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Test report No. MAIC-2022-3326

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:	1. Summary	Page 2
	2. Sample description	Page 4
	3. Methods	Page 4
	4. Parameters of the chamber emission tests	Page 5
	5. Annex	Page 7

This report comprises 10 pages.

The test report may be made available or duplicated only in its unabridged form. Publication in excerpt form is subject to the written consent of the Fraunhofer Institute for Wood Research – Wilhelm-Klauditz-Institut (WKI). The test results refer solely to the objects tested. The tested material was used up.

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 (wtd 54mm 60+). 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 P95582 (wtd 54mm 60+) according to the Blue Angel criteria DE-UZ 176.

Parameter	Measured values	3 rd day	Measured values (after 7 days)	28 th day
		Requirements		Requirements
TVOC [mg/m ³]	0.065	≤ 3	0.059	≤ 0.3
TSVOC [mg/m ³]	< 0.005	-	< 0.005	≤ 0.1
Carcinogenic substances [µg/m ³]	< 1	≤ 10 (total)	< 1	≤ 1 (per single value)
Sum VOC without LCI [mg/m ³]	< 0.005	-	< 0.005	≤ 0.1
R-value	0.161	-	0.136	≤ 1
Formaldehyde [ppm]	0.009 (11 µg/m ³)	-	0.007 (9 µg/m ³)	≤ 0.05
Requirements acc.to DE-UZ 176 fulfilled? (Edition January 2013, Ver. 7)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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. to AgBB scheme for sample P95582 (wtd 54mm 60+)

Parameter	3 rd day		28 th day	
	Measured values	Requirements	Measured values (after 7 days)	Requirements
TVOC [mg/m ³]	0.065	≤ 10	0.059	≤ 1.0
TSVOC [mg/m ³]	< 0.005	-	< 0.005	≤ 0.1
Carcinogenic substances [mg/m ³]	< 0.001	≤ 0.01	< 0.001	≤ 0.001
VOC without LCI [mg/m ³]	< 0.005	-	< 0.005	≤ 0.1
R-value	0.161	-	0.136	≤ 1
Requirements acc. to AgBB scheme fulfilled? (Version June 2021, LCI list 2020)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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 P95582 (wtd 54mm 60+).

RT	CAS-No.	Substance	Concentration in µg/m³ after		Ri-value after		LCI-list 2020	
			3d	7d	3d	7d	No.	Value
analysis acc. to DIN ISO 16000-3								
	000050-00-0	Formaldehyde	11	9	0.110	0.090	<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	19	17	0.000	0.000	<C6b	8-10 120000
analysis acc. to DIN ISO 16000-6								
6.81	000064-19-7	Acetic acid	12	12	0.010	0.010	bd	9-1 1200
10.91	000110-62-3	Pentanal	3	2			bd	7-2 800
14.76	000108-88-3	Toluene	1	1			bdhp	1-1 2900
16.74	000066-25-1	n-Hexanal	10	7	0.011	0.008	bd	7-3 900
26.29	000111-90-0	Ethyl diglycol	3	1			b	6-38 350
37.93		Terpene (Toluene)	16	16	0.011	0.011	b	3-5 1400
40.01		Terpene (Toluene)	27	24	0.019	0.017	b	3-5 1400
Sum of VOC (< C6) ¹ :			< 5	< 5				
Sum of VOC (C6-C16) as TVOC _{original response} ^{*1,2} :			65	59				
Sum of VOC (C6-C16) as TVOC _{Toluene} according to DIN EN 16516 ^{1,3} :			46	40				
Sum of VOC (C6-C16) as TVOC _{Toluene} according to DIN EN ISO 16000-6 ⁴ :			62	56				
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)					0.161	0.136		

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

¹Limit value of consideration is 5 µg/m³

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

³Sum of TVOC_{original response} quantified with toluene

⁴Sum of all measured VOC quantified with toluene

⁵Sum of carcinogenic substances acc. to AgBB-scheme

⁶Additional 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;