Test Report

Report No.: 770718-1D

DANISH TECHNOLOGICAL INSTITUTE

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hbk/nmlh/hbs
Order no.: 770718
No. of appendices: 5

Assignor: F. Junckers Industrier A/S
Attn: Thomas Flindt
Værftsvej 4
DK-4600 Køge

Test material: Lacquered wood flooring: Junckers 14 mm SylvaKet Classic.

Sampling: The test material was sampled by the assignor (Appendix 1) and received in air tight, original plastic wrapping at the Danish Technological Institute on 28-08-2017.

Method: Danish Society of Indoor Climate "Standard Test Method for Determination of the Indoor-Relevant Time-value by Chemical Analysis and Sensory Evaluation, 3rd ed. 2005.
Danish Indoor Climate Labelling "Testing and Labelling Criteria for Products for flooring installation Systems" 1st ed. 2011.06.11.
The methods used for the chamber testing and sampling is shown in Appendix 2.

Period: The testing was carried out from 29-08-2017 to 26-09-2017.

Result: No carcinogenic compounds were found in the emissions.
Based on chemical analyses, volatile substances were found to be below the threshold for sensory irritation after 3 days.
Regarding the sensory determination, the odour is perceived acceptable with weak odour intensity after 20 days.

Results from chemical analysis of the air samples are shown in appendix 3.
Results from the sensory evaluation of odour emission are shown in appendix 4.

Evaluation: **Indoor-relevant time-value: 20 days**

The tested material fulfils the DICL criteria for flooring where the maximum allowed indoor-relevant time-value is 60 days. See appendix 5.

Note: The sensory evaluation of odour and evaluation of the indoor-relevant time-value are not part of the accreditation.

Storage: The test material will be destroyed after the issue of this test report, unless otherwise agreed.

Terms: The accredited test was carried out according to DANAK's general conditions see www.danak.dk and according to the General Terms and Conditions regarding Commissioned Work Accepted by the Danish Technological Institute, which apply at the time of signing the agreement. The test is only valid for the tested specimen. The test report may only be extracted, if the laboratory has approved the extract.

Date/place: 20-11-2017, Danish Technological Institute, Wood and Biomaterials, Taastrup

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Co-signatory

ilac-MRA DANAK TEST Reg.no. 2

DANISH TECHNOLOGICAL INSTITUTE

Sample information

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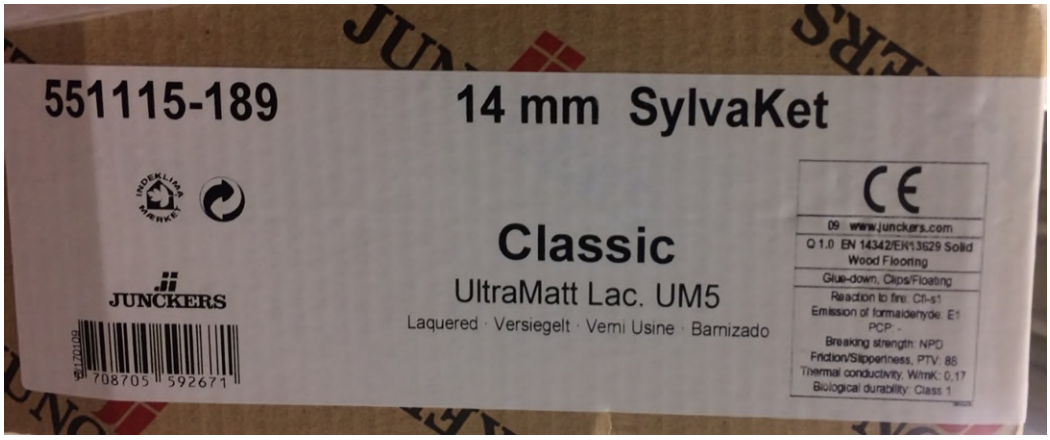
Material:	Lacquered wood flooring: Junckers 14 mm SylvaKet Classic.
Article number:	551115-189
Production date:	N/A
Photo of label:	



Prior to testing the wrapped samples were stored at the test laboratory at 23 °C.

