

INFORME No.: 077598-010-3

CLIENTE	INDUSTRIAS TITAN, S.A.U.
PERSONA DE CONTACTO	Virginia Sánchez
DIRECCIÓN	Pol. Ind. Pratense, calle 114, nº 21-23 08820 El Prat de Llobregat (Barcelona)
OBJETO	Emisión de VOCs y clasificación según legislación francesa de VOC
MUESTRA ENSAYADA	Oxiron Forja al Agua Negro
FECHA DE RECEPCIÓN	08.11.2018
FECHAS DE ENSAYO	26.11.2018 / 28.01.2019
FECHA DE EMISIÓN	07.02.2019



Blanca Ruiz de Gauna
Jefe Laboratorio de Caracterización de
Materiales de Construcción
División Lab_services

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

* Este informe no podrá ser reproducido sin la autorización expresa de FUNDACIÓN TECNALIA R&I, excepto cuando lo sea de forma íntegra.

CARACTERISTICAS DE LAS MUESTRAS

Con fecha 08.11.2018 se recibió en Fundación TecNALIA R&I por parte de la empresa **“INDUSTRIAS TITAN, S.A.U.”** una muestra de pintura referenciada como:

- Oxiron Forja al Agua Negro

ENSAYOS SOLICITADOS

Los ensayos solicitados son los siguientes:

- ◆ Ensayo de emisión de VOC's (Compuestos orgánicos volátiles) según la norma ISO 16000-6:2006 para establecer una clasificación según los criterios establecidos en el decreto N° 2011-321 del 23 de marzo de 2011 del Ministerio Francés de Ecología, Desarrollo Sostenible, Transporte y Vivienda. 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:

- Condiciones de la cámara de ensayo según la norma ISO 16000-9
 - Volumen: 0.125m³
 - Temperatura y humedad relativa: 23°C al 50% HR.
 - Presión: atmosférica
 - Renovación del aire: 0,5 h⁻¹

La determinación de las emisiones de VOC's para establecer una clasificación según los criterios establecidos en el decreto N° 2011-321 del 23 de marzo de 2011 del Ministerio Francés de Ecología, Desarrollo Sostenible, Transporte y Vivienda, se ha desarrollado según indican las normas ISO 16000-3 e ISO 16000-6. La preparación de las probetas de ensayo se ha realizado según la norma ISO 16000-11 y un periodo de acondicionamiento fuera de la cámara de ensayo de 72 horas.

El límite de detección de las técnicas empleadas es de 1 µg/m³.

RESULTADOS

Los resultados obtenidos y los valores de referencia establecidos en el decreto N° 2011-321 del 23 de marzo de 2011 del Ministerio Francés de Ecología, Desarrollo Sostenible, Transporte y Vivienda se muestran en la tabla I:

Tabla I – Regulación VOC

Ref.: Oxiron Liso Forja al Agua Negro	Concentración (aire en la cámara de ensayo) [µg/m³] tras 28 días	Clases			
Sustancias (Análisis de emisiones)		A+	A	B	C
Formaldehído	2	<10	<60	<120	>120
Acetaldehído	<2	<200	<300	<400	>400
Tolueno	<1	<300	<450	<600	>600
Tetracloroetileno	<1	<250	<350	<500	>500
Xileno	<1	<200	<300	<400	>400
1,2,4-Trimetilbenceno	<1	<1000	<1500	<2000	>2000
1,4-Diclorobenceno	<1	<60	<90	<120	>120
Etilbenceno	<1	<750	<1000	<1500	>1500
2-Butoxyetanol	<1	<1000	<1500	<2000	>2000
Estireno	<1	<250	<350	<500	>500
TVOC	30	<1000	<1500	<2000	>2000

CONCLUSIONES

El producto denominado *Oxiron Forja al Agua Negro* cumple los requisitos de la **Clase A+** del decreto N° 2011-321 del 23 de marzo de 2011 del Ministerio Francés de Ecología, Desarrollo Sostenible, Transporte y Vivienda. Por lo tanto, en base a los resultados obtenidos, el producto queda clasificado con el siguiente distintivo correspondiente a la clasificación A+ según la legislación mencionada:



