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## Test report No. MAIC-2012-2461

**Customer:** NV Muylle Facon, Belgium.

**Object of the test:** Chamber emission test of a wood oil sample according the French VOC regulations.

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This report comprises 8 pages.

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**Sample description:**

WKI no.	Date of reception	Sample Name (this information is provided by the customer)	Product No.	Manufacturer-Code	Date-Stamp
P24889	09.12.2011	Rubio oil plus 2c	n.a.	n.a.	n.a.

(Sample P24889: Bottle/box/wrapped separately, wrapping ok; )

Notice: Sample material will be stored for 2 months after test report date. Please contact us if an extended storage time is required or if sample material needs to be returned. Sample material for emission tests cannot be retained for repeated tests, it will only be stored for identification and documentation purposes.



**Methods:**

The measurements were carried out according the AgBB test protocol for surface coatings for floor coverings.

**Determination of background concentration:**

For the determination of the background concentration of the carrier material 16 oak panels (0,25m x 0,05m) were placed in a 500L stainless steel chamber.

The back side and the edges were sealed with aluminum foil. The panels were placed on the chamber floor during the entire testing time. After 3 days samples of the chamber air were collected on sorbent tubes (Tenax TA) and analyzed on a thermal desorption-GC/MS system (PerkinElmer ATD400/Agilent 6890/5972). Additionally air samples were collected on DNPH and analyzed regarding lower aldehydes (including formaldehyde) after elution with acetonitrile by HPLC-UV.

**Sample preparation:** Rubio oil plus 2c consists of two components. Component A: oil plus 2c pure and component B: oil plus 2c accelerator. Both components were mixed appr. 100 volume parts A to 30 volume parts B. In the next step 15 g/m<sup>2</sup> of the sample material were applied with a brush on the oak panels. Some minutes later the excess of oil was removed until the surface felt dry.

**Chamber emission test:** After the sample preparation the coated panels have been placed in an emission test chamber (DIN EN ISO 16000-9) without prior conditioning. According the regulations of AgBB/DIBt the air sampling was performed after 3, 7 and 28 days. Therefor samples of the chamber air were collected on sorbent tubes (Tenax TA) and analyzed on a thermal desorption-GC/MS system (PerkinElmer ATD400/Agilent 6890/5972). Compounds were identified using MS-spectra libraries. In case of LCI substances the quantification was done using pure reference compound mixtures and in case of non-LCI substances the quantification was done against toluene. Furthermore air samples were collected on DNPH and analyzed regarding lower aldehydes (including formaldehyde) after elution with acetonitrile by HPLC-UV. The measurements were performed according to DIN EN ISO 16000-3 and -6)

**Evaluation:**

The evaluation of the emissions was carried out on the basis of the AgBB/DIBt-scheme and the evaluation program ADAM based on the LCI List 2010.

**Results:**

The quantitative test results can be found on the next page.

**Background concentration of the oak panels (uncoated)**

RT	CAS-No.	Substance	Concentration in Info $\mu\text{g}/\text{m}^3$ after 3d
8.54	000064-19-7	Acetic acid	470 bd
19.24	000098-01-1	2-Furaldehyde	8 abd
40.14		BHT-Derivate (Toluene)	8
Sum of all measured compounds as VVOC value (< C6):			< 1
Sum of all measured compounds as TVOC* <sub>original response</sub> value:			486
Sum of all measured compounds as TVOC <sub>Toluene</sub> value:			76
Sum of all measured compounds as SVOC value (> C16):			< 1

**Background concentration of the oak panels (uncoated)**

CAS-No.	Substance	Concentration in $\mu\text{g}/\text{m}^3$ after 3d	Limit of detection [ $\mu\text{g}/\text{m}^3$ ]
50-00-0	Formaldehyde	1	0,6
75-07-0	Acetaldehyde	< 0,4	0,4
123-38-6	Propanal	< 0,2	0,2
123-72-8	Butanal	< 0,4	0,4

