



TEST REPORT

LAB LOCATION:TURKEY
SERVICE TYPE: Regular
LAB NO: (7217)132-0432 **REVISION**
DATE IN : May 12th, 2017
DATE OUT: July 26th, 2017
REVISION DATE: February 01th 2018

COMPANY : DYO BOYA FABRIKALARI SAN. VE TIC. A.S.
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Attn: hasan.serefhan@dyo.com.tr)

SUPPLIER NAME : /

SUPPLIER REFERENCE : /

CODE BU : /

STYLE NO : DYOTHERM ISOLTECO 110

BUYER : /

MANUFACTURER : DYO BOYA FABRIKALARI SAN. VE TIC. A.S.

COUNTRY of ORIGIN : TURKEY

COUNTRY of DESTINATION : /

SAMPLE DESCRIPTION : **Sample A:** THERMAL INSULATING PLASTER FOR
INTERIOR AND EXTERIOR WALLS

COLOR : /

SUBMITTED CARE : /

INSTRUCTION : /

GENERAL CONCLUSION : SEE TEST RESULTS

SUMMARY OF TEST RESULTS

TEST REQUIRED	Sample A
Evaluation of Volatile Organic Compounds and aldehydes emitted by a "Cement based product" according to ISO 16000	DATA

EXECUTIVE SUMMARY: Only vendor selected tests have been performed and submitted samples have been rated as "DATA".

REMARK 1: "Evaluation of Volatile Organic Compounds and aldehydes emitted by a "Cement based product" according to ISO 16000" analysis have been performed by BV-France Laboratories as subcontracted [Report No D-230517-04320].

REMARK 2: 72171320432 test report dated July 26th, 2017 is not valid, it is replaced by this report 72171320432 REVISION.

REMARK 3: As per client's request Address information has been changed.



LAB NO: (7217)132-0432 REVISION

**Bureau Veritas Consumer Products Services Turkey
BV CPS Test Lab. Ltd. Sti.**

**Eylem Yaldizli
Client Team Lead –Hardline**

**Kerem Can
Operations Manager**

-Photo of Submitted Sample -



TEST RESULTS

I- Objective

The objective of this test was to characterize and quantify the emissions of volatile organic compounds (VOCs) emitted by "Cement based product" supply by BV CPS Turkey to comply with to the decree N° 2011-321 of march 2011 and 19th april 2011. Emission ratings were established on the basis of measurements taken after 28 days in an emission test chamber. The aim was to classify emission rate from A+ to C, A+ indicating a very low level of emissions and C a high level of emissions. The level of emissions is indicated by the exposure concentration, expressed in $\mu\text{g.m}^{-3}$.

II- Principle of the test

The sample was conditioned as described in the ISO 16000-9 method for 28 days in an emission test chamber under constant conditions of temperature, relative humidity and air flow rate per unit specific surface.

Samples of chamber air emissions were carried out after 28 days of conditioning according to ISO 16000-6 methods for VOC analysis method for testing ISO 16000-3 aldehydes.

The interpretation of the results was based on targets set by the table below.

Ratings	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	>2,000	<2,000	<1,500	<1,000
1,4-Dichlorobenzene	>120	<120	<90	<60
Ethylbenzene	>1,500	<1,500	<1,000	<750
2-Butoxyethanol	>2,000	<2,000	<1,500	<1,000
Styrene	>500	<500	<350	<250
TVOC	>2,000	<2,000	<1,500	<1,000

III- References

a. Preparation of sample

NF EN ISO 16000-11: Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing - Sampling, storage of samples and preparation of test specimens (AFNOR, 2006).

b. Conditioning

NF EN ISO 16000-9: Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method (AFNOR, 2006).


c. Sampling and analyse

NF ISO 16000-3: Indoor air – Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air Air intérieur (AFNOR, 2001).

TEST RESULTS

NF ISO 16000-6: Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA® sorbent, thermal desorption and gas chromatography using MS or MS-FID (AFNOR, 2004).

IV- Description of sample

	<p>“Cement based product” supply by BV CPS Turkey</p> 
No. of sample	Cement based product
No sample Bureau Veritas (LIMS)	D-230517-04320-001
Supplier Name	CPS Turkey
Commercial reference	DYOTHERM ISOLTECO 110
Product Description	New generation of cement based thermal insulation product, reinforced with chemical binders, contains special manufactured fixed size EPS particles
Lot Number	-
Sample selection process	-
Conditionning	Paper bag
Manufacture date	-
Packing date	-
Volume of the chamber	0,0509 m3
Conditioning period	28 days
Beginning of the test	06/06/2017 11:15:00
Test (28 days)	03/07/2017 12:04:00
Relative Humidity	50 ± 5 %
Temperature	23 ± 2 °C
Name and address of the person who performed the sampling and analysis	<p>Bureau Veritas Laboratoires 8, avenue de Bourgogne - 95310 Saint Ouen l'Aumône Laboair.interieur@fr.bureauveritas.com</p>

TEST RESULTS

V- Preparation of the test specimen

The “Cement based product” was applicated on two inox plates according the technical sheet supplied by the Customer and the specimen was introduced in clean emission chamber.



