



# Test Report

**Nr. 31/18/3448/01**  
**2 Ausfertigungen**

**MPA | Eberswalde**

Materialprüfanstalt  
Brandenburg GmbH

Prüfung, Überwachung,  
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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 products) 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: **Interior Hardwood Plywood**  
Samples received: 15.11.2018  
Persons in charge: B.Sc. J. Murr, Dr. R. Wegner  
Period of testing: 11/2018 – 1/2019

This test report comprises 7 pages and annex. It refers exclusively to the material submitted for testing and remains property of MPA until completion of full payment. The test material is being stored until 6/2019 and may be given back to the contractor at his expense. Publication of test reports is only permissible if published as a whole. Publication of excerpts, references to tests for purposes of advertising and the use of contents of test reports require in every single case the revocable written consent of MPA.

**1. Test material and sampling**

Product: **Interior Hardwood Plywood**

Sample: 3 panel segments a 500 mm x 500 mm x 15 mm  
Manufacturing date: 07.11.2018 (batch No.: 29047)

Sampling: 09.11.2018 by manufacturer (sampling report is shown below)

Packaging: wrapped in plastic foil

Storage conditions at : room temperature, light protected area

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

**EN 16516**

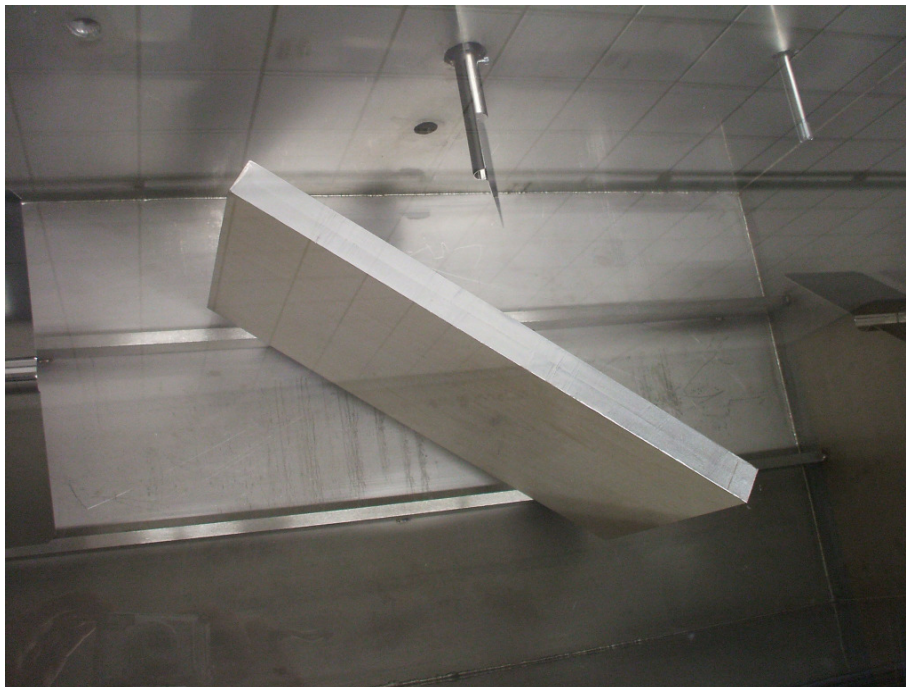
Testing laboratory / certification body: <i>MPA Eberswalde - VOC test</i>		Sampler (name, company, telephone): <i>Natalia Wota, Technologiest, Sklejka-Alco</i>	
Name of the manufacturer at the place of sampling (address/stamp): <i>SKLEJKA - EKO S.A. ul. Reymonta 35 (3a) 63-400 Ostrów Wlkp. Regon 250005943 NIP 622-00-05-391</i>		Manufacturer (if deviating from company's name at the place of sampling): —	
Name of the product: <i>INTERIOR HARDWOOD PLYWOOD</i>		Type of product (e.g. laminate, textile flooring, PVC-flooring): <i>PLYWOOD</i>	
Model/program/series: —		Batch No: <i>29047</i>	
Article No: —		Date of batch production: <i>07. 11. 2018</i>	
Sample is taken from <input checked="" type="checkbox"/> Production <input type="checkbox"/> Store <input type="checkbox"/> Miscellaneous		How had the product been stored prior to sampling? <input checked="" type="checkbox"/> open <input type="checkbox"/> in the stack <input type="checkbox"/> wrapped up	
Place of storage: <i>S1 B hall</i>		Packing material: <i>PVC</i>	
Specifics (possible negative influences by emission at the place of taking the sample, petrol emissions, solvent emissions from production, uncertainties, questions, etc.): <i>The forklifts drive on the hall</i>			
Cut edges (identification of cut edges when present and identification of new surfaces and surface to be exposed in the emission test): —			
<b>Confirmation:</b> 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: <i>9. 11. 2018</i>		Signature: (Stamp) <i>TECHNOLOG Wota Natalia Wota</i>	

