

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 click flooring was delivered to RISE by the customer.

Product name:	Vinyl Comfort
Manufacturer:	Polynexx Industries Ltd, China
Manufacturing date:	2024-12-15
Batch No:	10896
Size of sample:	10 tiles, 2.17 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. Two tiles were click-jointed together and two pieces of 290 x 200 mm were cut out with the joint in the middle. 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 0.08 m². 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 °C 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:	0.08 m ²
Air exchange rate:	0.5 h ⁻¹
Area specific air change rate:	1.66 m ³ /m ² h.
Temperature:	23 ± 1 °C
Relative humidity:	50 ± 5 % RH
Air velocity at specimen surface:	0.1 – 0.3 m/s

RISE Research Institutes of Sweden AB

Postal address

Box 857
501 15 BORÅS
SWEDEN

Office location

Brinellgatan 4
504 62 Borås
SWEDEN

Phone / Fax / E-mail

+46 10-516 50 00
+46 33-13 55 02
info@ri.se

Confidentiality level

C3 - Sensitive

This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Accred. No. 1002
Testing
ISO/IEC 17025

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 (VOC, 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/m³ and above.

Minimum duplicate air samples were taken and the results are mean values. Sampled volumes are 2.6 to 5.9 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 – 31 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 m², floor area is 12 m², small area, like a door, is 2 m² and very small area, like sealant, is 0.2 m². 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/m³

E_a = area specific emission rate, in µg/m²h

A = surface area of product in reference room, in m²

n = air exchange rate, in changes per hour

V = volume of the reference room, in m³

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

Volatile organic compounds	CAS number	Retention time (min)	ID ¹	Emission rate (µg/m ² h)	Concentration in reference room (µg/m ³)	LCI _i (µg/m ³)	R _i (c _i /LCI _i)
TVOC (C ₆ – C ₁₆)	--	6.2 – 38	B	43	34	--	--
Volatile Carcinogens ²		6.2 – 38					
No substances detected	--	--	B	< 1	< 1	--	--
VOC with LCI ³		6.2 – 38					
2-Propanol, 1-methoxy	107-98-2	7.7	A	100	80	7900	0.01
1-Hexanol, 2-ethyl-	104-76-7	19.7	A	7	5	800	< 0.01
Σ VOC with LCI	--	--	A	110	85	--	--
VOC without LCI ⁴		6.2 – 38					
No substances detected	--	--	B	< 2	< 5	--	--
Σ VOC without LCI	--	--	B	< 2	< 5	--	--
SVOC (C ₁₆ – C ₂₂) ⁵		38 – 51.3					
Benzophenone, 2,4,6-trimethyl-	954-16-5	42.3	B	6	5	--	--
Possible: Methanone, (2-chlorophenyl)phenyl-	5162-03-08	42.6	B	4	< 5	--	--
Σ SVOC	--	--	B	10	9	--	--
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	--
Σ VVOC	--	--	A	< 2	< 5	--	--
R = Σ C _i / LCI _i ⁸	--	--	--	--	--	--	0.01

¹) ID: A = quantified compound specific, B = quantified as toluene-equivalent²) Volatile carcinogens = VOCs according to EU Regulation No 1272/2008 Annex VI, cat 1A and 1B³) VOC with LCI = identified VOC-compound with LCI-value according to EU-LCI, Dec 2023⁴) VOC without LCI = VOC-compound without LCI-value or not identified.⁵) SVOC = semi-volatile organic compounds, as defined in ISO 16000-6⁶) VVOC = very volatile organic compounds, as defined in ISO 16000-6⁷) 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 µg/m²h are listed in Table 1, carcinogenic compounds ≥ 1 µg/m²h. Only compounds with a concentration in the reference room ≥ 5 µg/m³ are evaluated based on LCI (= lowest concentration of interest).

TVOC expressed in µg/m³ and µg/m²h is the sum of all individual substances with concentrations ≥ 5 µg/m³ (in toluene equivalents) in the reference room.

Quantification limit for TVOC is 10 µg/m²h. Measurement uncertainty for TVOC is 30 % (rel) and for formaldehyde 36 % (rel). Background of TVOC in the empty chamber was below 10 µg/m³ 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 Comfort**

Compounds	Emission rate (µg/m ² h)	Concentration in reference room (Floor area) (µg/m ³)
TVOC	43	34
∑ Carcinogenic VOCs	< 1	< 1
∑ VOC with LCI	110	85
∑ VOC without LCI	< 2	< 5
∑ VVOC	< 2	< 5
Formaldehyde	< 1	< 5
∑ SVOC	10	9
$R = \sum C_i / LCI_i$	0.01	

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.

Bygghälsöversyn 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 Comfort** is compared to the requirements for the Recommended class of Byggsvarubedömningen, version 7.4 dated 2024-09-02, see Table 3.

Table 3.