Figure 1: Emission chamber with specimen

VI- Conditioning of sample

The sample was conditioned for 28 days in an emission chamber of 51 liters.
The test parameters below have been applied:

Test Parameters	Conditions
Emission test chamber	CLIMPAQ
Chamber Volume	0,0509 m ³
Conditioning period	28 days
Relative Humidity	50 ± 5 %
Temperature	23 ± 2 °C
Scenario	Wall
Specimen surface	0,090 m ²
Loading rate	1,768 m ² /m ³
Airflow	0,75 L/min
Speed	0,2 m/s
Specific ventilation rate (q c)	Murs

TEST RESULTS

VII- Sampling conditions of VOCs and aldehydes

The VOC samplings were conducted according to NF ISO 16000-6. It was carried out in double on Tenax tube before the start of the trial (J0) and after 28 ± 2 days (J28) of conditioning in the emission chamber.

Sampling	VOC
Number of tubes	2
Adsorbent support	Tenax TA
Duration of sampling	30 and 60 min
Sample flow	80 ml. min ⁻¹
Volume of sampled air	2.5 L and 4.8 L

The samples of aldehydes were produced at the same time as the VOC samples on adsorbent cartridges impregnated with DNPH (2,4-dinitrophenylhydrazine) according to standard NF ISO 16000-3.

Sampling	Aldehydes
Number of tubes	1
Adsorbent support	DNPH
Duration of sampling	170 min
Sample flow	500 ml. min ⁻¹
Volume of sampled air	84 L

VIII- Conditions of analyse of VOC and aldehydes sampling

The VOC analysis was performed using a Perkin Elmer thermodesorbeur 650 coupled to a GC Clarus 680/ MS Clarus 600C/FID Perkin Elmer according to NF ISO 16000-6. The tubes were heated by thermodesorbeur for 30 min at 280°C. This heating caused a desorption of volatile substances which are then passed through the chromatographic column and GC were detected by mass spectrometry (MS) and FID.



Figure 2: Photography of Thermal desorption System coupled to GC / MS / FID

TEST RESULTS

Appliance	Parameter	Conditions
Thermodesorbeur	Temperature of valve	280°C
	Temperature of tube	280°C
	Time of desorption	30 min
	Flow of inlet split	40 ml/min
	Cooling temperature	- 30°C
	Heating trap temperature	300°C
	Increase of temperature of the trap	40°C/s
GC	Program of temperature for GC	40°C lasting 2min 3°C/min until 92°C 5°C/min until 160°C 10°C/min until 280°C 280°C lasting 10 min
	Column	Capillary column not polar (stationary phase : 5% phenyl-methylsiloxane) 50 m x 0,32 mm x 0,52µm
MS	Scan	29 à 520 uma
	Inter scan time	0,1 s

Analysis of aldehydes was carried out according to standard NF ISO 16000-3. The cartridges were eluted in 5 ml of acetonitrile. Two injections of 6µl of the elution solution were then analyzed by high performance liquid chromatography (HPLC) on a Perkin Elmer system equipped with a UV detector diode array.

The aldehydes were identified and quantified by specific calibration.



Figure 3: Photography of HPLC

TEST RESULTS

Sampling	Aldehyde
Detector	UV-VIS diode array (360 nm)
Column	Inverse phase C18, 2,7µm, diameter = 3,0mm, L = 15 cm, tube Inox
Elution Flow	0,35 ml/min
Temperature of column	60°C

IX- Test Results

a. Exposure concentrations

C exp in $\mu\text{g}\cdot\text{m}^{-3}$ is the concentration that would result in a model room defined in the decree of 19 avril 2011.

$$C_{\text{exp}} = \text{SER} / q_e$$

q_e : Ventillation rate of model room ($\text{m}^3\cdot\text{m}^{-2}\cdot\text{h}^{-1}$)

SER: Emission factor of VOC and aldehydes ($\mu\text{g}\cdot\text{m}^{-2}\cdot\text{h}^{-1}$)

$$\text{SER} = C_{\text{mes}} * q_c$$

q_c : Ventillation rate of chamber ($\text{m}^3\cdot\text{m}^{-2}\cdot\text{h}^{-1}$)

C_{mes} : Concentration of VOC in emission chamber ($\mu\text{g}\cdot\text{m}^{-3}$)