## **2. Test specimen**

Dimension:	450 mm x 250 mm; back to back storage of 2 specimens, with edges covered with low emission aluminium tape
Thickness:	30 mm (2 x 15 mm)
Date of preparation of test specimen:	21.11.2018 (cutting)

## **3. Chamber test**

Chamber (volume/material):	0,225 m <sup>3</sup> (stainless steel / glass)
Area of test specimen:	0,225 m <sup>2</sup>
Loading factor:	1,0 m <sup>2</sup> /m <sup>3</sup> (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):	23.11.2018



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 [ $\mu\text{g}/\text{m}^3$ ] *	C <sub>tol</sub> [ $\mu\text{g}/\text{m}^3$ ] **	NIK ***	R-value ****
Formaldehyde	VVOC	50-00-0	64	-	100	0,640
Propanal*	VVOC	123-38-6	14	-	750	0,019
Acetaldehyde	VVOC	75-07-0	12	-	1200	0,010
Butanal	VOC	123-72-8	4	-	650	0,006
Pentanal	VOC	110-62-3	28	-	800	0,035
Hexanal	VOC	66-25-1	170	-	900	0,189
Heptanal	VOC	111-71-7	2	-	900	0,002
Nonanal	VOC	124-19-6	3	-	900	0,003
Decanal	VOC	112-31-2	1	-	900	0,001
Pentan	VVOC	109-66-0	12	-	-	-
n-Heptane	VOC	142-82-5	2	-	15000	0,000
3-Methylhexan	VOC	589-34-4	15	-	14000	0,001
Cyclohexane	VOC	110-82-7	4	-	6000	0,001
Pentanol (all isomers)	VOC	71-41-0	5	-	730	0,007
1-Octen-2-ol	VOC	3391-86-4	1	-	-	-
Acetic acid	VOC	64-19-7	290	-	1200	0,242
Propionic acid	VOC	79-09-4	3	-	1500	0,002
n-Valeric acid	VOC	109-52-4	2	-	2100	0,001
n-Caproic acid	VOC	142-62-1	24	-	2100	0,011
Methyl acetate	VVOC	79-20-9	2	-	-	-
Acetone	VVOC	67-64-1	13	-	1200	0,011
1-Hydroxyacetone	VOC	116-09-6	23	-	2100	0,011
2-Octenal	VOC	2548-87-0	-	7	18	0,389
Not identified VOC Cluster	VOC		-	58	-	-

