Translation from Polish into English

Instytut Techniki Budowlanej
(Building Research Institute)
Testing Laboratories Unit
accredited by the Polish Centre for Accreditation -
accreditation certificate no. AB 023

TEST REPORT
LZF00-01901/24/R67NZF/B

Client:	Profile VOX Sp. z o.o. sp. k. ul. Gdyńska 143 62-004 Czerwonak, Poland
Product name: **(declared by the Client)**	Extruded polystyrene (XPS) Linerio mouldings Linerio L-line Natural strip
Date of issue:	15 April 2025

(replaces the report of 04 Nov. 2024)
The new issue of the report includes an assessment of the results in accordance with French requirements.

Laboratory of Thermal Physics, Acoustic and the Environment (NZF)
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1. Information on testing

Product manufacturer: Profile VOX Sp. z o.o. sp. k.
ul. Gdyńska 143
62-004 Czerwonak, Poland

Test start date: 27-09-2024

Test end date: 28-10-2024

Other information on testing:

Sample unpacking date: 27-09-2024

Sample preparation date: 27-09-2024

Date of placing the sample in the emission test chamber: 27-09-2024

Sample surface area: 0.14 m^2

Sample dimensions: two samples measuring 58 cm x 12.2 cm were prepared; the edges not subject to testing were secured with aluminium tape

Stainless steel chamber; capacity: 0.1 m^3

Chamber fill rate: 1.4 m^2/m^3

Temperature: (23±1)°C

Relative humidity: (50±5)%

Air exchange rate: 0.5 h^{-1}

Place of testing:

LZF laboratory, at the following address: ul. Filtrowa 1, 00-611 Warsaw, Poland

Fig. 1. Sample Linerio L-line Natural strip prepared for testing

2. Product

2.1. Information provided by the Client

Product:	Extruded polystyrene (XPS) Linerio mouldings - Linerio L-line Natural strip
Declared scope of application:	Extruded polystyrene (XPS) LINERIO mouldings are designed for indoor wall and ceiling cladding.
Product range:	S-line cladding strips + finishing strips L-line cladding strips + finishing strips M-line cladding strips + finishing strips U all-purpose starter strip XS Line Micro cladding strips XS Line Wave cladding strips XS Line Oval cladding strips M Plus Line cladding strips L-XS M all-purpose strips L-XS O/W all-purpose strips M Plus Line starter strip M Plus Line finisher strip
Other information on testing:	From the range of Linerio extruded polystyrene (XPS) mouldings, the Client selected the Linerio L-line Natural strip as the representative product, given its highest weight and thickness.

3. Tested item, sample

3.1. Information provided by the Client

Origin of the sample:

Place of collection: from the warehouse

Date and time of sample collection: 24.07.2024 / 11:00 a.m.

Place of manufacture: Profile VOX Sp. z o.o. sp. k., ul. Gdyńska 143, 62-004 Czerwonak, Poland

Production batch: Q/Y/R

Production date: 25-02-2024

3.2. Information obtained from visual inspection in the Laboratory

Acceptance of the test item into the laboratory:

Date:	31-07-2024
Acceptance report:	LZF00-01901/24/R67NZF

Condition of the test item:
The sample was delivered in a condition and quantity suitable for testing.

Description of the test item:
Two Linerio L-line Natural strips (265 cm x 12.2 cm) were supplied for testing.

