

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

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

Braunschweig, 19.12.2022

Test report No. MAIC-2022-3322

| | | |
|-------------------------------|---|--------|
| 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). | |
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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 40mm 30+). 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 P95578 (wtd 40mm 30+) according to the Blue Angel criteria DE-UZ 176.

| Parameter | Measured values | 3 rd day | Measured value (after 7 days) | 28 th day |
|--|----------------------------------|---|----------------------------------|---|
| | | Requirements | | Requirements |
| TVOC [mg/m ³] | 0.133 | ≤ 3 | 0.080 | ≤ 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 | 0.299 | - | 0.235 | ≤ 1 |
| Formaldehyde [ppm] | 0.015 (19 µg/m ³) | - | 0.014 (17 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 P95578 (wtd 40mm 30+).

| Parameter | 3 rd day | | 28 th day | |
|---|---|--------------|---|--------------|
| | Measured values | Requirements | Measured values (after 7 days) | Requirements |
| TVOC [mg/m ³] | 0.133 | ≤ 10 | 0.080 | ≤ 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 | 0.299 | - | 0.235 | ≤ 1 |
| Requirements acc. to AgBB scheme fulfilled? <small>(Version June 2021, LCI list 2020)</small> | <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 P95578 (wtd 40mm 30+).

| RT | CAS-No. | Substance | Concentration in µg/m³ after | | Ri-value after | | Info ⁶ | LCI-list 2020 | |
|---|-------------|---|------------------------------|-----|----------------|-------|-------------------|---------------|--------|
| | | | 3d | 7d | 3d | 7d | | No. | Value |
| analysis acc. to DIN ISO 16000-3 | | | | | | | | | |
| | 000050-00-0 | Formaldehyde | 19 | 17 | 0.190 | 0.170 | <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 | 4 | 4 | | | <C6b | 8-10 | 120000 |
| analysis acc. to DIN ISO 16000-6 | | | | | | | | | |
| 5.47 | 000067-63-0 | 2-Propanol (Toluene) | 2 | 1 | | | <C6c | | |
| 7.20 | 000064-19-7 | Acetic acid | 113 | 62 | 0.094 | 0.052 | bd | 9-1 | 1200 |
| 14.75 | 000108-88-3 | Toluene | 1 | 2 | | | bdhp | 1-1 | 2900 |
| 18.41 | 000098-01-1 | 2-Furaldehyde | 1 | 1 | | | abd | 7-17 | 10 |
| 37.93 | | Terpene (Toluene) | 8 | 6 | 0.006 | 0.004 | b | 3-5 | 1400 |
| 40.02 | | Terpene (Toluene) | 12 | 12 | 0.009 | 0.009 | b | 3-5 | 1400 |
| | | Sum of WOC (< C6) ¹ : | < 5 | < 5 | | | | | |
| | | Sum of VOC (C6-C16) as TVOC ^{original response} *1,2: | 133 | 80 | | | | | |
| | | Sum of VOC (C6-C16) as TVOC ^{Toluene} according to DIN EN 16516 ^{1,3} : | 34 | 25 | | | | | |
| | | Sum of VOC (C6-C16) as TVOC ^{Toluene} according to DIN EN ISO 16000-6 ⁴ : | 40 | 31 | | | | | |
| | | 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) | | | 0.299 | 0.235 | | | |

(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;