB 2018

The sample with the internal sample number 56509-A001, article description according to customer: **ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO (01T)**, meets the emission requirements of the AgBB-Scheme.

Cologne, 18.08.2021

A handwritten signature in black ink, reading "M. A. Dobaj". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

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

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:

09.07.2021

Sample preparation:

Application on glass with a brush;
application quantity 130 g/m²; drying / pre-conditioning outside of the test
chamber 72 hours

Masking of backside:

not applicable

Masking of edges:

no

Relationship of unmasked
edges to surface:

not applicable

Loading:

related to area

Dimensions:

7.1 cm x 7.1 cm with 0.65 g

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

Chamber volume:

0.100 m³

Temperature:

23 °C ± 1 °C

Relative humidity:

50 % ± 1 %

Air pressure:

normal

Air:

cleaned

Air change rate:

0.5 h⁻¹

Air velocity:

0.3 m/s

Loading:

0.050 m³/m³

Specific air flow rate:

10 m³/(m² · h)

Air sampling:

3 days after test chamber loading
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 16000-6:2012-11

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 3 days

Test objective:

Volatile Organic Compounds (VOC), test chamber, air sampling 3 days after test chamber loading

Test result:

Internal sample number: | 56509-A001

No.	Substance	CAS No.	RT [min]	Concentration+ Substances ≥ 1 µg/m³ [µg/m³]	Toluene- equivalent Substances ≥ 5 µg/m³ [µg/m³]	CMR Classifi- cation++	LCI AgBB 2018 [µg/m³]	R-value
6	Glycols, Glycol ethers, Glycol esters							
6-1	Propylene glycol (1,2-Dihydroxypropane)	57-55-6	7.07	6			2100	0.00
6-31	Dipropylene glycol mono-n-butyl ether	29911-28-2	17.96	74	77		810	0.09
6-38	Ethylidiglycol, (Diethylene glycol monoethyl ether, 2-(2-Ethoxyethoxy) ethanol)	111-90-0	12.85	28	16		350	0.08
8	Ketones							
8-1	Ethylmethylketone	78-93-3		2			20000	0.00
8-10	Acetone	67-64-1		3			1200	0.00
9	Acids							
9-8	n-Heptanoic acid	111-14-8	14.11	4			2100	0.00
12	Others							
12-17	n-Ethyl-2-pyrrolidone	2687-91-4	15.28	3		Repr. 1B	400	0.01

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A, DFG MAK-list: Kategorie III1 and III2

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

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: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (Sum)	3	30
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 10

TVOC, Total volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	93	930
Sum of VOC according to AgBB 2018 / DIBt	110	1100
Sum of VOC according to eco-INSTITUT-Label	120	1200
Sum of VOC according to ISO 16000-6	110	1100

TSVOC, Total semi volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of SVOC according to DIN EN 16516	< 5	< 50
Sum of SVOC without LCI according to AgBB 2018 / DIBt	< 5	< 50
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 10
Sum of SVOC with LCI according to AgBB 2018 / DIBt	< 5	< 50

TVVOC, Total very volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2018 / DIBt and Belgian regulation	< 5	< 50
Sum of VVOC according to eco-INSTITUT-Label	3	30

*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 3 days [µg/m³]	SERa [µg/(m² · h)]
VOC without LCI according to AgBB/DIBt and Belgian regulation (Sum)	< 5	< 50
VOC without LCI according to eco-INSTITUT-Label (Sum)	< 1	< 10
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, M3, R3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	< 1	< 10
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (Sum)	< 1	< 10
Bicyclic Terpenes (sum)	< 1	< 10
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 10
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 20
C9 - C15 Alkylated benzenes (Sum)	< 1	< 10
Cresols (Sum)	< 1	< 10

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.19
R-value according to AgBB 2018 / DIBt	0.17
R-value according to Belgian regulation	0.17
R-value according to EU-LCI	0.38

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.

