



INFORME DE

ENSAYO Nº: 114445-2

CLIENTE: INDUSTRIAS JUNO S.A.

PERSONA DE CONTACTO: Luis Gil

DIRECCIÓN: Bº Saconi, 10
48950 Erandio (Bizkaia)

OBJETO: Emisión de VOCs, clasificación según legislación francesa de VOC

MUESTRA ENSAYADA: Muestra Ref. «Junoprof» que representa a la siguiente gama:

- «Bikril Mate»
- «A-5000»
- «Junoral B-5»
- «Junoral N-5»
- «G-200»
- «Castor N»
- «J-25»
- «J-28»
- «TotalCover»
- «Radiance»
- «Junoprof»

FECHA DE RECEPCION: 17.07.2024

FECHAS DE ENSAYO: 01.08.2024 a 24.10.2024

FECHA DE EMISIÓN: 13.11.2024



Blanca Ruiz de Gauna
Jefe Laboratorio de Materiales de
Construcción
Unidad Lab Services

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

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CARACTERISTICAS DE LAS MUESTRAS

Con fecha 17.07.2024 se recibió en Fundación Tecnalía R&I por parte de la empresa **“INDUSTRIAS JUNO S.A.”** una muestra referenciada como⁽¹⁾:

- «Junoprof» que representa a la siguiente gama:
 - «Bikril Mate»
 - «A-5000»
 - «Junoral B-5»
 - «Junoral N-5»
 - «G-200»
 - «Castor N»
 - «J-25»
 - «J-28»
 - «TotalCover»
 - «Radiance»
 - «Junoprof»

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 2021). Los ensayos se han realizado en el laboratorio acreditado “eco-INSTITUT” 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

	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 $[\mu\text{g}/\text{m}^3]$	SER+ $[\mu\text{g}/(\text{m}^2.\text{h})]$	Clasificación CMR	LCI AgBB 2021 $[\mu\text{g}/\text{m}^3]$	Valor R
	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols								
VOC	1-Butanol	71-36-3	5.84	5	<5	2.5		3000	0.00
	Aldehydes								
VOC	Hexanal	66-25-1	8.76	2	<5	1		900	0.00
VOC	Heptanal	111-71-7	11.12	1	<5	0.5		900	0.00
VOC	Octanal	124-13-0	13.46	4	<5	2		900	0.00
VOC	Nonanal	124-19-6	15.68	33	37	17		900	0.04
VOC	Decanal	112-31-2	17.83	1	<5	0.5		900	0.00
VVOC	Formaldehyde	50-00-0		7	n. d.	3.5	Carc. 1B Muta. 2	100	0.07
	Acids								
VOC	2-Ethylhexanoic acid	149-57-5	15.48	2	<5	1	Repr. 1B	150	0.01
	Esters								
VOC	n-Butyl formate	592-84-7	7.07	1	<5	0.5		2000	0.00
	Other identified substances in addition to LCI list								
VOC	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.81	3	<5	1.5			
VVOC	Boric acid trimethyl ester*		4.97	2	<5	1			
VOC	not ident. VOC, m/z 57 70*		20.67	3	<5	1.5			
VOC	Glycol, m/z 45 57 89*		23.42	21	21	11			
VOC	not ident. VOC, m/z 57 85 71*		24.21	2	<5	1			

+ Substancias identificadas y calibradas, substancias calculadas específicamente.

++ Clasificación según el reglamento (EC) N° 1272/2008: Categorías Carc. 1A, 1B y 2, Muta. 1A, 1B y 2, Repr. 1A, 1B y 2, TRGS 905: K1A, K1B, K2, M1A, M1B, M2, R1A, R1B, R2, IARC: Grupo 1, 2A, 2B y 3 DFG (Lista MAK): Categoría III1 a III5

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

n.d.: no determinado



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: K1A, K1B, M1A, M1B, R1A, R1B; - IARC: Grupo 1 y 2A; - DFG (lista MAK): Categorías III1, III2 (Suma)	2	1
C 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A u. 1B; - TRGS 905: K1A, K1B (Suma)	<1	<0.5

