

Test Report

Nr. 31/18/3448/04
2 Ausfertigungen



MPA | Eberswalde

Materialprüfanstalt
Brandenburg GmbH

Prüfung, Überwachung,
Zertifizierung, Gutachten,
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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: **Exterior Softwood Plywood** (exterior pine plywood)

Samples received: 15.11.2018

Persons in charge: B.Sc. J. Murr, Dr. R. Wegner

Period of testing: 1-3/2019

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Sparkasse Schwandorf
Kto-Nr.: 100 164 862
BLZ: 750 510 40
IBAN: DE55 7505 1040 0100 1648 62
BIC-/SWIFT: BYLADEM1SAD
USt.-Id. DE814335485
Finanzamt Eberswalde



Die Akkreditierung gilt nur für die in der Urkunde aufgeführten Verfahren.



vom DIBt anerkannte
PUZ-Stelle BRA02



EC notified 0763



CARB notified TPC 18

1. Test material and sampling

Product: **Exterior Softwood Plywood** (exterior pine plywood)

Sample: 3 panel segments a 500 mm x 500 mm x 12 mm
Manufacturing date: 29.10.2018 (batch No.: 28576)

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, sulejka-Eko	
Name of the manufacturer at the place of sampling (address/stamp): EKO S.A. ul. Reymonta 35 (3a) 63-400 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 SOFTWOOD PLYWOOD (exterior pine plywood)		Type of product (e.g. laminate, textile flooring, PVC-flooring): PLYWOOD	
Model/program/series: —		Batch No.: 28576	
Article No: —		Date of batch production: 29.10.2018	
Misc.: —		—	
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: S1B 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} move 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:	8091,8 g/m ²
Date of preparation of test specimen:	14.01.2019 (cutting)

