BELAC 633-TEST

Emission test report of a Regupol sample Everroll®

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ML02001-06R

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Servaco Product Testing is a joint venture between VITO and the Servaco Group. The new company focuses on product emission testing and VOC reduction performance testing. The product emission tests analyse the impact of all kinds of building and consumer products and materials on indoor air quality. The Joint Venture has departments in Mol and Wetteren. The product emission tests are performed in Mol.

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1. OBJECTIVE/EVALUATION FRAMEWORK

Determination of the volatile organic compound emissions for the Regupol sample Everroll according to the M1 label.

M1	M1 Emission Classification of Building Materials: Protocol for Chemical and Sensory Testing of Building Materials Version 15.11.2017 + CMR update January 2019

2. SAMPLE INFORMATION

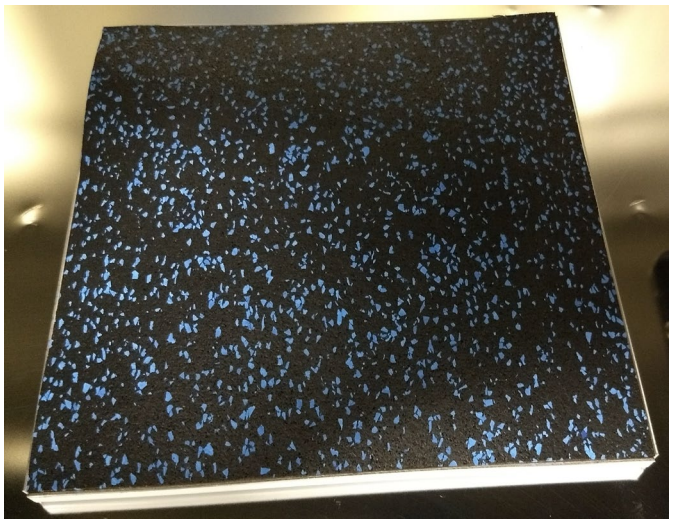
Table 1: Sample information provided by client

S1

Sample identification	Everroll®
Date of production	15/10/2019
Date of sampling	03/12/2019
Batch N°	2/4738
Model/program/series	classic
Type of product	PUR Bonded Rubber granulate
Article nr.	/
Misc.	/

Table 2: Sample information provided by Servaco Product Testing

Sample group code	**SPT2019233**
Sample code	SPT20192766
Date of reception of the sample	05/12/2019
Preconditioning period (start – end)	/
Date of the test (start – end)	12/12/2019-09/01/2020



Photograph 1: test sample S1

3. TEST METHODS - ACCREDITATION

The following test methods were used:

- Test chamber was operated according to EN 16516 (2017) (ISO 16000-9 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure MIM-GA-013)
- Analysis of TENAX samples was performed according to EN 16516 (2017) (ISO 16000-6 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure MIM-GA-014)
- Analysis of DNPH cartridges was performed according to EN 16516 (2017) (ISO 16000-3): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure MIM-OR-022)
- The test sample preparation was performed according to EN 16516 (2017) (ISO 16000-11 with extra clauses): Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air (internal procedure MIM-GA-013)

Table 3: Overview of the test method parameters

EN 16516 method

Analytical methods	**analytes**
ISO 16000-3	Volatile aldehydes (C1-C4)
ISO 16000-6 + extra clauses	VOC, SVOC
Test chamber parameters	**values**
	S1
Chamber volume (m^3)	0.110
Air exchange rate (h^{-1})	0.5
Temperature (°C)	23 ± 1
Relative humidity (%)	50 ± 5
Loading factor (m^2/m^3)	0.4
Sample preparation	
Dimensions (m^2)	0.21 x 0.21
Application amount (g)	/

Servaco Product Testing is an accredited laboratory according to EN ISO/IEC 17025 (BELAC 633-TEST) for the internal procedures MIM-GA-013 and MIM-GA-014. The analysis of DNPH cartridges (internal procedure MIM-OR-022) was subcontracted to VITO and is part of their EN ISO/IEC 17025 accreditation scope (BELAC 045-TEST). At present the accreditation does not cover the compounds marked with *, however analysis for these compounds was performed at the same level of quality as for the accredited compounds. The analytical measurement uncertainty (expanded uncertainty) for volatile aldehydes amounts to maximum 15 % and 30 % for the other target compounds.

4. RESULTS

4.1. VOC EMISSION RESULTS AFTER 28 DAYS

VOC analysis after 28 days						
S1	CAS number	RT	Id[1]	Conc. (µg/m³)	SER_a (µg/m²h)	R_i
VOC with LCI[2]						
Cyclohexanone	108-94-1	16.0	1	6	7	0.014
VVOC with LCI						
Formaldehyde	50-00-0	2.2	1	<1		
Acetaldehyde	75-07-0	3.1	1	<1		
VOC without LCI (non-assessable)[2]						
Benzoic acid*	65-85-0	22.3	2	14	18	
Benzothiazole*	95-16-9	23.9	2	49	61	
VVOC without LCI						
Non identified						
Sum of VOCs without LCI				63	79	
TVOC				79	99	
TSVOC				<5		
R value						0.014
carcinogens				<1		
benzene				<1		
D.L.: detection limit < 0.5 µg/m³ Q.L.: quantification limit < 1 µg/m³						

[1] Identification:
- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

[2] Compounds marked with an * are not part of the accreditation

Analysis of the NH3 after 28 days		
Analyte	CAS number	Concentration (µg/m^3)
NH_3	7664-41-7	<q.l.

