REPORT

Issued by an Accredited Testing Laboratory

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Idé Flooring Sverige AB
c/o Ideflooring Albygatan 136
172 63 SUNDBYBERG

Emission measurements after 28 days

(3 appendices)

Test object

A sample of a vinyl dryback flooring was delivered to RISE by the customer.

Product name:	**Vinyl Public**
Manufacturer:	Polynexx Industries Ltd, China
Manufacturing date:	2024-12-15
Batch No	10861
Size of sample:	14 tiles, 3.14 m^2
Package:	Retail package wrapped in plastic
Date of arrival:	2025-04-10
Place of testing:	Chemistry and Applied Mechanics, Brinellgatan 4, Borås

Assignment

Emission measurements according to ISO 16000-9:2024 (Indoor air – Part 9: Determination of the emission of volatile organic compounds from building products and furnishing – Emission test chamber method) after 28 days regarding volatile organic compounds (VOC and VVOC/SVOC), carcinogenic substances (VOC-substances, EU Regulation No 1272/2008 Annex VI, cat 1A and 1B) formaldehyde and acetaldehyde (ISO 16000-3:2022). Reference room calculations according to EN 16516:2017/A1:2020 (EU-LCI values).

Method

The test was started on April 14, 2025 by unpacking the sample. Two pieces of 180 x 480 mm were cut out from the tiles. The pieces were placed back-to-back and the cut edges and part of the surface were sealed with aluminium tape leaving an exposed surface area of 0.12 m^2. The specimen was then placed in a separate conditioning container (with air velocity of ca 0.2 m/s) in a room with controlled climate conditions of 23 ± 2 ºC and 50 ± 5 % RH. The test specimen was placed in the emission chamber three days prior to the air sampling. Air samplings after 28 days of conditioning were carried out on May 12, 2025.

Conditions of the test in the emission chamber:

Test chamber volume:	0.266 m^3
Area of test specimens:	0.12 m^2
Air exchange rate:	0.5 h^{-1}
Area specific air change rate:	1.11 m^3/m^2 h.
Temperature:	23 ± 1 ºC
Relative humidity:	50 ± 5 % RH
Air velocity at specimen surface:	0.1 – 0.3 m/s

Tenax TA and multisorbents were used as adsorption mediums for VOC. The tubes were thermally desorbed and analysed in accordance with ISO 16000-6:2021 (Indoor air - Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID). This means an analysis in a gas chromatograph and detection with a flame ionisation detector (FID) and mass selective detector (MS). The FID signals are used for compound quantification. The TVOC is quantified as toluene equivalents. The mass selective detector is used for identification of compounds. The capillary column used is coated with 5% phenyl/ 95 % methylpolysiloxane.
Tenax TA and multisorbents were also used as adsorption mediums for testing of volatile carcinogenic compounds, according to EU Regulation No 1272/2008 Annex VI, cat 1A and 1B), (exclusive formaldehyde), 0.001 mg/m^3 and above.
Minimum duplicate air samples were taken and the results are mean values. Sampled volumes are 2.4 to 5.5 L.

The samplings of aldehydes were carried out with DNPH samplers. The samplers were analysed according to ISO 16000-3:2022 (Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds – Active sampling method). This means analysis on a liquid chromatograph with absorbance detector. Duplicate air samples were taken and the results are mean values. Sampled volumes were 30 L.

Results

The results relate only to the items tested.

The results in Table 1 are expressed as area specific emission rates and as concentrations in a reference room (according to EN 16516:2017/A1:2020). The reference room has a base area of 3 m x 4 m and a height of 2.5 m, with an air exchange rate of 0.5 h^{-1}. The wall area is 31.4 m^2, floor area is 12 m^2, small area, like a door, is 2 m^2 and very small area, like sealant, is 0.2 m^2. Floor area is used for the calculation of the concentrations.

Calculation of the concentration from the emission rate:

$$C = \frac{E_a \times A}{n \times V}$$

C = concentration of VOC in the reference room, in µg/m^3
E_a = area specific emission rate, in µg/m^{2}h
A = surface area of product in reference room, in m^2
n = air exchange rate, in changes per hour
V = volume of the reference room, in m^3