3. Chamber test

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

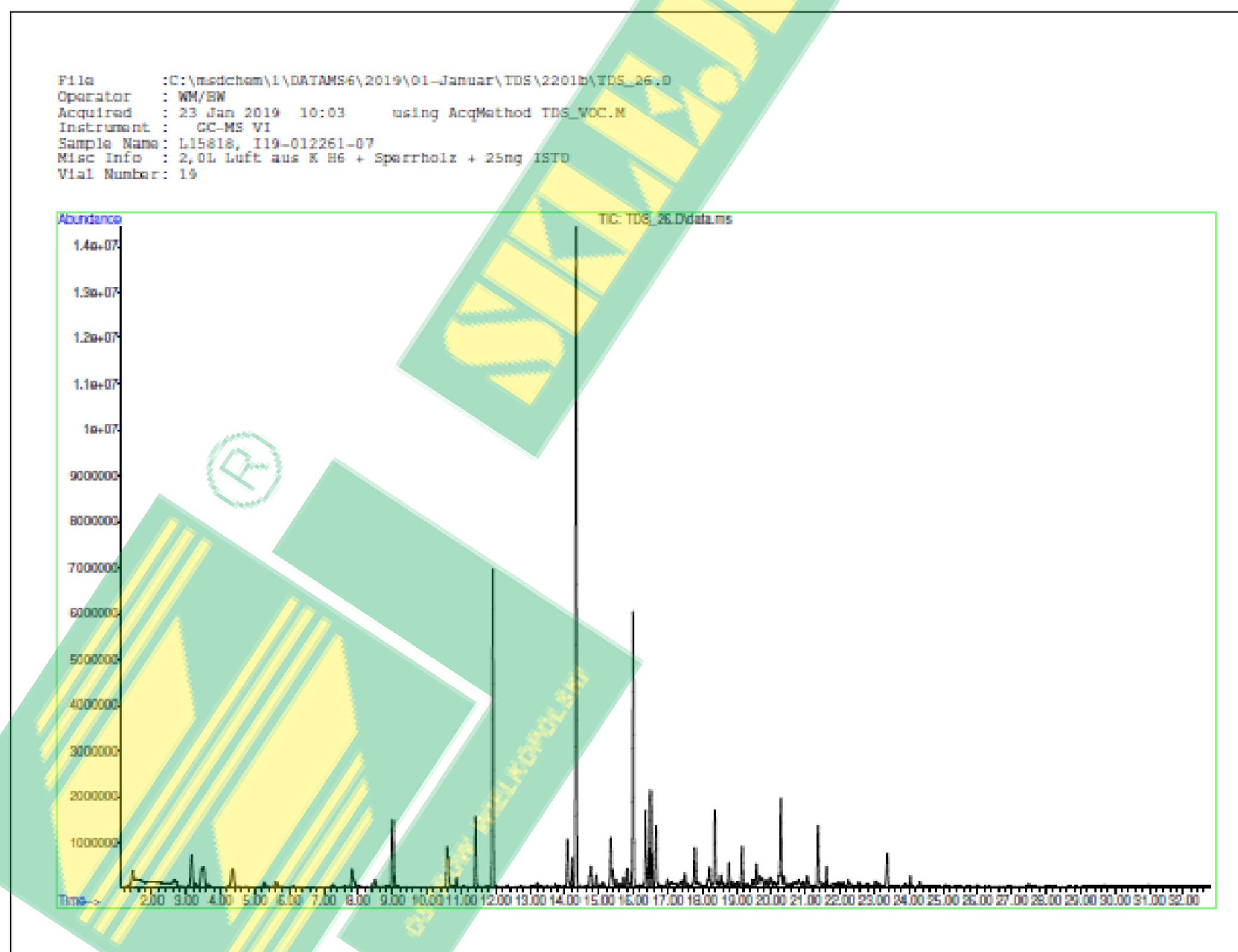
Compound	Retention range	CAS No.	C [µg/m ³] [*]	C_tol [µg/m ³] ^{**}	NIK ^{***}	R-value ^{****}
formaldehyde	VVOC	50-00-0	20	-	100	0,200
propanal*	VVOC	123-38-6	17	-	750	0,023
acetaldehyde	VVOC	75-07-0	55	-	1200	0,046
butanal	VOC	123-72-8	17	-	650	0,026
pentanal	VOC	110-62-3	67	-	800	0,084
hexanal	VOC	66-25-1	270	-	900	0,300
heptanal	VOC	111-71-7	25	-	900	0,028
octanal	VOC	124-13-0	33	-	900	0,037
nonanal	VOC	124-19-6	25	-	900	0,028
pentane	VVOC	109-66-0	6	-	-	-
n-heptane	VOC	142-82-5	4	-	15000	0,000
octane	VOC	111-65-9	4	-	14000	0,000
1-pentanol	VOC	71-41-0	36	-	730	0,049
1-octene-3-ol	VOC	3391-86-4	2	-	-	-
1-heptanol	VOC	111-70-6	7	-	-	-
toluene	VOC	108-88-3	2	-	2900	0,001
1-isopropyl-4-methylbenzene (p-cymene)	VOC	99-87-6	11	-	1000	0,011
acetic acid	VOC	64-19-7	30	-	1200	0,025
propionic acid	VOC	79-09-4	2	-	1500	0,001
butyric acid	VOC	107-92-6	1	-	1800	0,001
n-valeric acid	VOC	109-52-4	8	-	2100	0,004
n-caproic acid	VOC	142-62-1	47	-	2100	0,022
n-heptanoic acid	VOC	111-14-8	2	-	2100	0,001
n-octanoic acid	VOC	124-07-2	12	-	2100	0,006
methyl acetate	VVOC	79-20-9	16	-	-	-
2-heptanone	VOC	110-43-0	6	-	-	-
phenol	VOC	108-95-2	2	-	70	0,029
α-pinene	VOC	80-56-8	190	-	2500	0,076
beta-pinene	VOC	127-91-3	5	-	1400	0,004
myrcene	VOC	123-35-3	2	-	1400	0,001
camphene	VOC	79-92-5	5	-	1400	0,004

