

Test Report

Nr. 31/18/3448/02
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 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 Softwood Plywood** (interior pine plywood)

Samples received: 15.11.2018

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

Period of testing: 1-3/2019

This test report comprises 9 pages. 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.

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.



Deutsche
Akkreditierungsstelle
D-PL-11241-01-00



vom DIBt anerkannte
PUZ-Stelle BRA02



EC notified 0763



CARB notified TPC 18

1. Test material and sampling

Product: **Interior Softwood Plywood** (interior pine plywood)
 Sample: 3 panel segments a 500 mm x 500 mm x 9 mm
 Manufacturing date: 05.11.2018 (batch No.: 28903)
 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

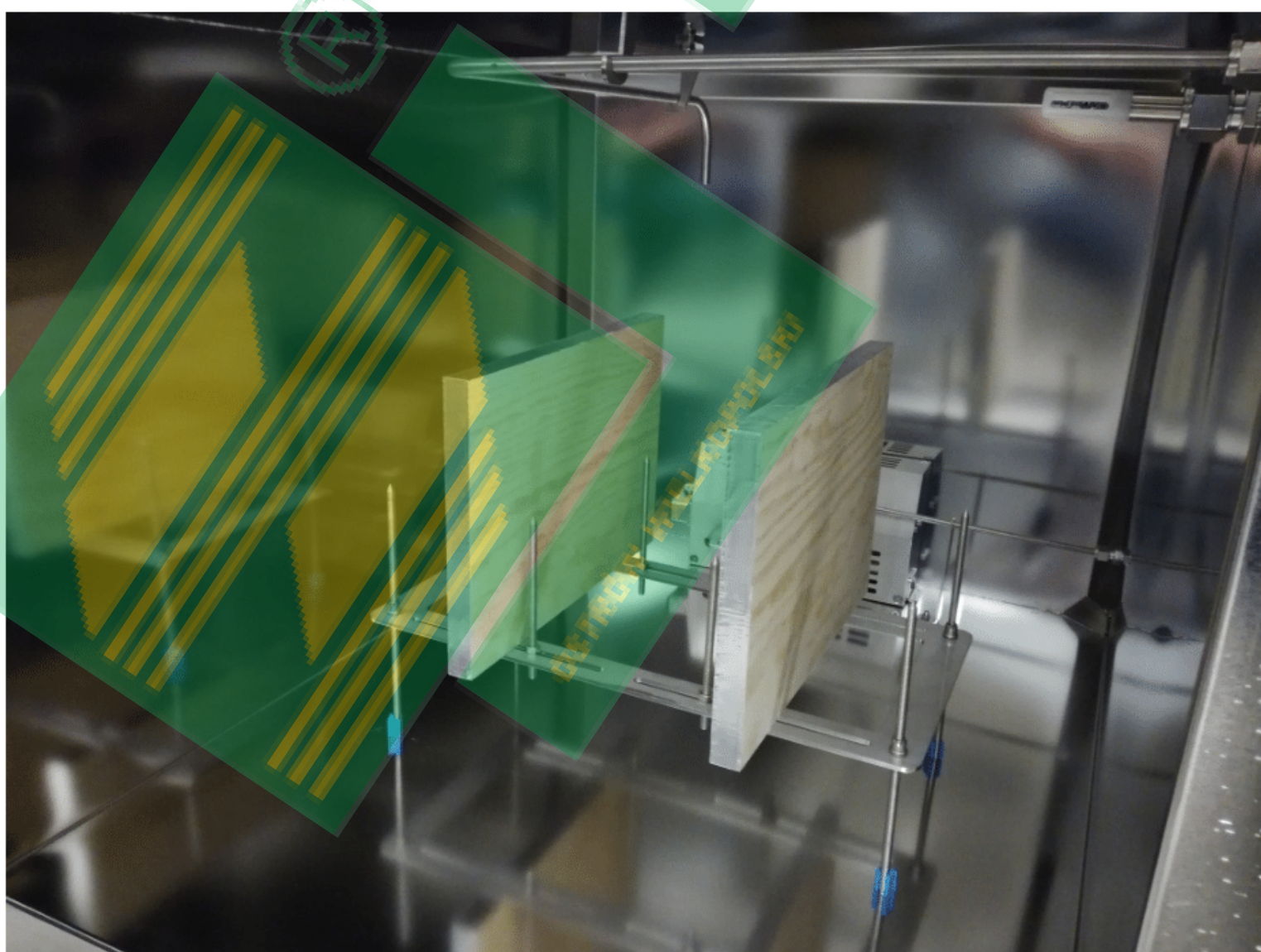
Testing laboratory / certification body: MPA Eberswalde - VOC test		Sampler (name, company, telephone): Natalia Wota, Technolog, Sulejka-Geo	
Name of the manufacturer at the place of sampling (address/stamp): KO S.A. ul. Reymonta 35 (3e) 63-400 Ostrow Wlkp. Regon 250005943 NIP 672-00-00-391		Manufacturer (if deviating from company's name at the place of sampling): -	
Name of the product: INTERIOR SOFTWOOD PLYWOOD (interior pine plywood)		Type of product (e.g. laminate, textile flooring, PVC-flooring): PLYWOOD	
Model/program/series: -		Batch No: 28903	
Article No: -		Date of batch production: 05.11.2018	
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 hell		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 hell			
