ilac-MRA 👑 **DANAK**
TEST Reg.nr. 522

eurofins

Bostik SA
420 rue d'Estienne d'Orves
92700 Colombes
FRANCE

Eurofins Product Testing A/S
Smedeskovvej 38
8464 Galten
Denmark

CustomerSupport@eurofins.com
www.eurofins.com/voc-testing

Date
20 April 2020

EMICODE Test Report

1   Sample Information

Sample identification	STIX A800 PREMIUM
Batch no.	-
Production date	-
Product type	Adhesive
Date when sample was received	20/04/2015
Testing (start - end)	07/05/2015 - 04/06/2015

2   Evaluation of the Results

The tested product complies with the requirements of GEV and the results correspond to the EMICODE emission class EC 1 PLUS.

Parameter	Concentration µg/m³	EC 2 µg/m³	EC 1 µg/m³	EC 1 Plus µg/m³
TVOC 3 days	740	≤ 3000	≤ 1000	≤ 750
TVOC 28 days	5.2	≤ 300	≤ 100	≤ 60
TSVOC 28 days	32	≤ 100	≤ 50	≤ 40
Total VOC without NIK 28 days	< 5	>40		≤ 40
R-value (dimensionless) 28 days	0.13	>1		≤ 1
Formaldehyde 3 days	< 3	≤ 50		
Acetaldehyde 3 days	< 3	≤ 50		
Sum Formaldehyde + Acetaldehyde 3 days (ppm)	<0.005	≤ 0.05		
Total Carcinogens 3 days	<1	≤ 10		
Total Carcinogens 28 days	<1	≤ 1		

This test report does not alone entitle to use the protected trademark label EMICODE. For the use of an EMICODE label a license has to be applied for at the GEV, Düsseldorf, Germany. A license can only be granted for ready-to-use products, if some additional require-ments on contents of certain chemicals (e.g. solvent-free) are fulfilled.

Note: The label is supplemented with a final letter R (e.g. EMICODE EC 1 R) for installation products that fulfill the specification in clause 3.1.2 sentence 2 of GEV classification criteria and that therefore may require measures for ensuring occupational safety during application.

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3   Test Method

Method		Principle	Parameter	Quantification limit	Uncertainty
GEV method in its version of 15.04.2013.					
Internal method numbers: 9810, 9811, 9812, 2808B, 8400		GC/MS	VVOC, VOC, SVOC	5 µg/m³	22% (RSD)
		HPLC	Volatile alde-hydes	3 µg/m³	Um = 2 x RSD= 45 %
Test chamber parameter					
Chamber volume, l	119	Temperature, °C	23±1	Relative humidity, %	50±3
Air change rate, 1/h	0.5	Loading ratio, m²/m³	0.4		
Sample preparation					
Application amount, g/m²	300	The sample was homogenised, applied onto a glass plate and struc-tured with a notched trowel "TKB-B1" (hold in a 60° angle of inclina-tion).			
Deviations from the test method		None			