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:

Internal sample number: | 56509-A001

No.	Substance	CAS No.	RT [min]	Concentration+ Substances ≥ 1 µg/m³ [µg/m³]	Toluene- equivalent Substances ≥ 5 µg/m³ [µg/m³]	CMR Classifi- cation++	LCI AgBB 2018 [µg/m³]	R-value
6	Glycols, Glycol ethers, Glycol esters							
6-31	Dipropylene glycol mono-n-butyl ether	29911-28-2	13.38	18	14		810	0.02
7	Aldehydes							
7-22	Formaldehyde	50-00-0		2		Carc. 1B Muta. 2	100	0.02

+ identified and calibrated substances, substance specific calculated

++ Classification according to Regulation (EG) N° 1272/2008: Categories Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A, DFG MAK-list: Kategorie III1 and III2

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

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)	< 1	< 10
C 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EG) Nr. 1272/2008: Category Carc. 1A u. 1B (Sum)	< 1	< 10

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	14	140
Sum of VOC according to AgBB 2018 / DIBt	18	180
Sum of VOC according to eco-INSTITUT-Label	18	180
Sum of VOC according to ISO 16000-6	16	160

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	< 50
Sum of SVOC without LCI according to AgBB 2018 / DIBt	< 5	< 50
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 10
Sum of SVOC with LCI according to AgBB 2018 / DIBt	< 5	< 50

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2018 / DIBt and Belgian regulation	< 5	< 50
Sum of VVOC according to eco-INSTITUT-Label	2	20

*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/DIBt and Belgian regulation (Sum)	< 5	< 50
VOC without LCI according to eco-INSTITUT-Label (Sum)	< 1	< 10
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, M3, R3; IARC: Group 2B; DFG (MAK list): Category III3 (Sum)	2	20
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (Sum)	2	20
Bicyclic Terpenes (Sum)	< 1	< 10
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (Sum)	< 1	< 10
C4 - C11 Aldehydes, acyclic, aliphatic (Sum)	< 2	< 20
C9 - C15 Alkylated benzenes (Sum)	< 1	< 10
Cresols (Sum)	< 1	< 10

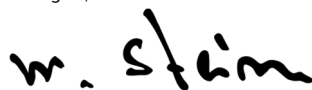
Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.04
R-value according to AgBB 2018 / DIBt	0.02
R-value according to Belgian regulation	0.02
R-value according to EU-LCI	0.07

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, 18.08.2021



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

Appendix

Sampling sheet

Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting

56509-001

eco
INSTITUT

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 (Name, Company, Phone number)	Same as manufacturer.
Name of manufacturer / distributor at place of sampling (Address / Stamp)	INDUSTRIAS TITAN, S.A.U Ind. Pratense, C/114 nº 21-23 08820 PRAT DE LLOBREGAT, BARCELONA	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	- ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO Codigo de producto: 01T	Product type (e.g. parquet, floor covering)	- ESMALTE ECOLÓGICO AL AGUA TITANLUX SATINADO Codigo de producto: 01T : for the protection and decoration of any surface in your home both indoors and outdoors. Furniture, doors, windows, radiators, garden furniture, machinery.
Model / programme / series	--	Batch	--
Article number	--	Production date of batch	--
Samples are taken from	☐ current production ☒ storage	Sampling date	21.06.21
Storage location before sampling	☐ in production ☒ storage ☐ other Storage location: Manufacturer location	Storage conditions before sampling	☐ open ☒ packaged Packaging material: Plastic
Special features (possible negative effects through emissions at place of sampling (e.g. benzene, exhaust fumes), unclarities, questions etc.)		Application rate: : 130,04gr/m2.	
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: 25.06.21 Signature:  Inspiring Business (Company stamp)  Foundation TECNALIA Research & Innovation			