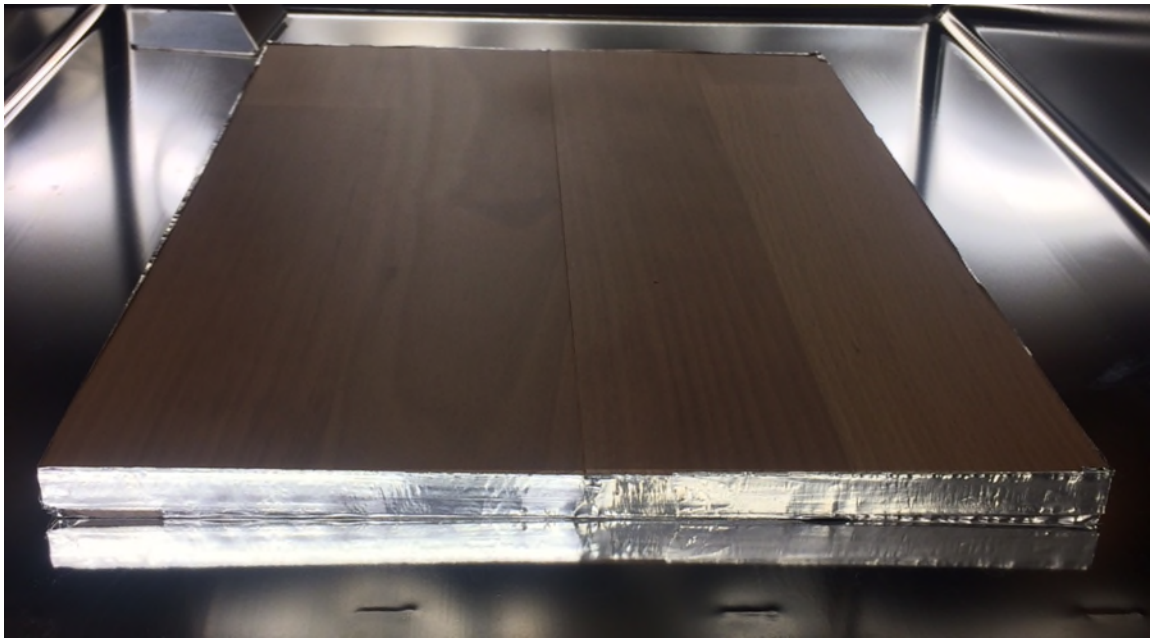
Emission testing

Material: Lacquered wood flooring: Junckers 14 mm SylvaKet Classic.

Preparation date of test specimen: 29-08-2017

The test specimen was prepared as floor and cut edges were sealed with aluminium tape. The test specimen was placed on the bottom of the test chamber with exposure of upper side without prior conditioning.

Photo of test specimen in the climate chamber:



Climate chamber	113 L Polished stainless steel
Temperature	23ºC ± 1ºC
Relative humidity	50 % RH ± 5 % RH
Air velocity at the surface of the specimen	0.1 – 0.3 m/s
Air change	1.0 h^{-1} ± 0.05 h^{-1}
Material load	0.8 m^2/ m^3
Area specific air flow rate (q)	1.0 m^3/m^2h

Sampling and analytical methods of air samples:

	Method	Absorbent	Sampling volume	Quantification/Analysis method	Detection limit
VOC and Carcinogens	ISO 16000-6	Tenax TA	3 - 6 L	TDS-GC/MS Calibrated with pure reference standards	1 µg/m^3
Formaldehyde and carbonyls	ISO 16000-3	DNPH coated silica gel	21 - 61 L	HPLC-DAD Calibrated with pure reference standards	1 µg/m^3

Results of volatile compounds emissions

Material: Lacquered wood flooring: Junckers 14 mm SylvaKet Classic.

The measured chamber concentrations are equal to the emissions from floor covering in a model room of 17.4 m^3, with an air change rate of 0.5 h^{-1} and a material loading factor of 0.4 m^2/m^3.

Results from VOC analysis are shown in Table 1

ISO 16000-6: 2011. Indoor air – Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID.

Analysis of the air sampled on Tenax was performed at the Wilhelm Klauditz Institut (WKI) under DAkkS accreditation number D-PL-11140-05-02. Report no. MAIC-2017-4034 and -4462.

