Test Report

Nr. 31/18/3448/03
2 Ausfertigungen

MPA | Eberswalde
Materialprüfanstalt
Brandenburg GmbH

Prüfung, Überwachung,
Zertifizierung, Gutachten,
Forschung und Entwicklung

Alfred-Möller-Straße 1, H 13
D-16225 Eberswalde

Fon +49 (0) 33 34. 65 560
Fax +49 (0) 33 34. 65 550

www.mpaew.de
office@mpaew.de

Geschäftsführer:
Dr. Peter Schumacher

HRB 10408 FF

Client:	Sklejka – Eko S.A. Ul. Raymonta 35 63-400 Ostrów Wlkp. Poland
Applied test procedure:	Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air (DIN EN 16516); Determination of the emission of volatile organic compounds (VOC) and Formaldehyde from construction products – Emission test chamber method; assessment according to German AgBB-scheme (Committee of Health-related evaluation of construction produts) and according to French regulations “decret n° 2011-321 du 23 mars 2011” and “arrête du 19 avril 2011”
Date of order:	14.11.2018
Received:	14.11.2018
Test product:	**Exterior Hardwood Plywood**
Samples received:	15.11.2018
Persons in charge:	B.Sc. J. Murr, Dr. R. Wegner
Period of testing:	1-3/2019

1. Test material and sampling

Product:	**Exterior Hardwood Plywood**
Sample:	3 panel segments a 500 mm x 500 mm x 12 mm Manufacturing date: 08.11.2018 (batch No.: 29182)
Sampling:	09.11.2018 by manufacturer (sampling report is shown below)
Packaging:	wrapped in plastic foil
Storage conditions at :	room temperature, light protected area

Qualitäts-Management-System	MPA Eberswalde	Code:
	Materialprüfanstalt Brandenburg GmbH	Ausgabe: 1
	Zertifizierungsanweisung	Datum: 14.02.2018
	Sampling report	Seite 1 von 1

EN 16516

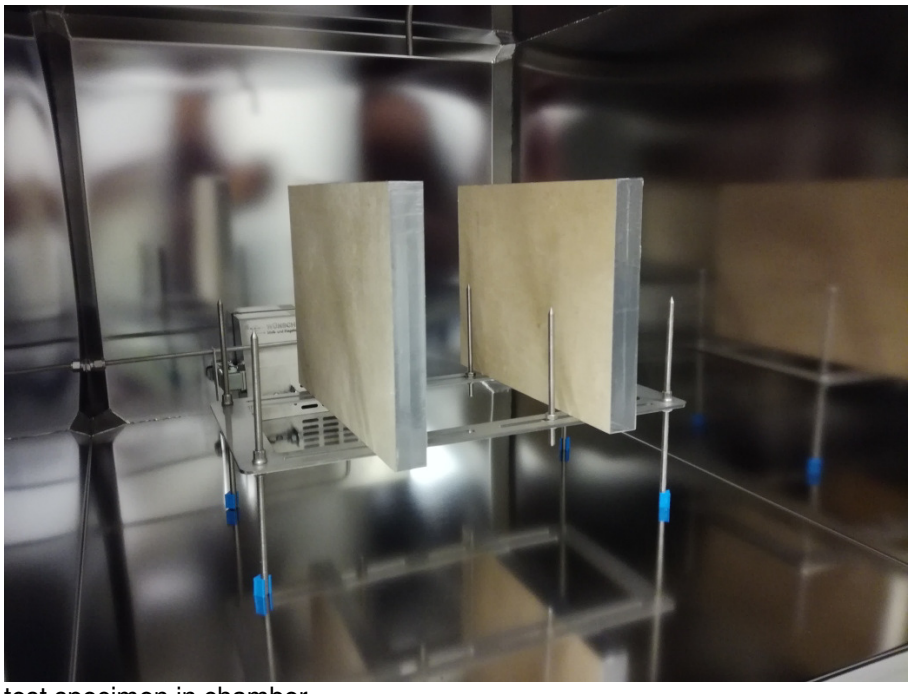
Testing laboratory / certification body: MPA EBERSWALDE - VOC test		Sampler (name, company, telephone): Natalia Wota, technolog, Sklejka-Eko	
Name of the manufacturer at the place of sampling (address/stamp): SKLEJKA-EKO S.A. ul. Reymonta 35 (3a) 58-400 Ostrów Wlkp. Regon 250005943 NIP 622-00-05-391		Manufacturer (if deviating from company's name at the place of sampling): –	
Name of the product: EXTERIOR HARDWOOD PLYWOOD		Type of product (e.g . laminate, textile flooring, PVC-flooring): PLYWOOD	
Model/program/series: –		Batch No: 29182	
Article No: Misc.: –		Date of batch production: 08. 11. 2018	
Sample is taken from	x Production o Store o Miscellaneous	How had the product been stored prior to sampling?	x open o in the stack o wrapped up
	Place of storage: S1 B hall		Packing material: PVC
Specifics (possible negative influences by emission at the place of taking the sample, petrol emissions, solvent emissions from production, uncertainties, questions, etc.): the forklifts drive on the hall			
Cut edges (identification of cut edges when present and identification of new surfaces and surface to be exposed in the emission test): –			
Confirmation: The signer herewith confirms the correctness of the data given above. The sample was selected, drawn and packed personally in accordance with the instructions for the taking of samples.			
Date of sampling: 9. 11. 2018	Signature: (Stamp) TECHNOLOG Wota Natalia Wota		