For detailed method description see: Description of the applied test method

4 Results

4.1 Emission Test after 3 Days

	CAS No.	Retention time min	ID-Cat.	Concen-tration µg/m³	NIK-value µg/m³	R-value	Emission rate µg/(m²*h)	Toluene equivalent µg/m³
TVOC (C6-C16)				1100			1300	**740**
VOC with NIK								
1-Butanol	71-36-3	2.47	1	11	3100	0.0036	14	< 5
1,2-Propandiol (Propylene glycol) *	57-55-6	3.47	1	470	2500	0.19	590	110
Butylglycol *	111-76-2	6.94	1	40	490	0.082	50	26
Camphene *	79-92-5	7.74	1	< 5	1500	(<5)	< 7	< 5
Diethylene glycol *	111-46-6	7.92	1	16	440	0.036	20	< 5
a-Terpinene *	99-86-5	8.82	1	< 5	1500	(<5)	< 7	< 5
g-Terpinene *	99-85-4	9.43	1	< 5	1500	(<5)	< 7	< 5
Terpinolene *	586-62-9	9.84	1	< 5	1500	(<5)	< 7	5.8
Borneol *	507-70-0	10.85	1	14	1500	0.0095	18	14
Butyldiglycol *	112-34-5	11.03	1	20	670	0.030	25	8.8
n-Tridecane	629-50-5	12.22	1	< 5	6000	(<5)	< 7	< 5
Longicyclene *	1137-12-8	13.18	1	23	1500	0.015	28	34
n-Tetradecane	629-59-4	13.21	1	21	6000	0.0035	26	25
Isolongifolene *	1135-66-6	13.36	1	62	1500	0.041	77	99
Longifolene *	475-20-7	13.54	1	61	1500	0.041	77	90
n-Pentadecane *	629-62-9	14.15	1	15	6000	0.0024	18	15
n-Hexadecane	544-76-3	15.02	1	7.6	6000	0.0013	9.6	9.1
Saturated aliphatic hydrocar-bons higher than C9 *	-	11.8-15.0	2	240	6000	0.040	300	240
R-value = ∑ Conc$_i$/NIK$_i$						0.49		
VOC without NIK								
n-Butyl ether *	142-96-1	6.54	2	< 5	-	-	< 7	< 5
Not identified *	-	8.32	4	< 5	-	-	< 7	< 5
Not identified *	-	8.94	4	< 5	-	-	< 7	< 5
Not identified *	-	9.01	4	< 5	-	-	< 7	< 5
Not identified *	-	9.15	4	< 5	-	-	< 7	< 5
Not identified *	-	10.18	4	< 5	-	-	< 7	< 5
Not identified *	-	10.54	4	< 5	-	-	< 7	< 5
2,6,6-Trimethyl-, (1.alpha., 2.alpha.,5.alpha.) bicycle [3.1.1]heptan-3-one *	547-60-4	10.79	2	< 5	-	-	< 7	< 5
Not identified *	-	11.11	4	< 5	-	-	< 7	< 5
Estragole *	140-67-0	11.19	1	< 5	-	-	< 7	< 5

	CAS No.	Retention time	ID-Cat.	Concen-tration	NIK-value	R-value	Emission rate	Toluene equivalent
		min		µg/m³	µg/m³		µg/(m²*h)	µg/m³
Not identified *	-	11.57	4	< 5	-	-	< 7	< 5
Not identified *	-	13.49	4	70	-	-	88	70
Total VOC without NIK				70			88	70
Total VVOC (< C6)				< 5			< 7	< 5
n.d.	-	-	-	< 5	-	-	< 7	< 5
Total SVOC (> C16)				38			47	38
Not identified *	-	17.72	4	< 5	-	-	< 7	< 5
Not identified *	-	17.83	4	6.9	-	-	8.6	6.9
Not identified *	-	17.98	4	< 5	-	-	< 7	< 5
Not identified *	-	18.10	4	< 5	-	-	< 7	< 5
Not identified *	-	18.25	4	< 5	-	-	< 7	< 5
Saturated aliphatic hydrocar-bons higher than C16 *	-	15.0-15.9	4	31	-	-	39	31
Total Carcinogens				**< 1**			< 2	< 1
Volatile Aldehydes C1-C2 measured with DNPH-Method (see 5.1.4)								
Formaldehyde	50-00-0	-	-	**< 3**	-		< 4	-
Acetaldehyde	75-07-0	-	-	< 3	-	-	< 4	-
Sum Formaldehyde + Acetal-dehyde (ppm)	-	-	-	<0.005	ppm	-	-	-

n.d.   Not detected
<   Means less than
*   Not a part of our accreditation. See 5.3.6 Accreditation
(<5) The R-value is not calculated for compounds with a concentration <5 µg/m³.
a   The method is not optimal for very volatile compounds. For these substances smaller results and a higher uncertainty in the measurement cannot be excluded.

The results are only valid for the tested sample(s).
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4.2 Emission Test after 28 Days

