



Produktprüfung
Zertifizierung
Qualitätssicherung

eco
INSTITUT

Appraisal for the eco-INSTITUT-Label



NAPURE Latex Foam

Lamifoam SDN BHD, Malaysia

Test Report Nr. 21438-1



eco-INSTITUT GmbH
Sachsenring 69
50677 Köln

Fon +49-(0)221-931 245 -0
Fax +49-(0)221-931 245 -33

www.eco-institut.de
www.eco-info.de
info@eco-institut.de

Akkreditiert ISO/IEC 17025

 **AKS** Akkreditierung: AKS-PL-20708
Verzeichnis: www.aks-hannover.de
Staatliche Akkreditierungsstelle Hannover



Test Report No. 21438-1

Client:	Lamifoam SDN BHD, Lot 6122, Jalan Haji Salleh, Off Jalan Meru, 41050 Klang, Selangor Durai Ehsan, Malaysia
Sample description by client:	NAPURE Latex Foam
Sample no.:	21438-1
Type of sample:	Natural latex foam
Sampled by:	Lamifoam SDN BHD, Lot 6122, Jalan Haji Salleh, Off Jalan Meru, 41050 Klang, Selangor Durai Ehsan
Date of sampling:	16.8.2009
Location of sampling:	Lamifoam SDN BHD, Lot 6122, Jalan Haji Salleh, Off Jalan Meru, 41050 Klang, Selangor Durai Ehsan
Date of production:	11.8.2009
Date of arrival of sample:	26.8.2009
Condition of sample:	without objection
Date of report:	13.10.2009
Number of pages of report:	21
Test parameter:	see table of contents
Testing laboratory:	eco-INSTITUT GmbH, Cologne * external laboratory



Contents

Test report	4
Complete mattress	4
1 Emission test	4
1.1 Volatile organic compounds (VOC)	4
Measurement time 2 days after test chamber loading	7
1.1.1 CMR VOC _{2d}	7
1.1.2 VOC / TVOC _{2d}	8
1.1.3 VVOC _{2d}	9
1.1.4 SVOC _{2d}	10
Measurement time 7 days after test chamber loading	11
1.1.5 VOC _{7d} / TVOC _{7d}	11
1.1.6 VVOC _{7d}	12
1.1.7 SVOC _{7d}	13
1.2 Carbon Disulfide CS ₂	14
1.3 Nitrosamines	15
1.4 Formaldehyde _{2d}	16
1.5 Odour testing	17
2 Content analysis	18
2.1 Polymers and filler percentage	18
 Expert appraisal	 19
 Summary evaluation	 20
 Appendix	 21



Test report

Complete mattress

1 Emission test

1.1 Volatile organic compounds (VOC)

Definition of terms:

VOC (volatile organic compounds)	All individual materials with a concentration $\geq 0,001 \text{ mg/m}^3$ in retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane) Substances refer to NIK lists / AgBB (DIBt)
TVOC (total volatile organic compounds)	Sum of all individual substances in retention range C_6 to C_{16} .
CMR VOC (carcenogenic, mutagenic, reproduction toxic VOC)	All individual substances with the following categories: Directive 67/548 EC: Carc. Cat. 1, 2; Mut. Cat. 1, 2; Repr. Cat. 1, 2 IARC: Group 1, 2A DFG (MAK lists): Category III1, III2
VVOC (very volatile organic compounds)	All individual substances wit concentration $\geq 0,001 \text{ mg/m}^3$ in retention range $< C_6$
SVOC (semi-volatile organic compounds)	All individual materials $\geq 0,001 \text{ mg/m}^3$ in retention range $> C_{16}$ (n-Hexadecane) to C_{22} (Docosane)
Total SVOC (total semi-volatile organic compounds)	Sum of all SVOC in retention range $> C_{16}$ to C_{22} .
Identified and calibrated and substances ($C_{id,sub}$), substance specific calculated	Spectrum and retention time correlate with the calibrated substance
Not identified substances calculated as toluene equivalent ($C_{ni,tol}$)	Suggestion from the spectrum library with high probability and/or allocation to a group of substances
SER	Specific emission rate (see appendix)



