

Test Report
Polyseam A/S
Emission test of
GRAFT FR Eco-Foam
in accordance with M1 classification

October 2014

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Date: 9 October 2014

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

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Introduction

On 12 January 2012 Eurofins Product Testing A/S received a sample named

GRAFT FR Eco-Foam

for emissions testing in accordance with the M1 method. 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 6 February 2012 the sample had been stored unopened at room temperature.

1 Description of the Applied Testing Method

The applied method complies with the Protocol for Chemical and Sensory Testing of Building Materials as defined by the Finnish Emission Classification of Building Materials (version of 2004). The test method is based on the published methods: ISO 16000-3, ISO 16000-6, 16000-9, 16000-11. The internal method numbers are: 9810, 9811, 9812, 2808, 4430 and 8400.

1.1 Test Specimen

The sample was applied onto a glass plate and drawn off over a model giving a 3 mm thick and uniform layer with a broadness of 10 mm. The test specimen was transferred into a test chamber immediately (internal method no.: 9810).

1.2 Test Chamber

The test chamber was made of stainless steel and had a volume of 119 litres. The air clean-up was realised 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 ½ per hour. The loading of the test chamber was 0.007 m² test specimen per m³ air volume (internal method 9811).

1.3 Sampling, Desorption, Analyses

All emissions were calculated as area specific emission rate SER with the following formula:

$$SER_A = C \times n / L$$

With:

SER _A	Area specific emission rate, µg/m ² h
C	Concentration in test chamber, µg/m ³
n	Air exchange rate = 0.5 1/h
L	Loading factor = 0.007 m ² /m ³

1.3.1 Testing of VOC, SVOC, VVOC after 28 Days

The emissions of organic compounds after 28 days were tested by drawing air samples from the chamber outlet through Tenax TA tubes (main tube and backup tube). Analyses were done by thermal desorption and gas chromatography / mass spectroscopy (internal methods: 9812 / 2808).

Quantification was done with the Total Ion Chromatogram (TIC) signal, or in case of overlapping peaks by calculating with fragment ions. All identified and non-identified substances were quantified as toluene equivalent if giving more than 2.5 µg/m²xh.

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-C₆).
- Semi-volatile organic compounds SVOC: All substances appearing after n-hexadecane (n-C₁₆).

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Calculation of the TVOC (Total Volatile Organic Compounds) was done by addition of the results of all substances between C₆ and C₁₆ as toluene equivalent, as defined in ISO 16000-6.

Calculation of the TSVOC (Total Semi-Volatile Organic Compounds) was done by addition of the results of all substances between C₁₆ and C₂₂ as toluene equivalent, as defined in ISO 16000-6.

Calculation of the TVVOC (Total Very Volatile Organic Compounds) was done by addition of the results of all substances appearing before C₆ as toluene equivalent, as defined in ISO 16000-6.

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 Deviations from the M1 Test Method

No deviations for the tested parameters.

1.3.3 Accreditation

The testing methods described above have been accredited (ISO 17025-1) 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, search: Uncertainty. This uncertainty does not include sensory testing.

2 Results

2.1 Chemical testing after 3 days

GRAFT FR Eco-Foam	CAS No.	Retention time min	ID-Cat.	After 3 days $\mu\text{g}/\text{m}^3$	Emission rate $\mu\text{g}/(\text{m}^2\cdot\text{h})$	Toluene equivalent $\mu\text{g}/\text{m}^3$
TVOC (C₆-C₁₆)				6.4	450	6.4
Single VOC Substance:						
n-Butylacetat	123-86-4	3.71	2	2.9	210	2.9
2-Methyl-2-pentenal *	623-36-9	3.97	2	2	140	2
Decamethylcyclopentasiloxane *	541-02-6	10.76	2	1.4	100	1.4
Total VVOC (< n-C₆)				< 1	< 100	< 1
Single VVOC Substance:						
n.d.	-	-	-	< 1	< 100	< 1
Total SVOC (> n-C₁₆)				< 1	< 100	< 1
Single SVOC Substance:						
n.d.	-	-	-	< 1	< 100	< 1

n.d. Not detected

< Means less than

* Not a part of our accreditation. See Accreditation.

2.2 Chemical testing after 28 days

GRAFT FR Eco-Foam	CAS No.	Retention time min	ID-Cat.	After 3 days $\mu\text{g}/\text{m}^3$	Emission rate $\mu\text{g}/(\text{m}^2\cdot\text{h})$	Toluene equivalent $\mu\text{g}/\text{m}^3$
TVOC ($\text{C}_6\text{-C}_{16}$) as toluene equivalent				< 1	< 100	< 1
Single VOC Substance: n.d.	-	-	-	< 1	< 100	< 1
Total VVOC (< n-C₆)				< 1	< 100	< 1
Single VVOC Substance: n.d.	-	-	-	< 1	< 100	< 1
Total SVOC (> n-C₁₆)				< 1	< 100	< 1
Single SVOC Substance: n.d.	-	-	-	< 1	< 100	< 1

n.d. Not detected

< Means less than

* Not a part of our accreditation. See Accreditation.