\* 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

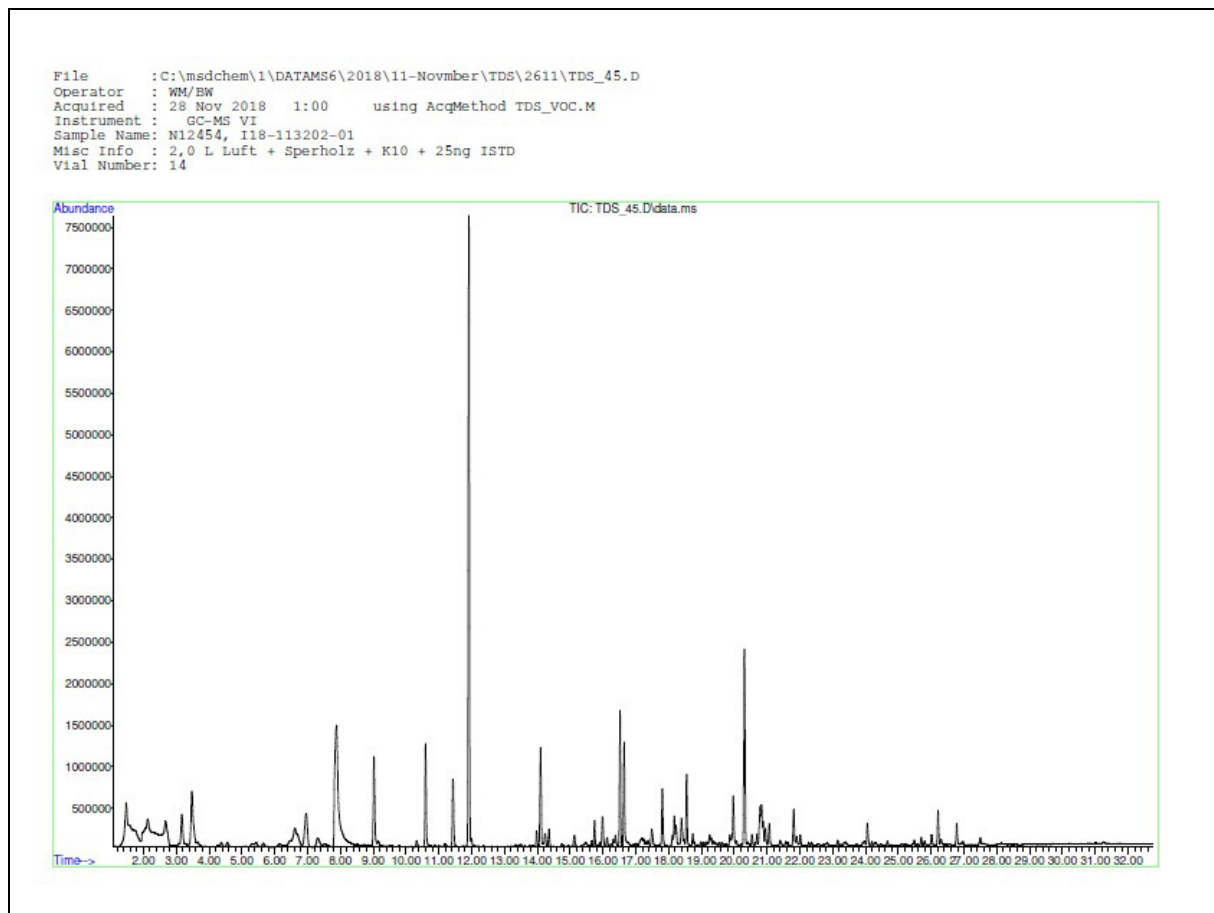
\*\*\*\* ratio of concentration of compound / NIK

	Concentration after 3 days [ $\mu\text{g}/\text{m}^3$ ]	SE <sub>a</sub> [ $\mu\text{g}/\text{m}^2\text{h}$ ] *
TVOC **	620	310
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	64	32

