LOBA GmbH & Co. KG
Leonberger Straße 56 - 62
71254 Ditzingen

Test Report No. 50056-003

Client:	**LOBA GmbH & Co. KG Ditzingen**
Sample description by client:	**WS Easy Prime**
Sampling by:	Client
Date of arrival of sample:	22.01.2015
Date of report:	23.03.2015
Number of pages of report:	15
Testing parameter:	see table of contents
Testing laboratory:	eco-INSTITUT Germany GmbH, Cologne

Content

Sample view

Internal Sample-no.	Description by customer	Condition upon delivery	Type of sample
A003	WS Easy Prime	without objection	Primer

Sample Specifications

Sample description:	A003: WS Easy Prime
Type of sample:	waterborne primer for roller and trowel application based on polyurethane-resins
Batch-Nº. / Prod.-Date:	A003: 327230
Sampling by:	Client
Delivery date:	19.01.2015
Sampling Location:	LOBA GmbH & Co. KG Ditzingen
Date of arrival of sample:	22.01.2015
Condition of sample:	without objection
Packaging Material:	Original packaging

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.

$$SER = q \bullet C$$

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:	04.02.2015
	Pre-treatment:	Waterborne Primer, cannot be diluted. Two applications on glass: total amount 80 g/m² 1st application: 40 g/m². Drying: 60 Min (rolled), 2nd application: 40 g/m². Final drying: 60 Min
	Masking of backside:	not applicable
	Masking of edges:	not applicable
	Relationship of unmasked edges to surface:	not applicable
	Charging:	related to area
	Dimensions:	25 cm x 20 cm (2 g each application, rolled) (Carrier plate: 353,1 g)
Test chamber conditions::		
	Chamber volume:	0.125 m³
	Temperature:	23 °C
	Relative humidity:	50 %
	Air pressure:	normal
	Air:	cleaned
	Air change rate:	0.5 h^{-1}
	Air velocity:	0.3 m/s
	Loading:	0.4 m²/m³
	Specific air flow rate:	1.25 m³/m² · h
	Air sampling:	28 days after test chamber loading
Analytics:	DIN ISO 16000-3	
	Limit of determination:	2 µg/m³
	DIN ISO 16000-6	
	Limit of determination:	1 µg/m³

Measurement time 28 days after test chamber loading

1.1.1 CMR-VOC$_{28d}$

Test parameter:

Carcinogenic, mutagenic and reproduction-toxic volatile organic compounds (CMR VOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A003: WS Easy Prime

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]	CMR classification*)
VOC$_{28d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)				
-	-	-	n.d.	-
VOC$_{28d}$: Further identified and calibrated CMR substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)				
-	-	-	n.d.	-
VOC$_{28d}$: 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 28d

Test parameter:
Volatile organic compounds (VOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A003: WS Easy Prime

No.	Substance	CAS No.	Concentration (Test chamber air) [µg/m³]
VOC_{28d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
7	**Aldehydes**		
7-19	Benzaldehyde	100-52-7	1
12	**Others**		
12-11	Triethylamine	121-44-8	3
VOC_{28d}: Further identified and calibrated substances in addition with LCI list/AgBB, substance specific calculated ($c_{id\ sub}$)			
-	-	-	n.d.
VOC_{28d}: Not calibrated substances calculated as toluene equivalent ($c_{ni\ tol}$)			
	-	-	n.d.

Total volatile organic compounds	Concentration (test chamber air) [µg/m³]	SER_a [µg/m²h]
$TVOC_{28d}$	**4**	**5**
Total volatile organic compounds	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
$TVOC_{28d,\ substances \geq 5\ µg/m³}$	**n.d.**	**n.d.**
Total volatile organic compounds	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
$TVOC_{28d,\ substances \geq 5\ µg/m³}$ calculated as toluene equivalent	**n.d.**	**n.d.**

Further VOC sums	**Concentration** (test chamber air) [µg/m³]	**SER_a** [µg/m²h]
Sum VOC without LCI	**n.d.**	**n.d.**
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	**n.d.**	**n.d.**
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	**n.d.**	**n.d.**
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)$_{28d}$	**0,08**

n.d. = not detectable

1.1.3 SVOC$_{28d}$

Test parameter:
Semivolatile organic compounds (SVOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A003: WS Easy Prime

No.	Substance	CAS No.	Concentration (test chamber air) [µg/m³]
SVOC $_{28d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
SVOC$_{28d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
SVOC$_{28d}$: 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$_{28d}$	**n.d.**	**n.d.**
Total semivolatile organic compounds	**Concentration (test chamber air) [µg/m³]**	**SER_a [µg/m²h]**
TSVOC$_{28d,\ substances \geq 5\ µg/m³}$	**n.d.**	**n.d.**

n.d. = not detectable

1.1.4 $VVOC_{28d}$

Test Parameter:
Very volatile organic compounds (VVOC), test chamber, air sampling 28 days after test chamber loading