2. Test specimen

Dimension:	2 test specimens 281 mm x 200 mm; each test specimen consist of back to back storage of 2 specimens, with edges covered with low emission aluminium tape
Thickness:	24 mm (2 x 12 mm)
Area weight:	9007,0 g/m²
Date of preparation of test specimen:	14.01.2019 (cutting)

3. Chamber test

Chamber (volume/material):	0,225 m³ (stainless steel / glass)
Area of test specimen:	0,225 m²
Loading factor:	1,0 m²/m³ (required for wall materials)
Temperature:	23 °C (± 1 °C)
Relative humidity:	50 % (± 3 %)
Air exchange rate:	0,5 AC/h (± 0,05 AC/h)
Start of testing (placing of test specimen):	18.01.2019



test specimen in chamber

4. Analysis

Parameter:	VOC resp. Formaldehyde and other Aldehydes
Analytical laboratory:	VOC: Labor Friedle GmbH, Tegernheim bei Regensburg (DAkkS; D-PL-14646-03-00); Formaldehyde and other Aldehydes: MPA
Method:	GC-MS after adsorption on Tenax and thermodesorption with cryofocussing resp. HPLC-UV after chemisorption on DNPH-cartridge and elution with Acetonitrile
Sampling volume:	2 L resp. 50 L
First and second sampling:	after 3 and 28 days