	CAS No.	Retention time	ID-Cat.	Concen-tration	NIK-value	R-value	Emission rate	Toluene equivalent
		min		µg/m³	µg/m³		µg/(m²*h)	µg/m³
TVOC (C6-C16)				25			31	**5.2**
VOC with NIK								
1-Butanol	71-36-3	2.47	1	5.9	3100	0.0019	7.3	< 5
1,2-Propandiol (Propylene glycol) *	57-55-6	3.42	1	6.3	2500	0.0025	7.9	< 5
2-methyl-4-isothiazolin-3-on *	2682-20-4	10.87	1	13	100	0.13	16	< 5
Butyldiglycol *	112-34-5	11.02	1	< 5	670	(<5)	< 7	< 5
Isolongifolene *	1135-66-6	13.35	1	< 5	1500	(<5)	< 7	< 5
Longifolene *	475-20-7	13.52	1	< 5	1500	(<5)	< 7	5.2
n-Pentadecane *	629-62-9	14.14	1	< 5	6000	(<5)	< 7	< 5
n-Hexadecane	544-76-3	15.01	1	< 5	6000	(<5)	< 7	< 5
R-value = ∑ Conc$_i$/NIK$_i$						**0.13**		
VOC without NIK								
Not identified *	-	12.80	4	< 5	-	-	< 7	< 5
(+)-Aromadendren *	489-39-4	13.48	2	< 5	-	-	< 7	< 5
Not identified *	-	13.97	4	< 5	-	-	< 7	< 5
Not identified *	-	14.22	4	< 5	-	-	< 7	< 5
Not identified *	-	14.30	4	< 5	-	-	< 7	< 5
Not identified *	-	14.51	4	< 5	-	-	< 7	< 5
Phenylmaleic anhydride *	36122-35-7	14.57	2	< 5	-	-	< 7	< 5
Not identified *	-	14.67	4	< 5	-	-	< 7	< 5
Not identified *	-	14.73	4	< 5	-	-	< 7	< 5
Not identified *	-	14.83	4	< 5	-	-	< 7	< 5
Total VOC without NIK				**< 5**			< 7	< 5
Total VVOC (< C6)				< 5			< 7	< 5
n.d.	-	-	-	< 5	-	-	< 7	< 5
Total SVOC (> C16)				**32**			40	32
Not identified *	-	15.07	4	< 5	-	-	< 7	< 5
Not identified *	-	15.29	4	< 5	-	-	< 7	< 5
Not identified *	-	15.42	4	< 5	-	-	< 7	< 5
Not identified *	-	15.56	4	< 5	-	-	< 7	< 5
Not identified *	-	15.66	4	< 5	-	-	< 7	< 5
n-Heptadecane *	629-78-7	15.83	2	< 5	-	-	< 7	< 5
Not identified *	-	15.89	4	< 5	-	-	< 7	< 5
Not identified *	-	17.71	4	5.9	-	-	7.4	5.9

The results are only valid for the tested sample(s).
This report may only be copied or reprinted in its entity, parts of it only with a written acceptance by Eurofins.

	CAS No.	Retention time	ID-Cat.	Concen-tration	NIK-value	R-value	Emission rate	Toluene equivalent
		min		µg/m³	µg/m³		µg/(m²*h)	µg/m³
Not identified *	-	17.82	4	15	-	-	18	15
Not identified *	-	17.96	4	5.4	-	-	6.7	5.4
Not identified *	-	18.09	4	6.1	-	-	7.6	6.1
Not identified *	-	18.24	4	< 5	-	-	< 7	3 5
Total Carcinogens				**< 1**			**< 2**	**< 1**

n.d.   Not detected
<   Means less than
*   Not a part of our accreditation. See 5.3.6 Accreditation
(<5) The R-value is not calculated for compounds with a concentration <5 µg/m³.
a   The method is not optimal for very volatile compounds. For these substances smaller results and a higher uncertainty in the measurement cannot be excluded.

