

Testing Laboratory No. 1030.1 accredited by the Czech Accreditation Institute according to ČSN EN ISO/IEC 17025:2005

REPORT

on tests

Report Reference No.

AZL-N-002-17

Product Name

Cement bonded particleboard CETRIS®

Applicant's Name

CIDEM Hranice, a.s.
Skalní 1088, Hranice I - Město, 753 01 Hranice
Czech Republic

ID No.: 14617081

Manufacturer

CIDEM Hranice, a.s.
Skalní 1088, Hranice I - Město, 753 01 Hranice
Czech Republic

ID No.: 14617081

Tests carried out by

Ing. Petr Čech, Ph.D.

Report made by

Ing. Petr Čech, Ph.D.

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The Czech version of the test protocol is crucial in case of litigation.

Person responsible for the accuracy of this Report



Ing. Miroslav Zapletal
Head of the Testing Laboratory

1. GENERAL

1.1 Party requesting the tests:

CIDEM Hranice a.s., Skalní 1088, Hranice I - Město, 753 01 Hranice, Czech Republic.

1.2 Purpose of tests:

Determination of emissions of volatile organic compounds (VOC) on the product: Cement bonded particleboard CETRIS®

2. DETAILS OF THE RECEIPT OF SAMPLES

2.1 Receipt of samples:

The sample to be tested in the quantity of 1 (one) piece was delivered to the Furniture Testing Laboratory on May 17, 2017. Sample was taken by the technician of the ATL (Accredited Testing Laboratory) - Ing. Petr Čech, Ph.D.

2.2 Identification of samples:

Sample No. 1 (Reg. No. 07/17) – Cement bonded particleboard CETRIS®- thickness 18 mm.

3. DESCRIPTION OF SAMPLES

3.1 Technical documentation and drawings:

The party requesting the tests delivered neither technical documents nor drawings..

3.2 Description of test samples

Sample No. 1 - Cement bonded particleboard CETRIS®

Dimensions: 700 x 700 x 18 mm (length x width x thickness), test area: 1,03 m².

4. PRODUCT TESTING

4.1 Testing commenced on:

19.05.2017

Testing finished on: 20.06.2017

4.2 Testing location: Testing Laboratory No. 1030.1 accredited by the Czech Accreditation Institute, Lesnická 39, 613 00 Brno.

4.3 The test methods and procedures:

Determination of emissions of volatile organic compounds from building materials and furniture (VOC) using the GC / MS and TVOC_{MS} methods, calculated from the measured values - Workflow PP05 (ČSN EN ISO 16 000 -9).

Principle of the method:

The essence of this test is the determination of emissions of volatile organic compounds released from different materials. The chamber test is performed in a test emission chamber with constant temperature, relative humidity and area-related air flow. In the case of a chamber test, this is the determination of emissions from furniture and materials for indoor use. The air sample volume is passed through a sorption tube filled with a suitable sorbent on which the analytes are collected. The sampled compounds are desorbed by thermal desorption from a tube into the gas chromatograph injection chamber equipped with a capillary column and mass spectrometer detector. The calibration is done by spraying standard solutions onto the sorption tube (plating). The internal standard method is used for evaluation. The individual concentrations of volatile organic compounds and the TVOC_{MS} parameter are evaluated.



4.4 Test equipment used:

Testing chamber:

Testing chambre VOC TEST 1000

Air purification system:

Active charcoal filters

Managing the climatic conditions of the laboratory:

The air supplied to the test chamber comes from the laboratory and is pre-cleaned

Sampling:

Pumps GILIAN LFS-113

Sampling time: 180 min., withdrawn volume: 36 liters

Sorption tubes: M, N, O, P, S, U, T

Analytical instruments:

Gas chromatograph with mass spectrometer GC-MS Agilent Technologies GC 6890 a MSD 5973N

Thermal desorption single point system TD-4, Scientific Instrument Services

Cryofocus unit

Filling the chamber in m²:

Total tested area: 1,03

Degree of filling the chamber: 1,03:1

4.5 Any deviations, additions or exclusions regarding the test method:

By agreement with the customer, the test specimen of the cement-bonded board was chosen with the thickness of 18 mm.

4.6 Additional information required by specific methods, customers or groups of customers:

None.