5. Test results

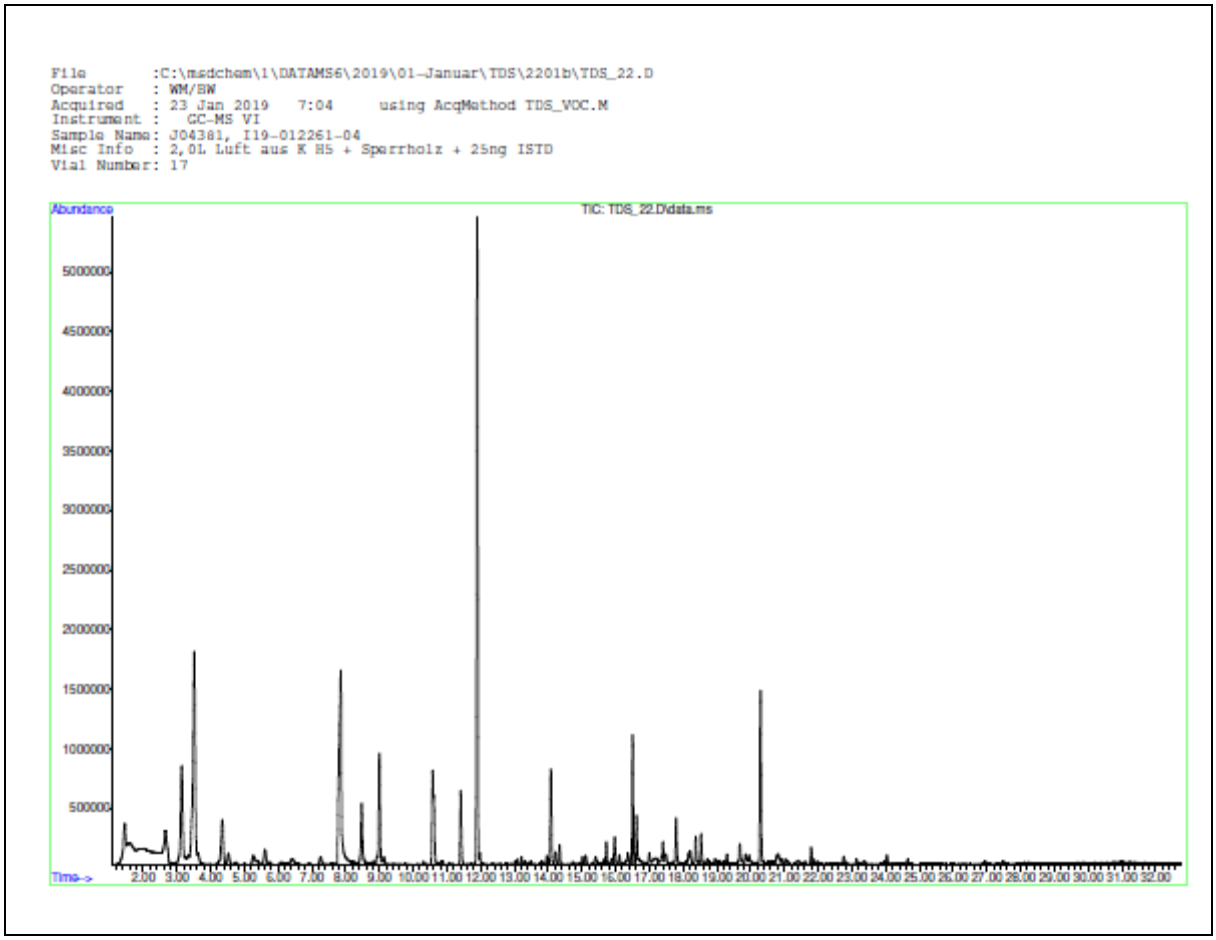
5.1. VOC/VVOC after 3 days

Compound	Retention range	CAS No.	C [µg/m³] *	C_tol [µg/m³] **	NIK ***	R-value ****
formaldehyde	VVOC	50-00-0	11	-	100	0,110
propanal*	VVOC	123-38-6	38	-	750	0,051
acetaldehyde	VVOC	75-07-0	62	-	1200	0,052
butanal	VOC	123-72-8	11	-	650	0,017
pentanal	VOC	110-62-3	44	-	800	0,055
hexanal	VOC	66-25-1	220	-	900	0,244
heptanal	VOC	111-71-7	3	-	900	0,003
octanal	VOC	124-13-0	1	-	900	0,001
pentane	VVOC	109-66-0	21	-	-	-
1-butanol	VOC	71-36-3	18	-	3000	0,006
1-pentanol	VOC	71-41-0	14	-	730	0,019
1-octene-3-ol	VOC	3391-86-4	1	-	-	-
toluene	VOC	108-88-3	1	-	2900	0,000
acetic acid	VOC	64-19-7	280	-	1200	0,233
propionic acid	VOC	79-09-4	4	-	1500	0,003
n-valeric acid	VOC	109-52-4	2	-	2100	0,001
n-caproic acid	VOC	142-62-1	14	-	2100	0,007
methyl acetate	VVOC	79-20-9	77	-	-	-
2-octenal	VOC	2548-87-0	-	5	18	0,278

* emission test chamber concentration of a specific VVOc, VOC or SVOC
** emission test chamber concentration as toluene equivalent
*** lowest concentration of interest acc. to AgBB 2018
**** ratio of concentration of compound / NIK

	Concentration after 3 days [µg/m³]	SER_a [µg/m²h] *
TVOC **	606	303
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	11	5,5

* specific emission rate related to area
** total volatile organic compounds (sum of concentrations of VOC)
*** total semi-volatile organic compounds (sum of concentrations of SVOC)