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:	18 mm (2 x 9 mm)
Area weight:	5765,0 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	66	-	100	0,660
propanal*	VVOC	123-38-6	20	-	750	0,027
acetaldehyde	VVOC	75-07-0	68	-	1200	0,057
butanal	VOC	123-72-8	12	-	650	0,018
pentanal	VOC	110-62-3	66	-	800	0,083
hexanal	VOC	66-25-1	320	-	900	0,356
heptanal	VOC	111-71-7	8	-	900	0,009
furfural	VOC	98-01-1	3	-	10	0,300
octanal	VOC	124-13-0	7	-	900	0,008
nonanal	VOC	124-19-6	4	-	900	0,004
pentane	VVOC	109-66-0	100	-	-	-
n-heptane	VOC	142-82-5	9	-	15000	0,001
octane	VOC	111-65-9	9	-	14000	0,001
2-propanol	VVOC	67-63-0	1	-	-	-
1-pentanol	VOC	71-41-0	17	-	730	0,023
1-octene-3-ol	VOC	3391-86-4	5	-	-	-
1-heptanol	VOC	111-70-6	1	-	-	-
toluene	VOC	108-88-3	2	-	2900	0,001
1-isopropyl-3-methylbenzene (m-cymene)	VOC	535-77-3	1	-	1000	0,001
1-isopropyl-4-methylbenzene (p-cymene)	VOC	99-87-6	14	-	1000	0,014
acetic acid	VOC	64-19-7	180	-	1200	0,150
propionic acid	VOC	79-09-4	6	-	1500	0,004
isobutyric acid	VOC	79-31-2	6	-	1800	0,003
n-valeric acid	VOC	109-52-4	9	-	2100	0,004
n-caproic acid	VOC	142-62-1	83	-	2100	0,040
methyl acetate	VVOC	79-20-9	3	-	-	-
acetone	VVOC	67-64-1	11	-	1200	0,009
acetophenone	VOC	98-86-2	4	-	490	0,008
phenol	VOC	108-95-2	2	-	70	0,029

α -pinene	VOC	80-56-8	150	-	2500	0,060
beta-pinene	VOC	127-91-3	60	-	1400	0,043
myrcene	VOC	123-35-3	3	-	1400	0,002
camphene	VOC	79-92-5	4	-	1400	0,003
3-carene	VOC	498-15-7	170	-	1500	0,113
limonene	VOC	138-86-3	6	-	5000	0,001
verbenon	VOC	1196-01-6	3	-	1400	0,002
2-octenal	VOC	2548-87-0	-	14	18	0,778
Not identified VOC Cluster	VOC		-	130	-	-