List of the analysed VOCs:

Aromatic hydrocarbons

Toluene
Ethylbenzene
p-Xylene
m-Xylene
o-Xylene
Isopropylbenzene
n-Propylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,2,3-Trimethylbenzene
2-Ethyltoluene
1-Isopropyl-4-methylbenzene
1,2,4,5-Tetramethylbenzene
n-Butylbenzene
1,3-Diisopropylbenzene
1,4-Diisopropylbenzene
Phenyl octane
1-Phenyl decane²
1-Phenyl undecane²
4-Phenylcyclohexene
Styrene
Phenyl acetylene
2-Phenyl propene
Vinyl toluene
Naphthalene
Indene
Benzene

Saturated aliphatic substances

Hydrocarbons
2-Methyl pentane¹
3-Methyl pentane¹
n-Hexane
Cyclohexane
Methylcyclohexane
1,4-Dimethylcyclohexane
n-Heptane
n-Octane
n-Nonane
n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane
n-Hexadecane
Methylcyclopentane

Terpenes

δ-3-Carene
α-Pinene
β-Pinene
Limonene
Longifolene
Caryophyllene
Isolongifolene
alpha-Phellandrene
Myrcene
Camphene
alpha-Terpinene
Longipinene
beta-Caryophyllene
beta-Farnesene
alpha-Bisabolen

Aliphatic alcohols and ether

1-Propanol¹
2-Propanol¹
tert-Butanol
2-Methyl-1-propanol
1-Butanol
1-Pentanol
1-Hexanol
Cyclohexanol
2-Ethyl-1-hexanol
1-Octanol
4-Hydroxy-4-methyl-pentan-2-one

1-Heptanol
1-Nonanol
1-Decanol

Aromatic alcohols (phenols)

Phenol
BHT (2,6-di-tert-butyl-4-methylphenol)
Benzylalcohol

Glycols, Glycol ether, Glycol ester

Propylenglycol (1,2-Dihydroxypropane)
Ethylene glycol (Ethandiol)
Ethylene glycol monobutyl ether
Diethylene glycol
Diethylene glycol-monobutyl ether
2-Phenoxyethanol
Ethylene carbonate
1-Methoxy-2-propanol
Glycolic acid butyl ester
Texanol
Butyldiglycol acetate
Dipropylenglycol mono-methyl ether
2-Methoxyethanol
2-Ethoxyethanol
2-Propoxyethanol
2-Methylethoxyethanol
2-Hexoxyethanol
1,2-Dimethoxyethane
1,2-Diethoxyethane
2-Methoxyethyl acetate
2-Ethoxyethyl acetate
2-Butoxyethyl acetate
2-(2-Hexoxyethoxy)-ethanol
1-Methoxy-2-(2-methoxy-ethoxy)-ethane
Propylene glycol di-acetate
Dipropylene glycol
Dipropylene glycol monomethylether acetate
Dipropylene glycol mono-n-propylether
Dipropylene glycol mono-t-butylether
1,4-Butanediol
Tripropyleneglycolmonomethyl ether
Triethylene glycol dimethyl ether
1,2-Propylene glycol dimethyl ether
TXIB
Ethylidiglycol
Dipropylene glycol-dimethyl ether

Aldehydes

Butanal^{1,3}
Pentanal³
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal³
2-Pentenal³
2-Hexenal
2-Heptenal
2-Octenal
2-Nonenal
2-Decenal
2-Undecenal
Furfural
Glutaraldehyde
Benzaldehyde
Acetaldehyde^{1,3}
Propanal^{1,3}
Propenal^{1,3}
Isobutenal

Ketones

Ethylmethylketone³
3-Methyl-2-propanol
Methylisobutylketone
Cyclopentanone
Cyclohexanone

Acetone^{1,3}

2-Methylcyclopentanone
2-Methylcyclohexanone
Acetophenone
1-Hydroxyacetone

Acids

Acetic acid
Propionic acid
Isobutyric acid
Butyric acid
Pivalic acid
n-Valeric acid
n-hexanoic acid
n-Heptanoic acid
n-Octanoic acid
2-Ethylhexanoic acid