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

eco-INSTITUT Germany GmbH · Schanzenstrasse 6-20 · Carlsplatz Superbug 3.2 · D-51063 Köln · Germany
Tel. +49 221 931245-0 / Fax +49 221 931245-33 · eco-institut.de · Geschäftsführer: Dr. Frank Kuebart
HRB 17917 · USt-ID: DE 122633308 · Raiffeisenbank Rhenisch-Hellweg 1841 · OES0370624651701900010 · BIC: RFIB33HAN

WIRTSCHAFTSUNIVERSITÄT WIEN

DAKKS
Deutsche
Akreditierungsstelle
D-PL-1411/61-00

List of calibrated Volatile Organic Compounds (VOC)

Aromatic hydrocarbons

Toluene
 Ethylbenzene
 p-xylene
 m-xylene
 o-xylene
 Isopropylbenzene
 n-Propylbenzene
 1,3,5-trimethylbenzene
 1,2,4-trimethylbenzene
 1,2,3-trimethylbenzene
 2-ethyltoluene
 1-isopropyl-2-methylbenzene
 1-isopropyl-4-methylbenzene
 1,2,4,5-tetramethylbenzene
 n-butylbenzene
 1,3-diisopropylbenzene
 1,4-diisopropylbenzene
 Phenyltoluene
 1-phenyldecane²
 1-phenylundecane²
 4-phenylcyclohexene
 Styrene
 β-methylstyrene
 Phenylacetylene
 2-phenylpropene
 Vinyltoluene
 Naphthalene
 Indene
 Benzene
 1-methylnaphthalene
 2-methylnaphthalene
 1,4-dimethylnaphthalene

Saturated aliphatic substances

2-methylpentane¹
 3-methylpentane¹
 n-hexane
 Cyclohexane
 Methylcyclohexane
 n-heptane
 n-octane
 n-nonane
 n-decane
 n-undecane
 n-dodecane
 n-tridecane
 n-tetradecane
 n-pentadecane
 n-hexadecane
 Methylcyclopentane
 1,4-dimethylcyclohexane
 2,2,4,6,6-pentamethylheptane

Terpenes

delta-3-carene
 alpha-pinene
 beta-pinene
 Limonene
 Longifolene
 beta-caryophyllene

alpha-phellandrene
 Myrcene
 Camphene
 alpha-terpinene
 Longipinene

Aliphatic alcohols and ether

1-propanol¹
 2-propanol¹
 1-butanol
 1-pentanol
 1-hexanol
 tert-butanol
 Cyclohexanol
 2-ethyl-1-hexanol
 2-methyl-1-propanol
 1-octanol
 4-hydroxy-4-methyl-2-pentanone
 1-heptanol
 1-nonanol
 1-decanol
 1,4-cyclohexandimethanol
 Ethanol¹

Aromatic alcohols (phenoles)

Phenol
 BHT (2,6-Di-tert-butyl-4-methylphenol)
 Benzyl alcohol
 Cresols
 4-Chlor-3-methylphenol (chlorkresole)
 2-Phenylphenol (oPP)

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-1-propyl acetate
 Texanol
 Glycolic acid butylester
 Butyl diglycol acetate
 Dipropylene glycol monomethyl ether
 2-methoxyethanol
 2-ethoxyethanol
 2-propoxyethanol
 2-methylethoxyethanol
 2-hexoxyethanol
 1,2-dimethoxyethane
 1,2-diethoxyethane
 2-methoxyethyl acetate
 2-ethoxyethyl acetate
 2-(2-hexoxyethoxy)ethanol
 1-methoxy-2-(2-methoxy-ethoxy)ethane
 Propylene glycol diacetate
 Dipropylene glycol
 Dipropylene glycol monomethylether acetate
 Dipropylene glycol n-butylether
 Dipropylene glycol n-propyl ether

Di(propylene glycol) tert-butylether
 1,4-Butanediol
 Tri(propylene glycol) methyl ether
 Triethylene glycol dimethyl ether
 Propylene glycol dimethyl ether
 TXIB (Texanol isobutyrate)
 Ethyldiglycol
 Dipropylene glycol dimethylether
 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
 2-Butoxy ethyl acetate