Categories of identity:
1:      Identified and specifically calibrated
2:      Identified by comparison with a mass spectrum obtained from a library and supported by other information. Calibrated as toluene equivalent
3:      Identified by comparison with a mass spectrum obtained from a library. Calibrated as toluene equivalent
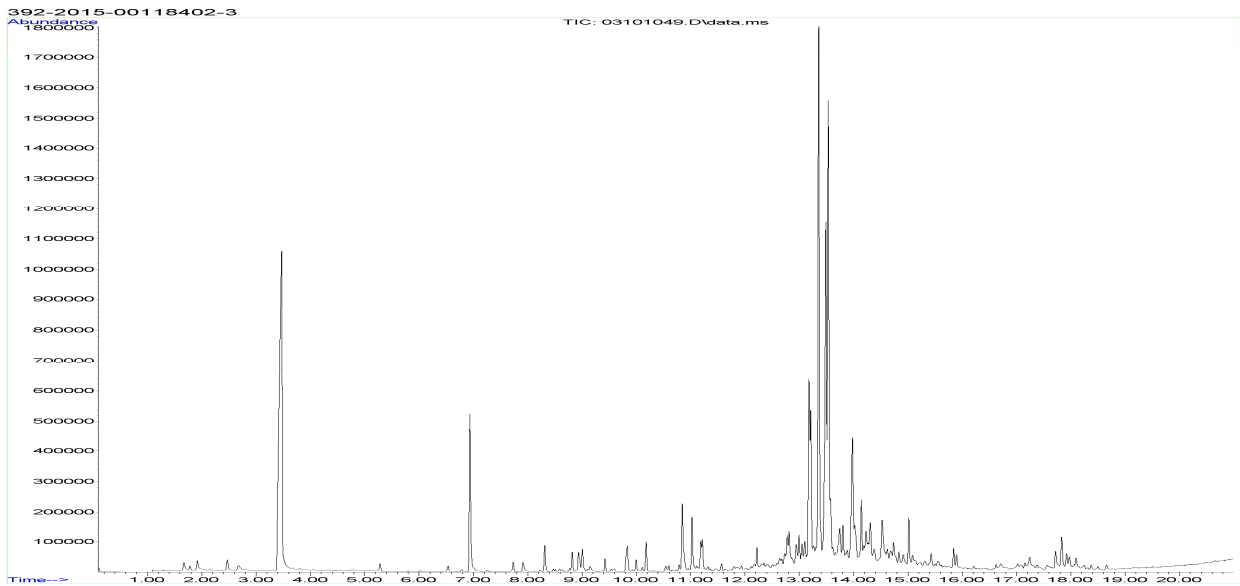4:   Not identified. Calibrated as toluene equivalent

Rasmus Stengaard Christensen
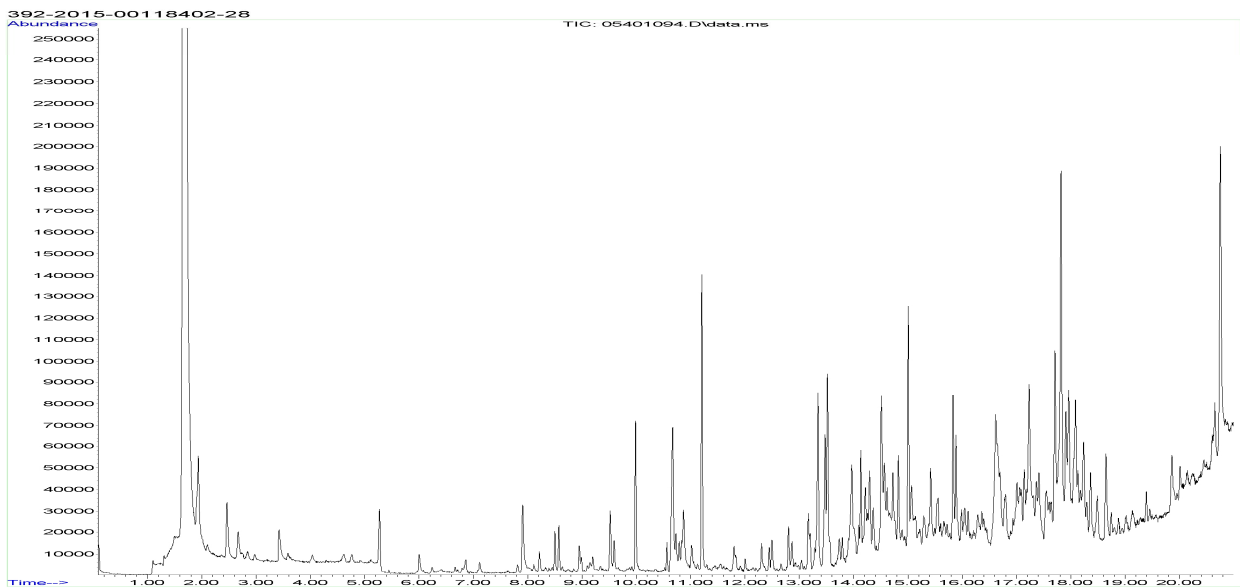Analytical Service Manager, MSc in Chemistry

Maria Pelle
Chemist

4.3   Chromatograms

4.3.1   Chromatogram after 3 days

4.3.2   Chromatogram after 28 days

Please consider the different scales

5   Appendices

5.1   Description of the applied test method

5.1.1   Test Chamber

The test chamber is made of stainless steel. A multi-step air clean-up is performed before loading the chamber, and a blank check of the empty chamber is performed. The operation parameters are 23 °C, 50 % relative air humidity in the supply air.

