International Bedding
Green Sleep International cvba Belgien
Sint-Janslaan 21
B-8500 Kortrijk
Belgium

Test Report No. 44204-001

Client:	**International Bedding** **Green Sleep International, B-8500 Kortrijk** **Belgium**
Sample description by client:	**100 % Natural Latex**
Sampled by:	client
Product Manufacturer:	Lamifoam Sdn Bhd, Malysia
Date of sampling:	08.09.2014
Location of sampling:	at the client
Date of production:	Juni 2014
Date of arrival of sample:	11.09.2014
Date of report:	20.11.2014
Number of pages of report:	25
Testing parameter:	see table of contents
Testing laboratory:	eco-INSTITUT GmbH, Cologne except * subcontracted

outside accreditation

Nach DIN EN ISO/IEC 17025 akkreditiertes Prüflabor
DAkkS Deutsche Akkreditierungsstelle D-PL-14117-01-00

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Content

Sample view

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A001	100 % Natural Latex	without objection	Latex core

Test Report

1 Emission test

1.1 Volatile Organic Compounds (VOC)

Definition of terms:

VOC (volatile organic compounds)	All individual materials with a concentration ≥ 0,001 mg/m³ in retention range C_6 (n-Hexane) to C_{16} (n-Hexadecane) Substances refer to LCI lists / AgBB (DIBt)
TVOC (Total volatile organic compounds)	Sum of all individual substances in retention range C_6 to C_{16}.
CMR-VOC (carcinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)	All individual substances with the following categories: Regulation (EC) No. 1272/2008: Category Car.1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK lists): Category III1and III2
VVOC (very volatile organic compounds)	All individual substances wit concentration ≥ 0,001 mg/m³ in retention range < C_6
TVVOC (Total very volatile organic compounds)	Sum of all VVOC in retention range < C_6
SVOC (semi volatile organic compounds)	All individual materials ≥ 0,001 mg/m³ in retention range > C_{16} (n-Hexadecane) to C_{22} (Docosane)
TSVOC (Total semi volatile organic compounds)	Sum of all SVOC in retention range > C_{16} to C_{22}.
Identified and calibrated substances ($c_{id\ sub}$), substance specific calculated	Spectrum and retention time are concordant with the calibrated comparison 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)
LCI value	Lowest Concentration of Interest; calculated value for the evaluation of VOC, established by the Committee for Health-related Evaluation of Building Products (Ausschuss zur gesundheitlichen Bewertung von Bauprodukten - AgBB)
R value	The quotient of the concentration and the LCI value is generated for every substance which is detected in the test chamber air. The sum of the calculated quotients results in the R value.

List of 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 decane[2]
1-Phenyl undecane[2]
4-Phenylcyclohexene
Styrene
Phenyl acetylene
2-Phenyl propene
Vinyl toluene
Naphthalene
Indene
Benzene
Cresol

Saturated aliphatic substances
Hydrocarbons
2-Methyl pentane[1]
3-Methyl pentane[1]
n-Hexane
Cyclohexane
Methylcyclohexane
n-Heptane
n-Octane
n-Nonane
n-Decane
n-Undecane
n-Dodecane
n-Tridecane
n-Tetradecane
n-Pentadecane
n-Hexadecane
Methylcyclopentane
1,4-Dimethylcyclohexane

Terpenes
δ-3-Caren
α-Pinene
β-Pinene
Limonene
Longifolene
Caryophyllene
Isolongifolene
alpha-Phellandrene
Myrcene
Camphene
alpha-Terpinend
Longipinene
beta-Caryophyllene
beta-Farnesen
alpha-Bisabolen