\* 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/m <sup>3</sup> ] <sup>*</sup>	C <sub>tol</sub> [µg/m <sup>3</sup> ] <sup>**</sup>	NIK <sup>***</sup>	R-value <sup>****</sup>
Formaldehyde	VVOC	50-00-0	37	-	100	0,370
Propanal*	VVOC	123-38-6	15	-	750	0,020
Acetaldehyde	VVOC	75-07-0	26	-	1200	0,022
Butanal	VOC	123-72-8	3	-	650	0,005
Pentanal	VOC	110-62-3	17	-	800	0,021
Hexanal	VOC	66-25-1	100	-	900	0,111
Heptanal	VOC	111-71-7	2	-	900	0,002
Pentan	VVOC	109-66-0	15	-	-	-
Pentanol (all isomers)	VOC	71-41-0	4	-	730	0,005
Acetic acid	VOC	64-19-7	57	-	1200	0,048
Propionic acid	VOC	79-09-4	2	-	1500	0,001
n-Valeric acid	VOC	109-52-4	5	-	2100	0,002
n-Caproic acid	VOC	142-62-1	51	-	2100	0,024
Methyl acetate	VVOC	79-20-9	1	-	-	-
Acetone	VVOC	67-64-1	8	-	1200	0,007
1-Hydroxyacetone	VOC	116-09-6	1	-	2100	0,000
2-Octenal	VOC	2548-87-0	-	4	18	0,222
Not identified VOC Cluster	VOC		-	7	-	-

\* 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

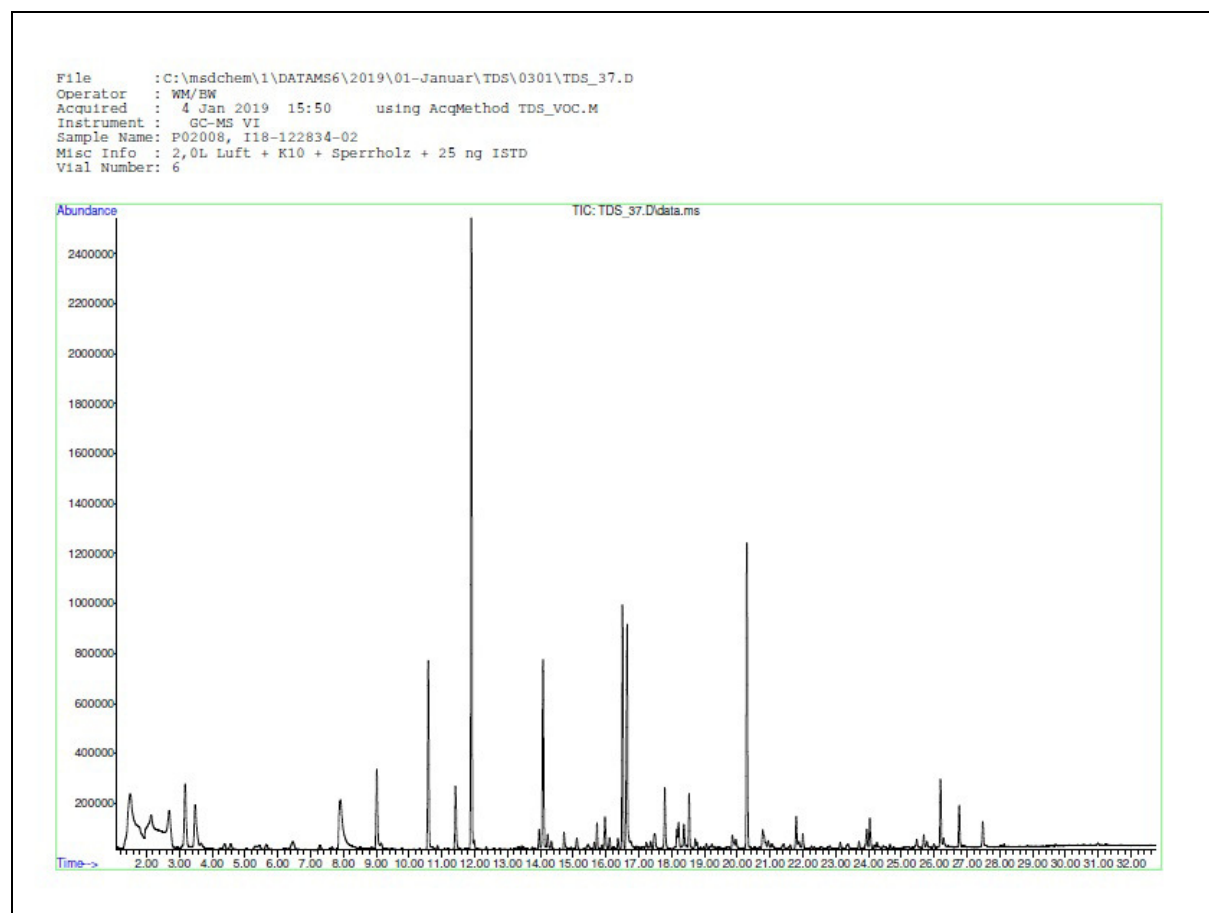
\*\*\*\* ratio of concentration of compound / NIK