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	58	29
Suma de VOC según AgBB 2021	59	30
Suma de VOC según eco-INSTITUT-Label	78	39
Suma de VOC según ISO 16000-6	85	43

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	<2.5
Suma de SVOC sin LCI según AgBB 2021	<5	<2.5
Suma de SVOC sin LCI según eco-INSTITUT-Label	<1	<0.5
Suma de SVOC con LCI según AgBB 2021	<5	<2.5

Tabla V

TVVOC Compuestos Orgánicos Muy Volátiles Totales	Concentración tras 3 días [µg/m³]	SER _a [µg/m².h]
Suma de VVOC según AgBB 2021	7	3.5
Suma de VVOC según eco-INSTITUT-Label	9	4.5

* 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 2021 (suma)	21	11
Suma de otros VOC sin LCI según eco-INSTITUT-Label (suma)	29	15
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: K2, M2, R2; - IARC: Grupo 2B; - DFG (lista MAK): Categorías III3 (Suma)	7	3.5
Compuestos sensibilizantes categorizados como: - DFG (lista MAK): Categoría IV; - Reglamento (EC) No. 1272/2008: sensibilización cutánea, sensibilización respiratoria - TRGS 907 (Suma)	7	3.5
Terpenos bicíclicos (suma)	<1	<0.5
C9 - C14: Alcanos / Isoalcanos expresado como equivalentes de decano (Suma)	<1	<0.5
C4-C11 aldehídos, acíclicos, alifáticos (Suma)	41	21
C9-C15 Bencenos alquilados (Suma)	<1	<0.5
Cresoles (Suma)	<1	<0.5

Tabla VII

Valor de riesgo para evaluación de LCI	Valor R
Valor R según eco-INSTITUT-Label	0.13
Valor R según AgBB 2021	0.11
Valor R según regulación belga	0.11
Valor R según EU-LCI	0.11

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 16516:2020-10. 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 16516:2020-10.



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

Tabla VIII

	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 [$\mu\text{g}/\text{m}^3$]	SER+ [$\mu\text{g}/(\text{m}^2 \cdot \text{h})$]	Clasificación CMR	LCI AgBB 2021 [$\mu\text{g}/\text{m}^3$]	Valor R
	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols								
VOC	1-Butanol	71-36-3	6.17	5	<5	2.5		3000	0.00
	Aldehydes								
VOC	Nonanal	124-19-6	15.58	4	<5	2		900	0.00
VOC	Decanal	112-31-2	17.71	2	<5	1		900	0.00
VVOC	Formaldehyde	50-00-0		6	n. d.	3	Carc. 1B Muta. 2	100	0.06
	Other identified substances in addition to LCI list								
VOC	not ident. VOC, m/z 57 70*		20.53	4	<5	2			
VOC	Glycol, m/z 45 57 89*		23.3	5	5	2.5			

+ Substancias identificadas y calibradas, substancias calculadas específicamente.

++ Clasificación según el reglamento (EC) N° 1272/2008: Categorías Carc. 1A, 1B y 2, Muta. 1A, 1B y 2, Repr. 1A, 1B y 2, TRGS 905: K1A, K1B, K2, M1A, M1B, M2, R1A, R1B, R2, IARC: Grupo 1, 2A, 2B y 3 DFG (Lista MAK): Categoría III1 a III5

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

n.d.: no determinado



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: K1A, K1B, M1A, M1B, R1A, R1B; - IARC: Grupo 1 y 2A; - DFG (lista MAK): Categorías III1, III2 (Suma)	<1	<0.5
C 1: VOC (incl. VVOC y SVOC) clasificados como: - Reglamento (EC) No. 1272/2008 en las siguientes categorías: Carc. 1A u. 1B; - TRGS 905: K1A, K1B (Suma)	<1	<0.5

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	5	2.5
Suma de VOC según AgBB 2021	10	5
Suma de VOC según eco-INSTITUT-Label	20	10
Suma de VOC según ISO 16000-6	30	15