**Results of the chamber emission test of sample P24889 (Rubio oil plus 2c)**

RT	CAS-No.	Substance	Concentration in $\mu\text{g}/\text{m}^3$ after			Info
			3d	7d	28d	
6.09	000123-38-6	Propanal	44	20	7	<C6b
7.59	000123-72-8	Butanal	27	13	< 1	<C6bd
8.03	000064-19-7	Acetic acid	< 1*	< 1*	< 1*	bd
10,90	000616-25-1	1-Penten-3-ol (Toluene)	10	6	< 1	
11,60	000110-62-3	Pentanal	180	72	19	bd
12,60	000079-09-4	Propanoic acid	106	46	16	bd
17.27	000066-25-1	n-Hexanal	84	34	9	bd
20.14	006728-26-3	trans-2-Hexenal	7	3	< 1	bd
22.40	000109-52-4	Pentanoic acid	112	49	12	bd
22.48	000111-71-7	n-Heptanal	4	2	< 1	bd
23.00		Carboxylic acid (Toluene)	3	< 1	< 1	
24.98	018829-55-5	trans-2-Heptenal	12	5	< 1	bd
25.13		saturated aliphatic hydrocarbons from C9 (Toluene)	5	2	< 1	b
26.16	000142-62-1	Hexanoic acid	61	29	10	bd
26.37	003777-69-3	n-Pentylfuran (Toluene)	3	1	< 1	
26.67	004313-03-5	2,4 Heptadienal (Toluene)	6	3	< 1	
26.92	000124-13-0	Octanal	11	6	4	bd
27.29		Heptadienal (Toluene)	5	2	< 1	
28.18		Furan derivative (Toluene)	5	2	< 1	
28.63		saturated aliphatic hydrocarbons from C9 (Toluene)	3	1	< 1	b
29,10	002548-87-0	trans-2-Octenal	11	5	< 1	bd
29.55		Silane (Toluene)	398	202	39	
29.86		unknown substance (Toluene)	12	5	< 1	
30.61	001120-21-4	C 11 (Undecane)	2	1	< 1	b
30.82	000124-19-6	n-Nonanal	16	9	5	bd
31.54	000149-57-5	2-Ethylhexanoic acid	145	39	< 1	bd
31.78		Carboxylic acid ester (Toluene)	15	< 1	< 1	
32.11		Carboxylic acid ester (Toluene)	5	< 1	< 1	
32.56		Carboxylic acid ester (Toluene)	4	< 1	< 1	
33.22	000124-07-2	Octanoic acid	3	< 1	< 1	bd
33.61		Carboxylic acid ester (Toluene)	76	11	< 1	
33.75		unknown substance (Toluene)	4	< 1	< 1	
34.03	000112-40-3	C 12 (Dodecane)	4	2	< 1	b
34.11		Carboxylic acid ester (Toluene)	10	< 1	< 1	

34.25	000112-31-2	n-Decanal	4	3	< 1	bd
34.58	005910-87-2	2,4-Nonadienal (Toluene)	14	4	< 1	
35.14		saturated aliphatic hydrocarbons from C9 (Toluene)	10	4	< 1	b
35.65	000112-05-0	Nonanoic acid (Toluene)	4	3	2	
35.71	003913-81-3	trans-2-Decenal	10	5	2	b
35.87		saturated aliphatic hydrocarbons from C9 (Toluene)	4	2	< 1	
36.10		unknown substance (Toluene)	17	6	< 1	
36.50		saturated aliphatic hydrocarbons from C9 (Toluene)	3	< 1	< 1	
36.99	025152-84-5	2,4-Decadienal (Toluene)	3	2	< 1	
37.45		Furanoderivate (Toluene)	5	2	< 1	
37.85	002463-77-6	trans-2-Undecenal	6	3	< 1	b
39.40	000091-64-5	Coumarin (Toluene)	7	4	< 1	d
39.61		saturated aliphatic hydrocarbons from C9 (Toluene)	4	3	< 1	
39.66		unknown substance (Toluene)	3	1	< 1	
41.17	000084-66-2	1,2-Benzenedicarboxylic acid, diethyl ester (Toluene)	24	18	7	
41.84	024851-98-7	Methylidihydrojasmonate (Toluene)	6	5	< 1	>C16d
Sum of all measured compounds as VVOC value (< C6):			71	33	7	
Sum of all measured compounds as TVOC* <sub>original response</sub> value:			1440*	597*	125*	
Sum of all measured compounds as TVOC <sub>Toluene</sub> value:			1036*	428*	86*	
Sum of all measured compounds as SVOC value (> C16):			6	5	< 1	

(The fragments/substances shown in subscript were used for the quantification)

Additional information: (b) German LCI list; (c) Safe sampling volume too low, underestimation possible; (d) odor relevant; (e) compound boiling point exceeds thermal limit of the TDS unit – underestimation likely; (f) terpene, possibly wood-related; (h) aromatic substance IOS-MAT0054; (i) chlorinated solvent IOS-MAT0054; (<C6) VVOC compound; (>C16) SVOC compound.

Classification according to UN GHS / EC 1272/2008: (a): acute toxic substance cat. 1+2+3; (g): chronic toxic substance CMR cat. 1A+1B; (l): specific target organ toxic substance STOT RE1+SE1

\* Calculated concentration after subtraction of background concentration (uncoated wood sample); procedure according to DIBt regulations.