* 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

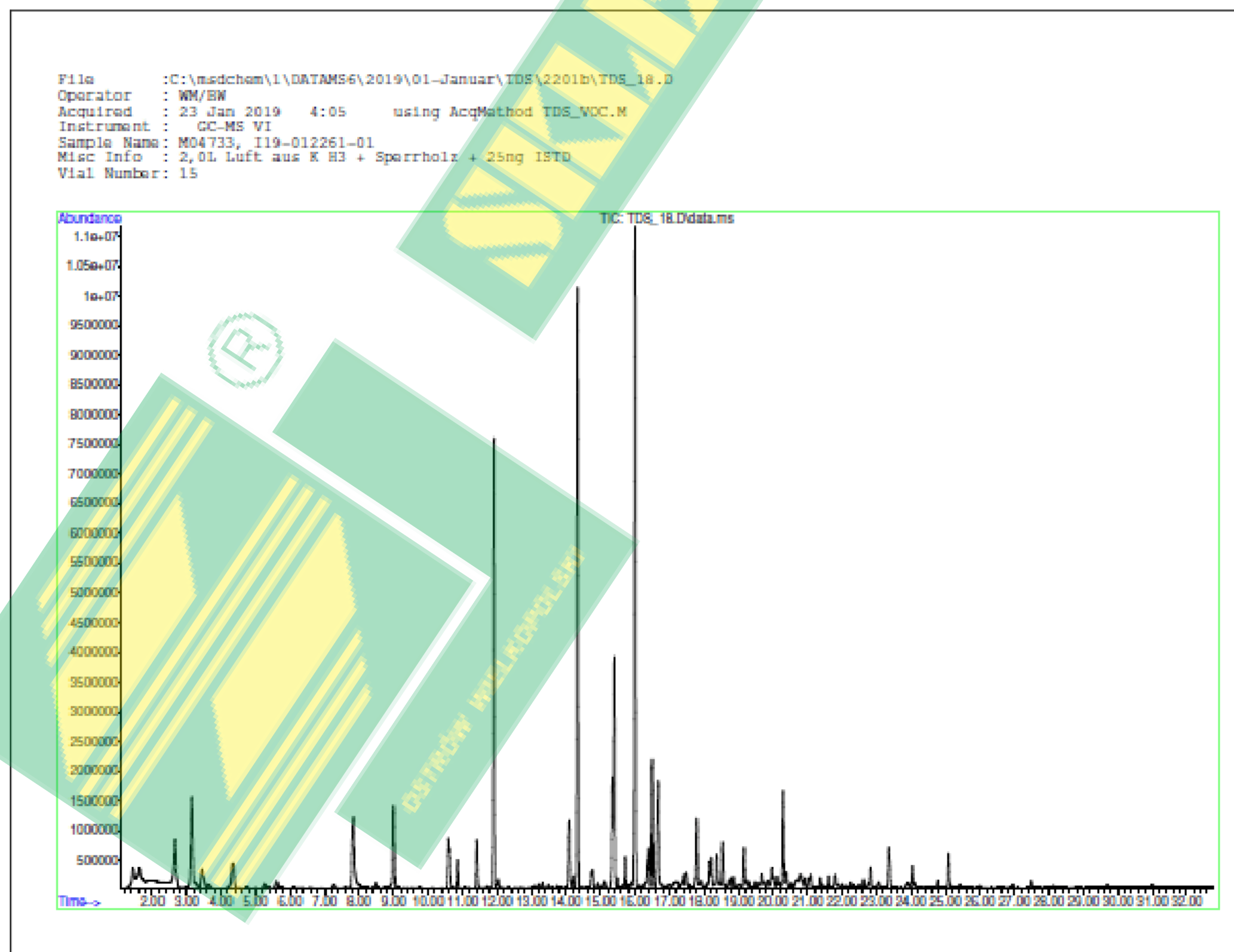
**** ratio of concentration of compound / NIK