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	<2.5
Suma de SVOC sin LCI según AgBB 2021	<5	<2.5
Suma de SVOC sin LCI según eco-INSTITUT-Label	<1	<0.5
Suma de SVOC con LCI según AgBB 2021	<5	<2.5

Tabla XII

TVVOC Compuestos Orgánicos Muy Volátiles Totales	Concentración tras 28 días [µg/m³]	SER _a [µg/m².h]
Suma de VVOC según AgBB 2021	6	3
Suma de VVOC según eco-INSTITUT-Label	6	3

* 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 2021 (suma)	5	2.5
Suma de otros VOC sin LCI según eco-INSTITUT-Label (suma)	9	4.5
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: K2, M2, R2; - IARC: Grupo 2B; - DFG (lista MAK): Categorías III3 (Suma)	6	3
Compuestos sensibilizantes categorizados como: - DFG (lista MAK): Categoría IV; - Reglamento (EC) No. 1272/2008: sensibilización cutánea, sensibilización respiratoria - TRGS 907 (Suma)	6	3
Terpenos bicíclicos (suma)	<1	<0.5
C9 - C14: Alcanos / Isoalcanos expresado como equivalentes de decano (Suma)	<1	<0.5
C4-C11 aldehídos, acíclicos, alifáticos (Suma)	6	3
C9-C15 Bencenos alquilados (Suma)	<1	<0.5
Cresoles (Suma)	<1	<0.5

Tabla XIV

Valor de riesgo para evaluación de LCI	Valor R
Valor R según eco-INSTITUT-Label	0.07
Valor R según AgBB 2021	0.06
Valor R según regulación belga	0.06
Valor R según EU-LCI	0.06

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 16516:2020-10. 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 16516:2020-10.



Evaluación de resultados:

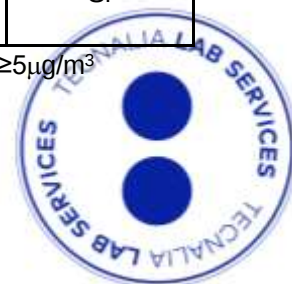
El producto denominado «**Junoprof**» que representa a la siguiente gama:

- «Bikril Mate»
- «A-5000»
- «Junoral B-5»
- «Junoral N-5»
- «G-200»
- «Castor N»
- «J-25»
- «J-28»
- «TotalCover»
- «Radiance»
- «Junoprof»

se ha ensayado y se evalúa en base a los criterios de ensayo del esquema “Health-related Evaluation of Emissions of Volatile Organic Compounds (VOC, VOC and SVOC) from Building Products” del comité para la evaluación de aspectos de salud de los productos de la construcción (AgBB 2021):

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) ⁽²⁾	0.059 mg/m ³	≤10 mg/m ³	Si
Suma sustancias carcinógenas (EU cat. 1A y 1B) según el Reglamento (CE) nº 1272/2008 (y TRGS 905) (por sustancia)	≤0.01 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 ⁽²⁾	0.01 mg/m ³	≤1.0 mg/m ³	Si
Suma SVOC sin LCI (C16-C22) ⁽²⁾	<0.005 mg/m ³	≤0.1 mg/m ³	Si
Valor R (adimensional)	0.06	≤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) según el Reglamento (CE) nº 1272/2008 (y TRGS 905) (por sustancia)	≤0.001 mg/m ³	≤0.001 mg/m ³	Si

⁽²⁾ Para la suma de VOC (C6-C16) y SVOCs (C16-C22) solo se consideran sustancias ≥5µg/m³



ANEXO I

**Informe laboratorio colaborador con
Tecnalia**

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

Test Report No. 59444-A001-AgBB-L II

Test objective:	Evaluation according to AgBB scheme 2021
Article designation according to order:	Junoprof tested as a representative for: - Bikril Mate - A-5000 - Junoral B-5 - Junoral N-5 - G-200 - Castor N - J-25 - J-28 - TotalCover - Radiance
Date of report:	24/10/2024
Number of pages of report:	20
Testing / responsible laboratory:	eco-INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓
Note:	The test results in the report refer exclusively to the test sample submitted by the manufacturer. The report is not permitted to be used in product and company advertising. The report may be published in full as technical documentation on the Internet with the written consent of eco-INSTITUT Germany GmbH. eco-INSTITUT Germany GmbH has recommended that the manufacturer repeats the test after 3 years at the latest. More information at www.eco-institut.de/en/advertising