Aliphatic alcohols and ether
1-Propanol[1]
2-Propanol[1]
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
1,4-Butanediol
Tripropyleneglycolmonomethyl ether
Triethylene glycol dimethyl ether
1,2-Propylene glycol dimethyl ether
TXIB
Ethyldiglycol
Dipropylene glycol-dimethyl ether
Propylene carbonate
Hexylene glycol
3-Methyl-1-butanol
1,2-Propylene glycol n-propyl ether
1,2-Propylene glycol n-butyl ether
Diethylglycol phenyl ether
Neopentyl glycol

Aldehydes
Butanal[1,3]
Pentanal[3]
Hexanal
Heptanal
2-Ethylhexanal
Octanal
Nonanal
Decanal
2-Butenal[3]
2-Pentenal[3]
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
3-Methyl-2-propanol
Methylisobutylketone
Cyclopentanone
Cyclohexanone

Ketones
Ethylmethylketone[3]
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
Methylacetate[1]
Ethyl acetate[1]
Vinyl acetate[1]
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
Hexandioldiacrylate
Maleic acid dibutyl ester
Butyrolactone
Dibutyl glutarate
Dibutyl succinate
Dimethylphthalate
Texanol
Dipropylene glycol diacrylate

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

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

1 VVOC
2 SVOC
3 Analysis according to DIN ISO 16000-3

Explanation of the Specific Emission Rate SER

Emission measurements are accomplished in test chambers under defined physical conditions (temperature, relative humidity, room loading, air change 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)	relation between emission and length
a = unit area (m^2)	relation between emission and surface
v = unit volume (m^3)	relation between emission and volume
u = piece unit (unit = piece)	relation between emission and 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.

$$SER = q \, \text{Å} C$$

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.

Test method

Preparation of test sample:	Date:	17.09.2014
	Pre-treatment:	not applicable
	Masking of backside:	no
	Masking of edges:	no
	Relationship of unmasked edges to surface:	not applicable
	Charging:	related to area
	Dimensions:	20.2 cm x 20.2 cm x 10 cm
Test chamber conditions::		
	Chamber volume:	0.125 m³
	Temperature:	23 °C
	Relative humidity:	50 %
	Air pressure:	normal
	Air:	cleaned
	Air change rate:	1 h^{-1}
	Air velocity:	0.3 m/s
	Loading:	1.3 m²/m³
	Specific air flow rate:	0.769 m³/m² · h
	Air sampling:	2 and 7 days after test chamber loading
Analytics:	DIN ISO 16000-3	
	DIN ISO 16000-6	
	Limit of determination:	1 µg/m³

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:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]	CMR classification*)
VOC_{2d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)				
-	-	-	-	n.d.
VOC_{2d}: Further identified and calibrated CMR substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)				
-	-	-	-	n.d.
VOC_{2d}: Further identified, not calibrated CMR substances, calculated as toluene equivalent ($c_{ni\ tol}$)				
-	-	-	-	n.d.

*) Classification acc. to Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG (MAK list): Category III1 and III2

	Concentration (Test chamber air) [µg/m³]	SER_a [µg/m²h]
Sum of VOC with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK list): Category III1 and III2	**n.d.**	**n.d.**

n.d. = not detectable

1.1.2 VOC / TVOC $_{2d}$

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

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]
VOC_{2d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
1	**Aromatic hydrocarbons**		
1-4	p-Xylene	106-42-3	4
1-5	m-Xylene	108-38-3	
1-6	o-Xylene	95-47-6	2
1-10	1,3,5-Trimethylbenzene	108-67-8	1
1-11	1,2,4-Trimethylbenzene	95-63-6	3
1-12	1,2,3-Trimethylbenzene	526-73-8	1
2	**Saturated aliphatic hydrocarbons**		
2-10.1	n-Nonane	111-84-2	1
2-10.2	n-Decane	124-18-5	8
2-10.3	n-Undecane	1120-21-4	7
2-10.4	n-Dodecane	112-40-3	4
3	**Terpenes**		
3-1	δ-3-Caren	498-15-7	4
3-2	α-Pinene	80-56-8	4
3-3	β-Pinene	127-91-3	1
3-4	Limonene	138-86-3	10
3-5.1	Longifolene	475-20-7	1
5	**Aromatic alcohols (phenols)**		
5-2	BHT (2,6-di-tert-butyl-4-methylphenol)	128-37-0	1
12	**Others**		
12-4	Octamethylcyclotetrasiloxane	556-67-2	1
12-14	Tetrahydrofuran	109-99-9	3