Table 1.
Emission results for the product **Vinyl Public** after 28 days

Volatile organic compounds	**CAS number**	**Retention time** (min)	**ID** [1]	**Emission rate** ($\mu g/m^2h$)	**Concentration in reference room** ($\mu g/m^3$)	**LCI_i** ($\mu g/m^3$)	**R_i** (c_i/LCI_i)
TVOC ($C_6 - C_{16}$)	--	6.2 – 38	B	26	21	--	--
Volatile Carcinogens [2]		6.2 – 38					
No substances detected	--	--	B	< 1	< 1	--	--
VOC with LCI [3]		6.2 – 38					
Isopropyl acetate	108-21-4	7.2	A	27	22	4200	0.01
2-Propanol, 1-methoxy	107-98-2	7.7	A	8	6	7900	< 0.01
Cyclohexanone	108-94-1	15.3	A	19	15	410	0.04
Phenol	108-95-2	17.8	A	7	5	70	0.07
1-Hexanol, 2-ethyl-	104-76-7	19.7	A	7	6	800	0.01
∑ **VOC with LCI**	--	--	A	68	54	--	--
VOC without LCI [4]		6.2 – 38					
No substances detected	--	--	B	< 2	< 5	--	--
∑ **VOC without LCI**	--	--	B	< 2	< 5	--	--
SVOC ($C_{16} - C_{22}$) [5]		38 – 51.3					
No substances detected	954-16-5	42.3	B	< 2	< 5	--	--
∑ **SVOC**	--	--	B	< 2	< 5	--	--
VVOC (< C_6) [6]		4.5 – 6.2					
Formaldehyde [7]	50-00-0	--	A	< 1	< 5	100	--
Acetaldehyde [7]	75-07-0	--	A	< 1	< 5	300	--
∑ **VVOC**	--	--	A	< 2	< 5	--	--
R = ∑ C_i / LCI_i [8]	--	--	--	--	--	--	0.13

1) ID: A = quantified compound specific, B = quantified as toluene-equivalent
2) Volatile carcinogens = VOCs according to EU Regulation No 1272/2008 Annex VI, cat 1A and 1B
3) VOC with LCI = identified VOC-compound with LCI-value according to EU-LCI, Dec 2023
4) VOC without LCI = VOC-compound without LCI-value or not identified.
5) SVOC = semi-volatile organic compounds, as defined in ISO 16000-6
6) VVOC = very volatile organic compounds, as defined in ISO 16000-6
7) VVOC-aldehydes measured with DNPH samplers (ISO 16000-3)
8) R_i is the ratio of c_i/LCI_i, where c_i is the concentration in the reference room for compound *i*. All VVOC, VOC, SVOC and carcinogens with LCI are included in the calculation of R value.

Only VOC-compounds with an emission rate higher than 2 $\mu g/m^2h$ are listed in Table 1, carcinogenic compounds $\geq$ 1 $\mu g/m^2h$. Only compounds with a concentration in the reference room $\geq$ 5 $\mu g/m^3$ are evaluated based on LCI (= lowest concentration of interest).

TVOC expressed in µg/m^3 and µg/m^{2}h is the sum of all individual substances with concentrations ≥ 5 µg/m^3 (in toluene equivalents) in the reference room.

Quantification limit for TVOC is 10 µg/m^{2}h. Measurement uncertainty for TVOC is 30 % (rel) and for formaldehyde 36 % (rel). Background of TVOC in the empty chamber was below 10 µg/m^3 and is subtracted.

See Appendix 1 for a gas chromatogram (FID spectra) and Appendix 2 for a photo of the test specimen. Appendix 3 is the sampling report received from the customer.

Summary of the test results

The test results are summarized in Table 2.

Table 2.
Summary of the emission results after 28 days for the product **Vinyl Public**

Compounds	**Emission rate** (µg/m^{2}h)	**Concentration in reference room** (Floor area) (µg/m^3)
TVOC	26	21
∑ Carcinogenic VOCs	< 1	< 1
∑ VOC with LCI	68	54
∑ VOC without LCI	< 2	< 5
∑ VVOC	< 2	< 5
Formaldehyde	< 1	< 5
∑ SVOC	< 2	< 5
R = ∑ C_i / LCI_i	0.13	

Evaluation of the test results

Decision rule:
When stating conformity to requirement documents, the average value of the measured result is compared to the requirement level. The uncertainty is not taken into consideration unless it is a demand to the applicable requirement document. Procedure ”Simple acceptance” for handling the measurement uncertainty is applied according to document ILAC-G8:09/2019, ”Guard band 0”, shared risk <50 % probability for false acceptance.

The emission results can be compared to different Emission Labelling Systems.

Byggvarubedömningen has criteria regarding Emissions of VOC to indoor environment. The emissions are to be measured according to a standard method such as ISO 16000-9 after 28 days regarding TVOC, carcinogenic compounds CMR 1A and 1B, EU-LCI values and formaldehyde.

The tested sample, **Vinyl Public** is compared to the requirements for the Recommended class of Byggvarubedömningen, version 7.4 dated 2024-09-02, see Table 3.

Table 3.
The test results of **Vinyl Public** are compared to the requirements for the Recommended Class according to Byggvarubedömningen

Compounds	**Requirement Recommended Class** (µg/m^3)	**Test Results** (µg/m^3)	**Pass / Fail**
TVOC	≤ 300	**21**	**PASS**
CMR 1A+1B	≤ 1	**< 1**	**PASS**
Single VOC (µg/m^3)	≤ EU-LCI	**≤ EU-LCI**	**PASS**
R value	≤ 1	**0. 13**	**PASS**
Formaldehyde	< 60	**< 1**	**PASS**

Conclusion

The test results of TVOC, VOC and aldehydes are in compliance with the coming requirements for the **Recommended class** of Byggvarubedömningen regarding Emissions of VOC to the indoor environment.

