Test Report No. 42010-002 (II)

Client: Li & Co AG
Müstair

Sample description by client: Printkork mit Hot. Coating Oberfläche

Sampling by: Client
Date of arrival of sample: 09.10.2013
Date of report: 08.01.2014
Number of pages of report: 15
Testing parameter: see table of contents
Testing laboratory: eco-INSTITUT 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>Material composition</th>
<th>Material</th>
<th>Type of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>A002</td>
<td>Printkork mit Hot. Coating Oberfläche</td>
<td>without objection</td>
<td>print cork with hot. coating surface</td>
<td>not documented</td>
<td>floor covering</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 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 (volatile organic compounds)
All individual materials with a concentration \(\geq 0,001\) mg/m\(^3\) 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 III1 and III2

VVOC (very volatile organic compounds)
All individual substances with concentration \(\geq 0,001\) mg/m\(^3\) 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 \(\geq 0,001\) mg/m\(^3\) 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 (\(C_{\text{std,sub}}\)), substance specific calculated
Spectrum and retention time are concordant with the calibrated comparison substance

Not identified substances calculated as toluene equivalent (\(C_{\text{tol}}\))
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.

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### 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-Ethylhexane
- 1-Isopropy1-4-methylbenzene
- 1,2,4,5-Tetramethylbenzene
- n-Butylbenzene
- 1,3-Diisopropylbenzene
- 1,4-Diisopropylbenzene
- Phenyl octane
- 1-Phenyldecane
- 1-Phenylundecane
- 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
- Methylcylohexane
- 1,4-Dimethylcyclohexane

#### Terpenes
- α-3-Caren
- α-Pinene
- β-Pinene
- Limonene
- Longifoline
- Caryophyllene
- Isolongifoline
- alpha-Phellandrene
- Myrcene
- Camphene
- alpha-Terpine
- Longipienne
- beta-Caryophyllene
- beta-Farnesene
- alpha-Bisabol

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

#### Aldehydes
- Butanal
- Pentanal
- Hexanal
- Heptanal
- Octanal
- Nonanal
- Decanal
- 2-Butenal

#### Ketones
- Propionaldehyde
- Benzaldehyde
- Acetaldehyde
- Propionaldehyde
- 2-Propanol
- 2-Butanol
- 2-Undecenal
- Furfural
- Glutaraldehyde
- Benzaldehyde
- Acetaldehyde
- Propionaldehyde
- Isobutanol
- 3-Methyl-2-propanol
- Methylisobutylketone
- Cyclopentanone
- Cyclohexanone

#### Ketones
- Ethylmethylketone
- 3-Methyl-2-propanol
- Methylisobutylketone
- Cyclopentanone
- Cyclohexanone
- Acetone
- 2-Methylcyclopentanone
- 2-Methylcyclohexanone
- Acetophenone
- 1-Hydroxyacetone

#### Acids
- Acetic acid
- Propionic acid
- Isobutyric acid
- Butyric acid
- 2-Pivalic acid
- n-Valeric acid
- n-Hexanoic acid
- n-Octanoic acid
- n-Nonanoic acid
- n-Undecanoic acid
- n-Nonanoic acid
- n-Octanoic acid
- n-Undecanoic acid
- 2-Undecenoic acid

#### Esters and Lactones
- Acetic acid
- Propionic acid
- Isobutyric acid
- Butyric acid
- 2-Pivalic acid
- n-Valeric acid
- n-Hexanoic acid
- n-Octanoic acid
- n-Nonanoic acid
- n-Octanoic acid
- n-Undecanoic acid
- n-Nonanoic acid
- n-Octanoic acid
- n-Undecanoic acid

#### Esters
- Acetic acid
- Propionic acid
- Isobutyric acid
- Butyric acid
- 2-Pivalic acid
- n-Valeric acid
- n-Hexanoic acid
- n-Octanoic acid
- n-Nonanoic acid
- n-Octanoic acid
- n-Undecanoic acid
- n-Nonanoic acid
- n-Octanoic acid
- n-Undecanoic acid

