Test Report No. 50056-001-002

Client: LOBA GmbH & Co. KG
Ditzingen

Sample description by client:
WS 2K Duo
WS 2K Härter

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
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Sample view

<table>
<thead>
<tr>
<th>Internal Sample-no.</th>
<th>Description by customer</th>
<th>Condition upon delivery</th>
<th>Type of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>A001</td>
<td>WS 2K Duo</td>
<td>without objection</td>
<td>Sealing</td>
</tr>
<tr>
<td>A002</td>
<td>WS 2K Härter</td>
<td>without objection</td>
<td>hardener</td>
</tr>
</tbody>
</table>

Sample Specifications

Sample description: A001: WS 2K Duo
                  A002: WS 2K Härter
Type of sample: Two-component waterborne finish based on polyurethane-resins
Batch-No. / Prod.-Date: A001: 329803 / 47-14
                  A002: 319013 / 24-14
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

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alteration of material composition or in manufacturing process. Publishing in parts requires authorisation.
Test Report

1 Emission test

1.1 Volatile Organic Compounds (VOC)

Definition of terms:

VOC
(volatil organic compounds)

TVOC
(Total volatile organic compounds)

CMR-VOC
(caricinogenic, mutagenic, reproduction-toxic VOC, VVOC and SVOC)

VVOC
(very volatile organic compounds)

TVVOC
(Total very volatile organic compounds)

SVOC
(semi volatile organic compounds)

TSVOC
(Total semi volatile organic compounds)

Identified and calibrated substances (csub), substance specific calculated

Not identified substances calculated as toluene equivalent (cni tol)

SER
Specific emission rate (see appendix)

LCI value

R value

All individual materials with a concentration \( \geq 0.001 \text{ mg/m}^3 \) in retention range \( C_6 \text{ (n-Hexane) to C}_{16} \text{ (n-Hexadecane)} \)

Substances refer to LCI lists / AgBB (DIBt)

Sum of all individual substances in retention range \( C_6 \text{ to C}_{16} \).

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 III1 and III2

All individual substances with concentration \( \geq 0.001 \text{ mg/m}^3 \) in retention range \( < C_6 \)

Sum of all VVOC in retention range \( < C_6 \)

All individual materials \( \geq 0.001 \text{ mg/m}^3 \) in retention range \( > C_{16} \text{ (n-Hexadecane) to C}_{22} \text{ (Docosane)} \)

Sum of all SVOC in retention range \( > C_{16} \text{ to C}_{22} \).

Spectrum and retention time are concordant with the calibrated comparison substance

Suggestion from the spectrum library with high probability and/or allocation to a group of substances

Specific emission rate (see appendix)

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
- 1-Phenyl undecane
- 4-Phenylcyclohexene
- Styrene
- Phenyl acetylene
- 2-Phenyl propene
- Vinyl toluene
- Naphthalene
- Indene
- Benzene
- Cresol

### Saturated aliphatic substances
- Hydrocarbons
  - 2-Methyl pentane
  - 3-Methyl pentane
  - 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-Pinen
- β-Pinen
- Limonene
- Longifolene
- Caryophyllene
- Isolongifolene
- alpha-Phellandrene
- Myrcene
- Camphene
- alpha-Terpinene
- Longipinen
- beta-Caryophyllene
- beta-Farnesene
- alpha-Bisabolene

