

INFORME No.: 068703-9

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OBJETO:	Ensayo de emisión de VOC's (Compuestos orgánicos volátiles)
MUESTRA ENSAYADA:	«02T TITANLUX ESMALTE AL AGUA MATE»
FECHA DE RECEPCION:	07.07.2017
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CARACTERISTICAS DE LAS MUESTRAS

Con fechas 07.07.2017 se recibió en Fundación Tecnalia R&I por parte de la empresa **“INDUSTRIAS TITAN, S.A.U.”** muestras referenciadas como:

- «02T TITANLUX ESMALTE AL AGUA MATE»

ENSAYO SOLICITADO

El ensayo solicitado es el siguiente:

- ♦ Ensayo de emisión de VOC's (Compuestos orgánicos volátiles) según la norma ISO 16000-6:2006

ENSAYO REALIZADO

- ♦ Ensayo de emisión de VOC's (Compuestos orgánicos volátiles) según la norma ISO 16000-6:2006

Ensayo realizado por Laboratorio Acreditado eco-INSTITUT Germany GmbH, cuyo informe original se adjunta como Anexo I.

RESULTADOS

♦ Ensayo de emisión de VOC's (Compuestos orgánicos volátiles) según la norma ISO 16000-6:2006

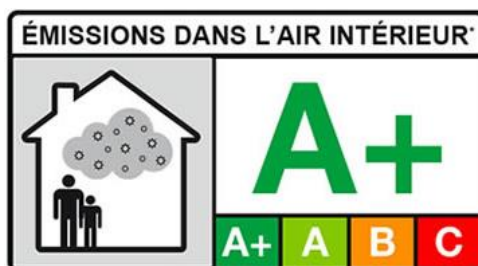
Los resultados obtenidos y los valores de referencia establecidos en el decreto N° 2011-321 del 23 de marzo de 2011 del Ministerio Francés de Ecología, Desarrollo Sostenible, Transporte y Vivienda se muestran en la siguiente tabla:

Tabla I – Regulación VOC

Ref.: «02T TITANLUX ESMALTE AL AGUA MATE»	Concentración (aire en la cámara de ensayo) [µg/m³] tras 28 días	Clases			
		A+	A	B	C
Formaldehído	2	<10	<60	<120	>120
Acetaldehído	3	<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	140	<1000	<1500	<2000	>2000

Conclusiones

El producto denominado como «02T TITANLUX ESMALTE AL AGUA MATE» 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 I

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

Test Report No. 52359-003

Test objective:	Evaluation according to French VOC-Regulation
Sample description by client:	068703 – 02T Esmalte Titanlux al agua mate
Sampled by:	Industrias Titan S.A., Barcelona, ES
Date of sampling:	12.07.2017
Location of sampling:	at the client
Date of production:	not specified
Date of arrival of sample:	17.07.2017
Test period:	17.07.2017 - 11.09.2017
Date of report:	08.09.2017
Number of pages of report:	14
Testing laboratory:	eco-INSTITUT Germany GmbH, Köln
Test objective fulfilled:	✓ Class A+

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Sample View

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A003	02T Esmalte Titanlux al agua mate	without objection	paint for walls and ceilings



A003: 02T Esmalte Titanlux al agua mate

Expert Evaluation

The product **02T Esmalte Titanlux al agua mate** 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.

VOC regulation

Emission analysis	Concentration (Test chamber air) [µg/m³]	Class			
Substance	after 28 days	C	B	A	A+
Formaldehyde	2	> 120	< 120	< 60	< 10
Acetaldehyde	3	> 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-Dichlorbenzene	< 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}	140	> 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 **02T Esmalte Titanlux al agua mate** 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, 08.09.2017

A handwritten signature in black ink, reading "M. A. Dobaj", with a long, sweeping flourish extending from the end of the name.

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

Evaluation d'expert

Le produit **02T Esmalte Titanlux al agua mate** 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.

COV décret

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	3	> 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
COV_{tol}	140	> 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.

Résumé d'évaluation

Le produit **02T Esmalte Titanlux al agua mate** 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, 08.09.2017

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
(Chef de projet)

Laboratory report

1 Emission analysis

Test method

prEN 16516	Testing and evaluation of the release of dangerous substances; determination of emissions into indoor air
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A003, Preparation of test sample

Date:	04.08.2017
Pre-treatment:	Application on glass with a brush; application quantity 94 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:	2 x [25 cm x 25 cm] each 5.9 g

A003, 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:	1 m ² /m ³
Specific air flow rate:	0.5 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 (BIT: 5 µg/m ³)
Note for analysis:	not specified

1.1 Sample A003, Volatile Organic Compounds after 28 days

Test objective:

Volatile Organic Compounds (VOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample: A003: 02T Esmalte Titanlux al agua mate