5. TEST RESULTS

5.1 Determination of emissions of volatile organic compounds – Chamber test

Test samples air conditioning time: 3 days

Measuring conditions:

Background concentration of the monitored substances in the chamber:

are listed in the result tables

Results of simultaneously taken samplings and analysis:

are listed in the result tables

Quality of climatic parameters:

temperature: 21,3 °C

humidity: 50%

Replacement of air in the chamber: 1,00 m³.h⁻¹

Airflow velocity: 0,2 m.s⁻¹



Table 1: Emission measurement results VOC a TVOC_{MS} emitted by the test sample – cement-bonded board CETRIS®, Measured 72 hours after the sample was placed into a small-space chamber VOC TEST 1000

Number	Compound	1. measurement		1. corrected result		2. measurement		2. corrected result		Average result ± widespread uncertainty	Hygienic Limit
		Unit		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³		
		1. measurement	1. blank	1. corrected result	2. measurement	2. blank	2. corrected result	1. measurement	1. blank		
1	Formaldehyd	7,3	47,1	< 3	4,5	42,7	< 3	< 3	< 3	60	
2	1,3-Butadien	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	NLK	
3	Aceton	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
4	Ethyl Acetát	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
5	Benzen	< 0,1	0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	7	
6	1-Methoxy-2-Propanol	0,9	0,1	0,8	1,0	0,1	0,9	(0,8 ± 0,2)		NLK	
7	Pentanal	0,9	0,2	0,7	0,8	0,1	0,7	(0,7 ± 0,2)		NLK	
8	Trichlorethylen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	150	
9	Toluuen	1,2	0,5	0,7	1,0	0,3	0,7	(0,7 ± 0,2)		300	
10	Hexanal	2,3	0,3	2,0	2,0	0,2	1,8	(1,9 ± 0,6)		NLK	
11	Tetrachlorethylen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	150	
12	n-Butyl acetát	0,9	0,2	0,7	0,7	0,2	0,5	(0,6 ± 0,2)		NLK	
13	Ethylbenzen	0,4	0,1	0,3	0,3	0,1	0,2	(0,2 ± 0,1)		200	
14	m,p-Xylen	1,0	0,3	0,7	0,8	0,3	0,5	(0,6 ± 0,2)		200***	
15	Styren	0,2	< 0,1	0,2	< 0,1	< 0,1	< 0,1	(0,1 ± 0,03)		40	
16	o-Xylen	0,3	0,1	0,2	0,2	0,1	< 0,1	(0,1 ± 0,03)		200***	
17	Butoxy-Ethanol	0,2	< 0,1	0,2	0,2	< 0,1	0,2	(0,2 ± 0,1)		NLK	
18	α-Pinen	0,5	0,1	0,4	0,6	0,1	0,5	(0,4 ± 0,1)		NLK	
19	Camphen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
20	3-Ethyl-Toluen	0,2	0,1	< 0,1	< 0,1	0,1	< 0,1	< 0,1	< 0,1	NLK	
21	4-Ethyl-Toluen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	(0,1 ± 0,03)	NLK	
22	1,3,5-Trimethyl-Benzen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
23	β-Pinen	0,5	0,1	0,4	0,6	0,1	0,5	(0,4 ± 0,1)		NLK	
24	2-Ethyl Toluen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
25	Myrcen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
26	1,2,4-Trimethyl-Benzen	0,2	0,1	< 0,1	< 0,1	0,1	< 0,1	< 0,1	< 0,1	NLK	
27	α-Phellandren	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
28	3-δ-Caren	0,8	< 0,1	0,8	0,6	0,1	0,5	(0,6 ± 0,2)		NLK	
29	1,2,3-Trimethyl-Benzen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	(0,1 ± 0,03)		NLK	
30	Limonen	0,7	0,3	0,4	0,5	0,1	0,4	(0,4 ± 0,1)		NLK	
31	γ-Terpinen	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
32	Bornyl Acetát	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
33	TVOC _{MS}	49	13	36	47	12	35	(36 ± 11)		NLK	

Explanation of note: NLK means no limit concentration

** Hygiene limit according to the regulation č. 6/2003, Laying down hygienic limits of chemical, physical and biological indicators for indoor living quarters of certain buildings