#### Chlorinated hydrocarbons
- Tetrachlorethane
- 1,1,1-Trichlorethane
- Trichlorethene
- 1,4-Dichlorobenzene

#### Others
- 1,4-Dioxane
- Caprolactam
- N-Methyl-2-pyrrolidone
- Octamethylcyclotetrasiloxane
- Methenamine
- 2-Butanonoxime
- Triethyl phosphate
- 2-Chloro-1,3,5-pentamethylenebenzene
- Tetrahydrofurant (THF)
- 1-Decene
- 1-Octene
- 2-Pentylfuran
- Tetramethyl 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:

- \( l \) = 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 \( \text{SER}_l \) 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.

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**Test method**

<table>
<thead>
<tr>
<th>Preparation of test sample:</th>
<th>DIN EN ISO 16000-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>08.11.2013</td>
</tr>
<tr>
<td>Pre-treatment:</td>
<td>not applicable</td>
</tr>
<tr>
<td>Masking of backside:</td>
<td>ja</td>
</tr>
<tr>
<td>Masking of edges:</td>
<td>100 %</td>
</tr>
<tr>
<td>Charging:</td>
<td>related to area</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>25 cm x 20 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test chamber conditions::</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber volume:</td>
</tr>
<tr>
<td>Temperature:</td>
</tr>
<tr>
<td>Relative humidity:</td>
</tr>
<tr>
<td>Air pressure:</td>
</tr>
<tr>
<td>Air:</td>
</tr>
<tr>
<td>Air change rate:</td>
</tr>
<tr>
<td>Air velocity:</td>
</tr>
<tr>
<td>Loading:</td>
</tr>
<tr>
<td>Specific air flow rate:</td>
</tr>
<tr>
<td>Air sampling:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analytics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN ISO 16000-3</td>
</tr>
<tr>
<td>DIN ISO 16000-6</td>
</tr>
<tr>
<td>Limit of determination:</td>
</tr>
</tbody>
</table>

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Measurement time 11 days after test chamber loading

1.1.1 TVOC_{11d}

Test parameter:
Volatile organic compounds (VOC), test chamber, air sampling 11 days after test chamber loading

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<table>
<thead>
<tr>
<th>Total volatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER₂ [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC_{11d}</td>
<td>35</td>
<td>44</td>
</tr>
</tbody>
</table>

1.1.1.1 Formaldehyde_{11d}

Test parameter:
Formaldehyde, test chamber, air sampling 11 days after test chamber loading

Test method:
Preparation of test sample: according to DIN EN 717-1
see Volatile organic compounds

Test chamber conditions:
DIN EN 717-1 with the following deviations:
- No determination of the equilibrium concentration; the formaldehyde emission is indicated at a measuring point as determined above.
- Chamber volume: see Volatile organic compounds
- Relative humidity: 50%
- Air change rate and loading: see Volatile organic compounds

Emission chamber parameters: see volatile organic compounds

Air sampling: 11 days after test chamber loading

Analytics:
DIN ISO 16000-3

Limit of determination: 3 µg/m³ ≈ 0,003 ppm

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<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; 3</td>
<td>&lt; 0,003</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 alteration of material composition or in manufacturing process. Publishing in parts requires authorisation.
Measurement time 12 days after test chamber loading

1.1.2 TVOC_{Tol 12d}

Test parameter:
Volatile organic compounds (VOC), test chamber, air sampling 12 days after test chamber loading

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<table>
<thead>
<tr>
<th>Total volatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER_{a} [µg/m³h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC_{Tol 12d}</td>
<td>35</td>
<td>44</td>
</tr>
</tbody>
</table>

1.1.2.1 Formaldehyde_{12d}

Test parameter:
Formaldehyde, test chamber, air sampling 12 days after test chamber loading

Test method:
Preparation of test sample: according to DIN EN 717-1
see Volatile organic compounds

Test chamber conditions: DIN EN 717-1 with the following deviations:
- No determination of the equilibrium concentration; the formaldehyde emission is indicated at a measuring point as determined above.
- Chamber volume: see Volatile organic compounds
- Relative humidity: 50%
- Air change rate and loading: see Volatile organic compounds