### Aliphatic alcohols and ether
- 1-Propanol
- 2-Propanol
- tert-Butanol
- 2-Methyl-1-propanol

### Aromatic alcohols (phenols)
- Propylenglycol (1,2-Dihydroxypropane)
- Ethylene glycol (Ethandiol)
- Ethylene glycol mono butyl ether
- Diethylglycol
- Ethylene glycol monobutyl ether
- 2-Phenoxyethanol
- Ethylene carbonate
- Propylene carbonate
- Ethylene glycol monobutyl ether
- Glycolic acid butyl ester
- Texanol
- Butyldiglycol acetate
- 2-Methoxyethanol
- 2-Ethoxyethanol
- 2-Propanol
- 2-Propanol
- 2-Methoxyethanol
- 2-Butanone
- 2-Methyl acetate
- 1-Methoxy-2-(2-methoxy-ethoxy)-ethane
- Tripropylene glycol dimethyl ether
- 1,4-Butanediol
- Tripropyleneglycolmonomethyl ether
- Triphenylenglycol dimethyl ether
- Triethylenglycol dimethyl ether
- Triallylenglycol dimethyl ether
- Triethylenglycol dimethyl ether
- 2-Propylenglycol phenyl ether

### Ketones
- Ethylmethylketone
- 3-Methyl-2-propanone
- Cyclopentanone
- Cyclohexanone
- Acetone
- 2-Methylcyclopentanone
- 2-Methylcyclohexanone
- Acetonaphone
- 1-Hydroxyacetone

### Acids
- Propionic acid
- Butyric acid
- n-Valeric acid
- n-Hexanoic acid
- n-Heptanoic acid
- n-Octanoic acid

### Esters and Lactones
- Methylacetate
- Ethyl acetate
- Isopropyl acetate
- Propyl acetate
- 2-Methoxy-1-methylethyl acetate
- n-Butyl formate
- Methylmethylacrylate
- Isovaleric acid
- 1-Butyl acetate
- 2-Ethylhexyl acetate
- Ethyl acetate
- n-Butyl acetate
- 2-Ethylhexyl acetate
- Adipic acid dimethyl ester
- Fumaric acid dibutyl ester
- Succinic acid dimethyl ester
- Hexanoldiacrylate
- Maleic acid dibutyl ester
- Butylroloaceone
- Dibutyl glutarate
- Dibutyl succinate
- Dimethylylthialate
- Texanol
- Dipropylene glycol diacrylate

### Chlorinated hydrocarbons
- Tetrachloroethene
- 1,1,1-Trichloroethane
- Trichlorethene
- 1,4-Dichlorobenzene

### Others
- 1,4-Dioxane
- Caprolactam
- N-Methyl-2-pyrrolidone
- Octamethylocyclotetrasiloxane
- Methylene
- 2-Butanonoic acid
- Triethyl phosphate
- 5-Chlor-2-methyl-4-isothiazolin-3-one
- 2-Methyl-4-isothiazolin-3-one (MIT)
- Triethyamine
- Decamethylocyclopentasiloxane
- Dodecamethylocyclopentasiloxane
- Tetrahydroyloran (THF)
- 1-Decene
- 1-Octene
- 2-Pentylfuran
- Tetramethy succinonitrile
- Propylene carbonate
- Isophorone
- Dimethylformamide (DMF)
- Tributyl phosphate

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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:
- \( l = \text{unit of length (m)} \) relation between emission and length
- \( a = \text{unit area (m}^2\text{)} \) relation between emission and surface
- \( v = \text{unit volume (m}^3\text{)} \) relation between emission and volume
- \( u = \text{piece unit (unit = piece)} \) relation between emission and complete unit

From this the different dimensions for SER result:

- length-specific \( \text{SER}_l \) in \( \mu g/m \ h \)
- surface-specific \( \text{SER}_a \) in \( \mu g/m^2 \ h \)
- volume-specific \( \text{SER}_v \) in \( \mu g/m^3 \ h \)
- unit specific \( \text{SER}_u \) in \( \mu g/u \ h \)

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.

\[
\text{SER} = q \cdot C
\]