Aldehydes

Butanal^{1,3}
 3-Methyl-1-butanol
 Pentanal
 Hexanal
 Heptanal
 2-Ethylhexanal
 Octanal
 Nonanal
 Decanal
 2-Butenal³
 2-Pentenal³
 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}
 Isobutena³

Ketones

Ethylmethylketone³
 3-methyl-2-butanone
 Methylisobutylketone
 Cyclopentanone
 Cyclohexanone
 Acetone^{1,3}
 2-methylcyclopentanone
 2-methylcyclohexanone
 Acetophenone
 1-hydroxyacetone
 2-heptanon
 2-hexanone

Acids

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

Esters and Lactones

Methylacetate¹
Ethyl acetate¹
Vinyl acetate¹
Isopropyl acetate
Propyl acetate
2-methoxy-1-methylethyl acetate
2-methoxy-1-propylacetate
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

1 VVOC

2 SVOC

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

Maleic acid dibutylester
Butyrolactone
Glutaric acid diisobutylester
Succinic acid diisobutylester
Dimethylphthalate
Diethylphthalate²
Dipropylphthalate²
Dibutylphthalate²
Diisobutylphthalate²
Texanol
Dipropyleneglycoldiacrylate

Chlorinated hydrocarbons

Tetrachlorethene
1,1,1-trichlorethane
Trichlorethene
1,4-dichlorbenzene
2-chloro-propane

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)
2-n-octyl-4-isothiazolin-3-one (OIT)
Triethylamine
Decamethylcyclopentasiloxane

Dodecamethylcyclohexasiloxane
Tetradecamethylcycoheptasiloxane
Tetrahydrofuran (THF)
1-octene
1-decene
1-dodecene
2-pentylfuran
2-methylfuran
Isophorone
Tetramethyl succinonitrile
Dimethylformamide (DMF)
Tributyl phosphate
N-ethyl-2-pyrrolidone
Aniline
4-vinylcyclohexene
Dichlormethane
Carbon tetrachloride
Chlorobenzene
Chloroform
Chloroprene (monomer)
Acetamide
Formamide
1,3-dichlor-2-propanol
Cyclohexylisocyanate
Butyl methacrylate
Azobis[isobutyronitrile]
Benzophenone
1-buthyl-2-pyrrolidone
Acroleine
Furfuryl alcohol
Decahydronaphthalene
tert.-butyl-methylether (MTBE)

Definition of terms

VOC (volatile organic compounds)	All individual compounds with a concentration $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane)
TVOC	Total volatile organic compounds
TVOC according to DIN EN 16516:2020-10	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 16000-6:2012-11	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: K1A, K1B, M1A, M1B, R1A, R1B 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} (n- hexadecane) to C_{22} (docosane)
TSVOC	Total semi volatile organic compounds
TSVOC according to DIN EN 16516:2020-10	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 substance-specific calibrated and SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI
SER	Specific emission rate (see "Explanation of Specific Emission Rate SER")
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 substances $\geq 1 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to AgBB 2018/DIBt	R value for all identified substances $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to Belgian regulation	R value for all identified substances $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the Belgian regulation
R value according to EU-LCI	R value for all identified substances $\geq 5 \mu\text{g}/\text{m}^3$ with EU-LCI value, established by the European Commission
R value according to AFSSET	R value for all identified substances $\geq 5 \mu\text{g}/\text{m}^3$ 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

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 from 1 µg/m³.

All other substances – insofar as is possible – are identified through comparison with a library of spectra. The quantification of these substances and non-identified substances is performed through a comparison of their signal area with the signal of the standard d8 toluene. The identification and quantification of substances is carried out, as far as technically feasible, from a concentration (evaluation limit) of 5 µg/m³ test chamber air.

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.

$$SER = q \cdot c$$

- 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.