3-carene	VOC	498-15-7	80	-	1500	0,053
limonene	VOC	138-86-3	2	-	5000	0,000
verbenon	VOC	1196-01-6	20	-	1400	0,014
2-octenal	VOC	2548-87-0	-	12	18	0,667
Not identified VOC Cluster	VOC		-	84	-	-

- * 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 _{Ra} [$\mu\text{g}/\text{m}^2\text{h}$] *
TVOC **	906	453
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	20	10

- * 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)



5.2. VOC/VVOC after 28 days

Compound	Retention range	CAS No.	C [$\mu\text{g}/\text{m}^3$] [*]	C_tol [$\mu\text{g}/\text{m}^3$] ^{**}	NIK ^{***}	R-value ^{****}
formaldehyde	VVOC	50-00-0	10	-	100	0,100
propanal*	VVOC	123-38-6	10	-	750	0,013
acetaldehyde	VVOC	75-07-0	33	-	1200	0,028
butanal	VOC	123-72-8	9	-	650	0,014
pentanal	VOC	110-62-3	49	-	800	0,061
hexanal	VOC	66-25-1	240	-	900	0,267
heptanal	VOC	111-71-7	15	-	900	0,017
octanal	VOC	124-13-0	17	-	900	0,019
nonanal	VOC	124-19-6	13	-	900	0,014
pentane	VVOC	109-66-0	17	-	-	-
n-heptane	VOC	142-82-5	3	-	15000	0,000
octane	VOC	111-65-9	4	-	14000	0,000
2-propanol	VVOC	67-63-0	3	-	-	-
1-pentanol	VOC	71-41-0	26	-	730	0,036
toluene	VOC	108-88-3	6	-	2900	0,002
1-isopropyl-4-methylbenzene (p-cymene)	VOC	99-87-6	6	-	1000	0,006
n-valeric acid	VOC	109-52-4	9	-	2100	0,004
n-caproic acid	VOC	142-62-1	51	-	2100	0,024
n-octanoic acid	VOC	124-07-2	4	-	2100	0,002
methyl acetate	VVOC	79-20-9	18	-	-	-
acetone	VVOC	67-64-1	60	-	1200	0,050
2-heptanone	VOC	110-43-0	4	-	-	-
phenol	VOC	108-95-2	2	-	70	0,029
α -pinene	VOC	80-56-8	140	-	2500	0,056
beta-pinene	VOC	127-91-3	2	-	1400	0,001
camphene	VOC	79-92-5	3	-	1400	0,002
3-carene	VOC	498-15-7	55	-	1500	0,037
limonene	VOC	138-86-3	0	-	5000	0,000
verbenon	VOC	1196-01-6	10	-	1400	0,007
2-octenal	VOC	2548-87-0	-	5	18	0,278
Not identified VOC Cluster	VOC		-	38	-	-