- \( q \) 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.
### Test method

**Preparation of test sample:**

<table>
<thead>
<tr>
<th>Date:</th>
<th>04.02.2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment:</td>
<td>Two-component coating, mixing ratio 10:1, cannot be diluted. An application on glass with 120 ml/m² - corresponds to a density of 1,044 g/m³: 125 g/m². Application with roller. Final drying: 4 - 6 hours.</td>
</tr>
<tr>
<td>Masking of backside:</td>
<td>not applicable</td>
</tr>
<tr>
<td>Masking of edges:</td>
<td>not applicable</td>
</tr>
<tr>
<td>Relationship of unmasked edges to surface:</td>
<td>not applicable</td>
</tr>
<tr>
<td>Charging:</td>
<td>related to area</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>25 cm x 20 cm (6,25g) (carrier plate: 352,2 g)</td>
</tr>
</tbody>
</table>

**Test chamber conditions:**

<table>
<thead>
<tr>
<th>Chamber volume:</th>
<th>0.125 m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature:</td>
<td>23 °C</td>
</tr>
<tr>
<td>Relative humidity:</td>
<td>50 %</td>
</tr>
<tr>
<td>Air pressure:</td>
<td>normal</td>
</tr>
<tr>
<td>Air:</td>
<td>cleaned</td>
</tr>
<tr>
<td>Air change rate:</td>
<td>0.5 h⁻¹</td>
</tr>
<tr>
<td>Air velocity:</td>
<td>0.3 m/s</td>
</tr>
<tr>
<td>Loading:</td>
<td>0.4 m²/m³</td>
</tr>
<tr>
<td>Specific air flow rate:</td>
<td>1.25 m³/m² · h</td>
</tr>
<tr>
<td>Air sampling:</td>
<td>28 days after test chamber loading</td>
</tr>
</tbody>
</table>

**Analytics:**

<table>
<thead>
<tr>
<th>DIN ISO 16000-3</th>
<th>Limit of determination: 2 µg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN ISO 16000-6</td>
<td>Limit of determination: 1 µg/m³</td>
</tr>
</tbody>
</table>
Measurement time 28 days after test chamber loading

1.1.1 CMR-VOC\textsubscript{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: A001: WS 2K Duo
A002: WS 2K Härter

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS No.</th>
<th>Concentration (Test chamber air) [µg/m\textsuperscript{3}]</th>
<th>CMR classification*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC\textsubscript{28d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated (c\textsubscript{id sub})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>VOC\textsubscript{28d}: Further identified and calibrated CMR substances in addition to LCI list/AgBB, substance specific calculated (c\textsubscript{id sub})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>VOC\textsubscript{28d}: Further identified, not calibrated CMR substances, calculated as toluene equivalent (c\textsubscript{ni tol})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
<td>-</td>
</tr>
</tbody>
</table>

*) 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

<table>
<thead>
<tr>
<th>Concentration (Test chamber air) [µg/m\textsuperscript{3}]</th>
<th>SER\textsubscript{a} [µg/m\textsuperscript{2}h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of VOC with the following categorisations:</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>n.d.</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

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:  

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS No.</th>
<th>Concentration (Test chamber air) [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>VOC(<em>{28d}): Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated (c(</em>{id\ sub}))</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Glycols, Glycol ethers, Glycol esters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-3</td>
<td>Ethylene glycol monobutyl ether</td>
<td>111-76-2</td>
<td>2</td>
</tr>
<tr>
<td>6-22</td>
<td>2-Butoxyethyl acetate</td>
<td>112-07-2</td>
<td>1</td>
</tr>
<tr>
<td>6-39</td>
<td>Dipropylene glycol-dimethyl ether</td>
<td>63019-84-1</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Aldehydes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-7</td>
<td>Nonanal</td>
<td>124-19-6</td>
<td>1</td>
</tr>
<tr>
<td>7-8</td>
<td>Decanal</td>
<td>112-31-2</td>
<td>2</td>
</tr>
<tr>
<td>7-19</td>
<td>Benzaldehyde</td>
<td>100-52-7</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Acids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-1</td>
<td>Acetic acid</td>
<td>64-19-7</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-11</td>
<td>Triethylamine</td>
<td>121-44-8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>VOC(<em>{28d}): Further identified and calibrated substances in addition with LCI list/AgBB, substance specific calculated (c(</em>{id\ sub}))</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-11</td>
<td>Hexamethylcyclotrisiloxan</td>
<td>541-05-9</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>VOC(<em>{28d}): Not calibrated substances calculated as toluene equivalent (c(</em>{tol\ tot}))</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not identified</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER(_a) [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total volatile organic compounds</td>
<td>29</td>
<td>36</td>
</tr>
<tr>
<td>TVOC(_{28d})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volatile organic compounds</td>
<td>Concentration (test chamber air) [µg/m³]</td>
<td>SER(_a) [µg/m²h]</td>
</tr>
<tr>
<td>TVOC(_{28d}), substances ≥ 5 µg/m³</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Total volatile organic compounds</td>
<td>Concentration (test chamber air) [µg/m³]</td>
<td>SER(_a) [µg/m²h]</td>
</tr>
<tr>
<td>TVOC(_{28d}), substances ≥ 5 µg/m³ calculated as toluene equivalent</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>
### Further VOC sums

