Fraunhofer
WKI

Fraunhofer Institut für Holzforschung
Wilhelm-Klauditz-Institut WKI

Institutsleiter
Prof. Dr. -Ing. Bohumil Kasal

Bienroder Weg 54 E
38108 Braunschweig | Germany

Anette Ligarski

Materialanalytik & Innenluftchemie
Phone + 49 531 2155-359 | Fax + 49 531 2155-905
sample_info@wki.fraunhofer.de
www.wki.fraunhofer.de

Fraunhofer WKI | Bienroder Weg 54 E | 38108 Braunschweig

Berkvens B.V.
Attn: Herr Joost Baerselmann
Kanaaldijk Noord 24

Postbus 2
5710 AA Someren
Niederlande - Netherlands

Braunschweig, 19.12.2022

Test report No. MAIC-2022-3319

Customer: Berkvens B.V., Someren.

Objective of the test: Testing and evaluation of a door sample according to the Blue Angel criteria for "Low-emission floor coverings, panels and doors of interiors made of wood and wood-based materials" (DE-UZ 176).

Contents:

This report comprises 10 pages.

Summary

The Fraunhofer WKI Braunschweig, Department Material Analysis and Indoor Chemistry, was commissioned by Berkvens B.V. with the emission testing of a door sample (HPL Flax). The tests were carried out according to the Blue Angel basic award criteria for "Low-emission floor coverings, panels and doors of interiors made of wood and wood-based materials"- DE-UZ 176, (edition January 2013, ver. 7) in consideration of the AgBB evaluation scheme 2021, LCI List 2020. The test results are summarized in the table below.

Detailed results of the emission test can be found in the annex (Table 1).

Evaluation of the results of sample P95575 (HPL Flax) according to the Blue Angel criteria DE-UZ 176.

Parameter	3rd day		28th day	
	Measured values	Requirements	Measured valus (after 7 days)	Requirements
TVOC [mg/m³]	0.091	≤ 3	0.084	≤ 0.3
TSVOC [mg/m³]	< 0.005	-	< 0.005	≤ 0.1
Carcinogenic substances [µg/m³]	< 1	≤ 10 (total)	< 1	≤ 1 (per single value)
Sum VOC without LCI [mg/m³]	< 0.005	-	< 0.005	≤ 0.1
R-value	0.225	-	0.199	≤ 1
Formaldehyde [ppm]	0.012 (15 µg/m³)	-	0.011 (13 µg/m³)	≤ 0.05
Requirements acc. to DE-UZ 176 fulfilled? (Edition January 2013, Ver. 7)		☒ Yes ☐ No		☒ Yes ☐ No

The boundary conditions selected as part of the emission test corresponded to the test specifications for doors according to the Blue Angel basic award criteria.

The tested sample material met the requirements for "Low-emission floor coverings, panels and doors of interiors made of wood and wood-based materials"- DE-UZ 176 (edition January 2013, ver. 7).

The break off criteria after 7 days were tested and could be applied.

Summarized results of the evaluation acc. AgBB scheme for sample P95574 (HPL Flax)

Parameter	3rd day Measured values	3rd day Requirements	28th day Measured values (after 7 days)	28th day Requirements
TVOC [mg/m³]	0.091	≤ 10	0.084	≤ 1.0
TSVOC [mg/m³]	< 0.005	-	< 0.005	≤ 0.1
Carcinogenic substances [mg/m³]	< 0.001	≤ 0.01	< 0.001	≤ 0.001
VOC without LCI [mg/m³]	< 0.005	-	< 0.005	≤ 0.1
R-value	0.225	-	0.199	≤ 1
Reguirements acc. to AgBB scheme fulfilled? (Version June 2021, LCI list 2020)		☒ Yes ☐ No		☒ Yes ☐ No

The tested sample material met the requirements of the AgBB scheme "Health-related evaluation for Volatile Organic Compound Emissions from Building Products (AgBB scheme 2021, LCI list 2020)".

Table 1. Results of the emission test of sample Probe P95575 (HPL Flax).

RT	CAS-No.	Substance	Concentration in µg/m³ after		Ri-value after		LCI-list 2020		
			3d	7d	3d	7d	Info[6]	No.	Value
	analysis acc. DIN ISO 16000-3								
	000050-00-0	Formaldehyde	15	13	0.150	0.130	<C6bag	7-22	100
	000075-07-0	Acetaldehyde	3	3			<C6bdg	7-20	300
	000107-02-8	Acrolein	< 2	< 2			<C6bad	7-23	14
	000123-38-6	Propanal	< 2	< 2			<C6bd	7-21	650
	000123-72-8	Butanal	< 2	< 2			<C6bd	7-1	650
	000067-64-1	Acetone	7	8	0.000	0.000	<C6b	8-10	120000
	analysis acc. DIN ISO 16000-6								
7.01	000064-19-7	Acetic acid	58	53	0.048	0.044	bd	9-1	1200
14.75	000108-88-3	Toluene	2	2			bdhp	1-1	2900
16.74	000066-25-1	n-Hexanal	7	6	0.008	0.007	bd	7-3	900
18.41	000098-01-1	2-Furaldehyde	1	1			abd	7-17	10
23.56	000080-56-8	alpha-Pinene	3	2			bdf	3-2	2500
33.74		Terpene $_{(Toluene)}$	3	2			b	3-5	1400
37.93		Terpene $_{(Toluene)}$	11	11	0.008	0.008	b	3-5	1400
40.01		Terpene $_{(Toluene)}$	15	14	0.011	0.010	b	3-5	1400
Sum of VVOC (< C6)[1]:			< 5	< 5					
Sum of VOC (C6-C16) as TVOC $_{original\ response}$*[1,2]:			91	84					
Sum of VOC (C6-C16) as TVOC $_{Toluene}$ according to DIN EN 16516[1,3]:			38	33					
Sum of VOC (C6-C16) as TVOC $_{Toluene}$ according to DIN EN ISO 16000-6[4]:			49	43					
Sum of SVOC (> C16)[1]:			< 5	< 5					
Sum of VOC without LCI[1]:			< 5	< 5					
Sum of carcinogen[5] :			< 1	< 1					
R-value (sum of Ri-values, dimensionless)					0.225	0.199			

(The fragments/substances shown in subscript were used for the quantification)

[1]Limit value of consideration is 5 µg/m³

[2]LCI-substances were quantified with the original response and non-LCI substances were quantified with toluene.

[3]Sum of TVOC $_{original\ response}$ quantified with toluene

[4]Sum of all measured VOC quantified with toluene

[5]Sum of carcinogenic substances acc. to AgBB-scheme

[6]Additional information: **a** acute toxic substance cat. 1+2+3 (acc. UN-GHS/CLP); **b** German LCI list; **c** safe sampling volume too low, under-estimation likely;

d odor relevant; **e** compound boiling point exceeds thermal limit of the TDS unit – underestimation likely; f terpene, possibly wood-related;
g chronic toxic substance CMR cat. 1A+1B (acc. UN-GHS/CLP); **h** aromatic substance; **i** chlorinated substance;
l specific target organ toxic substance STOT RE1+SE1 (acc. UN-GHS/CLP); **p** listed in Proposition 65; **<C6** VVOC compound; **>C16** SVOC compound.