RISE Research Institutes of Sweden AB
Chemistry and Applied Mechanics - Chemical Product Safety

Performed by

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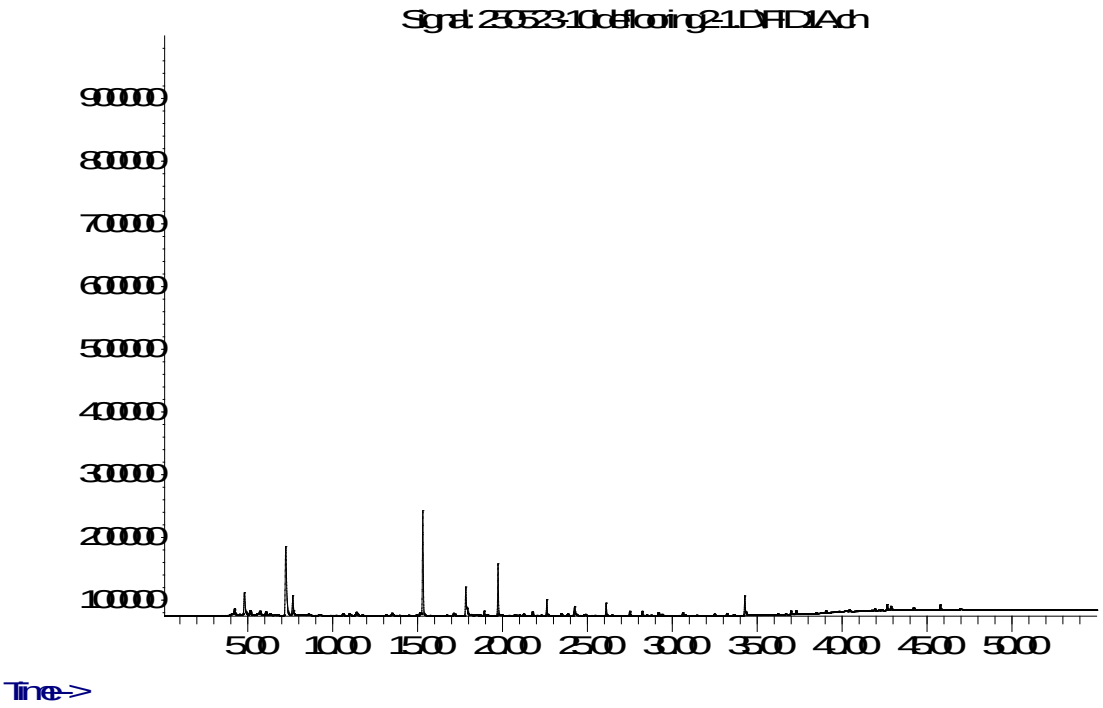
Appendices

1. Gas chromatogram
2. Photo of test specimen
3. Sampling report

Appendix 1

Gas chromatogram

Vinyl Public after 28 days



TVOC between C_6 and C_{16}, means compounds eluting between 6.2 and 38 minutes.

Appendix 2

Photo of test specimen

Appendix 3

Sampling Report

Sampler (Name, Company, contact info): Ideflooring Sverige AB Ättehögsgatan 8B 41674 Göteborg Robert Johnson 0733158100 robert@ideflooring.se	**Manufacturer of the product :** **Polynexx Industries Ltd** **No 3 Clumpu Road , Auto Accessory** **Industrial Zone** **Xingou Town Funning Country** **Jiangsu Province** **China**
Name of product: 1 Vinyl Public 2 Vinyl Comfort	**Type of product:** **1 Vinyl Dryback** **2 Vinyl klick**
Manufacturing Date: December 2024	**Batch No:** **Vinyl Public batch 10861** **Vinyl Comfort batch 10896**
Date of sampling: 2025-04-08	**Amount/size of material sampled:** **Vinyl Public 3,14 m2** **Vinyl Comfort 2,17 m2** **Packing material:**
Sample is taken from: Production line ☐ Stock / Storage x☐ Miscellaneous ☐ -where, specify:	**How was the product stored before sampling?** wearhouse
If a sub-sample was collected from a larger material amount, describe how the sub-sample was taken: Taken from 1000 m2 production , picket from a pallet	
Observations and remarks:	
Confirmation I hereby confirm that the sample was selected, taken and packed in accordance with the instructions.	
Date: 2025-04-07	**Signature:** **Robert Johnson**

Verification

Transaction 09222115557549573441

Document

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