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Through our consultant

Your notice of 03-04-2018
Your reference
Date 24-07-2018

Analysis Report 18.01991.01

Required tests:
EN 16516 (2017) Emission of volatile organic compounds (chamber method)
ISO 16000-3 (2011) determination of aldehydes after emission

Identification number
Information given by the client
Date of receipt
T1807975 TONGA 03-04-2018

Jo Wynendaele

Order responsible

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Reference:  
T1807975 - TONGA

_Emission of volatile organic compounds (chamber method)_

Date of ending the test 23-07-2018  
Standard used EN 16516 (2017)  
Product standard décret Français sur les COV

Preparation Procedure of sampling, storage of samples and preparation of test specimens as described in the standard EN 16516  
Sampling and conditioning Emission test chamber method at 23°C and 50% RH under ½ air exchange per hour. Sampling (under continuous ventilation) on Tenax TA

Sampling after X days 28 days  
Analytical method Volatile compounds are thermally desorbed, cryo-trapped and injected into a GC-MS.

Detection Gas chromatography with Agilent MSD detector.  
Quantification Target compounds are calibrated, non-target and unidentified compounds are quantified using toluene equivalents (TEQ)

Results  
Determination limit µg/m³  
(emissions) 5  
(carcinogenic, mutagenic and toxic substances) 1
Limites measured in $\mu g/m^3$:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Limit</th>
<th>Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>&lt;10</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>&lt;200</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Toluene</td>
<td>&lt;300</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>&lt;250</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>&lt;750</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Xylene</td>
<td>&lt;200</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Styrene</td>
<td>&lt;250</td>
<td>&lt;5</td>
</tr>
<tr>
<td>2-butoxyethanol</td>
<td>&lt;1000</td>
<td>&lt;5</td>
</tr>
<tr>
<td>1,2,4-trimethylbenzene</td>
<td>&lt;1000</td>
<td>&lt;5</td>
</tr>
<tr>
<td>1,4-dichlorobenzene</td>
<td>&lt;60</td>
<td>&lt;5</td>
</tr>
<tr>
<td>TVOC</td>
<td>&lt;1000</td>
<td>482</td>
</tr>
<tr>
<td>Benzene</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>DBP</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>DEHP</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

**Sample identification**

**Type of test method**

- Flec: -
- Test-chamber: x

**Material of test chamber**

- Steel: x
- Glass
- Other

<table>
<thead>
<tr>
<th>Test chamber volume</th>
<th>0.25 $[m^3]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of sample</td>
<td>0.25 $[m^2]$</td>
</tr>
<tr>
<td>Air exchange rate</td>
<td>0.5 $[h^{-1}]$</td>
</tr>
<tr>
<td>Area specific air exchange rate</td>
<td>0.5 $[m^3h^{-1}]$</td>
</tr>
<tr>
<td>Temperature</td>
<td>23 $[^{\circ}C]$</td>
</tr>
<tr>
<td>Rel. humidity</td>
<td>50 $[%]$</td>
</tr>
</tbody>
</table>

**Insert of sample into the test chamber** 06-04-18
**Sampling after 28 days** 04-05-18

Table 1: Summary of conditions and results of 28 day emission test

Annex 1  Annex.1_report18.01991.01.pdf

Performed under accreditation in the chemical lab under the responsibility of Pablo Moerman
Reference: T1807975_01d - TONGA

**Determination of aldehydes after emission**

Date of ending the test 18-05-2018

Standard used ISO 16000-3 (2011)

Product standard décret Français sur les COV

Deviation from the standard

Sample preparation The sample is conditioned in a simulation room at 23°C and 50% R.H.

Air exchange rate 0.5 air exchange per hour

Sampling formaldehyde and acetaldehyde are adsorbed on dinitrophenylhydrazine (DNPH) impregnated silica

Analytical method RP-HPLC (UV 360 nm)

Results

<table>
<thead>
<tr>
<th>Component</th>
<th>Determination limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 days mg/m³</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>&lt; 0.002</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>&lt; 0.002</td>
</tr>
<tr>
<td>Acrolein</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Propionaldehyde</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Crotonaldehyde</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Butyraldehyde</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Isovaleraldehyde</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Valeraldehyde</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Hexaldehyde</td>
<td>&lt; 0.005</td>
</tr>
</tbody>
</table>

Formaldehyde < 0.002
Acetaldehyde < 0.002
Acrolein < 0.005
Propionaldehyde < 0.005
Crotonaldehyde < 0.005
Butyraldehyde < 0.005
Isovaleraldehyde < 0.005
Valeraldehyde < 0.005
Hexaldehyde < 0.005

Performed under accreditation in the chemical lab under the responsibility of David Van de Vyver
Sample history

T1807975_01d  TONGA
From sample T1807975 and the following procedure (TONGA)

Quantitative determination of aldehydes (chamber method)

Date of ending the test: 16-07-2018
Standard used: ISO 16000-3 (2011)

Deviation from the standard
Sample preparation: The sample is conditioned in a simulation room at 23°C and 50% R.H.
Residence time (in days): 28 days
Air exchange rate: 0.5 air exchange per hour
Sampling: Aldehydes on dinitrophenylhydrazine (DNPH) impregnated silica

Results