

Novofibre Panel Board Holding China Ltd.  
A2 Zone, Room A116  
Zhao Wei Hua Deng Mansion  
14 Jiuxianqiao Road, Chaoyang District

100015 Beijing

China

Dresden, 2013-12-19  
50-br/ku

## Test report Order number 2513483/F


**Customer:** Novofibre Panel Board Holding China Ltd.  
A2 Zone, Room A116  
Zhao Wei Hua Deng Mansion  
14 Jiuxianqiao Raod, Chaoyang District  
100015 Beijing

**Date of order:** 2013-10-18

**Order:** Determination and validation of the VOC and formaldehyde emission from a straw board according to "Arrêté étiquetage", ISO 16000 part 3, 6 and 9, VDI 4301 part 6  
**Straw board 22 mm**

**Contractor:** EPH – Laboratory chemical testing

**Engineer in charge:** Dipl.-Ing. M. Broege

  
Dipl.-Chem. K. Aehlig  
Head of laboratory  
Chemical testing

The test report contains 4 pages. Any duplication in part requires written approval from EPH.  
These test results are exclusively related to the tested material.

## 1. Assignment

Accomplishment of an emission test based on DIN ISO 16000 part 3, 6 and 9 and validation according to the French regulation **ARRÊTÉ** relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils and CMR-Regulation.

## 2. Sample

Product name: **straw board**  
Thickness: 22 mm  
Sample receipt at EPH 2013-10-07

## 3. Emission measurement

### Chamber test – ISO 16000 part 9

The test pieces (2 pieces 500 x 500) were placed into a test chamber – lying on a rack – under the following conditions:

Temperature	23 °C ± 1K
Air humidity	50 % ± 5 %
Air exchange rate	0.5 /h ± 0.1 /h
Loading	1 m <sup>2</sup> /m <sup>3</sup>
Chamber volume	1 m <sup>3</sup>

Storage 2013-11-15

During the test the climatic parameters temperature and relative air humidity were recorded.

The applied test conditions correspond to the application wall.

## 4. Analytics

### Volatile organic compounds (VOC) - ISO 16000 part 6

The determination of the VOC was carried out gaschromatographically after previous adsorption on tenax and following thermodesorption with cryo focusing (GC-MS).

Sample air volume: 1 – 6 l

1. Measurement after 3 d double determination
2. Measurement after 7 d double determination

### Formaldehyde/Aldehydes – ISO 16000 part 3

The determination of formaldehyde and other aldehydes was carried out applying DNPH-method. Sample air volume: 120 l

1. Measurement after 3 d double determination
2. Measurement after 7 d double determination

### Plasticizer (Phthalates) – VDI 4301 part 6

The determination of the plasticizers Bis(2-ethylhexyl)phthalat (DEHP) and Dibutylphthalat (DBP) is carried out by adsorption on tenax and following determination by GC-MS.

Sample air volume: 70 – 75 l

1. Measurement after 7 d double determination

## 5. Results

### VOC-Emission

Table 1: Test chamber concentrations

Compound	CAS-number	Concentration in $\mu\text{g}/\text{m}^3$	
		3 d	7 d
<i>Compounds with a boiling point 50 – 250 °C</i>			
Acetic acid	000064-19-7	238	170
Cyclotrisiloxane, hexamethyl-	000541-05-9	2	< 1
Benzaldehyde	000100-52-7	5	1
Unidentified compounds		< 1	< 1
<b>Sum (TVOC)</b>		<b>245</b>	<b>171</b>
<i>Compounds with a boiling point of &gt; 250°C</i>			
<b>Sum (TSVOC)</b>		<b>&lt; 1</b>	<b>&lt; 1</b>
<i>Carcinogenic substances</i>			
<b>Sum</b>		<b>&lt; 1</b>	<b>&lt; 1</b>
<i>Plasticizer</i>			
Bis(2-ethylhexyl) phthalate (DEHP)	000117-81-7	-	n.d.
Dibutyl phthalate (DBP)	000084-74-2	-	n.d.

n.d.

not detected

Carcinogenic substances

carcinogenic in categories 1 or 2 according to Table 3.2 or categories 1A and 1B according to Table 3.1 of Annex VI to Regulation (EC) No 1272/2008

TVOC

total volatile organic compounds between  $\text{C}_6 - \text{C}_{16}$ 

TSVOC

total semi-volatile organic compounds

### Formaldehyde

1. Measurement	0.007 ppm	after	3 days
2. Measurement	0.006 ppm	after	7 days

## 6. Evaluation

Table 2: Requirements regarding French regulation "Arrête étiquetage" in  $\mu\text{g}/\text{m}^3$ 

	C	B	A	A+
Formaldehyde	> 120	< 120	< 60	< 10
Acetaldehyde	> 400	< 400	< 300	< 200
Toluene	> 600	< 600	< 450	< 300
Tetrachlorethylene	> 500	< 500	< 350	< 250
Xylene	> 400	< 400	< 300	< 200
1,2,4-Trimethylbenzene	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorobenzene	> 120	< 120	< 90	< 60
Ethylbenzene	> 1500	< 1500	< 1000	< 750
2-Butoxyethanol	> 2000	< 2000	< 1500	< 1000
Styrene	> 500	< 500	< 350	< 250
<b>TVOC</b>	<b>&gt; 2000</b>	<b>&lt; 2000</b>	<b>&lt; 1500</b>	<b>&lt; 1000</b>

Requirements according CMR Regulation after 28 days:

Trichlorethylen	< 1 µg/m <sup>3</sup>
Benzol	< 1 µg/m <sup>3</sup>
DEHP	< 1 µg/m <sup>3</sup>
DBP	< 1 µg/m <sup>3</sup>

Table 3: Summarized test results after 7 days

	µg/m <sup>3</sup>
Formaldehyde	7
Acetaldehyde	24
Toluene	n.d.
Tetrachlorethylene	n.d.
Xylene	n.d.
1,2,4-Trimethylbenzene	n.d.
1,4-Dichlorbenzene	n.d.
Ethylbenzene	n.d.
2-Butoxyethanol	n.d.
Styrene	n.d.
<b>TVOC</b>	<b>171</b>
<b>Classification</b>	<b>A+</b>

n.d. not detected

The tested product "straw board 22 mm" equates, for the application wall, Category A+ according to the French regulation "Arrêté étiquetage". The requirements according CMR regulation on plasticizer are fulfilled.



Dipl.-Ing. M. Broege  
Engineer in charge