Esters and Lactones

Methylacetate¹
Ethyl acetate¹
Vinyl acetate¹
Isopropyl acetate
Propyl acetate
2-Methoxy-1-methylethyl acetate
n-Butyl formate
Methylmethacrylate
Isobutylacetate
1-Butyl acetate
2-Ethylhexyl acetate
Methyl acrylate
Ethyl acrylate
n-Butyl acrylate
2-Ethylhexyl acrylate
Adipic acid dimethyl ester
Fumaric acid dibutyl ester
Succinic acid dimethyl ester

Glutaric acid dimethyl ester
Hexandioldiacrylate
Maleic acid dibutyl ester
Butyrolactone
Dimethylphthalate
Texanol

Chlorinated hydrocarbons

Tetrachlorethene
1,1,1-Trichlorethane
Trichlorethene
1,4-Dichlorbenzene

Others

1,4-Dioxane
Caprolactam
N-Methyl-2-pyrrolidone
Octamethylcyclotetrasiloxane
Methenamine
2-Butanonoxime
Tributyl phosphate
Triethyl phosphate
5-Chlor-2-methyl-4-isothiazolin-3-one
2-Methyl-4-isothiazolin-3-one (MIT)
Triethylamine
Tetrahydrofuran (THF)
1-Decene
1-Octene
2-Pentylfuran
Tetramethyl succinonitrile
Propylencarbonate
Isophorone
Dimethylformamide (DMF)

1 VVOC
2 SVOC
3 Analysis after DIN ISO 16000-3

Note: The test results exclusively refer to the submitted tested material. On changes of the composition or the production procedure of the material the report loses its validity. Publication of the test report requires permission in writing.



Test method:

Preparation of test sample:	DIN EN ISO 16000-11 Pre-treatment: n/a Masking of backside: no Masking of edges: no Relationship of open edges to the surface: n/a Loading: related to the surface Dimensions: 17 cm x 16.9 cm x 15.5 cm
Test chamber conditions:	DIN EN ISO 16000-9 Chamber volume: 0.125 m ³ Temperature: 23°C Relative humidity: 50 % Air pressure: normal Air: cleaned Air exchange rate: 1 h ⁻¹ Upstream air velocity: 0.3 m/s Loading: 1.3 m ² /m ³ Specific air flow rate: 0.77 m ³ /m ² *h Air sampling: 2 days (CMR VOC) or 7 days after test chamber loading
Analytics:	DIN ISO 16000-6 Detection limit: 2 µg/m ³

Product testing Certification Quality assurance
 Latex

Note: The test results exclusively refer to the submitted tested material. On changes of the composition or the production procedure of the material the report loses its validity. Publication of the test report requires permission in writing.



Measurement time 2 days after test chamber loading

1.1.1 CMR VOC_{2d}

Test parameter:

Carcinogenic, mutagenic and reproduction-toxic volatile organic compounds (CMR VOC), test chamber, air sampling 2 days after test chamber loading

Test result:

CMR VOCs were not detectable 2 days after test chamber loading.



1.1.2 VOC / TVOC_{2d}

Test parameter:

Volatile organic compounds (VOC), test chamber, air sampling 2 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m ³]
VOC_{2d}: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
1	Aromatic hydrocarbons		
1-1	Toluene	108-88-3	2
3	Terpene		
3-4	Limonene	138-86-3	2
3-5	others		21
3-5.1	Longifolen	475-20-7	14
3-5.3	Isolongifolen	1135-66-6	2
7	Aldehydes		
7-7	Nonanal	124-19-6	2
7-8	Decanal	112-31-2	2
9	Acids		
9-1	Acetic acid	64-19-7	4
VOC_{2d}: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
-	-	-	-
VOC_{2d}: Not identified substances calculated as toluene equivalent (c_{ni tol})			
-	N,N-Diethylformamide	-	2
-	Benzothiazole	-	12

Total volatile organic compounds	Concentration (Test chamber air) [µg/m ³]	SER _a [µg/m ³ h]
TVOC _{2d}	63	49



1.1.3 $VVOC_{2d}$

Test parameter:

Very volatile organic compounds (VVOC), test chamber, air sampling 2 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [$\mu\text{g}/\text{m}^3$]
$VVOC_{2d}$: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated ($C_{id\ sub}$)			
7	Aldehyde		
7-20	Acetaldehyde	75-07-0	5
$VVOC_{2d}$: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated ($C_{id\ sub}$)			
-	-	-	-
$VVOC_{2d}$: Not identified substances calculated as toluene equivalent ($c_{ni\ tol}$)			
-	N,N-Diethylamine	-	8



1.1.4 SVOC_{2d}

Test parameter:

Semi- volatile organic compounds (SVOC), test chamber, air sampling 2 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m ³]
SVOC_{2d}: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (c_{id sub})			
-	-	-	-
SVOC_{2d}: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (c_{id sub})			
-	-	-	-
SVOC_{2d}: Not identified substances calculated as toluene equivalent (c_{ni tol})			
-	-	-	-

Total semi-volatile organic compounds	Concentration (Test chamber air) [µg/m ³]	SER _a [µg/m ³ h]
Σ SVOC _{2d}	-	-



Measurement time 7 days after test chamber loading

1.1.5 VOC_{7d} / TVOC_{7d}

Test parameter:

Volatile organic compounds (VOC), test chamber, air sampling 7 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m ³]
VOC_{7d}: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
1	Aromatic hydrocarbons		
1-1	Toluene	108-88-3	2
3	Terpene		
3-5	others		13
3-5.1	Longifolen	475-20-7	51
3-5.3	Isolongifolen	1135-66-6	3
7	Aldehydes		
7-6	Octanal	124-13-0	2
7-7	Nonanal	124-19-6	4
7-8	Decanal	112-31-2	7
9	Acids		
9-1	Acetic acid	64-19-7	7
VOC_{7d}: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
-	-	-	-
VOC_{7d}: Not identified substances calculated as toluene equivalent (c_{ni tol})			
-	Benzotiazole	-	12

Total volatile organic compounds	Concentration (Test chamber air) [µg/m ³]	SER _a [µg/m ³ h]
TVOC_{7d}	101	78



1.1.6 $VVOC_{7d}$

Test parameter:

Very volatile organic compounds (VVOC), test chamber, air sampling 7 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [$\mu\text{g}/\text{m}^3$]
$VVOC_{7d}$: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated ($C_{id\ sub}$)			
-	-	-	-
$VVOC_{7d}$: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated ($C_{id\ sub}$)			
-	-	-	-
$VVOC_{7d}$: Not identified substances calculated as toluene equivalent ($C_{ni\ tol}$)			
-	-	-	-

Note: The test results exclusively refer to the submitted tested material. On changes of the composition or the production procedure of the material the report loses its validity. Publication of the test report requires permission in writing.



1.1.7 SVOC_{7d}

Test parameter:

Semi- volatile organic compounds (SVOC), test chamber, air sampling 7 days after test chamber loading

Test result:

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m ³]
SVOC_{7d}: Identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
-	-	-	-
SVOC_{7d}: Further identified and calibrated substances in accordance with NIK list/AgBB, substance specific calculated (C_{id sub})			
-	-	-	-
SVOC_{7d}: Not identified substances calculated as toluene equivalent (c_{ni tol})			
-	-	-	-

Total semi-volatile organic compounds	Concentration (Test chamber air) [µg/m ³]	SER _a [µg/m ³ h]
Σ SVOC _{7d}	-	-



1.2 Carbon Disulfide CS₂

Test parameter:

Emissions of carbon disulfide CS₂ in the test chamber, air sampling 2 days after test chamber loading

Test method:

Preparation of test sample:	DIN EN ISO 16000-11 see No. 1.1 VOCs
Test chamber conditions:	DIN ISO 16000-9 and according to DIN V ENV 717-1 see No. 1.1 VOCs
Air sampling:	2 days after test chamber loading
Analytics:	DIN EN 16000-6
Detection limit:	1 µg/m ³

Test result:

Substance	Concentration (Test chamber air) [µg/m ³]
Carbon Disulfide CS ₂	11



1.3 Nitrosamines

Test parameter:

Emission of nitrosamines in the test chamber, air sampling 2 days after test chamber loading