<table>
<thead>
<tr>
<th></th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER$_a$ [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sum VOC without LCI</strong></td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td><strong>Sum of bicyclic terpenes</strong></td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td><strong>Sum of sensitising materials</strong> with the following categorisations:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFG (MAK lists): Category IV</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td>German Federal Institute for Risk Assessment lists: Cat A TRGS 907</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sum of VOC</strong> with the following categorisations:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C$<em>9$ - C$</em>{14}$ - Alkanes / Isoalkanes</strong></td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td><strong>Sum C$<em>9$-C$</em>{11}$ Aldehydes, acyclic, aliphatic</strong></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Sum C$<em>9$-C$</em>{15}$ Alkyl benzenes</strong></td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td><strong>Sum Cresols</strong></td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

**R-Value (without dimension)$_{28d}$**  

|                         | 0,14                         |

n.d. = not detectable

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.
1.1.3 SVOC_{28d}

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

**Test result:**
Sample: A001: WS 2K Duo  
A002: WS 2K Härter

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS No.</th>
<th>Concentration (test chamber air) [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SVOC_{28d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated (c_{id sub})</td>
<td></td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td>SVOC_{28d}: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated (c_{id sub})</td>
<td></td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td>SVOC_{28d}: Not calibrated substances calculated as toluene equivalent (c_{ni tox})</td>
<td>not identified</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total semivolatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER_a [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSVOC_{28d}</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total semivolatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER_a [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSVOC_{28d}, substances ≥ 5 µg/m³</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

n.d. = not detectable

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.
1.1.4 VVOC<sub>28d</sub>

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

**Test result:**
Sample: A001: WS 2K Duo
A002: WS 2K Härter

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS-No.</th>
<th>Concentration (test chamber air) [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VVOC&lt;sub&gt;28d&lt;/sub&gt;: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated&lt;sup&gt;(cid sub)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Esters und Lactones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-2</td>
<td>Ethylacetate</td>
<td>141-78-6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>VVOC&lt;sub&gt;28d&lt;/sub&gt;: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated&lt;sup&gt;(cid sub)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td>VVOC&lt;sub&gt;28d&lt;/sub&gt;: Not calibrated, identified substances calculated as toluene equivalent&lt;sup&gt;(c_{ni tol})&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

**Total very volatile organic compounds**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER&lt;sub&gt;n&lt;/sub&gt; [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVVOC&lt;sub&gt;28d&lt;/sub&gt;</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

n.d. = not detectable

**Remark:** The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.
1.1.4.1 Formaldehyde\textsubscript{28d} and Acetaldehyde\textsubscript{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: A001: WS 2K Duo
A002: WS 2K Härter

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration (Test chamber air) [µg/m³]</th>
<th>Concentration (Test chamber air) [ppm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>&lt; 2</td>
<td>&lt; 0.002</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>&lt; 2</td>
<td>-</td>
</tr>
</tbody>
</table>