N° CAS	Name of compound	tR (min)	C exp ($\mu\text{g}/\text{m}^3$) after 28 days
50-00-0	Formaldehyde _{COFRAC}	11.5	2,4
75-07-0	Acetaldehyde	14.5	8,9
108-88-3	Toluene	12.4	<LQ (2.0)
127-18-4	Tetrachloroethylene	14.5	<LQ (ND)
1330-20-7	Xylenes (m-, o-, p-)	17.7 and 19.1	27.4
95-63-6	1,2,4-Trimethylbenzene	24.4	<LQ (ND)
106-46-7	1,4-Dichlorobenzene	25.3	<LQ (ND)
100-41-4	Éthylbenzene	17.3	26.7
111-76-2	2-Butoxyethanol	19.7	<LQ (ND)
100-42-5	Styrene	19.0	174
Total VOC_{FID}			281

- Wide absolute incertitude of formaldehyde: 36%.
- ND: Not Detected
- LQ formaldéhyde: 2.0 $\mu\text{g}/\text{m}^3$ et LD formaldéhyde: 0.5 $\mu\text{g}/\text{m}^3$
- LQ acétaldéhyde: 2.8 $\mu\text{g}/\text{m}^3$
- LQ other VOC: 1.0 $\mu\text{g}/\text{m}^3$
- Rt: Retention time

TEST RESULTS

Labelling of product:

Concentrations of the 10 VOC bellow are inferior of A+ concentrations:

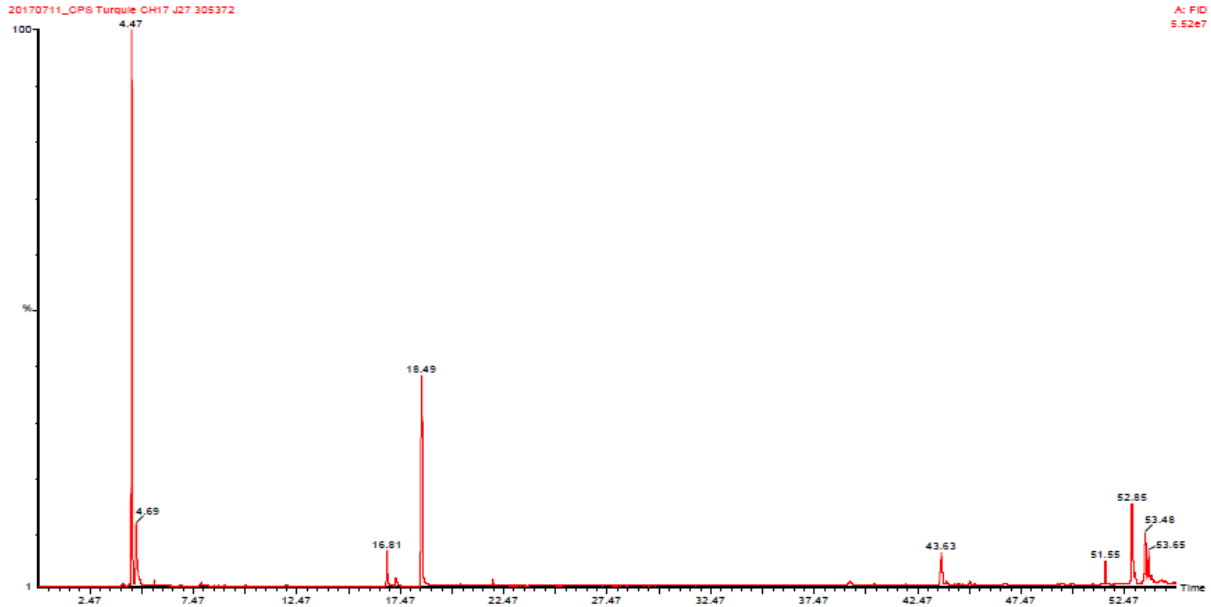
Futur étiquetage	C	B	A	A+
Formaldéhyde	>120	<120	<60	<10
Acétaldéhyde	>400	<400	<300	<200
Toluène	>600	<600	<450	<300
Tétrachloroéthylène	>500	<500	<350	<250
Xylène	>400	<400	<300	<200
1,2,4-Triméthylbenzène	>2000	<2000	<1500	<1000
1,4-Dichlorobenzène	>120	<120	<90	<60
Éthylbenzène	>1500	<1500	<1000	<750
2-Butoxyéthanol	>2000	<2000	<1500	<1000
Styrène	>500	<500	<350	<250
COVT	>2000	<2000	<1500	<1000

* Information representative of the indoor air emissions of volatile substances posing an inhalation toxicity risk on a scale from C (high emissions) to A+ (very low emissions)



X- Appendix

a. Chromatogram after 28 Days



b. Quality

The background concentration of formaldehyde is conform to standard ISO 16000-9.
Recovery rates of toluene and n-dodecane are higher than 80%.
The above information and duplicate analysis are available upon request.

-END OF REPORT -