Emission chamber parameters: see volatile organic compounds

Air sampling: 12 days after test chamber loading

Analytics: DIN ISO 16000-3

Limit of determination: 3 µg/m³ ≈ 0,003 ppm

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<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; 3</td>
<td>&lt; 0,003</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.
Measurement time 14 days after test chamber loading

1.1.3 CMR-VOC\textsubscript{14d}

Test parameter:
Carcinogenic, mutagenic and reproduction-toxic volatile organic compounds (CMR VOC), test chamber, air sampling 14 days after test chamber loading

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS No.</th>
<th>Concentration (Test chamber air) [µg/m³]</th>
<th>CMR classification*</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC\textsubscript{14d}: 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>n.d.</td>
</tr>
<tr>
<td>VOC\textsubscript{14d}: 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>n.d.</td>
</tr>
<tr>
<td>VOC\textsubscript{14d}: Further identified, not calibrated CMR substances, calculated as toluene equivalent (c\textsubscript{ni tol})</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>n.d.</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>Sum of VOC with the following categorisations:</th>
</tr>
</thead>
<tbody>
<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>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration (Test chamber air) [µg/m³]</th>
<th>SER\textsubscript{a} [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>n.d.</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

n.d. = not detectable

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1.1.4 VOC / TVOC 14d

Test parameter:
Volatile organic compounds (VOC), test chamber, air sampling 14 days after test chamber loading

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<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>VOC: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated (ci sub)</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>9</td>
</tr>
<tr>
<td>6-9</td>
<td>Texanol</td>
<td>25265-77-4</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Aldehydes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-19</td>
<td>Benzaldehyde</td>
<td>100-52-7</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Ketones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-5</td>
<td>Cyclohexanone</td>
<td>108-94-1</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>VOC: Further identified and calibrated substances in addition with LCI list/AgBB, substance specific calculated (ci sub)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dipropylenglycoldiacrylate</td>
<td>57472-68-1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>VOC: Not calibrated substances calculated as toluene equivalent (cn tol)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total volatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SERₐ [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC₁₄d</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>TVOC₆₅₁₄d</td>
<td>40</td>
<td>50</td>
</tr>
</tbody>
</table>

n.d. = not detectable

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<table>
<thead>
<tr>
<th>Further VOC sums</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>$\text{SER}_{\text{a}}$ [µg/m²h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum VOC without LCI</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sum of bicyclic terpenes</td>
<td>n.d.</td>
<td>n.d.</td>
</tr>
<tr>
<td><strong>Sum of sensitising materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cat A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRGS 907</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum of VOC with the following categorisations:</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Regulation (EC) No. 1272/2008: Category Carc. 2, Muta. 2, Repr. 2</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>TRGS 905: K3, M3, R3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IARC: Group 2B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFG (MAK list): Category III3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C₉ - C₁₄ - Alkanes / Isoalkanes</strong></td>
<td></td>
<td>n.d.</td>
</tr>
<tr>
<td>Sum C₉-C₁₁ Aldehydes, acyclic, aliphatic</td>
<td></td>
<td>n.d.</td>
</tr>
<tr>
<td>R-Value (without dimension)$_{14d}$</td>
<td></td>
<td>0.06</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.
### 1.1.5 SVOC$_{14d}$

**Test parameter:**
Semivolatile organic compounds (SVOC), test chamber, air sampling 14 days after test chamber loading

**Test result:**
Sample: A002: Printkork mit Hot. Coating Oberfläche

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>CAS No.</th>
<th>Concentration (test chamber air) $[\mu g/m^3]$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>SVOC$_{14d}$</strong>: 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>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td><strong>SVOC$_{14d}$</strong>: 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>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td><strong>SVOC$_{14d}$</strong>: Not calibrated substances calculated as toluene equivalent ($c_{ni \ toil}$)</td>
<td></td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total semivolatile organic compounds</th>
<th>Concentration (test chamber air) $[\mu g/m^3]$</th>
<th>SER$_3$ $[\mu g/m^3 h]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSVOC$_{14d}$</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.
### 1.1.6 VVOC_{14d}