	Concentration after 3 days [$\mu\text{g}/\text{m}^3$]	SER _a [$\mu\text{g}/\text{m}^2\text{h}$] *
TVOC **	1281	640
TSVOC ***	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	66	33

* 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 ³] [*]	C_tol [µg/m ³] ^{**}	NIK ^{***}	R-value ^{****}
formaldehyde	VVOC	50-00-0	31	-	100	0,310
propanal*	VVOC	123-38-6	15	-	750	0,020
acetaldehyde	VVOC	75-07-0	46	-	1200	0,038
butanal	VOC	123-72-8	7	-	650	0,011
pentanal	VOC	110-62-3	49	-	800	0,061
hexanal	VOC	66-25-1	320	-	900	0,356
heptanal	VOC	111-71-7	6	-	900	0,007
furfural	VOC	98-01-1	1	-	10	0,100
octanal	VOC	124-13-0	5	-	900	0,006
nonanal	VOC	124-19-6	2	-	900	0,002
pentane	VVOC	109-66-0	130	-	-	-
n-heptane	VOC	142-82-5	12	-	15000	0,001
octane	VOC	111-65-9	9	-	14000	0,001
1-pentanol	VOC	71-41-0	11	-	730	0,015
1-octene-3-ol	VOC	3391-86-4	3	-	-	-
toluene	VOC	108-88-3	4	-	2900	0,001
1-isopropyl-4-methylbenzene (p-cymene)	VOC	99-87-6	5	-	1000	0,005
acetic acid	VOC	64-19-7	59	-	1200	0,049
propionic acid	VOC	79-09-4	6	-	1500	0,004
isobutyric acid	VOC	79-31-2	3	-	1800	0,002
butyric acid	VOC	107-92-6	1	-	1800	0,001
n-valeric acid	VOC	109-52-4	10	-	2100	0,005
n-caproic acid	VOC	142-62-1	99	-	2100	0,047
methyl acetate	VVOC	79-20-9	4	-	-	-
acetone	VVOC	67-64-1	60	-	1200	0,050
2-heptanone	VOC	110-43-0	2	-	-	-
acetophenone	VOC	98-86-2	2	-	490	0,004
phenol	VOC	108-95-2	1	-	70	0,014
α-pinene	VOC	80-56-8	48	-	2500	0,019
beta-pinene	VOC	127-91-3	15	-	1400	0,011
camphene	VOC	79-92-5	1	-	1400	0,001
3-carene	VOC	498-15-7	42	-	1500	0,028
2-octenal	VOC	2548-87-0	-	13	18	0,722
Not identified VOC Cluster	VOC		-	44	-	-