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‡ subcontracted, # outside accreditation

Sample View

Internal sample number (filled in by laboratory)

59444-A001

Photo of the test specimen: A001



Article designation according to order:

Junoprof

Sample/batch number according to order:

no information

Type of sample:

Interior. For all types of wall surfaces, especially in smooth finishes. Masonry surfaces. Highly decorative finishes. Do-it-yourself in general.

Date of production:

no information

Sampling by:

INDUSTRIAS JUNO, S.A. C/ Saconi 10, 48950 Erandio Bizkaia, España

Date of sampling:

17/07/2024

Location of sampling:

INDUSTRIAS JUNO, S.A. C/ Saconi 10, 48950 Erandio Bizkaia, España

Receipt of sample / Condition upon delivery:

08/08/2024 / without objection

Statement of conformity with AgBB 2021

The sample with the internal sample number 59444-A001 has been tested on behalf of **Tecnia Research & Innovation**. The article description according to the order is **Junoprof**.

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 2021).

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

Test parameter	Result	Requirement	Requirement hold [yes/no]
Emission analysis			
Measurement time: 3 days after test chamber loading			
Sum VOC (C6-C16) ¹⁾	0.059 mg/m ³	≤ 10 mg/m ³	yes
Carcinogenic substances, cat. 1A and 1B acc. to Regulation (EC) No. 1272/2008 (and TRGS 905) (per substance)	≤ 0.01 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⁾	0.01 mg/m ³	≤ 1.0 mg/m ³	yes
Sum SVOC without LCI (C16-C22) ¹⁾	< 0.005 mg/m ³	≤ 0.1 mg/m ³	yes
R-value (dimensionless)	0.06	≤ 1	yes
Sum VOC without LCI	0.005 mg/m ³	≤ 0.1 mg/m ³	yes
Carcinogenic substances, cat. 1A and 1B acc. to Regulation (EC) No. 1272/2008 (and TRGS 905) (per substance)	≤ 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.

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 AgBB 2021

The sample with the internal sample number 59444-A001, article description according to order: **Junoprof**, meets the emission requirements of the AgBB scheme.

Cologne, 24/10/2024

A handwritten signature in black ink, appearing to read 'M.A. Dobaj', with a stylized flourish at the end.

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

Laboratory report

1 Emission analysis

Test method

DIN EN 16516:2020-10

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

A001, Preparation of test specimen

Date:

10/09/2024

Test specimen preparation:

Application on glass with a brush; application quantity 147 g/m²;
drying / pre-conditioning outside of the test chamber for 72 hours

Masking of backside:

not applicable

Masking of edges:

not applicable

Relationship of unmasked
edges to surface:

not applicable

Loading reference unit:

area-specific [m²]

Dimensions:

2 x 25.0 cm x 25.0 cm with each 9.2 g

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:

1.0 m²/m³

Specific air flow rate:

0.5 m³/(m²·h)

Starting time of the test (t₀):

13/09/2024

Air sampling:

3 days after test chamber loading
28 days after test chamber loading

Analytics

Aldehydes and ketones:

DIN ISO 16000-3:2023-12

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 3 days

Test objective:

Volatile organic compounds (VOC), test chamber, air sampling 3 days after test chamber loading

Test result:

Internal sample number: | 59444-A001

	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]	SER+ [µg/(m²·h)]	CMR Classifi- cation++	LCI AgBB 2021 [µg/m³]	R-value
	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols								
VOC	1-Butanol	71-36-3	5.84	5	< 5	2.5		3000	0.00
	Aldehydes								
VOC	Hexanal	66-25-1	8.76	2	< 5	1		900	0.00
VOC	Heptanal	111-71-7	11.12	1	< 5	0.5		900	0.00
VOC	Octanal	124-13-0	13.46	4	< 5	2		900	0.00
VOC	Nonanal	124-19-6	15.68	33	37	17		900	0.04
VOC	Decanal	112-31-2	17.83	1	< 5	0.5		900	0.00
VVOC	Formaldehyde	50-00-0		7	n. d.	3.5	Carc. 1B Muta. 2	100	0.07
	Acids								
VOC	2-Ethylhexanoic acid	149-57-5	15.48	2	< 5	1	Repr. 1B	150	0.01
	Esters								
VOC	n-Butyl formate	592-84-7	7.07	1	< 5	0.5		2000	0.00
	Other identified substances in addition to LCI list								
VOC	Hexamethylcyclotrisiloxane (D3)	541-05-9	8.81	3	< 5	1.5			
VVOC	Boric acid trimethyl ester*		4.97	2	< 5	1			
VOC	not ident. VOC, m/z 57 70*		20.67	3	< 5	1.5			



	Substance	CAS No.	RT	Concentration+ calib. substances ≥ 1 µg/m³ uncalib. substances ≥ 1 µg/m³ DNPH ≥ 2 µg/m³	Toluene- equivalent substances ≥ 5 µg/m³	SER+	CMR Classifi- cation++	LCI AgBB 2021	R-value
			[min]	[µg/m³]	[µg/m³]	[µg/(m²·h)]		[µg/m³]	
VOC	Glycol, m/z 45 57 89*		23.42	21	21	11			
VOC	not ident. VOC, m/z 57 85 71*		24.21	2	< 5	1			

+ identified and calibrated substances, substance specific calculated

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

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

n. d.: not determined

Carcinogenic, mutagenic, and reproductive toxic compounds*	Concentration after 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)	2	1
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	< 0.5

TVOC, Total volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	58	29
Sum of VOC according to AgBB 2021	59	30
Sum of VOC according to eco-INSTITUT-Label	78	39
Sum of VOC according to DIN ISO 16000-6	85	43

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	< 2.5
Sum of SVOC without LCI according to AgBB 2021	< 5	< 2.5
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.5
Sum of SVOC with LCI according to AgBB 2021	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 3 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2021	7	3.5
Sum of VVOC according to eco-INSTITUT-Label	9	4.5

*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 2021 (sum)	21	11
VOC without LCI according to eco-INSTITUT-Label (sum)	29	15
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)	7	3.5
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (sum)	7	3.5
Bicyclic Terpenes (sum)	< 1	< 0.5
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (sum)	< 1	< 0.5
C4 - C11 Aldehydes, acyclic, aliphatic (sum)	41	21
C9 - C15 Alkylated benzenes (sum)	< 1	< 0.5
Cresols (sum)	< 1	< 0.5

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.13
R-value according to AgBB 2021	0.11
R-value according to Belgian regulation	0.11
R-value according to EU-LCI	0.11

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: | 59444-A001

	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]	SER+ [µg/(m²·h)]	CMR Classifi- cation++	LCI AgBB 2021 [µg/m³]	R-value
	Aliphatic mono alcohols (n-, iso-, cyclo-) and dialcohols								
VOC	1-Butanol	71-36-3	6.17	5	< 5	2.5		3000	0.00
	Aldehydes								
VOC	Nonanal	124-19-6	15.58	4	< 5	2		900	0.00
VOC	Decanal	112-31-2	17.71	2	< 5	1		900	0.00
VVOC	Formaldehyde	50-00-0		6	n. d.	3	Carc. 1B Muta. 2	100	0.06
	Other identified substances in addition to LCI list								
VOC	not ident. VOC, m/z 57 70*		20.53	4	< 5	2			
VOC	Glycol, m/z 45 57 89*		23.3	5	5	2.5			

+ identified and calibrated substances, substance specific calculated

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

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

n. d.: not determined

Carcinogenic, mutagenic, and reproductive toxic compounds*	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
CMR 1: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1A, K1B, M1A, M1B, R1A, R1B; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2 (sum)	< 1	< 0.5
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	< 0.5