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:**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Measurement after [days]</th>
<th>Concentration (test chamber air) [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A001: WS 2K Duo</td>
<td>28</td>
<td>n.n.</td>
</tr>
<tr>
<td>A002: WS 2K Härter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.
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: A001: WS 2K Duo
A002: WS 2K Härter

<table>
<thead>
<tr>
<th>Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetical mean</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetical mean (background)</td>
</tr>
<tr>
<td>Standard deviation</td>
</tr>
<tr>
<td>half width of the 90% confidence interval</td>
</tr>
</tbody>
</table>
Remark: The test result referred to the submitted test sample exclusively. The validity of the report is three years at most and will end immediately at any alternation of material composition or in manufacturing process. Publishing in parts requires authorisation.

<table>
<thead>
<tr>
<th>Test person</th>
<th>Evaluation (Acceptance)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evaluation Sample</td>
<td>Evaluation Test Room</td>
</tr>
<tr>
<td>Test person 01</td>
<td>1</td>
<td>0,9</td>
</tr>
<tr>
<td>Test person 02</td>
<td>0,8</td>
<td>1</td>
</tr>
<tr>
<td>Test person 03</td>
<td>0,8</td>
<td>1</td>
</tr>
<tr>
<td>Test person 04</td>
<td>0,8</td>
<td>0,8</td>
</tr>
<tr>
<td>Test person 05</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Test person 06</td>
<td>0,6</td>
<td>0,7</td>
</tr>
<tr>
<td>Test person 07</td>
<td>0,8</td>
<td>0,9</td>
</tr>
<tr>
<td>Test person 08</td>
<td>0,6</td>
<td>0,8</td>
</tr>
<tr>
<td>Test person 09</td>
<td>0,6</td>
<td>0,9</td>
</tr>
<tr>
<td>Test person 10</td>
<td>0,7</td>
<td>0,6</td>
</tr>
<tr>
<td>Test person 11</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Test person 12</td>
<td>0,6</td>
<td>0,8</td>
</tr>
<tr>
<td>Test person 13</td>
<td>0,8</td>
<td>0,9</td>
</tr>
<tr>
<td>Test person 14</td>
<td>0,6</td>
<td>0,8</td>
</tr>
<tr>
<td>Test person 15</td>
<td>0,9</td>
<td>1</td>
</tr>
</tbody>
</table>

Cologne, 23.03.2015

Michael Stein, Dipl.-Chem.
(Deputy Technical Manager)
**Expert evaluation (M1)**

The product **WS 2K Duo / WS 2K Härter** 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.

<table>
<thead>
<tr>
<th>Test parameter</th>
<th>Result</th>
<th>Requirement Emission class M1</th>
<th>Requirement hold [yes/no]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emission analysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement time: 28 days after test chamber loading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TVOC (Sum volatile organic compounds) 1)</td>
<td>0.014 mg/m²h</td>
<td>&lt; 0.2 mg/m²h</td>
<td>yes</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>&lt; 0.002 mg/m²h</td>
<td>&lt; 0.05 mg/m²h</td>
<td>yes</td>
</tr>
<tr>
<td>Ammonia</td>
<td>&lt; 0.03 mg/m²h</td>
<td>&lt; 0.03 mg/m²h</td>
<td>yes</td>
</tr>
<tr>
<td>Sum carcinogenic substances (EU cat. 1A and 1B)</td>
<td>&lt; 0.001 mg/m²h</td>
<td>&lt; 0.005 mg/m²h</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Odour test</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement time: 28 days after test chamber loading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odour</td>
<td>Acceptance 0.8</td>
<td>Acceptance &gt; 0.0</td>
<td>yes</td>
</tr>
</tbody>
</table>

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

**Summary evaluation**

The product **WS 2K Duo / WS 2K Härter** meets the requirements of the **Emission Class M1**.

Cologne, 23.03.2015

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