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Test Report Order no. 2516436/2/2

Client: FINSA
N-550 km. 57
15890 Santiago de Compostela
Spain

Date of order: 2016-09-09

Order: Determination and validation of the VOC, formaldehyde and phthalate emission from a flooring according to "Arrêté étiquetage", ISO 16000 part 3, 6 and 9 and CMR Regulation
Laminate flooring FINfloor

Contractor: EPH – Laboratory Chemical Testing

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



Prof. Dr. habil. M. Beyer
Head of Laboratory Chemical Testing

The test report contains 5 pages. Any duplication, even in part, requires written permission of 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 material

Product name: **FINfloor**
Model/Series: FINfloor 12
Type: laminate floor covering
Thickness: 12 mm

3 Sampling

Manufacturing plant: Finsa Fibranor
Charge: FSB162331844
Date of production: 2016-10-09
Sampling: by manufacturer
Date of sampling: 2016-10-10
Packaging material: carton
Number: 1 box

Sample receipt at EPH: 2016-11-03

4 Emission measurement

Chamber test – ISO 16000 part 9

The test piece (0.09 m²) was placed into a test chamber – lying on the bottom – under the following conditions:

Temperature: 23 °C ± 1 K
Air humidity: 50 % ± 5 %
Air exchange rate: 0.5 / h ± 0.1 /h
Loading: 0.4 m²/m³
Chamber volume: 0.225 m³
Storage: 2016-11-25

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

5 Analytics

Volatile organic compounds (VOC) – ISO 16000 part 6

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

Sample air volume: 1 – 6 l

1. Measurement after 3 d double determination
2. Measurement after 7 d double determination
3. Measurement after 28 d double determination

Formaldehyde / Aldehydes – ISO 16000 part 3

The determination of formaldehyde and other aldehydes was carried out by DNPH-method.

Sample air volume: 120 l

1. Measurement after 3 d double determination
2. Measurement after 7 d double determination
3. Measurement after 28 d double determination

Phthalates

The determination of the phthalates Bis(2-ethylhexyl) phthalate (DEHP) and Dibutyl phthalate (DBP) was carried out according CPSC-CH-C1001-09.3 with GC-MS.

6 Results

VOC-Emission

Table 1: Test chamber concentrations

Compound	CAS-number	Concentration in $\mu\text{g}/\text{m}^3$		
		3 d	7 d	28 d
<i>Compounds with a boiling point < 50 °C</i>				
Acetaldehyde		4	5	2
Acetone		81	100	16
Total		85	105	18
<i>Compounds with a boiling point 50 – 286 °C</i>				
2-Butanone	000078-93-3	196	29	5
Acetic acid	000064-19-7	43	31	26
Triethylamine	000121-44-8	4	1	1
Hexanal	000066-25-1	5	4	1
p-Xylene	000106-42-3	1	1	< 1
Ethanol, 2-butoxy-	000111-76-2	5	1	< 1
(1R)-2,6,6-Trimethylbicyclo [3.1.1]hept-2-ene	007785-70-8	8	4	1
Benzaldehyde	000100-52-7	3	< 1	2
Hexanoic acid	000142-62-1	5	3	< 1
Bicyclo[3.1.1]heptane, 6,6- dimethyl-2-methylene-, (1S)-	018172-67-3	6	4	< 1
Octanal	000124-13-0	1	1	< 1
Tetramethylbutanedinitrile	003333-52-6	2	1	< 1
o-Cymene	000527-84-4	1	1	< 1
D-Limonene	005989-27-5	6	5	2

Acetophenone	000098-86-2	1	< 1	< 1
Undecane	001120-21-4	3	1	< 1
Nonanal	000124-19-6	5	3	< 1
Hexanoic acid, 2-ethyl-	000149-57-5	3	2	< 1
Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl-	001632-73-1	2	2	< 1
Ethanol, 1-(2-butoxyethoxy)- .alpha.-Terpineol	054446-78-5	75	46	23
.alpha.-Terpineol	000098-55-5	7	8	5
Decanal	000112-31-2	4	3	1
DPNB	029911-28-2	20	19	10
2,4,7,9-Tetramethyl-5-decyn- 4,7-diol	000126-86-3	8	10	9
Longifolene	000475-20-7	1	2	1
Caryophyllene	000087-44-5	6	7	6
Unidentified compounds		16	4	< 1
Aliphatic hydrocarbons C ₉ -C ₁₆		29	12	4
Total		466	205	97
TVOC		275	132	59
<i>Compounds with a boiling point of > 286°C</i>				
Total		< 1	< 1	< 1
<i>Carcinogenic substances</i>				
Total		< 1	< 1	< 1

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 C₆ – C₁₆ as toluene equivalent

Formaldehyde

Table 2: Formaldehyde results

Day of Measurement	Concentration	
	µg/m ³	ppm
3 d	10	0.008
7 d	15	0.012
28 d	7	0.006

Phthalates

The phthalates DEHP and DBP are not detectable.

7 Evaluation

Table 3: 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
Tetrachloroethylene	> 500	< 500	< 350	< 250
Xylene	> 400	< 400	< 300	< 200
1,2,4-Trimethylbenzene	> 2000	< 2000	< 1500	< 1000
1,4-Dichlorbenzene	> 120	< 120	< 90	< 60
Ethylbenzene	> 1500	< 1500	< 1000	< 750
2-Butoxyethanol	> 2000	< 2000	< 1500	< 1000
Styrene	> 500	< 500	< 350	< 250
TVOC	> 2000	< 2000	< 1500	< 1000

Table 4: Summarized test results after 28 days

	$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$
Formaldehyde	7	Trichloroethylene	n.d.
Acetaldehyde	2	Benzene	n.d.
Toluene	n.d.	DEHP	n.d.
Tetrachloroethylene	n.d.	DBP	n.d.
Xylene	n.d.	Compliance	Yes
1,2,4-Trimethylbenzene	n.d.		
1,4-Dichlorbenzene	n.d.		
Ethylbenzene	n.d.		
2-Butoxyethanol	n.d.		
Styrene	n.d.		
TVOC	59		
Classification	A+		

n.d. not detected

The tested product "Laminate flooring FINfloor" equates Category A+ according to the French regulation "Arrête étiquetage".

The requirements according to CMR-Regulation are also fulfilled.



Dipl.-Ing. M. Broege
Engineer in charge