ANEXO

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

Test Report No. 53817-008

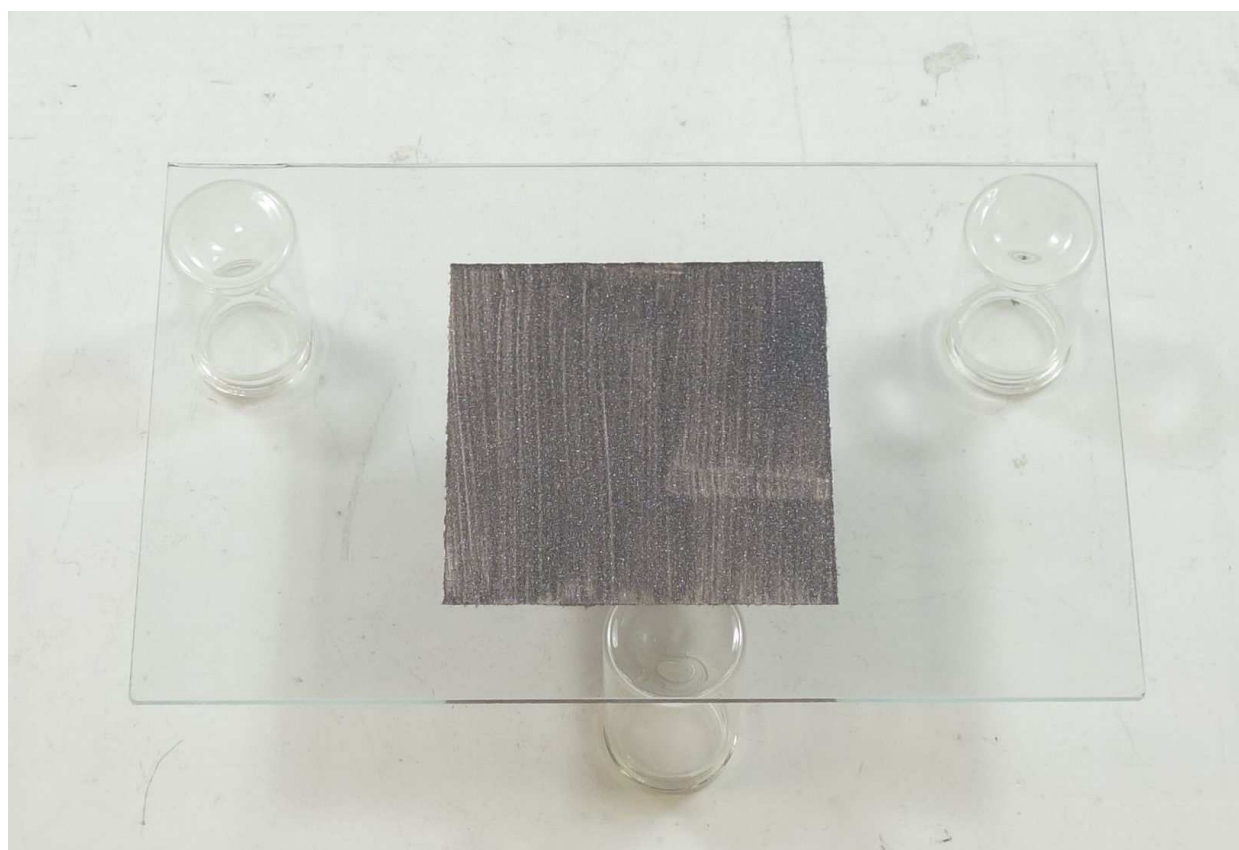
Test objective:	Evaluation according to French VOC-regulation
Sample description by client:	OXIRÓN FORJA AGUA
Sampled by:	INDUSTRIAS TITAN, S.A.U, Barcelona
Date of sampling:	08.11.2018
Location of sampling:	at the client
Date of production:	not specified
Date of arrival of sample:	26.11.2018
Test period:	26.11.2018 - 28.01.2019
Date of report:	28.01.2019
Number of pages of report:	15
Testing laboratory:	eco-INSTITUT Germany GmbH, Cologne except ‡ subcontracted # outside accreditation
Test objective fulfilled:	✓ Class A+

