

## Test Report

ROMA USA LLC

Product Emissions of Furniture  
in accordance with

Cradle to Cradle section 5.8

**ECODOMUS SATIN BASE TR**

March 2015

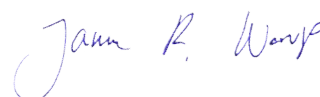
**Client:** **ROMA USA LLC**  
554 North Avenue NW, Suite B  
Atlanta, GA 30318  
USA

**Date:** 18 March 2015

**Testing Laboratory:** Eurofins Product Testing A/S  
Smedeskovvej 38, DK-8464 Galten, Denmark



Maria Pelle  
Chemist



Janne R. Norup  
Chemist

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## Introduction

On 21 January 2015 Eurofins Product Testing A/S received paint sample named

**ECODOMUS SATIN BASE TR**

Batch: 250/914B, Date of production: 13-11-2014

for emissions testing in accordance with ANSI/BIFMA M7.1-2011. The sample was clearly labelled, properly packaged and not damaged. Testing was carried out in the laboratories of Eurofins Product Testing A/S. Before starting the testing procedure on 10 February 2015 the sample had been stored unopened at room temperature.

# 1 Description of the Applied Testing Method

The applied method complies with the test method as defined in ANSI/BIFMA M7.1-2011 "American National Standard for Office Furnishing" with the limit values as defined in ANSI/BIFMA X7.1-2011. The internal method numbers are: 9810; 9811, 9812, 2802, 2803, 8400.

## 1.1 Test Specimen

A sample was sent by the client to the laboratory of Eurofins Product Testing A/S in an airtight package. The package was opened and the test specimen was transferred uncovered into a test chamber immediately (internal method no.: 9810). Size of the test specimen was 30x40 cm giving a total area of 0.12 m<sup>2</sup>. The sample was homogenised and applied onto a glass plate:

Layer	Application amount, g/m <sup>2</sup>	Mixing ratio, paint : water	Drying time, h
1	78	5.25 : 1	1
2	78	5.25 : 1	16
3	78	5.25 : 1	-

## 1.2 Test Chamber

The test chamber was consisting of stainless steel and had a volume of 119 L. The air clean-up was realized in multiple steps. Before loading the chamber a blank check of the empty chamber was performed. The operation parameters were 23 °C, 50 % relative air humidity (in the supply air) with an air exchange rate of 0.5 per hour. The loading of the test chamber was 1 m<sup>2</sup> test specimen per m<sup>3</sup> air volume (internal method 9811).

## 1.3 Sampling, Desorption, Analyses

### 1.3.1 VOC Emissions Testing after 7 Days

The emissions of organic compounds after 3 and after 7 days were tested by drawing air samples from the chamber outlet through Tenax TA tubes (main tube and backup tube) after 3 and after 7 days. Analyses were done by thermal desorption and gas chromatography / mass spectroscopy (internal methods no.: 9812 / 2808). All single substances were identified if the toluene equivalent in the Total Ion Chromatogram (TIC) exceeded 2 µg/m<sup>3</sup>. Quantification was done with the respective response factor and the TIC signal, or in case of overlapping peaks by calculating with fragment ions. All non-identified substances were quantified as toluene equivalent if giving more than 2 µg/m<sup>3</sup>.

The results of the individual substances were calculated in three groups depending on their appearance in a gas chromatogram when analysing with a non-polar column (HP-1):

- Volatile organic compounds VOC: All substances appearing between these limits.
- Very volatile organic compounds VVOC: All substances appearing before n-hexane (n-C<sub>6</sub>).
- Semi-volatile organic compounds SVOC: All substances appearing after n-hexadecane (n-C<sub>16</sub>).

Calculation of the TVOC<sub>SumVOC</sub> (Total Volatile Organic Compounds) was done by addition of the results of all individual substances between C<sub>6</sub> and C<sub>16</sub>.

The results are only valid for the tested sample(s).