The test results of **Vinyl Comfort** are compared to the requirements for the Recommended Class according to Byggsvarubedömningen

Compounds	Requirement Recommended Class ($\mu\text{g}/\text{m}^3$)	Test Results ($\mu\text{g}/\text{m}^3$)	Pass / Fail
TVOC	≤ 300	34	PASS
CMR 1A+1B	≤ 1	< 1	PASS
Single VOC ($\mu\text{g}/\text{m}^3$)	$\leq \text{EU-LCI}$	$\leq \text{EU-LCI}$	PASS
R value	≤ 1	0. 01	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 Byggsvarubedömningen regarding Emissions of VOC to the indoor environment.

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

Performed by

Examined by

Ulrika Johansson

Fredrik Solhage

Appendices

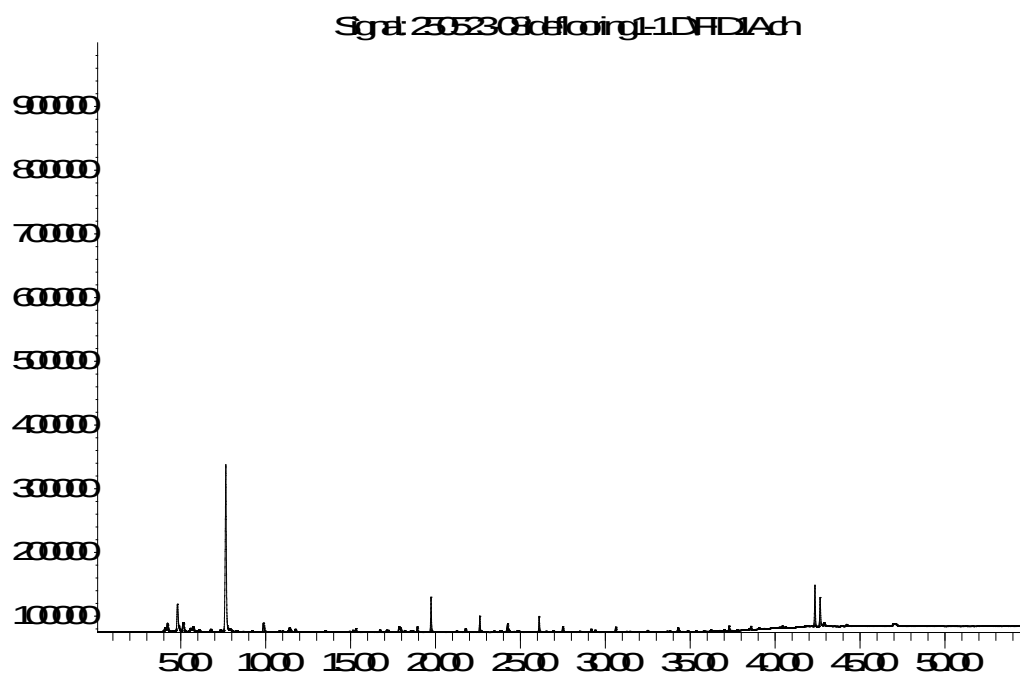
1. Gas chromatogram
2. Photo of test specimen
3. Sampling report

Appendix 1

Gas chromatogram

Vinyl Comfort after 28 days

Abundance



Time>

TVOC between C₆ and C₁₆, means compounds eluting between 6.2 and 38 minutes.

Appendix 2

Photo of test specimen

Appendix 3

Sampling Report

Sampler (Name, Company, contact info): <u>Ideflooring Sverige AB</u> Ättehögsgatan 8B 41674 Göteborg Robert Johnson 0733158100 robert@idefflooring.se	Manufacturer of the <u>product</u> : <u>Polynexx Industries Ltd</u> <u>No 3 Clumpu Road</u> , Auto Accessory Industrial Zone <u>Xingou Town Funning Country</u> 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 ☒ Miscellaneous ☐ -where, specify:	How was the product stored before sampling? <u>wearhouse</u>
If a sub-sample was collected from a larger material amount, describe how the sub-sample was taken: Taken from 1000 m2 <u>production</u> , 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 09222115557549573796

Document

O100785-1315083-2 Ideflooring, Vinyl Comfort, BVB
Main document
8 pages
Initiated on 2025-06-16 14:02:58 CEST (+0200) by Ulrika Johansson (UJ)
Finalised on 2025-06-16 15:03:27 CEST (+0200)

Signatories

Ulrika Johansson (UJ)
RISE Research Institutes of Sweden AB
Company reg. no. 556464-6874
ulrika.johansson@ri.se
Signed 2025-06-16 14:02:58 CEST (+0200)

Fredrik Solhage (FS)
fredrik.solhage@ri.se
Signed 2025-06-16 15:03:27 CEST (+0200)

This verification was issued by Scrive. For more information/evidence about this document see the concealed attachments. Use a PDF-reader such as Adobe Reader that can show concealed attachments to view the attachments. Please observe that if the document is printed, the integrity of such printed copy cannot be verified as per the below and that a basic print-out lacks the contents of the concealed attachments. The digital signature (electronic seal) ensures that the integrity of this document, including the concealed attachments, can be proven mathematically and independently of Scrive. For your convenience Scrive also provides a service that enables you to automatically verify the document's integrity at: <https://scrive.com/verify>