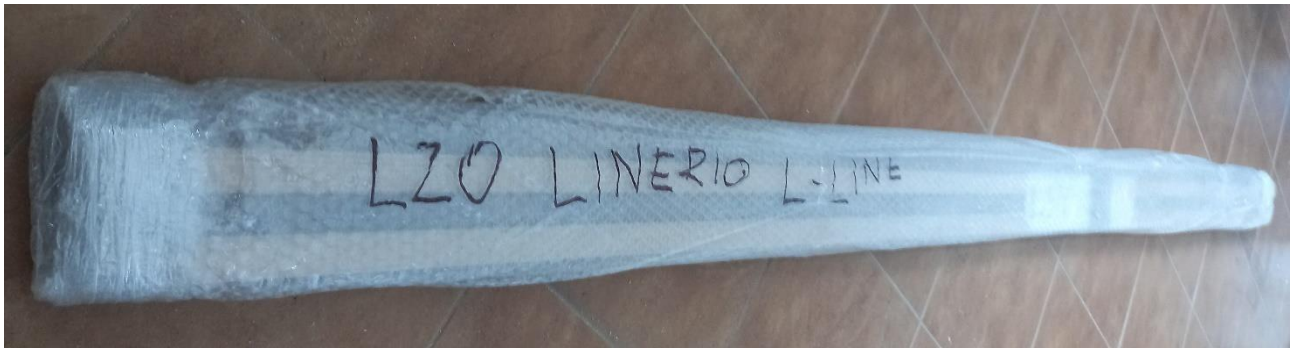

Fig. 2. Sample Linerio L-line Natural strip, as supplied to the laboratory.

Storage of the test item:
From the moment the sample was accepted until the start of the test, the sample was stored under laboratory conditions.

4. Test results

4.1. Testing for the emission of volatile organic compounds and volatile aldehydes

Volatile organic compounds were collected on Tenax tubes and analysed by thermal desorption using gas chromatography with a mass spectrometer (GC-MS). The compounds were identified using a mass spectrum library. The limit of quantification of this method is 1 µg/m^3.

In order to determine the volatile aldehydes, an air sample was collected on cassettes with a solid absorbent, silica gel with 2,4-dinitrophenylhydrazine (2,4-DNPH) applied to it, and then subjected to laboratory testing using high-performance liquid chromatography (HPLC/UV). The limit of quantification of this method is 1 µg/m^3.

4.1.1. Test method

1) PN-EN 16516+A1:2020-12 Construction products: Assessment of the release of dangerous substances - Determination of emissions into indoor air

2) PN-EN ISO 16000-9:2024-09 Indoor air - Part 9: Determination of emissions of volatile organic compounds from samples of building products and furnishing elements - Emission test chamber method

3) 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

4) ISO 16000-3:2022 Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air - Active sampling method

The test procedure, environmental conditions and accuracy of the measuring devices used comply with the requirements of the said standard.

4.1.2. Results

Table 1. Results of the emission of volatile organic compounds and volatile aldehydes in the air inside a chamber containing a sample of Linerio L-line Natural strip.

Identified chemical compound	[CAS]	Concentration of compounds in the chamber air [µg/m³] 1)	
		After 3 days	After 28 days
Volatile organic compounds C_6-C_{16}			
2,6,6-Trimethyloctane	[54166-32-4]	12 ± 3	< 1
2,2,4,4-Tetramethylooctane	[62183-79-3]	4 ± 1	< 1
Nonanal	[124-19-6]	16 ± 4	< 1
Decanal	[112-31-2]	5 ± 1	< 1
2-Methyl-propanoic acid 3-hydroxy-2,2,4-trimethylpentyl ester	[77-68-9]	13 ± 3	7 ± 2
Sum of unidentified compounds		14 ± 4	10 ± 3
TVOC (calculated as toluene equivalents)		**64 ± 17**	**18 ± 5**
Volatile aldehydes C_1-C_4			
Formaldehyde	[50-00-0]	< 1	< 1
Acetaldehyde	[75-07-0]	< 1	< 1
Propionaldehyde	[123-38-6]	< 1	< 1
Butyraldehyde	[123-72-8]	< 1	< 1

1) A standard solution produced by LGC Standards GmbH was used to quantify the C_6-C_{16} volatile organic compounds. The purity of the standard compounds is above 99.5%. Concentrations of the identified chemical compounds were calculated in relation to the toluene standard. A standard solution produced by Sigma-Aldrich was used to quantify the C_1-C_4 volatile aldehydes. The purity of the standard compounds is above 99%.

The expanded uncertainty (U) is 26% for VOCs and 23% for volatile aldehydes. The expanded uncertainty was calculated with an expansion probability of approximately 95% and an expansion factor k = 2.

The uncertainty of the test result may be influenced by additional factors unknown to the laboratory and related to the uncertainty of the test method. The level of uncertainty of the test method is given in ISO 16000-3:2022 and is not given in ISO 16000-6:2021.

The uncertainty of the U results was determined on the basis of available data including: data on the accuracy of the measurement system used and experimentally data on repeatability.