Chromatogram day 3

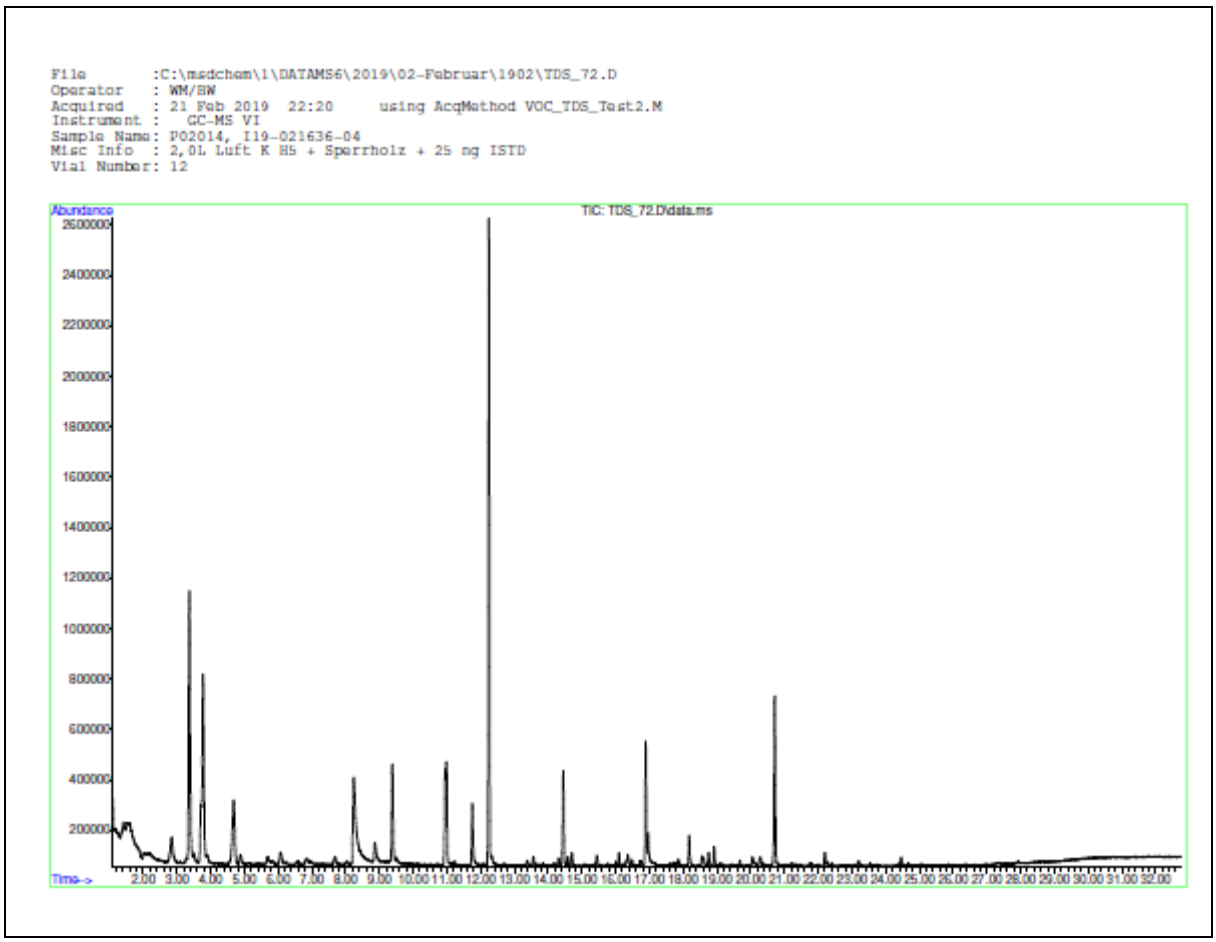
5.2. VOC/VVOC after 28 days

Compound	Retention range	CAS No.	C [µg/m³] *	C_tol [µg/m³] **	NIK ***	R-value ****
formaldehyde	VVOC	50-00-0	8	-	100	0,080
propanal*	VVOC	123-38-6	28	-	750	0,037
acetaldehyde	VVOC	75-07-0	47	-	1200	0,039
butanal	VOC	123-72-8	7	-	650	0,011
pentanal	VOC	110-62-3	38	-	800	0,048
hexanal	VOC	66-25-1	170	-	900	0,189
heptanal	VOC	111-71-7	2	-	900	0,002
pentane	VVOC	109-66-0	30	-	-	-
1-butanol	VOC	71-36-3	7	-	3000	0,002
1-pentanol	VOC	71-41-0	13	-	730	0,018
toluene	VOC	108-88-3	5	-	2900	0,002
acetic acid	VOC	64-19-7	270	-	1200	0,225
propionic acid	VOC	79-09-4	2	-	1500	0,001
n-valeric acid	VOC	109-52-4	3	-	2100	0,001
n-caproic acid	VOC	142-62-1	19	-	2100	0,009
methyl acetate	VVOC	79-20-9	57	-	-	-
acetone	VVOC	67-64-1	33	-	1200	0,028
2-octenal	VOC	2548-87-0	-	4	18	0,222