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
1-4	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-monobutylether (2-Butoxyethanol)	111-76-2		< 1	< 5
7	Aldehyde				
7-20	Acetaldehyde	75-07-0		3	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
	Tetrachloroethene	127-18-4		< 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]	SER _a [µg/m²h]
Sum of VOC according to ISO 16000-6	140	70

Cologne, 08.09.2017



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

Appendix

I Sampling sheet

Produktprüfung Product testing
Zertifizierung Certification
Beratung Consulting

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. pol. Ind. Pratene c/ 114 n° 21-23 08820 El 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	00T Esmalte Titanlux al agua brillante 01T Esmalte Titanlux al agua satinado 02T Esmalte Titanlux al agua mate	Product type (e.g. parquet, floor covering)	paint for walls and ceilings
Model / programme / series	—	Batch	—
Article number	—	Production date of batch	—
Samples are taken from	☐ current production ☒ storage	Sampling date	12.07.17
Storage location before sampling	☐ in production ☒ storage ☐ other	Storage conditions before sampling	☐ open ☒ packaged
Storage location:	Manufacturer location	Packaging material:	metal
Special features (possible negative effects through emissions at place of sampling (e.g. benzine, exhaust fumes), unclarities, questions etc.)	Application rate (to be applied in 1 coat or in 2 coats). If performed in 2 coats at least 10h between coats 02T (mate) 94g/m2; 01T and 00T (satin. and brill) 92 g/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: 27.06.17 Signature:  (Company stamp)  Fundación TECNALIA Research & Innovation			
* Please take one sampling sheet for each sample! The sampling instruction must be strictly maintained.			
Order		Reference from Tecnalia: 068703	
(Please insert quote number, or - if not available, please enter the desired analysis)		Test required: French labelling official order: SPC17-06993	

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HRB 17917 / USt-ID: DE 122653303 / Raiffeisenbank, Frechen-Hürth, IBAN: DE6037062351701900010, BIC: GENODE33HAN

DAKKS
Deutsche
Akkreditierungsstelle
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 prEN 16516	Sum of all VOC $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16} , calculated as toluene equivalent
TVOC according to AgBB/DIBt	Sum of all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ calculated as toluene equivalent
TVOC according to eco-INSTITUT-Label	Sum of all identified and calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$, SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI and not calibrated VOC $\geq 1 \mu\text{g}/\text{m}^3$ calculated as toluene equivalent
TVOC according to ISO 16000-6	Total area of chromatogram in the retention range C_6 to C_{16} , calculated as toluene equivalent
TVOC without LCI according to AgBB/DIBt and Belgian regulation	Sum of all VOC without NIK $\geq 5 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16}
TVOC without LCI according to eco-INSTITUT-Label	Sum of all VOC without NIK $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range C_6 to C_{16}
CMR-VOC (carcinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)	All individual substances with the following categories: Regulation (EC) No. 1272/2008: Category Car.1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK lists): Category III1 and III2
VVOC (very volatile organic compounds)	All individual substances with a concentration $\geq 1 \mu\text{g}/\text{m}^3$ in the retention range $< \text{C}_6$
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 prEN 16516	Sum of all SVOC in the retention range C_{16} to C_{22} , calculated as toluene equivalent
TSVOC without LCI according to AgBB/DIBt	Sum of all SVOC $\geq 5 \mu\text{g}/\text{m}^3$ without LCI
TSVOC without LCI according to eco-INSTITUT-Label	Sum of all SVOC $\geq 1 \mu\text{g}/\text{m}^3$ without LCI
TSVOC with LCI according to AgBB/DIBt	Sum of all identified and calibrated SVOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI
SER	Specific emission rate (see appendix IV)

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 2015
R value according to AgBB 2015/DIBt	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the AgBB in 2015
R value according to Belgian regulation	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by the Belgian regulation
R value according to AFSSET	R value for all identified and calibrated VOC $\geq 5 \mu\text{g}/\text{m}^3$ with LCI, established by ANSES (French National Agency on Food Safety, Environment, and Workplace Security)
RT (retention time)	Time for a particular analyte to pass through the system (from the column inlet to the detector)
CAS No. (Chemical Abstracts Service)	International unique numerical identifier for a chemical substance
Toluene equivalent	Concentration, calculated as toluene equivalent

III Commentary on emission analysis

Test method

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

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

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

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

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

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

The concentrations of substances that have been determined are corrected based on the recovery rate for an internal standard (d8 toluene). Identification and quantification of the substances is limited to 1 µg per m³ for substances adsorbed on Tenax and 2 µg/m³ for DNPH-derivatized substances (limit of quantification).

Quality assurance

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

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

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

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

IV Explanation of Specific Emission Rate SER

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

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

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

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

As material units the following are applicable:

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

From this the different dimensions for SER result:

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

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

$$SER = q \cdot c$$

- 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.