* 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

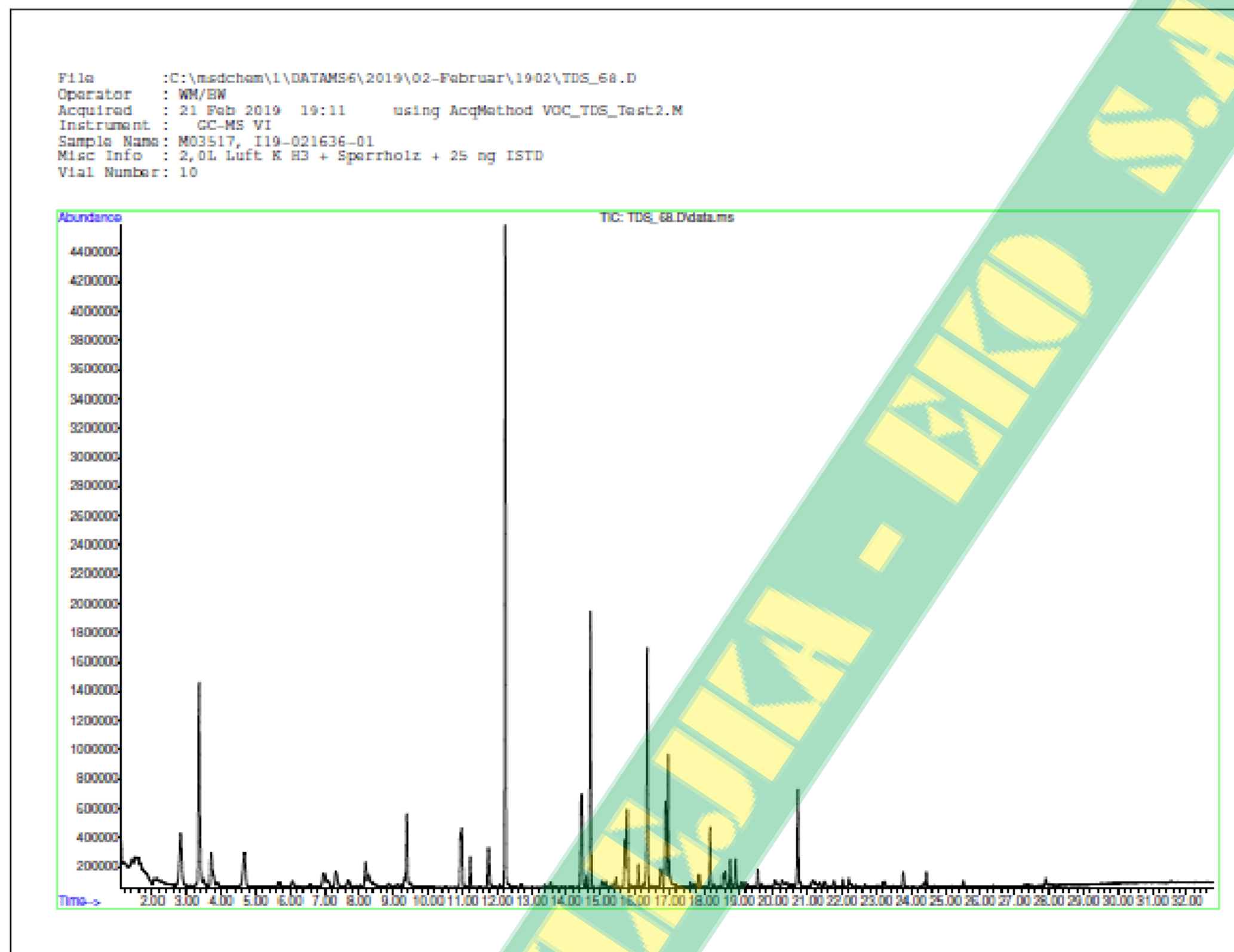
**** ratio of concentration of compound / NIK

	Concentration after 28 days [µg/m ³]	SER _a [µg/m ² h] ^{**}
TVOC ^{**}	716	358
TSVOC ^{***}	< 5	< 2,5
Volatile carcinogens of act. CARC 1A and CARC 1B	< 1	< 0,5
Formaldehyde	31	15,5

* 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	1,281 mg/m ³	≤ 10 mg/m ³	yes
Σ SVOC	<0,005 mg/m ³	-	-
R	2,5	-	-
Σ VOC without LCI	0,135 mg/m ³	-	-
Σ Cancerogene	< 1 µg/m ³	≤ 10 µg/m ³	yes
Formaldehyde	0,066 mg/m ³	-	-

Parameter	Test results (28 days)	AgBB-requirements	AgBB-requirements fulfilled
TVOC	0,716 mg/m ³	≤ 1 mg/m ³	yes
Σ SVOC	<0,005 mg/m ³	≤ 0,1 mg/m ³	yes
R	1,8	≤ 1	no
Σ VOC without LCI	0,044 mg/m ³	≤ 0,1 mg/m ³	yes
Σ Cancerogene	< 1 µg/m ³	≤ 1 µg/m ³	yes
Formaldehyde	0,031 mg/m ³	≤ 0,120 mg/m ³	yes

The tested product complies not 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. After 28 days the tested product failed the AgBB requirements for R-value.

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/m³]	Emission class
Formaldehyde	31	A
Acetaldehyde	46	A+
Toluene	4	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*	560	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)