Test method:

Preparation of test sample:	DIN EN ISO 16000-11 see No. 1.1 VOCs
Test chamber conditions:	DIN ISO 16000-9 and according to DIN V ENV 717-1 see No. 1.1 VOCs
Air sampling:	2 days after test chamber loading
Analytics:	BGI 505-23 determination of nitrosamines
Detection limit:	100 ng/m ³

Test result:

Substance	Concentration (Test chamber air) [ng/m ³]
N-Nitrosodimethylamine (NDMA)	< 100
N-Nitrosomethylethylamine (NMEA)	< 100
N-Nitrosodiethylamine (NDEA)	< 100
N-Nitrosodiisopropylamine (NDIPA)	< 100
N-Nitrosodipropylamine (NDPA)	< 100
N-Nitrosodibutylamine (NDBA)	< 100
N-Nitrosopyrrolidine (NPYR)	< 100
N-Nitrosopiperidine (NPIP)	< 100
N-Nitrosomorpholine (NMOR)	< 100



1.4 Formaldehyde_{2d}

Test parameter:

Formaldehyde, test chamber, air sampling 2 days after test chamber loading

Test method:

Preparation of test sample:	according to DIN EN 717-1 see No. 1.1 VOCs
Test chamber conditions:	DIN EN 717-1 with the following deviations: <ul style="list-style-type: none"> - No determination of the equilibrium concentration; the formaldehyde emission is indicated at a measuring point as determined above. - For test chamber volume see No. 1.1 VOCs - Relative humidity: 50% Test chamber parameter: see No. 1.1 VOCs
Air sampling:	2 days after test chamber loading
Analytics:	DIN EN 16000-3 Detection limit: 3 µg/m ³ ≈ 0,003 ppm

Test result:

Substance	Concentration (Test chamber air) [µg/m ³]	Concentration (Test chamber air) [ppm]
Formaldehyde	< 3	< 0,003



1.5 Odour testing

Test parameter:

Odour, test collective, odour test 24 hours after desiccator loading

Test method:

Analytics:

VDA recommendation 270 at 50 % humidity

Rating scale:

- | | |
|---|--|
| 1 | not perceivable |
| 2 | not disturbing |
| 3 | clearly discernable, not objectionable |
| 4 | objectionable |
| 5 | strongly discernable |
| 6 | intolerable |

Test result:

Temperature [°C]	Intensity [Note]	Odour characterisation
40	2	Product typical



2 Content analysis

2.1 Polymers and filler percentage

Test parameter:

Polymers and filler percentage

Test method:

Analytics:

Ash/filler percentage: Thermogravimetry;
Polymer percentage : IR/ATR

Benchmark:

Filler percentage: $\leq 5 \pm 1 \%$
Polymer percentage: NR $\geq 95 \%$

Test result:

Filler percentage	[weight/%]
Related to the total sample the polymer portion amounts to.	94
Related to the total sample the ash portion (including zinc oxide) amounts to.	6
Related to the total sample the filler portion amounts to ¹⁾	< 5
Polymer percentage	[weight/%]
Related to the polymer content the natural latex portion amounts to ²⁾	100
Related to the polymer content the synthetic latex portion amounts to ²⁾	0

¹⁾ The filler portion is calculated by the difference of ash portion and zinc oxide on the assumption that maximally 5% zinc oxide is contained related to the total weight of the expanded latex core.

²⁾ With findings < 5 % for natural latex the result is represented as 100 % synthetic latex. Usually no natural latex portion under 5 % is used.

Cologne, dated 13.10.2009

Dr. Hans-Ulrich Krieg
(Technical Manager)



Expert appraisal

The product NAPURE Latex Foam was submitted to laboratory tests on behalf of Lamifoam SDN BHD for an ecological product examination according to the eco-INSTITUT-Label test criteria "Mattresses" (Status: September 2009). The results documented in the test report were evaluated as follows.