3 Interpretation of the Results

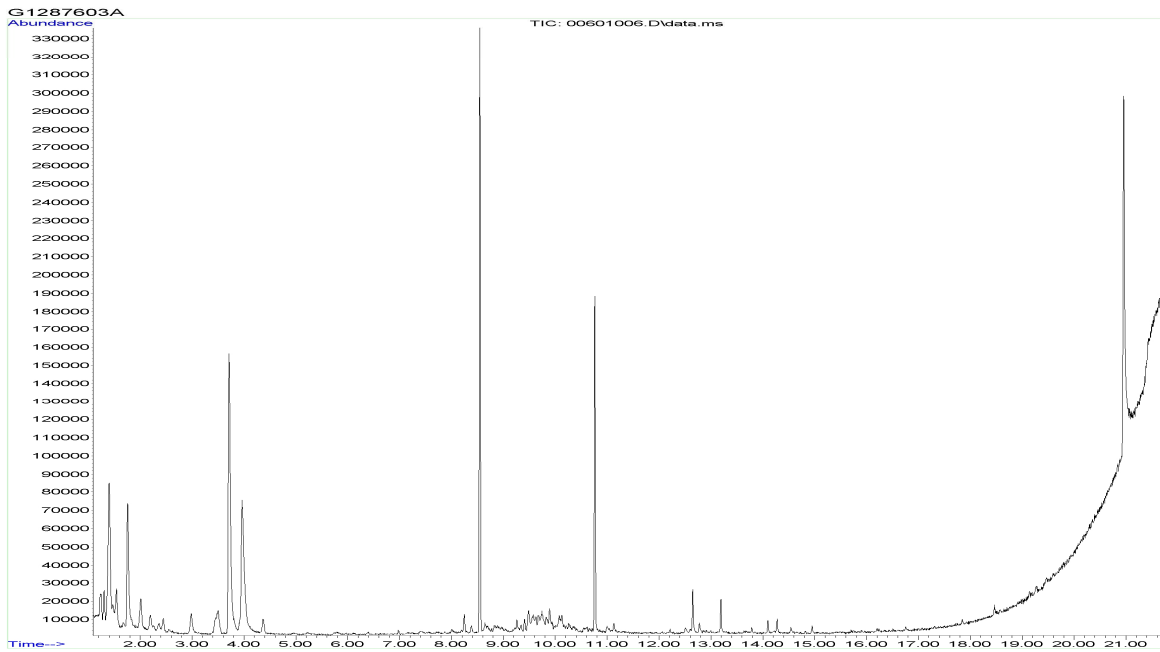
The results of **GRAFT FR Eco-Foam** be summarised within the scope of M1 classification as follows.

The emission rate after 28 days was

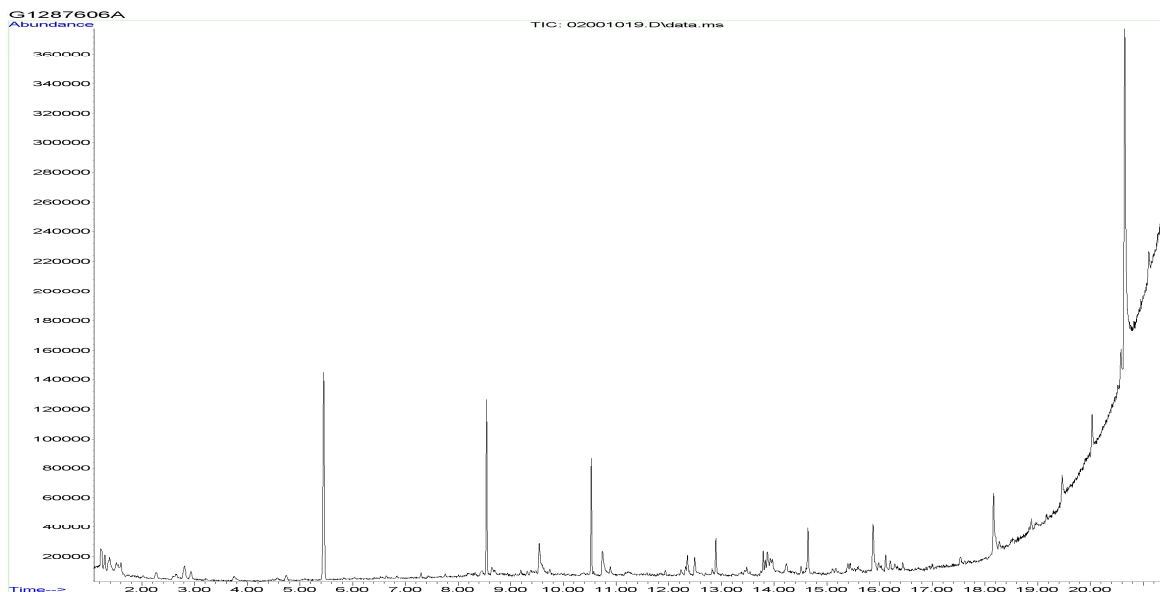
- **Below** the classification threshold of $200 \mu\text{g}/\text{m}^2\text{h}$ for TVOC

The tested product GRAFT FR Eco-Foam complies with the requirements of M1 for the tested parameters.

Appendix 1: Chromatogram VOC after 3 days



Appendix 2: Chromatogram VOC after 28 days



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