**Test Parameter:**
Very volatile organic compounds (VVOC), test chamber, air sampling 14 days after test chamber loading

**Test result:**
Sample: A002: Printkork mit Hot. Coating Oberfläche

<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_{14d}: Identified and calibrated substances in accordance with LCI list/AgBB, substance specific calculated(c_{id sub})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Aldehydes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-20</td>
<td>Acetaldehyde</td>
<td>75-07-0</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>VVOC_{14d}: Further identified and calibrated substances in addition to LCI list/AgBB, substance specific calculated(c_{id sub})</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
<tr>
<td></td>
<td>VVOC_{14d}: Not calibrated, identified substances calculated as toluene equivalent (c_{ni tol})</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>n.d.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total very volatile organic compounds</th>
<th>Concentration (test chamber air) [µg/m³]</th>
<th>SER_a [µg/m³·h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVVOC_{14d}</td>
<td>12</td>
<td>15</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.
1.1.6.1 Formaldehyde\text{\textsubscript{14d}} and Acetaldehyde\text{\textsubscript{14d}}

Test parameter:
Formaldehyde and Acetaldehyde, test chamber, air sampling 14 days after test chamber loading

Test method:
Preparation of test sample: according to DIN EN 717-1
see Volatile organic compounds

Test chamber conditions: DIN EN 717-1 with the following deviations:
- No determination of the equilibrium concentration; the formaldehyde emission is indicated at a measuring point as determined above.
- Chamber volume: see Volatile organic compounds
- Relative humidity: 50%
- Air change rate and loading: see Volatile organic compounds

Emission chamber parameters: see volatile organic compounds
Air sampling: 14 days after test chamber loading

Analytics: DIN ISO 16000-3
Limit of determination: 3 µg/m\textsuperscript{3} ≈ 0.003 ppm

Test result:
Sample: A002: Printkork mit Hot. Coating Oberfläche

<table>
<thead>
<tr>
<th>Substance</th>
<th>Concentration (Test chamber air) [µg/m\textsuperscript{3}]</th>
<th>Concentration (Test chamber air) [ppm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>&lt; 3</td>
<td>&lt; 0.003</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>12</td>
<td>-</td>
</tr>
</tbody>
</table>

Cologne, 08.01.2014

[Signature]

Dr. rer.-nat. Tobias Schulz
(Technical Manager Representative)
Expert evaluation according to California specification 01350

The product Printkork mit Hot. Coating Oberfläche has been product tested on behalf of Li & Co AG, Müstair.

This evaluation bases on the test criteria of the „Emission testing method for California Specification 01350 (02/2010)“. The VOC concentrations are calculated as Specific Emission Rate (SER_a). For the “Estimated Airborne Concentration in a standard private office” the SER_a is divided by area-specific flow rate of 1.86 m³/m²h for floorings in a standard private office (acc. to chapter 4.3 “IAQ Concentration Modelling”).

The results documented in the test report are evaluated as follows (acc. to Target CREL VOCs, CS01350, Table 4-1):

<table>
<thead>
<tr>
<th>No.</th>
<th>Compound Name</th>
<th>CAS-No.</th>
<th>SER_a 11d [µg/m²h]</th>
<th>SER_a 12d [µg/m²h]</th>
<th>SER_a 14d [µg/m²h]</th>
<th>Estimated Airborne Concentration in standard private office (SER_a 14d divided by 1.86 m³/h) [µg/m³]</th>
<th>Allowable Concentration in standard private office [µg/m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*) Standard private office: Volume 30.6 m³, Floor surface 11.1 m², Air change rate 0.68 h⁻¹, Area specific emission flow rate 1.86 m³/m²h

Conclusion

The results of the emission test comply with the requirements of “Emission testing method for California Specification 01350 (02/2010)“.

Cologne, 08.01.2014

Daniel Tigges, Dipl.-Holzwirt
(Project Manager)