VOC_{2d}: Further identified and calibrated substances in addition with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
12	**Others**		
	Benzothiazol	95-16-9	7

VOC_{2d}: Not calibrated substances calculated as toluene equivalent ($c_{ni\ tol}$)			
	Cluster (prob. Isoalkane C9-C14, Alkene a/o Alcohol)	-	300
	Sesquiterpen	-	2

Total volatile organic compounds	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
$TVOC_{2d}$	**365**	**281**

Further VOC sums	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
Sum VOC without LCI	**309**	**238**
Sum of bicyclic terpenes	**10**	**8**
Sum of sensitising materials with the following categorisations: DFG (MAK lists): Category IV German Federal Institute for Risk Assessment lists: Cat A TRGS 907	**14**	**11**
Sum of VOC with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2 TRGS 905: K3, M3, R3 IARC: Group 2B DFG (MAK list): Category III3	**1**	**1**
C_9 - C_{14} - Alkanes / Isoalkanes	**120**	**92**
Sum C_4-C_{11} Aldehydes, acyclic, aliphatic	**n.d.**	**n.d.**
Sum C_9-C_{15} Alkyl benzenes	**5**	**4**
Sum Cresols	**n.d.**	**n.d.**

R-Value (without dimension)$_{2d}$	**0,04**

n.d. = not detectable

1.1.3 $SVOC_{2d}$

Test parameter:
Semivolatile organic compounds (SVOC), test chamber, air sampling 2 days after test chamber loading

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (test chamber air) [µg/m³]
$SVOC_{2d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
$SVOC_{2d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
$SVOC_{2d}$: Not calibrated substances calculated as toluene equivalent ($c_{ni\ tol}$)			
-	-	-	n.d.

Total semivolatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TSVOC_{2d}$	**n.d.**	**n.d.**

n.d. = not detectable

1.1.4 $VVOC_{2d}$

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

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS-No.	Concentration (test chamber air) [µg/m³]
$VVOC_{2d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
2	**Saturated aliphatic hydrocarbons**		
2-1	3-Methylpentane	96-14-0	1
10	**Esters und Lactones**		
10-1	Methylacetate	79-20-9	2
$VVOC_{2d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
2	**Saturated aliphatic hydrocarbons**		
	2-Methylpentane	107-83-5	2
$VVOC_{2d}$: Not calibrated, identified substances calculated as toluene equivalent ($c_{ni\ tol}$)			
-	-	-	n.d.

Total very volatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TVVOC_{2d}$	**5**	**4**

n.d. = not detectable

1.1.4.1 Formaldehyde$_{2d}$ and Acetaldehyde$_{2d}$

Test parameter:
Formaldehyde and Acetaldehyde, test chamber, air sampling 2 days after test chamber loading

Test method:

Preparation of test sample and Test chamber conditions:	see Volatile organic compounds
Analytics:	DIN ISO 16000-3
Limit of determination:	2 µg/m³ ≈ 0,002 ppm

Test result:

Sample:	A001: 100 % Natural Latex

Substance	**Concentration** (Test chamber air) **[µg/m³]**	**Concentration** (Test chamber air) **[ppm]**
Formaldehyde	5	0,0043
Acetaldehyde	< 2	-

1.2 Carbon disulfide (CS_2, test chamber)

Test parameter:
Carbon disulfide (CS_2)

Test method:

Analytics:	DIN ISO 16000-6
Limit of determination:	1 µg/m³

Test result:

Sample:	A001: 100 % Natural Latex

Sample-no.:	Parameter	Measurement time [days]	Concentration (test chamber) [µg/m³]
A001	Carbon disulfide CS_2	2	32

Measurement time 7 days after test chamber loading

1.2.1 CMR-VOC$_{7d}$

Test parameter:
Carcinogenic, mutagenic and reproduction-toxic volatile organic compounds (CMR VOC), test chamber, air sampling 7 days after test chamber loading

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]	CMR classification*)
VOC$_{7d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated (c$_{id\ sub}$)				
-	-	-	-	n.d.
VOC$_{7d}$: Further identified and calibrated CMR substances in addition to LCI list/AgBB, substance specific calculated(c$_{id\ sub}$)				
-	-	-	-	n.d.
VOC$_{7d}$: Further identified, not calibrated CMR substances, calculated as toluene equivalent (c$_{ni\ tol}$)				
-	-	-	-	n.d.

*) Classification acc. to Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B, TRGS 905: K1 and K2, M1 and M2, R1 and R2, IARC: Group 1 and 2A, DFG (MAK list): Category III1 and III2

	Concentration (Test chamber air) [µg/m³]	SER$_a$ [µg/m²h]
Sum of VOC with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B TRGS 905: K1 and K2, M1 and M2, R1 and R2 IARC: Group 1 and 2A DFG (MAK list): Category III1 and III2	**n.d.**	**n.d.**

n.d. = not detectable

1.2.2 VOC / TVOC $_{7d}$

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

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]
VOC_{7d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
2	**Saturated aliphatic hydrocarbons**		
2-10.3	n-Undecane	1120-21-4	2
2-10.4	n-Dodecane	112-40-3	1
3	**Terpenes**		
3-4	Limonene	138-86-3	2
12	**Others**		
12-14	Tetrahydrofuran	109-99-9	3
VOC_{7d}: Further identified and calibrated substances in addition with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
12	**Others**		
	Benzothiazol	95-16-9	7
VOC_{7d}: Not calibrated substances calculated as toluene equivalent ($c_{ni\ tol}$)			
	Cluster (verm. haupts. Isoalkane C9-C14, Alkene u/o Alkohole)	-	50

Total volatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TVOC_{7d}$	**65**	**50**

Further VOC sums	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
Sum VOC without LCI	**57**	**44**
Sum of bicyclic terpenes	**n.d.**	**n.d.**
Sum of sensitising materials with the following categorisations: DFG (MAK lists): Category IV German Federal Institute for Risk Assessment lists: Cat A TRGS 907	**2**	**2**
Sum of VOC with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2 TRGS 905: K3, M3, R3 IARC: Group 2B DFG (MAK list): Category III3	**n.d.**	**n.d.**
C_9 - C_{14} - Alkanes / Isoalkanes	**20**	**15**
Sum C_4-C_{11} Aldehydes, acyclic, aliphatic	**n.d.**	**n.d.**
Sum C_9-C_{15} Alkyl benzenes	**n.d.**	**n.d.**
Sum Cresols	**n.d.**	**n.d.**

R-Value (without dimension)$_{7d}$	**0**

n.d. = not detectable

1.2.3 $SVOC_{7d}$

Test parameter:
Semivolatile organic compounds (SVOC), test chamber, air sampling 7 days after test chamber loading

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS No.	Concentration (test chamber air) [µg/m³]
$SVOC_{7d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
$SVOC_{7d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
$SVOC_{7d}$: Not calibrated substances calculated as toluene equivalent ($c_{ni\ tol}$)			
-	-	-	n.d.