Content

Sample View	3
Expert Evaluation.....	4
Summary evaluation	5
Evaluation d'expert	6
Résumé d'évaluation	7
Laboratory report	8
1 Emission analysis.....	8
1.1 Sample A008, Volatile Organic Compounds after 28 days.....	9
Appendix.....	11
I Sampling sheet	11
II Definition of terms.....	12
III Commentary on emission analysis.....	14
IV Explanation of Specific Emission Rate SER	15

Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A008	OXIRÓN FORJA AGUA	without objection	Coating for doors, small furniture and electrical appliance



A008: OXIRÓN FORJA AGUA

Expert Evaluation

The product **OXIRÓN FORJA AGUA** has been tested on behalf of **Tecnalia Research & Innovation**.

This evaluation bases on the test criteria of the decree no. 2011-321 of March 23rd, 2011 (VOC regulation) of the French Ministry of Ecology, Sustainable Development, Transport and Housing.

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

Emission analysis	Concentration (Test chamber air) [µg/m³]	Class			
Substance	after 28 days	C	B	A	A+
Formaldehyde	2	> 120	< 120	< 60	< 10
Acetaldehyde	< 2	> 400	< 400	< 300	< 200
Toluene	< 1	> 600	< 600	< 450	< 300
Tetrachlorethylene	< 1	> 500	< 500	< 350	< 250
Xylene	< 1	> 400	< 400	< 300	< 200
1,2,4-Trimethylbenzene	< 1	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorobenzene	< 1	> 120	< 120	< 90	< 60
Ethylbenzene	< 1	> 1500	< 1500	< 1000	< 750
2-Butoxyethanol	< 1	> 2000	< 2000	< 1500	< 1000
Styrene	< 1	> 500	< 500	< 350	< 250
TVOC_{tol}	30	> 2000	< 2000	< 1500	< 1000

Remark: The test results refer to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorization.

Summary evaluation

The product **OXIRÓN FORJA AGUA** meets the requirements of the **Class A+** of the decree no. 2011-321 of March 23, 2011 (VOC regulation) of the French Ministry of Ecology, Sustainable Development, Transport and Housing.

Cologne, 28.01.2019

A handwritten signature in black ink, reading "M. A. Dobaj", with a long, sweeping horizontal stroke extending to the right.

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

Evaluation d'expert

Le produit **OXIRÓN FORJA AGUA** a été testé sous la responsabilité du **Tecnalia Research & Innovation**.

Cette évaluation est basée sur les critères du décret n° 2011-321 du 23 mars 2011 (COV décret) par le Ministère de l'écologie, du développement durable, des transports et du logement.

Les résultats documentés dans le rapport du test sont évalués comme suit.

Analyse des émissions	Concentration (air de la chambre d'essai) [µg/m³]	Classe			
Substance	au bout de 28 jours	C	B	A	A+
Formaldéhyde	2	> 120	< 120	< 60	< 10
Acétaldéhyde	< 2	> 400	< 400	< 300	< 200
Toluène	< 1	> 600	< 600	< 450	< 300
Tétrachloréthylène	< 1	> 500	< 500	< 350	< 250
Xylène	< 1	> 400	< 400	< 300	< 200
1,2,4-Triméthylbenzène	< 1	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorobenzène	< 1	> 120	< 120	< 90	< 60
Ethylbenzène	< 1	> 1500	< 1500	< 1000	< 750
2-Butoxyéthanol	< 1	> 2000	< 2000	< 1500	< 1000
Styrène	< 1	> 500	< 500	< 350	< 250
COVT_{tol}	30	> 2000	< 2000	< 1500	< 1000

Résumé d'évaluation

Le produit **OXIRÓN FORJA AGUA** correspond aux exigences de la **classification A+** sur les critères du décret n° 2011-321 du 23 mars 2011 (COV décret) par le Ministère de l'écologie, du développement durable, des transports et du logement.