* emission test chamber concentration of a specific VVOc, VOC or SVOC
** emission test chamber concentration as toluene equivalent
*** lowest concentration of interest acc. to AgBB
**** ratio of concentration of compound / NIK

	Concentration after 28 days [µg/m³]	SER_a [µg/m²h] **
TVOC **	529	264
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	8	4

* specific emission rate related to area
** total volatile organic compounds (sum of concentrations of VOC)
*** total semi-volatile organic compounds (sum of concentrations of SVOC)



Chromatogram day 28

6. Assessment

6.1. Assessment according to German AgBB-scheme

The following requirements served as basis for testing and assessment:

- DIBt-guideline for health assessment of construction products used in interiors
- LCI (NIK) list of AgBB (Lowest concentration of interest; 2018)

Test parameter, general view of results, photos, emission data, chromatograms according to ADAM-evaluation form are given in the annex.
The emission results for 3 and 28 days sampling are shown below:

Parameter	Test results (**3 days**)	*AgBB-requirements*	AgBB-requirements fulfilled
TVOC	0,606 mg/m³	*≤ 10 mg/m³*	yes
Σ SVOC	<0,005 mg/m³	-	-
R	1,07	-	-
Σ VOC without LCI	<0,005 mg/m³	-	-
Σ Cancerogene	< 1 µg/m³	*≤ 10 µg/m³*	yes
Formaldehyde	0,011 mg/m³	-	-

Parameter	Test results (**28 days**)	*AgBB-requirements*	AgBB-requirements fulfilled
TVOC	0,529 mg/m³	*≤ 1 mg/m³*	yes
Σ SVOC	<0,005 mg/m³	*≤ 0,1 mg/m³*	yes
R	0,7	*≤ 1*	yes
Σ VOC without LCI	<0,005 mg/m³	*≤ 0,1 mg/m³*	yes
Σ Cancerogene	< 1 µg/m³	*≤ 1 µg/m³*	yes
Formaldehyde	0,008 mg/m³	*≤ 0,120 mg/m³*	yes

The tested product complies with the requirements of AgBB-scheme for emissions after 28 days in the chamber, at a loading 1 m²/m³. This corresponds to the required loading for construction products for walls and an air exchange rate of 0,5 h^{-1}.

6.2. Assessment according to French VOC-Regulation

The following requirements served as basis for testing and assessment:

- French mandatory labelling system – VOC-emission classes (acc. to Decree n°2011-321 of March 23, 2011 and order of April 19, 2011)

Compound / Parameter	Emission classes [µg/m³]			
	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-Trichlorobenzene	> 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
TVOC	> 2000	< 2000	< 1500	< 1000

The emission results for 28 day sampling are shown below:

Parameter	Analytical results (**28 days**) [µg/m³]	Emission class
Formaldehyde	8	A+
Acetaldehyde	47	A+
Toluene	5	A+
Tetrachloroethylene	<1	A+
Xylene	<1	A+
1,2,4-Trichlorobenzene	<1	A+
1,4-Dichlorobenzene	<1	A+
Ethylbenzene	<1	A+
2-Butoxyethanol	<1	A+
Styrene	<1	A+
TVOC*	210	A+

* $TVOC_{MS}$ as toluene equivalent

CMR substances (especially Trichlorebenzene, benzene, DEHP and DBP; listed in orders of April 30, 2009 and May 28, 2009) were not detectable.

The tested product complies with the requirements of French emission **class A+** regarding emission after 28 days in the chamber, tested as material for walls (loading 1 m²/m³).

NOTE: The test results refer exclusively to the material delivered for testing.

MPA Eberswalde
Materialprüfanstalt Brandenburg GmbH
- Holz und Holzschutz -

Eberswalde, 12.03.2019

Dr. P. Schumacher
(Head of Institute)

Dr. R. Wegner
(Head of Chemical testing)