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Calculation of the TVOC<sub>Toluene</sub> (Total Volatile Organic Compounds) was done by addition of the results of all substances between C<sub>6</sub> and C<sub>16</sub> as toluene equivalent.

This test covered only substances that can be adsorbed on Tenax TA and that can be thermally desorbed. If other emissions occurred then these could not be monitored (or with limited reliability only).

### 1.3.2 Testing of Aldehydes after 7 Days

The presence of formaldehyde and acetaldehyde was tested by drawing air samples from the chamber outlet through DNPH-coated silicagel tubes after 3 and 7 days. Analysis was done by solvent desorption, HPLC and UV-diode array detection (ISO 16000-3, internal methods no.: 9812 / 8400).

The absence of the aldehydes was stated if the specific wavelength UV detector response was lacking at the specific retention time in the chromatogram. Otherwise it was checked whether the detection limit was exceeded. In this case the identity was finally checked by comparing full scan sample UV spectra with full scan standard UV spectra.

### 1.3.3 Deviation from the test method

Instead of using 3 and 7 days results to calculate into theoretical 14 days results, the actual results from a 14 days test have been used.

### 1.3.4 Accreditation

The testing methods described above have been accredited (EN ISO/IEC 17025:2005) by DANAK (no. 522). But some parameters are not yet covered by that accreditation. At present the accreditation does not cover the parameters marked with a note \*. But the analysis was done for these parameters at the same level of quality as for the accredited parameters.

## 1.4 Uncertainty of the test method

The relative standard deviation of the test method is amounted to 22% (RSD). The expanded uncertainty  $U_m$  is 45% and equals 2 x RSD%, see also [www.eurofins.dk](http://www.eurofins.dk), search: Uncertainty.

## 2 Results

### 2.1 Concentrations and Emission factors

	CAS No.	Retention time min	ID-Cat.	Emission rate $\mu\text{g}/(\text{m}^2 \cdot \text{h})$	Concentration class room $\mu\text{g}/\text{m}^3$	Concentration office building $\mu\text{g}/\text{m}^3$	Half CREL $\mu\text{g}/\text{m}^3$
<b>TVOC (C<sub>5</sub>-C<sub>17</sub>)</b>				1.3	0.6	2.1	-
<b>Single VOC Substances:</b>							
1-Butanol	71-36-3	2.51	1	2.2	1.1	3.5	-
2-methyl-4-isothiazolin-3-one	2682-20-4	10.99	1	5.5	2.7	8.8	-
<b>Volatile Aldehydes measured with DNPH-Method (see 1.3.3)</b>							
Formaldehyde	50-00-0	-	-	< 2	< 1	< 2	9
Acetaldehyde	75-07-0	-	-	< 2	< 1	< 2	70

n.d. Not detected

< Means less than

\* Not a part of our accreditation, see 1.3.4.

# Calculated value, see 1.5

#### Categories of identity:

- 1 = definitely identified, specifically calibrated
- 2 = identified by comparison with a mass spectrum obtained from a library, identity supported by other information, calibrated as toluene equivalent
- 3 = identified by comparison with a mass spectrum obtained from a library, calibrated as toluene equivalent
- 4 = not identified, calibrated as toluene equivalent

### 3 Interpretation of the results

The results of ECODOMUS SATIN BASE TR can be summarised as follows:

- The Total VOC concentration was **below** the classification threshold of 0.5 mg/m<sup>3</sup>
- The formaldehyde specific emission rate was **below** the classification threshold of 9 µg/m<sup>3</sup>
- Carcinogenic substances were not detectable after 3 and after 7 days.
- All individual VOCs was **below** 0.01 TLV or MAK value (whichever is lower)

The tested product ECODOMUS SATIN BASE TR complies with the requirements in section 5.8 of Cradle to Cradle as formulated by MBDC in version 3.0 (2012).

**Appendix 1: Photo of the sample**