Cologne, 28.01.2019

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
(Chef de projet)

Laboratory report

1 Emission analysis

Test method

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

A008, Preparation of test sample

Date:	07.12.2018
Pre-treatment:	Application on glass with a brush; application quantity 169 g/m ² ; 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:	7.9 cm x 7.9 cm [1.06 g]

A008, Test chamber conditions according to DIN ISO 16000-9

Chamber volume:	0.125 m ³
Temperature:	23°C ± 1°C
Relative humidity:	50 % ± 1 %
Air pressure:	normal
Air:	cleaned
Air change rate:	0.5 h ⁻¹
Air velocity:	0.3 m/s
Loading:	0.05 m ² /m ³
Specific air flow rate:	10 m ³ /(m ² · h)
Air sampling:	28 days after test chamber loading

Analytics

Aldehydes and Ketones	DIN ISO 16000-3
Limit of determination:	2 µg/m ³
Volatile Organic Compounds	DIN ISO 16000-6
Limit of determination:	1 µg/m ³ (1,4-Cyclohexanedimethanol, Diethylene glycol, 1,4-Butanediol, Linalyl acetate: 5 µg/m ³)
Note for analysis:	not specified

1.1 Sample A008, Volatile Organic Compounds after 28 days

Test objective:

Volatile Organic Compounds according to „Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils“ (french VOC-regulation, 10 substances), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample: A008: OXIRÓN FORJA AGUA

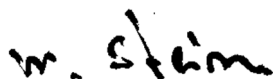
No.	Substance	CAS No.	RT [min]	Concentration+ (test chamber air) Substances ≥ 1 µg/m³ 28 days [µg/m³]	Toluene- equivalent Substances ≥ 5 µg/m³ 28 days [µg/m³]
1	Aromatic hydrocarbons				
1-1	Toluene	108-88-3		< 1	< 5
1-2	Ethyl benzene	100-41-4		< 1	< 5
1-3	Xylene, mix of o-, m- and p-xylene isomers	1330-20-7		< 1	< 5
1-4	p-Xylene (including m-Xylol)	106-42-3		< 1	< 5
1-6	o-Xylene	95-47-6		< 1	< 5
1-11	1.2.4-Trimethylbenzene	95-63-6		< 1	< 5
1-25	Styrene	100-42-5		< 1	< 5
6	Glycols, Glycol ethers, Glycol esters				
6-3	Ethylene glycol-monomobutylether (2-Butoxyethanol)	111-76-2		< 1	< 5
7	Aldehyde				
7-20	Acetaldehyde	75-07-0		< 2	n.d.
7-22	Formaldehyde	50-00-0		2	n.d.
13	Other identified substances in addition to LCI list				
	Benzene	71-43-2		< 1	< 5
	1,4-Dichlorobenzene	106-46-7		< 1	< 5
	Trichlorethene	79-01-6		< 1	< 5

+ identified and calibrated substances, substance specific calculated
n.d. = not determinable

Remark: The test results refer to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorization.

TVOC, Total volatile organic compounds	Concentration after 28 days [µg/m³]	SERa [µg/(m² · h)]
Sum of VOC according to ISO 16000-6	30	300

Cologne, 28.01.2019



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

Appendix

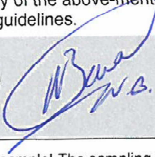
I Sampling sheet

* Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting

53817-008

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	OXIRÓN FORJA AGUA	Product type (e.g. parquet, floor covering)	Doors, small furniture and electrical appliance
Model / programme / series	--	Batch	--
Article number	--	Production date of batch	--
Samples are taken from	☐ current production ☒ storage	Sampling date	08.11.18
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), unclarities, questions etc.)	Application rate: 168,92gr/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: 21.11.18 Signature:  (Company stamp)  Fundación TECNALIA Research & Innovation			
* Please take one sampling sheet for each sample! The sampling instruction must be strictly maintained.			
Order (Please insert quote number, or - if not available, please enter the desired analysis)	Reference from Tecnalia: 077598-M1 Test required: French labelling without VOC (02188) official order: SPC18-10675		

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-Hürth, IBAN: DE60370623651701900010, BIC: GENODE33HAN

DAkkS
Deutsche
Akreditierungsstelle
D-PL-14117-01-00

Remark: The test results refer to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorization.