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to DIN EN 16516	5	2.5
Sum of VOC according to AgBB 2021	10	5
Sum of VOC according to eco-INSTITUT-Label	20	10
Sum of VOC according to DIN ISO 16000-6	30	15

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	< 2.5
Sum of SVOC without LCI according to AgBB 2021	< 5	< 2.5
Sum of SVOC without LCI according to eco-INSTITUT-Label	< 1	< 0.5
Sum of SVOC with LCI according to AgBB 2021	< 5	< 2.5

TVVOC, Total very volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VVOC according to AgBB 2021	6	3
Sum of VVOC according to eco-INSTITUT-Label	6	3

*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	2.5
VOC without LCI according to eco-INSTITUT-Label (sum)	9	4.5
CMR 2: VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K2, M2, R2; IARC: Group 2B; DFG (MAK list): Category III3 (sum)	6	3
Sensitising compounds with the following categorisations: DFG (MAK list): Category IV; Regulation (EC) No. 1272/2008: skin sensitising, respiratory sensitising; TRGS 907 (sum)	6	3
Bicyclic Terpenes (sum)	< 1	< 0.5
C9 - C14 Alkanes / Isoalkanes as dekane-equivalent (sum)	< 1	< 0.5
C4 - C11 Aldehydes, acyclic, aliphatic (sum)	6	3
C9 - C15 Alkylated benzenes (sum)	< 1	< 0.5
Cresols (sum)	< 1	< 0.5

Risk value for assessment of LCI	R-value
R-value according to eco-INSTITUT-Label	0.07
R-value according to AgBB 2021	0.06
R-value according to Belgian regulation	0.06
R-value according to EU-LCI	0.06

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, 24/10/2024



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

Appendix

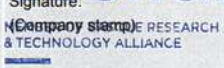
Sampling sheet

Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting

eco
INSTITUT

Sampling Sheet*

59444-001

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 JUNO, S.A. C/ Saconi 10 48950 ERANDIO BIZKAIA ESPAÑA	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	Junoprof	Product type (e.g. parquet, floor covering)	Interior. For all types of wall surfaces, especially in smooth finishes. Masonry surfaces. Highly decorative finishes. Do-it-yourself in general.
Model / programme / series	--	Batch	--
Article number	--	Production date of batch	--
Samples are taken from	☐ current production ☒ storage	Sampling date	17.07.24
Storage location before sampling	☐ in production ☒ storage ☐ other	Storage conditions before sampling	☐ open ☒ packaged
Storage location:	Manufacturer location	Packaging material:	Plastic
Special features (possible negative effects through emissions at place of sampling (e.g. benzine, exhaust fumes), unclarties, questions etc.)		Application rate 147g/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: 01.08.24 Signature:  			
Order		Reference from Tecnaia: 114445	
(Please insert quote number, or - if not available, please enter the desired analysis)		Test required: 05357+05365+02181+02183 official order: SPC24-07595	

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

eco-INSTITUT Germany GmbH / Schanzenstrasse 6-20 / Carlswerk Kupferzug 5.2 / D-51063 Köln / Germany
Tel. +49 221 931245-0 / Fax +49 221 931245-33 / eco-institut.de / Geschäftsführer: Dr. Frank Kuebart
HRB: 17917 / USt-ID: DE 122653308 / Raiffeisenbank Frechen-Hurth, IBAN: DE60370623651701900010, BIC: GENODE33HAN

 **DAKKS**
Deutsche
Akkreditierungsstelle
D-95, 14517 01-00

List of calibrated Volatile Organic Compounds (VOC)

Aromatic hydrocarbons (31)