Total semivolatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TSVOC_{7d}$	**n.d.**	**n.d.**

n.d. = not detectable

1.2.4 $VVOC_{7d}$

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

Test result:

Sample:	A001: 100 % Natural Latex

No.	Substance	CAS-No.	Concentration (test chamber air) [µg/m³]
$VVOC_{7d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
2	**Saturated aliphatic hydrocarbons**		
2-1	3-Methylpentane	96-14-0	1
10	**Esters und Lactones**		
10-1	Methylacetate	79-20-9	2
$VVOC_{7d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
2	**Saturated aliphatic hydrocarbons**		
	2-Methylpentane	107-83-5	1
$VVOC_{7d}$: Not calibrated, identified substances calculated as toluene equivalent ($c_{ni\ tol}$)			
-	-	-	n.d.

Total very volatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TVVOC_{7d}$	**4**	**3**

n.d. = not detectable

1.2.4.1 Formaldehyde$_{7d}$ and Acetaldehyde$_{7d}$

Test parameter:
Formaldehyde and Acetaldehyde, test chamber, air sampling 7 days after test chamber loading

Test method:

Preparation of test sample and Test chamber conditions:	see Volatile organic compounds
Analytics:	DIN ISO 16000-3
Limit of determination:	2 µg/m³ ≈ 0.002 ppm

Test result:

Sample:	A001: 100 % Natural Latex

Substance	**Concentration** (Test chamber air) **[µg/m³]**	**Concentration** (Test chamber air) **[ppm]**
Formaldehyde	3	0.0026
Acetaldehyde	< 2	-

2 Nitrosamines (test chamber) *

Test parameter:
Nitrosamines

Test method:

Analytics:	BGI 505-23
Limit of determination:	100 ng/m³

Test result:

Sample:	A001: 100 % Natural Latex

Parameter	Concentration (Test chamber air) after days [ng/m³]
N-Nitrosodimethylamine	< 100
N-Nitrosomethylethylamine	< 100
N-Nitrosodiethylamine	< 100
N-Nitrosodiisopropylamine	< 100
N-Nitrosodipropylamine	< 100
N-Nitrosodibutylamine	< 100
N-Nitrosopiperidine	< 100
N-Nitrosopyrrolidine	< 100
N-Nitrosomorpholine	< 100

3 Odour

Test parameter:

Odour, testing collective, odour testing, 24 hours after loading of desiccator

Test method:

Manufacture of test specimen:	see 1.1 volatile organic compounds Sizes:	5 cm x 5 cm x 6 cm
Conditions of dessicator:	Temperature: Relative air humidity: Loading: Air sampling:	40 °C 50% See 1.1 volatile organic compounds 24 hours after loading of dessicator
Analytics:	following VDA-recommendation 270	
Ratings:	1 not perceptible 2 perceptible, not bothering 3 clearly perceptible, not bothering 4 bothering 5 strongly bothering 6 unbearable	

Test result:

Sample:	A001: 100 % Natural Latex

Intensity of odour
2

4 Ash content#

Test parameter:
Polymer content

Test method:

Analytics:	IR/ATR.

Test result:

Sample:	A001: 100 % Natural Latex

Filler	[weight/%]
Ash content (incl. zinc oxide), with reference to the sample	5.0
Filler content, with reference to the sample [1)]	0

Remark:
[1)] The amount of filler is calculated as difference between the amount of ash and zinc oxide, assuming that the maximum of zinc oxide is 5 % of the total latex foam.

5 Polymer content # *

Test parameter:
Relation between natural rubber (NR) and synthetic rubber (SBR)

Test method:

Analytics:	IR/ATR.

Test result:

Sample-no.:	A001

Polymer content	[weight/%]
NR, with reference to the polymer content [1) 2) 3)]	100
SBR, with reference to the polymer content [1) 2) 3)]	0

[1)] If the NR-content is below 5 %, the result will be 100 % SBR. Usually there will be no use of NR below 5 % in a mixture of NR and SBR.
[2)] The result for the content of 100 % Natural Latex is based on the assumption that polyisoprene in latex mattresses is always of natural origin.
[3)] If the SBR (Styrene-Butadiene-Rubber)-content is negative, the result will be 100 % NR.