5. Conformity of the test results with applicable criteria

The results were assessed for conformity with the requirements of the Regulation of the Minister of Health and Welfare of 12.03.1996 on permissible concentrations and intensities of agents harmful to health emitted by building materials, devices and equipment in rooms intended for human occupancy (Monitor Polski of 1996, No. 19, item 231). The Regulation distinguishes between two types of indoor areas:

- category A - residential, intended for the permanent stay of patients in healthcare buildings and for the permanent stay of children and young people in educational buildings, as well as

indoor spaces intended for the storage of food products,

- category B - intended for the stay of people in public buildings other than those in category A, and auxiliary rooms in residential spaces.

Appendix 1 to the Regulation sets the permissible concentration for some of the identified chemical compounds. Their comparison against the values obtained by testing Linerio L-line Natural strip is shown in Table 2. For the other identified compounds, no permissible concentrations have been set.

Table 2. Comparison of the results against the requirements of the Regulation of the Ministry of Health and Welfare of 12.03.1996.

Tested property	**Test result (method according to 4.1.2.)**	**Evaluation criterion for indoor spaces in category A / B (Regulation of the Minister of Health and Welfare of 12.03.1996)**	**Conformity of the result with the criterion**
After 28 days			
Formaldehyde concentration	< 1 µg/m³	< 50 / 100 µg/m³	PASS
The parties agreed that as per the Regulation of the Ministry of Health and Welfare of 12.03.1996 the simple pass/fail criterion will be used. This means that the pass limits are equal to the tolerances stated in the aforementioned document.			

From the range of extruded polystyrene (XPS) Linerio mouldings, the Client selected the Linerio L-line Natural strip as a product representative for testing. Extruded polystyrene (XPS) Linerio mouldings fulfill the requirements of the national regulations on the release of hazardous substances specified in the Regulation of the Minister of Health and Welfare of 12.03.1996 and can be used without restriction in category A and category B indoor spaces.

The evaluation of the results with regard to the requirements of *Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils* can be found in Table 3.

Table 3. Evaluation of the results with regard to the requirements of *Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils.*

Tested property	**Test result (method according to 4.1.2.)**	**Assessment criterion [µg/m³]**				**Conformity of the result with the criterion**
		C	**B**	**A**	**A+**	
Formaldehyde concentration	< 1 µg/m³	> 120	< 120	< 60	<10	Class A+
Acetaldehyde concentration	< 1 µg/m³	> 400	< 400	< 300	< 200	Class A+
Toluene concentration	<1 µg/m³	> 600	< 600	< 450	< 300	Class A+
Tetrachloroethylene concentration	< 1 µg/m³	> 500	< 500	< 350	< 250	Class A+
Xylene concentration	< 1 µg/m³	> 400	< 400	< 300	< 200	Class A+
1,2,4-trimethylbenzene concentration	< 1 µg/m³	> 2000	< 2000	< 1500	< 1000	Class A+
1,4-dichlorobenzene concentration	< 1 µg/m³	> 120	< 120	< 90	< 60	Class A+
Ethylbenzene concentration	< 1 µg/m³	> 1500	< 1500	< 1000	< 750	Class A+

2-butoxyethanol concentration	< 1 µg/m³	> 2000	< 2000	< 1500	< 1000	Class A+
Styrene concentration	< 1 µg/m³	> 500	< 500	< 350	< 250	Class A+
TVOC	18 µg/m³	> 2000	< 2000	< 1500	< 1000	Class A+
The parties agreed that as per *Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils*, the simple pass/fail criterion will be used. This means that the pass limits are equal to the tolerances stated in the aforementioned document.						

Extruded polystyrene (XPS) Linerio mouldings meet the requirements of *Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils* regarding the release of class A+ hazardous substances.

The evaluation of the conformity of the test result with the criteria refers to the tested sample. The risk factors associated with the conformity assessment carried out are as follows:

- measurement uncertainty as presented in point 4 of this report,
- uncertainty of the test method as given in the ISO 16000-3:2022 test standard and not given in the ISO 16000-6:2021 test standard.

6. Disclaimer

The Testing Laboratory declares that the test results refer exclusively to the sample received.

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