*** The hygienic limit is set for the sum of Xylene



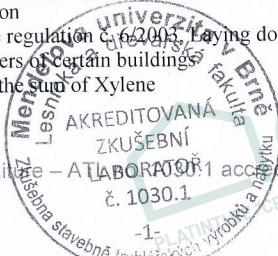
Tabulka 2: Emission measurement results VOC a TVOC_{MS} emitted by the test sample – cement-bonded board CETRIS®, Measured 28 days after the sample was placed into a small-space chamber VOC TEST 1000

Number	Compound	1. measurement		1. corrected result		2. measurement		2. blank		Average result \pm widespread uncertainty	Hygienic Limit
		Unit	$\mu\text{g}/\text{m}^3$								
1	Formaldehyd		25,1	49,7	< 3	25,8	48,3	< 3	< 3	< 3	60
2	1,3-Butadien		< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	< 0,3	NLK
3	Aceton		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK
4	Ethyl Acetát		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	(0,1 \pm 0,03)	NLK
5	Benzen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	7
6	1-Methoxy-2-Propanol		0,3	0,1	0,2	0,3	< 0,1	0,3	(0,2 \pm 0,1)	NLK	
7	Pentanal		0,4	0,2	0,2	0,4	0,1	0,3	(0,2 \pm 0,1)	NLK	
8	Trichlorethylen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	150	
9	Toluen		0,5	0,1	0,4	0,4	0,1	0,3	(0,3 \pm 0,1)	300	
10	Hexanal		1,6	0,2	1,4	1,2	0,1	1,1	(1,2 \pm 0,4)	NLK	
11	Tetrachlorethylen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	150	
12	n-Butyl acetát		0,5	0,1	0,4	0,3	0,1	0,2	(0,3 \pm 0,1)	NLK	
13	Ethylbenzen		0,2	0,1	< 0,1	0,2	< 0,1	0,2	(0,1 \pm 0,03)	200	
14	m,p-Xylen		0,8	0,2	0,6	0,6	0,1	0,5	(0,5 \pm 0,2)	200***	
15	Styren		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	40	
16	o-Xylen		0,2	0,1	< 0,1	0,2	< 0,1	0,2	(0,1 \pm 0,03)	200***	
17	Butoxy-Ethanol		0,6	0,1	0,5	0,5	< 0,1	0,5	(0,5 \pm 0,2)	NLK	
18	α -Pinen		0,2	0,1	< 0,1	0,3	< 0,1	0,3	(0,2 \pm 0,1)	NLK	
19	Camphen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
20	3-Ethyl-Toluen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	(0,1 \pm 0,03)	NLK	
21	4-Ethyl-Toluen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
22	1,3,5-Trimethyl-Benzen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
23	β -Pinen		0,2	0,1	< 0,1	0,2	< 0,1	0,2	(0,1 \pm 0,03)	NLK	
24	2-Ethyl Toluen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
25	Myrcen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
26	1,2,4-Trimethyl-Benzen		0,2	< 0,1	0,2	< 0,1	< 0,1	< 0,1	(0,1 \pm 0,03)	NLK	
27	α -Phellandren		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
28	3- δ -Caren		0,4	< 0,1	0,4	0,3	< 0,1	0,3	(0,3 \pm 0,1)	NLK	
29	1,2,3-Trimethyl-Benzen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
30	Limonen		0,3	< 0,1	0,3	0,3	< 0,1	0,3	(0,3 \pm 0,1)	NLK	
31	γ -Terpinen		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
32	Bornyl Acetát		< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	NLK	
33	TVOC _{MS}		37	11	26	34	10	24	(25 \pm 8)	NLK	

Explanation of note: NLK means no limit concentration

** Hygiene limit according to the regulation č. 6/2003 Sb. laying down hygienic limits of chemical, physical and biological indicators for indoor living quarters of certain buildings

*** The hygienic limit is set for the sum of Xylene



Expression of uncertainty in measurement:

Standard uncertainty of measurement $u_{(X)} = 15\%$ Measured emission values in $\mu\text{g}/\text{m}^3$.

The expanded measurement uncertainty is calculated by using the coefficient $k_{0,95} = 2$, which corresponds to 95% confidence level.