Cologne, 19.11.2014

Dr. rer.-nat. Hans-Ulrich Krieg
(Technical Manager)

Evaluation

The product **100 % Natural Latex** was submitted to laboratory tests on behalf of International Bedding Green Sleep International for an ecological product examination according to the test criteria of the Quality Association for Environmentally-Agreeable Latex Mattresses (QUL).
The results documented in the test report were evaluated as follows.

P11 Complete mattress			
Test parameter	**Result / Emission**	**Limit value**	**Within limits [yes/no]**
Emission test			
Measurement time: 2 days after test chamber loading			
TVOC (total volatile organic compounds)	365 µg/m³	Ò400 µg/m³	yes
VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 1A and 1B, Muta. 1A and 1B, Repr. 1A and 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC: Group 1 and 2A; DFG (MAK list): Categories III1, III2	< 1 µg/m³	Ò1 µg/m³	yes
Formaldehyd	5 µg/m³	Ò24 µg/m³	yes
Acetaldehyd	< 2 µg/m³	Ò24 µg/m³	yes
Disulphide (only latex products)	32 µg/m³	Ò50 µg/m³	yes
Measurement time: 7 days after test chamber loading			
TVOC (total volatile organic compounds)	65 µg/m³	Ò200 µg/m³	yes
VOC (sum) without LCI	57 µg/m³	Ò100 µg/m³	yes
VOC (individual values):			
Sum bicyclic Terpenes	< 1 µg/m³	Ò200 µg/m³	yes
Sum of sensitising materials with the following categorisations: DFG (MAK list): Category IV, German Federal Institute for Risk Assessment lists: Cat A, TRGS 907	2 µg/m³	Ò100 µg/m³	yes
Sum of VOC (incl. VVOC and SVOC) with the following categorisations: Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2; TRGS 905: K3; IARC: Group 2B; DFG (MAK list): Category III3	< 1 µg/m³	Ò50 µg/m³	yes
Sum C9 ï C14: Alkanes / Isoalkanes	20 µg/m³	Ò100 µg/m³	yes
Sum C4-C11 Aldehydes, acyclic, aliphatic	< 1 µg/m³	Ò100 µg/m³	yes
Sum C9 - C15 Alkylbenzenes	< 1 µg/m³	Ò100 µg/m³	yes
Sum Cresols	< 1 µg/m³	Ò5 µg/m³	yes

VOC (individual substances):			
Styrene	< 1 µg/m³	Ò10 µg/m³	yes
Methylisothiazolinon (MIT)	< 1 µg/m³	Ò1µg/m³	yes
Benzaldehyde	< 1 µg/m³	Ò20 µg/m³	yes
2-Ethyl-1-hexanol	< 1 µg/m³	Ò100 µg/m³	yes
Ethylenglycolmonobutylether	< 1 µg/m³	Ò100 µg/m³	yes
2-Hexoxyethanol	< 1 µg/m³	Ò100 µg/m³	yes
Methylisobutylketon	< 1 µg/m³	Ò100 µg/m³	yes
2-Butoxyethylacetate	< 1 µg/m³	Ò200 µg/m³	yes
TSVOC (total semi-volatile organic compounds)	< 1 µg/m³	Ò40 µg/m³	yes
R-value	0	Ò1,0	yes
Nitrosamines (only latex products)	< 100 ng/m³	≤ 300 ng/m³	yes
Odour	2	≤ Grade 3 (24 hours after loading of desiccator)	yes

n.d.: not detectable

P31 Upholstery / padding materials: Latex			
Test parameter	**Result**	**Limit Value**	**Within Limits [yes/no]**
Filler content (ash content)	Sample A001: 0 %	Ò5%	yes
Polymer content (NR: natural rubber)	Sample A001: 100 % NR	> 95 %	yes

n.d.: not detectable

Cologne, 20.11.2014

V. Laumann

Vanessa Laumann
(Project manager)