### Lower aldehydes results of sample P24889 (Rubio oil plus 2c)

CAS-No.	Substance	Concentration in $\mu\text{g}/\text{m}^3$ after			Limit of determination [ $\mu\text{g}/\text{m}^3$ ]
		3d	7d	28d	
50-00-0	Formaldehyde	8*	3*	1*	2
75-07-0	Acetaldehyde	23	15	8	1
123-38-6	Propanal	90	44	14	1
123-72-8	Butanal	8	4	2	1

\* Calculated concentration after subtraction of background concentration (uncoated wood sample); procedure according to DIBt regulations.

#### Parameters of the emission chamber test:

Chamber type: 500l-stainless steel chamber 8

Climatic conditions: 23 °C, 50 % r.h.

**Air exchange:  $0.5 \text{ h}^{-1}$**

**Loading factor:  $0.4 \text{ m}^2/\text{m}^3$**

Area specific air exchange rate  $q$ :  $1.25 \text{ m}^3/(\text{m}^2 \cdot \text{h})$

Test started: 23.01.2012 10:14:59

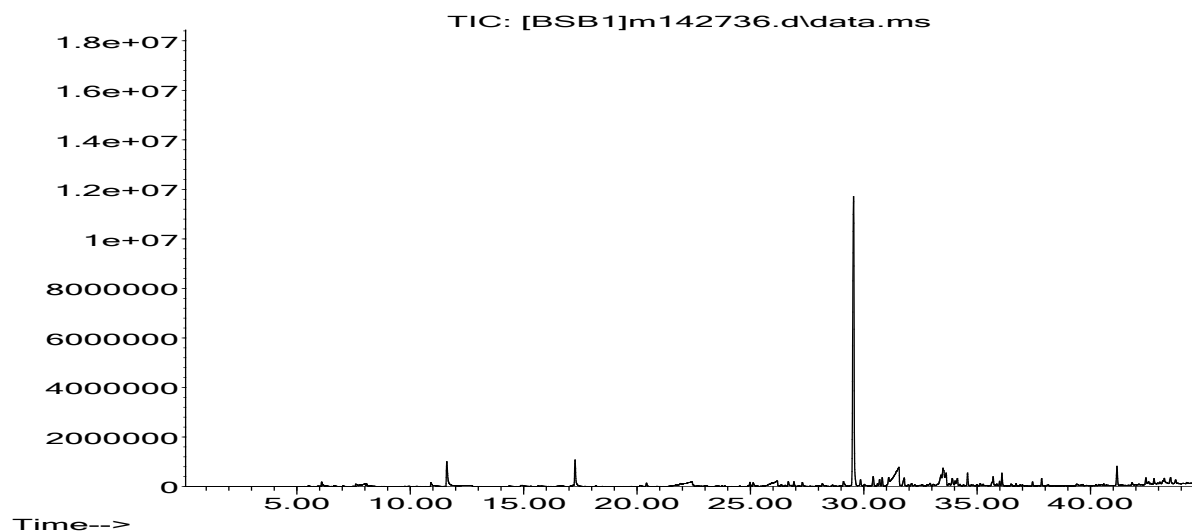
Sampling: Tenax TA, DNPH

Analysis: Thermal desorption GC/MS, HPLC/UV



#### Chromatogram of the measurement after 3 days

Abundance



**Results of the evaluation according to French VOC scheme**

Classes	C	B	A	A+	measured value [ $\mu\text{g}/\text{m}^3$ ]
Formaldehyde	>120	< 120	< 60	< 10	1
Acetaldehyde	> 400	< 400	< 300	< 200	8
Toluen	> 600	< 600	< 450	< 300	< 1
Tetrachlorethylene	> 500	< 500	< 350	< 250	< 1
Xylen	> 400	< 400	< 300	< 200	< 1
1,2,4-Trimethylbenzene	> 2000	< 2000	< 1500	< 1000	< 1
1,4-Dichlorobenzene	> 120	< 120	< 90	< 60	< 1
Ethylbenzene	> 1500	< 1500	< 1000	< 750	< 1
2-Butoxyethanol	> 2000	< 2000	< 1500	< 1000	< 1
Styrene	> 500	< 500	< 350	< 250	< 1
TVOC-value (toluene equivalents)	> 2000	< 2000	< 1500	< 1000	86

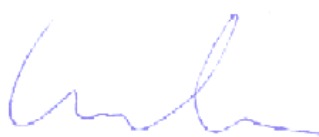
**Remark:** According to the 'ARRÊTÉ relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils' the sample material fulfills the requirements for class "A+" after 28 days (DEVL1104875A).

Officer in charge



A. Ligarski

For the department



Dr. E. Uhde