Test result:

Sample:	A003: WS Easy Prime

No.	Substance	CAS-No.	Concentration (test chamber air) [µg/m³]
$VVOC_{28d}$: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
10	**Esters und Lactones**		
10-2	Ethylacetate	141-78-6	5
$VVOC_{28d}$: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated($c_{id\ sub}$)			
-	-	-	n.d.
$VVOC_{28d}$: 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]
$TVVOC_{28d}$	**5**	**6**

n.d. = not detectable

1.1.4.1 Formaldehyde$_{28d}$ and Acetaldehyde$_{28d}$

Test parameter:
Formaldehyde and Acetaldehyde, test chamber, air sampling 28 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:	A003: WS Easy Prime

Substance	**Concentration (Test chamber air) [µg/m³]**	**Concentration (Test chamber air) [ppm]**
Formaldehyde	< 2	< 0,002
Acetaldehyde	< 2	-

1.2 Ammonia

Test parameter:
Ammonia, Test chamber, air sampling 28 days after test chamber loading

Test method:

Analytics:	UV/VIS-spectrometric analysis, DIBt-Laboratory Manual (State: 2015-01-30), point 11.3 Ammonia
Limit of determination:	30 µg/m³

Test result:

Sample	**Measurement after [days]**	**Concentration (test chamber air) [µg/m³]**
A003: WS Easy Prime	28	n.n.

2 Odour

Test parameter:
Odour, test collective, odour test 28 days after test chamber loading

Test method:

Preparation of test sample:	see 1.1. Volatile organic compounds	
Test chamber conditions:	see 1.1. Volatile organic compounds	
	Air sampling:	28 days after test chamber loading
Analytics:	following DIN EN ISO 16000-28	
Probands:	Quantity:	15
	therefrom female:	6
Evaluation:	Acceptance	Scale from +1 (clearly acceptable) to +0,1 (just acceptable)and from -0,1 (just unacceptable) to -1 (clearly unacceptable)

Test result:

Sample:	A003: WS Easy Prime

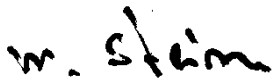
	Acceptance
Arithmetical mean	0,7

	Acceptance
Arithmetical mean (back-ground)	0,8
Standard deviation	0,1
half width of the 90% confidence interval	0,1

Detailed evaluation results:

Test person	Evaluation (Acceptance)	
	Evaluation Sample	Evaluation Test Room
Test person 01	0,7	0,8
Test person 02	0,8	0,6
Test person 03	0,8	1
Test person 04	0,7	0,9
Test person 05	0,5	0,9
Test person 06	0,7	0,6
Test person 07	0,5	1
Test person 08	0,5	0,7
Test person 09	0,8	0,9
Test person 10	0,4	0,7
Test person 11	0,8	0,9
Test person 12	0,7	0,9
Test person 13	0,6	0,8
Test person 14	0,7	0,8
Test person 15	0,8	1

Cologne, 23.03.2015



Michael Stein, Dipl.-Chem.
(Deputy Technical Manager)

Expert evaluation (M1)

The product **WS Easy Prime** has been tested on behalf of **LOBA GmbH & Co. KG**.

This evaluation bases on the test criteria of the Building Information Foundation RTS.
The results of the emission analysis are stated as Specific Emission Rate (SER).

The test results documented in the test report were evaluated as follows.

Test parameter	**Result**	**Requirement Emission class M1**	**Requirement hold [yes/no]**
Emission analysis			
Measurement time: 28 days after test chamber loading			
TVOC (Sum volatile organic compounds) [1)]	< 0.005 mg/m²h	< 0.2 mg/m²h	yes
Formaldehyde	< 0.002 mg/m²h	< 0.05 mg/m²h	yes
Ammonia	< 0.03 mg/m²h	< 0.03 mg/m²h	yes
Sum carcinogenic substances (EU cat. 1A and 1B)	< 0.001 mg/m²h	< 0.005 mg/m²h	yes
Odour test			
Measurement time: 28 days after test chamber loading			
Odour	**Acceptance** 0.7	**Acceptance** > 0.0	yes

1) for TVOC only substances ≥ 5 µg/m³ are considered

Summary evaluation

The product **WS Easy Prime** meets the requirements of the **Emission Class M1**.

Cologne, 23.03.2015

Tobias Rüsing, Dipl.-Geol.
(Project Manager)