5.1.2   Sampling, Desorption, Analyses

Testing for Carcinogens

The presence of carcinogens (EU Categories C1 and C2, as per the latest publication on the homepage of German BGIA Institute) was tested by drawing sample air from the chamber outlet through 2 Tenax TA tubes (main tube and backup tube). Analysis was performed by thermal desorption and gas chromatography / mass spectroscopy (internal methods no.: 9812 / 2808B). The absence of a listed carcinogen was stated if the specific combination of fragment ions was absent at the specific retention time in the chromatogram. If no listed carcinogens were found but the required detection limit was exceeded, the identity was checked by comparing full scan sample mass spectra with full scan standard mass spectra.

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

VOC Emission Testing

The emissions of organic compounds were tested by drawing sample air from the chamber outlet through 2 Tenax TA tubes (main tube and backup tube). Analysis was performed by thermal desorption and gas chromatography / mass spectroscopy (internal methods no.: 9812 / 2808B).

All single substances that are listed with a NIK value in the latest AgBB publication were identified. Quantification was done with the respective response factor and the TIC signal or in case of overlapping peaks by calculating with fragment ions. All other single substances, as well as all non-identified substances, were quantified as toluene equivalent.

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:

- Volatile organic compounds VOC: All substances appearing between these limits.
- Semi-volatile organic compounds SVOC: All substances appearing after n-hexadecane (n-C16).
- Very volatile organic compounds VVOC: All substances appearing before n-hexane (n-C6).

Calculation of the TVOC (Total Volatile Organic Compounds) was performed according to the AgBB/DIBt test method, by addition of the results of all individual substances with concentrations = 5 µg/m³ in the retention time interval C6-C16. Furthermore the TVOC was calculated as the toluene equivalent, as defined in ISO 16000-6.

Calculation of the TSVOC (Total Semi-Volatile Organic Compounds) was performed by addition of the results of all substances with concentrations = 5 µg/m³ between C16 and C22 as toluene equivalent, as defined in ISO 16000-6.

Calculation of the TVVOC (Total Very Volatile Organic Compounds) was performed by addition of the results of all substances with concentrations = 5 µg/m³ 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 substances cannot be detected (or with limited reliability only).

5.1.3   Calculation of R Values with the German NIK List

The concentrations of all substances = 5 µg/m³ in the interval between n-C6 and n-C16 were divided by their respective NIK value (if given). The sum of the quotients gives the R value:

$$R = \sum_{i}^{n} \left(\frac{c_i}{NIK_i} + \ldots + \frac{c_n}{NIK_n} \right)$$

In addition, all results were summed up for the substances without published NIK value, but in the interval be-tween n-C6 and n-C16, when concentrations were = 5 µg/m³.

5.1.4   Testing of Aldehydes

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

The absence of formaldehyde 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.

5.1.5   Quality assurance

Before loading the chamber a blank check of the empty chamber was performed and compliance with background concentrations in accordance with ISO 16000-9 was determined. Sampling at the chamber outlet and subsequent analysis was performed in duplicate. For monitoring any breakthrough or overloading of the tubes, two Tenax TA tubes were used in series.

In each sequence stability of GC system was checked by a general function test of device and column, and by use of control charts for monitoring mean values and standard deviations for individual VOCs. Reproducibility of the method was monitored for two selected VOCs per sequence.

5.1.6   Accreditation

The testing methods described above are accredited to EN ISO/IEC 17025:2005 by DANAK (no. 522). Not all parameters are covered by this accreditation. At present the accreditation does not cover the parameters marked with a note *, however analysis was performed for these parameters at the same level of quality as for the accredited parameters.

5.1.7   Uncertainty of the test method

The relative standard deviation (RSD) of the test method amounts to 22%. The expanded uncertainty Um is 45% and equals 2 x %RSD. For further information please visit www.eurofins.dk/uncertainty.