* 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

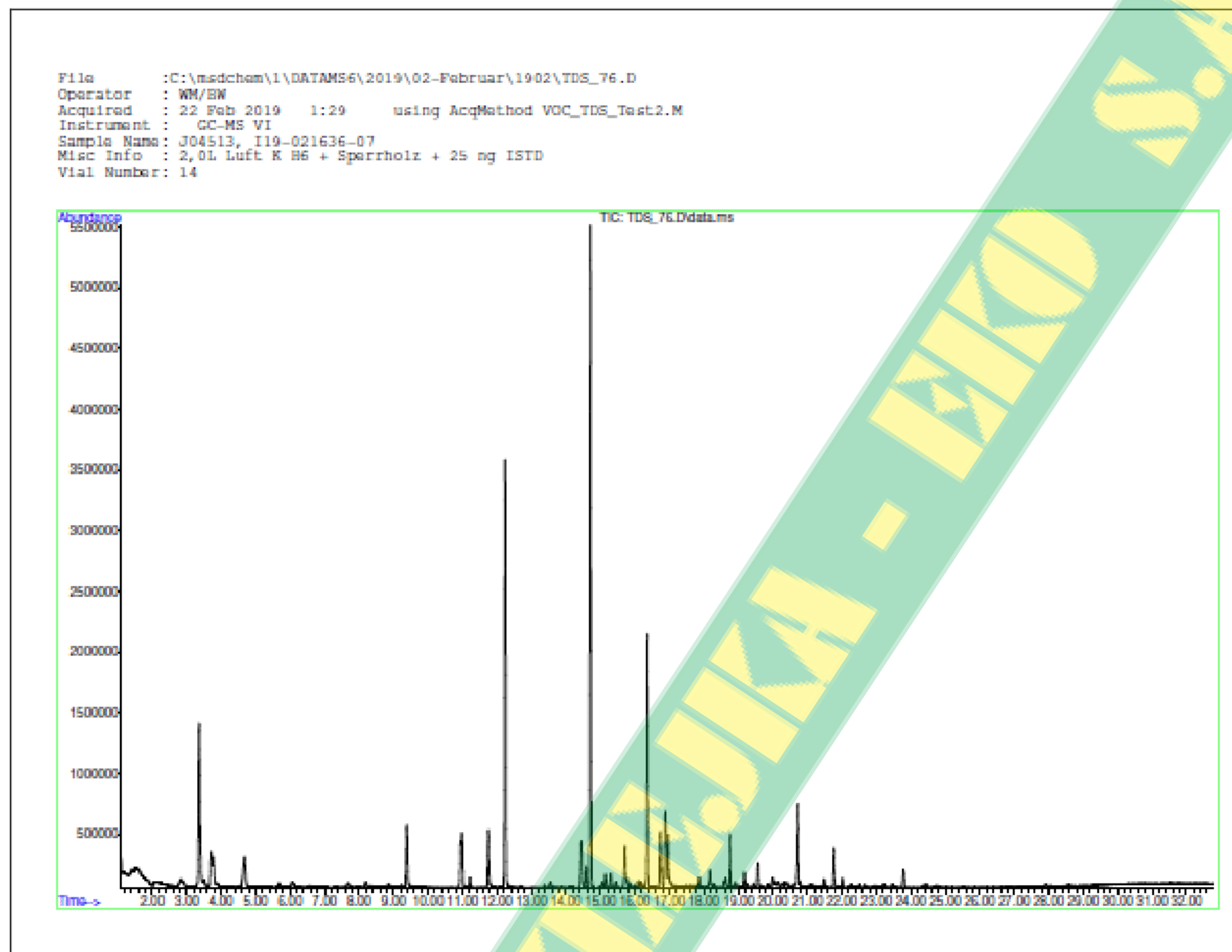
**** ratio of concentration of compound / NIK

	Concentration after 28 days [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$] ^{**}
TVOC ^{**}	651	326
TSVOC ^{***}	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	10	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	0,906 mg/m ³	≤ 10 mg/m ³	yes
Σ SVOC	<0,005 mg/m ³	-	-
R	1,7	-	-
Σ VOC without LCI	0,097 mg/m ³	-	-
Σ Cancerogene	< 1 µg/m ³	≤ 10 µg/m ³	yes
Formaldehyde	0,020 mg/m ³	-	-

Parameter	Test results (28 days)	AgBB-requirements	AgBB-requirements fulfilled
TVOC	0,651 mg/m ³	≤ 1 mg/m ³	yes
Σ SVOC	<0,005 mg/m ³	≤ 0,1 mg/m ³	yes
R	1	≤ 1	yes
Σ VOC without LCI	0,038 mg/m ³	≤ 0,1 mg/m ³	yes
Σ Cancerogene	< 1 µg/m ³	≤ 1 µg/m ³	yes
Formaldehyde	0,010 mg/m ³	≤ 0,120 mg/m ³	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/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-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 ³]	Emission class
Formaldehyde	10	A
Acetaldehyde	33	A+
Toluene	6	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*	600	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


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