Benzene⁴
 1,2,3-Trimethylbenzene
 1,2,4-Trimethylbenzene
 1,3,5-Trimethylbenzene
 1-Isopropyl-2-methylbenzene
 1-Isopropyl-4-methylbenzene
 1,2,4,5-Tetramethylbenzene
 Ethylbenzene
 n-Propylbenzene
 Isopropylbenzene (Cumene)⁴
 1,3-Diisopropylbenzene
 1,4-Diisopropylbenzene
 n-Butylbenzene
 1-Propenylbenzene (beta-Methylstyrene)
 Toluene
 2-Ethyltoluene
 Vinyltoluene
 o-Xylene
 m-/p-Xylene
 Styrene
 Phenylacetylene
 2-Phenylpropene (alpha-Methylstyrene)
 4-Phenylcyclohexene
 1-Phenylcyclohexane
 1-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 (phenoles) (8)

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

Glycols, Glycol ether, Glycol ester (49)

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

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

Aldehydes (26)

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

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

Ketones (15)

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

Acids (11)

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

Esters and Lactones (33)

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

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

Chlorinated hydrocarbons (18)

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

Cyclic siloxanes (5)

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

Others (42)

1,4-Dioxane⁴
 1,2-Dibromoethane⁴
 2-Nitropropane⁴
 2,3-Dinitrotoluene⁴
 2,4-Dinitrotoluene⁴
 2,6-Dinitrotoluene⁴
 3,4-Dinitrotoluene^{2,4}
 o-Anisidine⁴
 o-Toluidine⁴
 4-Chloro-o-toluidine⁴
 5-Nitro-o-toluidine²
 Acrylonitrile^{1,4}
 2,2'-Azobisisobutyronitrile
 Tetramethylsuccinonitrile
 Azobenzene^{2,4}
 Caprolactam
 Furan^{1,4}
 2-Methylfuran
 2-Pentylfuran
 Methenamine
 Triethylamine
 2-Butanoneoxime⁴
 Triethyl phosphate
 Tributyl phosphate²
 5-Chloro-2-methyl-4-isothiazolin-3-one (CIT)
 2-Methyl-4-isothiazolin-3-one (MIT)
 2-n-Octyl-4-isothiazolin-3-one (OIT)
 Formamide
 Dimethylformamide (DMF)
 Acetamide
 N-Nitrosopyrrolidine⁴
 N-Methyl-2-pyrrolidone
 N-Ethyl-2-pyrrolidone
 N-Butyl-2-pyrrolidone
 Aniline⁵
 4-Chloroaniline⁴
 2-Nitroanisole⁴
 Cyclohexyl isocyanate
 p-Cresidine⁴
 Diethyl sulfate⁴
 Epichlorohydrin⁴
 5-Ethyl-1,3-dioxan-5-methanol

- 1 VVOC
- 2 SVOC
- 3 Analysis acc. to DIN ISO 16000-3:2023-12 (DNPH)
- 4 Carcinogens, category 1A and 1B according to Regulation (EC) No 1272/2008 and TRGS 905
- 5 When analysing with TD-GC-MS, aniline can occur as a thermal decomposition product of other substances (e.g. 1,3-Diphenylguanidine).
 A cold analytical method is recommended to confirm the result.

(Status: August 2024)

Definition of terms

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

TVOC according to DIN EN 16516	Sum of all VOC $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16} , calculated as toluene equivalent (used i.a. for M1)
TVOC according to AgBB	Sum of all VOCs with LCI $\geq 5 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all VOCs without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent) (used i.a. for the Blue Angel)
TVOC according to eco-INSTITUT-Label	Sum of all calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all non-calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent) (used i.a. for natureplus)
TVOC according to ISO 16000-6	Total area of the chromatogram in the retention range $C_6 - C_{16}$ as toluene equivalent according to DIN ISO 16000-6, Annex A.1 item 3 (used i.a. for CDPH, BIFMA and the French VOC regulation)
TVOC without LCI according to AgBB	Sum of all VOCs without LCI $\geq 5 \mu\text{g}/\text{m}^3$ as toluene equivalent
TVOC without LCI according to eco-INSTITUT-Label	Sum of all calibrated VOCs without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all non-calibrated VOCs without LCI $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TVVOC	Sum of the concentrations of all identified and unidentified very volatile organic compounds eluting in the retention range $< C_6$ (n-hexane)
TVVOC according to AgBB	Sum of all VVOC with LCI $\geq 5 \mu\text{g}/\text{m}^3$ (quantified substance-specific) and all VVOC without LCI $\geq 5 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
TVVOC according to eco-INSTITUT-Label	Sum of all calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ (substance-specific quantified) and all non-calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ (as toluene equivalent)
VOC (volatile organic compound)	Organic compound eluting in the retention range from C_6 (n-hexane) to C_{16} (n-hexadecane)
VVOC (very volatile organic compound)	Organic compound eluting in the retention range $< C_6$ (n-hexane)