II Definition of terms

VOC (volatile organic compounds)	All individual compounds with a concentration $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane)
TVOC	Total volatile organic compounds
TVOC according to 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
TVOC according to AgBB/DIBt	Sum of all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ calculated as toluene equivalent
TVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ calculated as toluene equivalent
TVOC according to ISO 16000-6	Total area of chromatogram in the retention range C_6 to C_{16} , calculated as toluene equivalent
TVOC without LCI according to AgBB/DIBt and Belgian regulation	Sum of all VOC without NIK $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16}
TVOC without LCI according to eco-INSTITUT-Label	Sum of all VOC without NIK $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16}
CMR-VOC (carcinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)	All individual substances with the following categories: Regulation (EC) No. 1272/2008: Category Car.1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: 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 $< \text{C}_6$
TVVOC	Total very volatile organic compounds
TVVOC according to AgBB/DIBt and Belgian regulation	Sum of all identified and calibrated VVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI
TVVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VVOC $\geq 1 \mu\text{g}/\text{m}^3$ with LCI
SVOC (semi volatile organic compounds)	All individual substances $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C_{16} to C_{22}
TSVOC	Total semi volatile organic compounds
TSVOC according to DIN EN 16516	Sum of all SVOC in the retention range C_{16} to C_{22} , calculated as toluene equivalent
TSVOC without LCI according to AgBB/DIBt	Sum of all SVOC $\geq 5 \mu\text{g}/\text{m}^3$ without LCI
TSVOC without LCI according to eco-INSTITUT-Label	Sum of all SVOC $\geq 1 \mu\text{g}/\text{m}^3$ without LCI
TSVOC with LCI according to AgBB/DIBt	Sum of all identified and calibrated SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI
SER	Specific emission rate (see appendix IV)

Remark: The test results refer to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorization.

LCI value	Lowest Concentration of Interest; calculated value for the evaluation of VOC, established by the Committee for Health-related Evaluation of Building Products (Ausschuss zur gesundheitlichen Bewertung von Bauprodukten - AgBB)
R value	The quotient of the concentration and the LCI value is generated for every substance which is detected in the test chamber air. The sum of the calculated quotients results in the R value.
R value according to eco-INSTITUT-Label	R value for all identified and calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to AgBB 2018/DIBt	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2018
R value according to Belgian regulation	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the Belgian regulation
R value according to AFSSET	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by ANSES (French National Agency on Food Safety, Environment, and Workplace Security)
RT (retention time)	Time for a particular analyte to pass through the system (from the column inlet to the detector)
CAS No. (Chemical Abstracts Service)	International unique numerical identifier for a chemical substance
Toluene equivalent	Concentration, calculated as toluene equivalent

III Commentary on emission analysis

Test method

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

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

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

The substances derivatized with DNPH for the determination of formaldehyde and other short-chain carbonyl compounds (C1 - C6) are analysed using high-performance liquid chromatography.

Over 200 compounds, including volatile organic compounds (C6 - C16), semi-volatile organic compounds (C16 - C22) and – insofar as possible with this method – also very volatile organic compounds (less than C6) are determined and quantified individually.

All other substances – insofar as is possible – are identified through comparison with a library of spectra. The quantification of these substances and non-identified substances is performed through a comparison of their signal area with the signal of the standard d8 toluene. As far as feasible, identification and quantification limit of any substance shall be 1 µg per m³ for substances adsorbed on Tenax and 2 µg/m³ for DNPH-derivatized substances (limit of quantification).

Quality assurance

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

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

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

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

IV Explanation of Specific Emission Rate SER

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

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

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

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

As material units the following are applicable:

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

From this the different dimensions for SER result:

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

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

$$SER = q \cdot c$$

- 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.