The expanded measurement uncertainty U is expressed as a standard measurement uncertainty multiplied by the coefficient of expansion k = 2, which for normal distribution corresponds to a probability of coverage of approximately 95%.

6. PHOTOGRAPHIC DOCUMENTATION

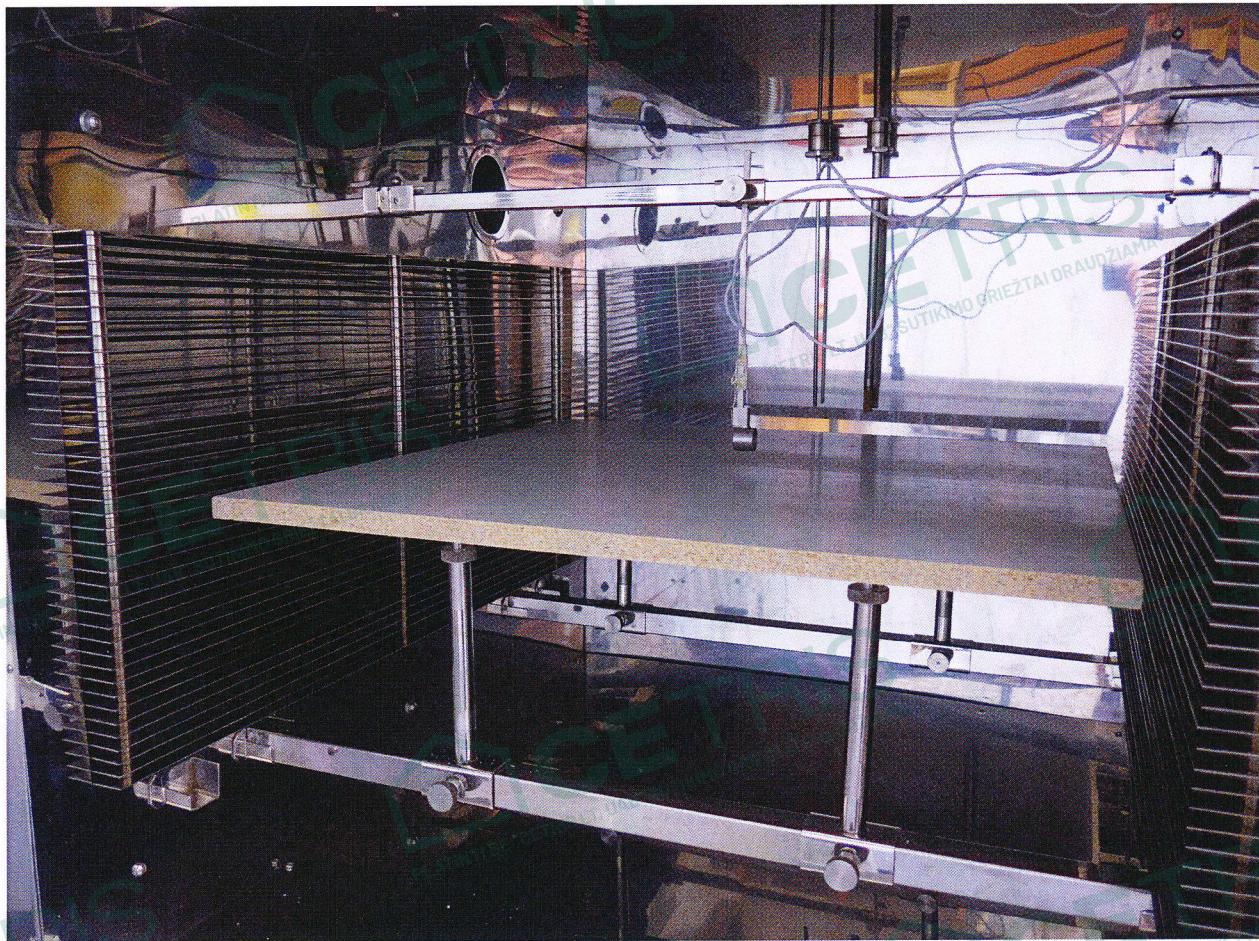


Photo 1 – Test specimen - cement-bonded board CETRIS®,
stored in a air condition chamber VOC TEST 1000