Table 1: Emissions of VOC according to ISO 16000-6

CAS-No.	Substance	3 d (µg/m³)	10 d (µg/m³)	28 d (µg/m³)
000078-78-4	iso-Pentane	-	1	-
000067-64-1	Acetone	28	21	17
000079-20-9	Methyl acetate	110	87	66
000064-19-7	Acetic acid	283	154	125
000141-78-6	Ethyl acetate	37	33	30
000109-99-9	Tetrahydrofurane	1	4	4
000071-36-3	n-Butanol	2	1	1
000108-88-3	Toluene	1	-	-
000079-09-4	Propanoic acid	-	-	2
000060-35-5	Acetamide	123	70	72
000066-25-1	n-Hexanal	1	-	-
000123-86-4	n-Butyl acetate	194	185	148
000541-05-9	Hexamethylcyclotrisiloxane	3	3	-
000100-52-7	Benzaldehyde	6	5	4
	Carboxylic acid ester (Methyl dodecanoate)	-	-	1
000868-77-9	2-Hydroxyethyl methacrylate (Toluene)	2	2	-
000104-76-7	2-Ethyl-1-hexanol	2	-	-
000124-19-6	n-Nonanal	2	1	1
000112-31-2	n-Decanal	1	1	1
007473-98-5	2-Hydroxy-2-methylpropiophenone (Darocur 1173)	5	3	3
(013475-82-6)	Sum other iso/cyclo-alkanes:	1	-	-
	Sum VVOC (< C6):	138	110	83
	Sum VOC (C6-C16):	664	462	388
	Sum SVOC (> C16):	-	-	-

(The fragments/substances shown in subscript were used for the quantification.)
- Not detected (< 1 µg/m^3)

Results of volatile compounds emissions

Results from aldehydes analysis are shown in Table 2.

ISO 16000-3: 2011. Indoor Air – Part 3: Determination of formaldehyde and other carbonyl compounds – Active sampling method.

Analysis of the air sampled on DNPH was performed at the Danish Technological Institute under DANAK accreditation 90. Reports no.772384, 775040 and 776649.

Table 2: Emissions of formaldehyde and carbonyls according to ISO 16000-3

CAS-No.	Substance	3 d (µg/m³)	20 d (µg/m³)	28 d (µg/m³)
50-00-0	Formaldehyde	2.1	1.7	2.4
75-07-0	Acetaldehyde	1.5	1.2	1.5
123-38-6	Propanal	2.7	-	1.3
123-72-8	Butanal	-	-	-
107-02-8	Acrolein	-	-	-

- Not detected (< 1 µg/m^3)

Sensory evaluations of odour emissions (not part of the accreditation)

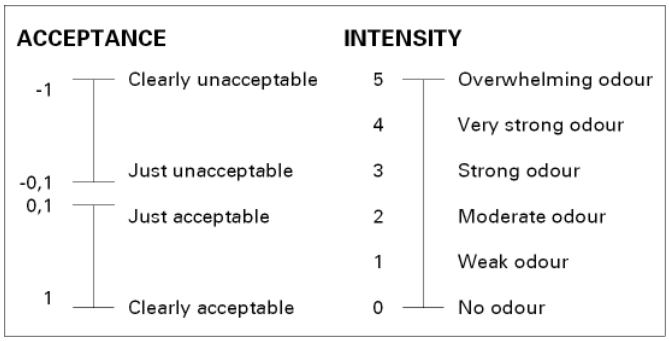
Material: Lacquered wood flooring: Junckers 14 mm SylvaKet Classic.

For the sensory determination test specimens were prepared with a total surface area of 2.6 m², corresponding to floor loading in a standard room.

Climpaq	200 L Glass
Temperature	23ºC ± 1ºC
Relative humidity	50 % RH ± 5 % RH
Outlet air flow rate	0.9 L/s
Panel load	2.6 m²

Sensory evaluation of acceptance and intensity of the air was performed from the test specimen in a Climpaq with an outlet air flow rate of 0.9 l/s through a funnel, using an untrained panel.

Evaluation scale:



The requirements according to the Danish Society of Indoor Climate are acceptability higher than 0 and an intensity of max. 2.

The sensory determination was carried out at approximately 10 days intervals up to the DICL maximum allowable time for the tested material, after 9, 20, 28 days' conditioning of the test specimens in the Climpaq.

Sensory evaluations of odour emissions (not part of the accreditation)

Result 9 days

Test date: 07-09-2017

	Reference Acceptability	Reference Intensity	Sample Acceptability	Sample Intensity
1	0,95	0,1	0,20	1,0
2	0,90	0,4	-0,45	2,7
3	-0,20	0,7	0,75	0,7
4	0,95	0,5	0,65	0,9
5	1,00	1,0	0,10	3,0
6	1,00	0,3	0,75	0,9
7	0,90	0,0	0,60	2,0
8	0,80	0,3	-0,30	3,0
9	1,00	1,0	0,95	0,6
10	1,00	0,5	0,40	2,0
11	0,95	0,1	0,95	0,8
12	0,90	0,5	0,15	2,2
13	1,00	0,0	-0,45	1,8
14	0,85	0,3	0,25	1,5
15	0,25	1,1	-0,60	2,0
16	0,75	1,0	0,30	2,3
17	0,95	0,0	-0,45	2,5
18	0,10	0,8	-0,60	2,5
19	1,00	0,0	0,30	1,0
20	0,95	0,1	-0,40	3,0
21	0,45	0,1	-0,15	1,3
22	0,85	0,7	-0,55	3,9
23	0,95	0,2	0,30	1,7
24	0,70	1,0	-0,50	2,7
Median	**0,92**	**0,4**	**0,18**	**2,0**