Latex foam			
Test parameter	Concentration	Limit value	Within limits [yes/no]
Emission test			
TVOC (total volatile organic compounds) (2 days after test chamber loading)	63 µg/m ³	≤ 400 µg/m ³	yes
TVOC (total volatile organic compounds) (7 days after test chamber loading)	101 µg/m ³	≤ 200 µg/m ³	yes
VOC classified in: K1, K2; M1, M2; R1, R2 (as per TRGS 905, RL 67/548 EC); IARC group 1 & 2A; MAK III1, III2 (2 days after test chamber loading)	< 2 µg/m ³	≤ 2 µg/m ³	yes
VOC (sum) without NIK (7 days after test chamber loading)	12 µg/m ³	≤ 100 µg/m ³	yes
VOC (individual sums):			
Sum of sensitising materials with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment list: Cat A, TRGS 907 (7 days after test chamber loading)	< 2 µg/m ³	≤ 100 µg/m ³	yes
Sum of VOC with the following categorisations: Directive 67/548 EC: Carc. Cat. 3, Mut. Cat. 3, Repr. Cat. 3, TRGS 905: K3, M3, R3, IARC: Group 2B, DFG (MAK lists): Category III3 (7 days after test chamber loading)	2 µg/m ³	≤ 50 µg/m ³	yes
Disulfide	11 µg/m ³	≤ 50 µg/m ³ (2 days after test chamber loading)	yes
Nitrosamines	< 0.1 µg/m ³	≤ 0.3 µg/m ³ (2 days after test chamber loading)	yes
R value	< 1	≤ 1.0 (7 days after test chamber loading)	yes
Formaldehyde	< 0.003 ppm	≤ 0.02 ppm (2 days after test chamber loading)	yes
Odour	Grade 2	≤ Grade 3 (24 hours after loading of desiccator)	yes
Content analysis			
Polymer percentage	100 % NR	Declaration in %	yes
Filler portion (ash content)	< 5 %	≤ 5%	yes

Note: The test results exclusively refer to the submitted tested material. On changes of the composition or the production procedure of the material the report loses its validity. Publication of the test report requires permission in writing.



Summary evaluation

The product NAPURE Latex Foam was submitted to an ecological product examination on behalf of Lamifoam SDN BHD for the acquisition of the eco-INITIUT-Label. The eco-INITIUT-Label criteria were successfully fulfilled.

As a result of the successful ecological product examination the

eco-INITIUT-Label



is awarded for the product/s:
NAPURE Latex Foam
for a period of two years.

Certification number	ID 1009 – 12242 – 001
Test report Number	21438-1
Validity	10/2011

After expiration of two years it is possible to acquire the eco-INITIUT-Label for another two year period. For this a laboratory test would be accomplished according to the latest eco-INITIUT-Label test criteria.

Cologne, dated 13.10.2009

Dr. Frank Kuebart
(Project Manager)



Appendix

Explanation of the Specific Emission Rate SER

Emission measurements are accomplished in test chambers under defined physical conditions (temperature, relative humidity, room loading, Air exchange rate etc.).

Test chamber measurement results are directly comparable only if the investigations were accomplished under the same basic conditions.

If the differences of the physical conditions refer only to the change of air rate and/or the loading, the "SER" or "specific emission rate" can be used for comparability of the measurement results. The SER indicates how many volatile organic compounds (VOC) are released by the sample for each material unit and hour (h).

The SER can be calculated using the formula below for each proven individual component of the VOC from the data in the test report.

As material units the following are applicable:

l = unit of length (m)	refers the emission to the length
a = unit area (m ²)	refers the emission to the surface
v = unit volume (m ³)	refers the emission to the volume
u = piece unit (unit = piece)	refers the emission to the complete unit

From this the different dimensions for SER result:

length-specific	SER _l in µg/m h
surface-specific	SER _a in µg/m ² h
volume-specific	SER _v in µg/m ³ h
unit specific	SER _u in µg/u h

SER thus represents a product specific rate, which describes the mass of the volatile organic compound, which is emitted by the product per time unit at a certain time after beginning of the examination.

$$\boxed{\text{SER} = q \cdot C}$$

q	specific air flow rate (quotient from change of air rate and loading)
C	Concentration of the measured substance(s)

The result can be indicated in milligrams (mg) in place of micro grams (µg), whereby 1 mg = 1000 µg.