Commentary on emission analysis

Test method

Measurement of the volatile organic compounds takes place in the test chamber in conditions similar to those applying in practice. Standardised test conditions are defined for the test chamber regarding loading, air exchange, relative humidity, temperature, and incoming air, based on the type of test specimen and the required guideline. These conditions and the underlying standards are to be found in the section on test methods in the laboratory report.

Air samples are taken from the test chamber at defined points in time during the continuously running test. To this end, approximately 5 L of air are collected from the test chamber at an air flow rate of 100 mL/min on Tenax and approx. 100 L at an air flow rate of 0.8 L/min on silica gel coated with DNPH (2,4-dinitrophenylhydrazine).

After thermal desorption, the substances adsorbed on Tenax are analysed using gas chromatographic separation and mass spectrometric determination. The gas chromatographic separation is performed with a slightly polar capillary column of 60 m in length.

The substances derivatised with DNPH for the determination of formaldehyde and other short-chain carbonyl compounds ($C_1 - C_6$) are analysed using high-performance liquid chromatography (HPLC).

Over 200 compounds, including volatile organic compounds ($C_6 - C_{16}$), semi-volatile organic compounds ($C_{16} - C_{22}$) and – insofar as possible with this method – also very volatile organic compounds (less than C_6) are determined and quantified individually.

All other substances – insofar as possible – are identified through comparison with a library of spectra. The quantification of these substances and non-identified substances is performed through a comparison of their signal area with the signal of toluene.

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

Quality assurance

The eco-INSTITUT Germany GmbH is granted flexible scope of accreditation pursuant to DIN EN ISO/IEC 17025:2018-03. The accreditation covers the analytical determination of all volatile organic compounds, including the test chamber method.

In each analysis the analytical system is checked using an external standard based on the specifications in standard DIN EN 16516:2020-10. The stability of the analytical systems is documented based on the test standard using control charts.

Laboratory performance is assessed at least once a year in inter-laboratory comparisons by comparing the results with those obtained by other laboratories for identical samples.

A blank is run prior to introducing the test specimen into the test chamber to check for the possible presence of volatile organic compounds.

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

Explanation of Specific Emission Rate SER

Emission measurements are accomplished in test chambers under defined physical conditions (temperature, relative humidity, room loading, air change rate etc.).

Test chamber measurement results are directly comparable only if the investigations were accomplished under the same basic conditions.

If the differences of the physical conditions refer only to the change of air rate and/or the loading, the "SER" or "specific emission rate" can be used for comparability of the measurement results. The SER indicates how many volatile organic compounds (VOC) are released by the sample for each material unit and hour (h).

The SER can be calculated using the formula below for each proven individual component of the VOC from the data in the test report.

As material units the following are applicable:

l = unit of length (m)	relation between emission and length
a = unit area (m ²)	relation between emission and surface
v = unit volume (m ³)	relation between emission and volume
u = piece unit (unit = piece)	relation between emission and complete unit

From this the different dimensions for SER result:

length-specific	SER _l	in µg/(m·h)
surface-specific	SER _a	in µg/(m ² ·h)
volume-specific	SER _v	in µg/(m ³ ·h)
unit-specific	SER _u	in µg/(u·h)

SER thus represents a product specific rate, which describes the mass of the volatile organic compound, which is emitted by the product per time unit at a certain time after beginning of the examination.

$$SER = q \cdot c$$

- 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.