Sensory evaluations of odour emissions (not part of the accreditation)

Result 20 days

Test date: 18-09-2017

	Reference Acceptability	Reference Intensity	Sample Acceptability	Sample Intensity
1	1,00	0,0	0,20	1,5
2	0,80	1,0	0,80	0,5
3	1,00	0,5	-0,10	3,0
4	0,90	0,0	-0,90	4,5
5	1,00	0,0	0,80	1,0
6	1,00	0,0	0,80	1,0
7	1,00	0,5	-0,20	2,0
8	1,00	0,0	-0,35	3,0
9	1,00	0,0	-0,10	3,0
10	1,00	0,0	0,30	1,0
11	1,00	0,0	-0,35	2,5
12	0,70	1,0	0,20	2,0
13	1,00	0,0	0,80	1,0
14	0,70	1,0	0,80	1,0
15	0,90	0,5	0,80	1,0
16	1,00	0,0	0,10	1,0
17	1,00	0,0	0,50	1,0
18	0,80	0,3	0,80	0,3
19	1,00	0,2	-0,10	0,5
20	1,00	0,0	-0,15	1,5
21	1,00	0,0	-0,10	2,0
22	1,00	0,0	0,20	2,0
23	1,00	0,0	-0,90	4,9
24	1,00	0,0	1,00	0,5
25	1,00	0,0	1,00	0,0
26	1,00	0,0	0,10	2,0
Median	**1,00**	**0,0**	**0,20**	**1,3**

Sensory evaluations of odour emissions (not part of the accreditation)

Result 28 days

Test date: 26-09-2017

	Reference Acceptability	Reference Intensity	Sample Acceptability	Sample Intensity
1	1,00	1,0	0,20	2,7
2	0,90	0,2	-0,20	2,2
3	0,20	2,0	-0,90	4,5
4	0,90	0,3	0,70	0,7
5	0,40	1,0	0,40	1,0
6	0,90	0,5	-0,20	1,5
7	1,00	0,2	0,85	0,6
8	1,00	0,0	0,10	2,0
9	1,00	0,1	0,70	0,8
10	0,40	1,5	-0,10	2,5
11	0,90	0,3	0,90	0,6
12	0,40	1,5	0,20	2,7
13	1,00	0,0	-0,10	1,0
14	1,00	0,0	-0,10	2,0
15	1,00	0,0	-0,40	2,1
16	0,20	2,0	0,20	2,0
17	0,90	0,2	-0,20	1,0
18	0,70	0,3	0,70	0,3
19	0,20	0,4	-0,10	0,6
20	1,00	0,0	0,20	0,9
21	0,95	0,3	0,40	1,0
22	1,00	1,0	0,30	1,0
23	1,00	1,0	1,00	2,0
24	-0,90	4,0	-0,65	3,1
25	1,00	0,2	0,80	0,8
Median	**0,90**	**0,3**	**0,20**	**1,0**

Evaluation of the indoor-relevant time value (not part of the accreditation)

No carcinogenic compounds were found according to (IARC, WHO): Overall Evaluations of Carcinogenicity to Humans, Group 1. (Formaldehyde is excepted from this recommendation by the Danish Indoor Climate Labelling).

The indoor climate relevant time-value is determined as the time until the emission of the decisive single compound calculated to concentration in a standard room is below half of the threshold value for irritation.

The irritation threshold value for formaldehyde in the model room is 150 µg/m^3. The formaldehyde concentration at 3 days is 2.1 µg/ m^3 and hence below the limit of 75 µg/m^3.

From the result table from the chemical analyses it appears that the emission of all chemical compounds is below half of the threshold value for irritation after 3 days.

The time value for the chemical determination is thus measured to 3 days.

The time value for the sensory evaluation is determined to be 20 days, where the odour expression is just acceptable (0.2) and the odour intensity is 1.3 corresponding to a weak odour.

The requirements according to the Danish Society of Indoor Climate are acceptability higher than 0 and an intensity of max. 2.

The indoor-relevant time value is thus determined by the combined sensory and chemical determinations to be 20 days.