	Concentration after 28 days [µg/m <sup>3</sup> ]	SER <sub>a</sub> [µg/m <sup>2</sup> h] <sup>**</sup>
TVOC **	237	118
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	37	18,5

\* 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 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	0,620 mg/m <sup>3</sup>	≤ 10 mg/m <sup>3</sup>	yes
Σ SVOC	<0,005 mg/m <sup>3</sup>	-	-
R	1,565	-	-
Σ VOC without LCI	0,058 mg/m <sup>3</sup>	-	-
Σ Cancerogene	< 1 µg/m <sup>3</sup>	≤ 10 µg/m <sup>3</sup>	yes
Formaldehyde	0,064 mg/m <sup>3</sup>	-	-

Parameter	Test results (28 days)	AgBB-requirements	AgBB-requirements fulfilled
TVOC	0,237 mg/m <sup>3</sup>	≤ 1 mg/m <sup>3</sup>	yes
Σ SVOC	<0,005 mg/m <sup>3</sup>	≤ 0,1 mg/m <sup>3</sup>	yes
R	0,625	≤ 1	yes
Σ VOC without LCI	0,007 mg/m <sup>3</sup>	≤ 0,1 mg/m <sup>3</sup>	yes
Σ Cancerogene	< 1 µg/m <sup>3</sup>	≤ 1 µg/m <sup>3</sup>	yes
Formaldehyde	0,037 mg/m <sup>3</sup>	≤ 0,120 mg/m <sup>3</sup>	yes

The tested product complies with the requirements of AgBB-scheme for emissions after 28 days in the chamber, at a loading 1 m<sup>2</sup>/m<sup>3</sup>. This corresponds to the required loading for construction products for walls and an air exchange rate of 0,5 h<sup>-1</sup>.

## 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/m <sup>3</sup> ]			
	<b>C</b>	<b>B</b>	<b>A</b>	<b>A+</b>
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/m <sup>3</sup> ]	Emission class
Formaldehyde	37	A
Acetaldehyde	26	A+
Toluene	<1	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*	220	A+

\* TVOC<sub>MS</sub> as toluene equivalent

\*\* Photos, emission data, chromatograms according ADAM-evaluation form are given in annex

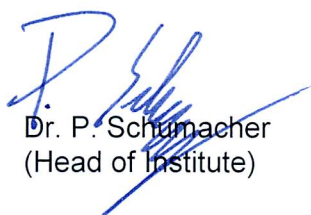
CMR substances (especially Trichlorebenzene, benzene, DEHP and DBP; listed in orders of April 30, 2009 and May 28, 2009) were not detectable.

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 m<sup>2</sup>/m<sup>3</sup>).

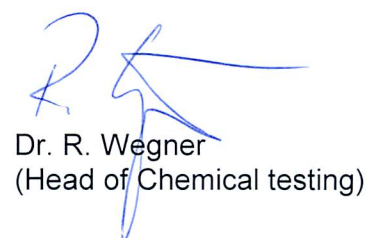
NOTE: The test results refer exclusively to the material delivered for testing.

**MPA Eberswalde**  
**Materialprüfanstalt Brandenburg GmbH**  
- Holz und Holzschutz -

Eberswalde, 28.01.2019

  
Dr. P. Schumacher  
(Head of Institute)



  
Dr. R. Wegner  
(Head of Chemical testing)