	Acceptability		**Acceptability**
Panel member 1	-0.03	Panel member 11	0.25
Panel member 2	0.00	Panel member 12	0.60
Panel member 3	0.50	Panel member 13	0.15
Panel member 4	0.50	Panel member 14	0.80
Panel member 5	-0.70	Panel member 15	0.00
Panel member 6	0.70	Panel member 16	-0.60
Panel member 7	0.80	Panel member 17	-0.55
Panel member 8	0.20	Panel member 18	0.00
Panel member 9	0.80	Panel member 19	-0.30
Panel member 10	0.00		
Arithmetic mean of acceptability: 0.15 Standard deviation: 0.49 90% confidence interval: -0.04 – 0.34			

5. EVALUATION OF THE RESULTS

5.1. COMPARISON WITH LIMIT VALUES OF M1

S1 Compound	CAS number	Identific-ation[3]	Emission rate (mg/m²h)	Emission rate M1 (mg/m²h)	Emission rate M2 (mg/m²h)
TVOC		2	0.099	<0.2	<0.4
Formaldehyde	75-07-0	1	<0.05	<0.05	<0.125
Ammonia	7664-41-7	1	<0.03	<0.03	<0.06
Carcinogenic compounds	126-99-8	1	<0.001	<0.001	<0.001
Single VOC			<EU-LCI	≤EU-LCI	≤EU-LCI
Odour (dimensionless)			0.15	0.0	0.0

[3] Identification:

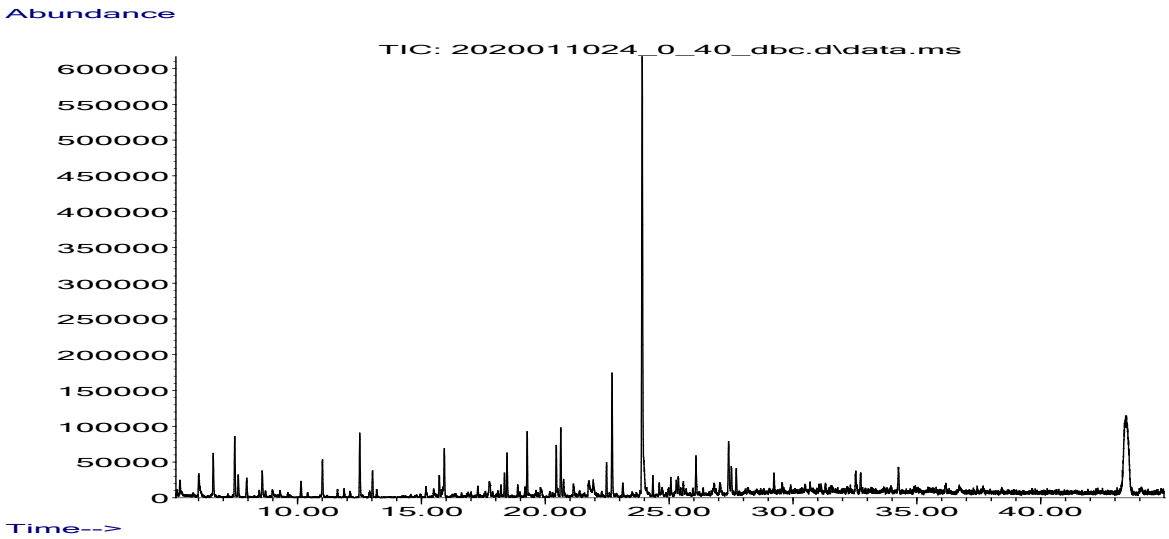
- 1: identification by standard solution and retention time, confirmed by spectrum library and specifically calibrated
- 2: identification by comparison with spectrum library and plausibility declaration, calibrated as toluene equivalent
- 3: not identified, calibrated as toluene equivalent

6. APPLIED LCI/NIK VALUES

Compound	CAS number	EU-LCI ($\mu g/m^3$)
VOC compounds		
cyclohexanone	108-94-1	410

7. CHROMATOGRAMS

S1 28 days



8. CONCLUSIONS

In the final table below is shown whether the product complies with the M1 protocol.

	S1
M1	√

X : not compliant
√ : compliant

The sample complies with M1 procotol.

According to the decision rule defined in the contract, for the above statements of conformity the measurement uncertainty was not taken into account.

9. AUTHORISATION OF REPORT

This report contains the results of samples, analysed within the scope of a study ordered by Regupol BSW GmbH (Am Hilgenacker 24, 57319 Bad Berleburg, Germany). It relates to the sample(s) with the following Servaco Product Testing - identification:

Sample monster codes belonging to sample group SPT2019233	
From	To
SPT20192766	SPT20192766

Servaco Product Testing is an accredited laboratory according to EN ISO/IEC 17025 (BELAC 633-TEST) for the internal procedures MIM-GA-013 and MIM-GA-014. The analysis of DNPH cartridges (internal procedure MIM-OR-022) was subcontracted to VITO and is part of their EN ISO/IEC 17025 accreditation scope (BELAC 045-TEST).

The laboratory is not responsible for the accuracy of the information provided by the customer (see Table 1).
The analytical results in this research report only relate to the samples analysed. Interpretations, advice and other not merely objective information are not covered by the EN ISO/IEC 17025 accreditation. Further information on measurement uncertainty and sample preservation will be provided upon request.

Dates of analysis:

- DNPH: 14/01/2020
- Tenax: 10/01/2020

This research report consists of 13 numbered pages, and the signature below confirms the authorisation of the analytical results according to EN ISO/IEC 17025.

M. Lor
Managing Director Servaco Product Testing