



**TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.**  
**Technical and Test Institute for Construction Prague**

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Testing Laboratory No 1018.3  
accredited by ČIA pursuant to ČSN EN ISO/IEC 17025:2018

# TEST REPORT

**No 010-046082**

- on test of**
- determination of compression behaviour
  - determination of long - term water absorption by immersion
  - determination of thermal conductivity coefficient, thermal resistance and apparent density
  - determination of thickness

Manufacturer: **EURO FISI group LLC**  
Address: Rruga Gjilani Nr.61, Radivojce 61000 Viti Kosovo  
Identification No: 810196908

Plant: **EURO FISI group LLC**  
Address: Rruga Gjilani Nr.61, Radivojce 61000 Viti Kosovo

Test sample: **XPS 30**

Order No: Z010220097

Number of pages of the test report incl. title page: 7

Prepared by:

Pages of annexes: 0

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Approved by:



**Ing. Radka Sedmidubská**  
head of the Testing Department

Copy No: 1  
Number of copies: 4

Prague, on 31.10.2022

stamp of the testing laboratory No 1018.3

**Declaration:** 1) The test results in this Report relate only to the tested article and they do not substitute any other documents.  
2) The test report must be copied as a whole only otherwise a written consent of the testing laboratory is needed.

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## 1. Sample data

Evidence Number: - VZ010220256 - XPS 30 (1250x600x20) mm  
 - VZ010220257 - XPS 100 (1250x600x50) mm  
 - VZ010220258 - XPS 100 (1250x600x100) mm  
 - VZ010220259 - XPS 100 (1250x600x200) mm

Sample: - XPS 30 (1250x600x20) mm  
 - XPS 30 (1250x600x50) mm  
 - XPS 30 (1250x600x100) mm  
 - XPS 30 (1250x600x200) mm

Order: Z010220097

Date of sample delivery: 24.06.2022

Sampling place: not mentioned

Sampling method: not mentioned

Method of the sample preparation: Preparation of test samples was performed according to technical requirements of the applicant and test samples were prepared according to relevant standard.

The test results apply to the sample as received.

## 2. Test methods

Identification of the test method		Title of the test method
ČSN EN 826	Thermal insulating products for building applications - Determination of compression behaviour	Pressure test
ČSN EN ISO 16535*	Thermal insulating products for building applications - Determination of long-term water absorption by immersion <i>Note: *This standard replaced ČSN EN 12087.</i>	Determination of long term water absorption by immersion
ČSN EN 1602	Thermal insulating products for building applications - Determination of the apparent density	Determination of mass per unit volume
ČSN EN 12667	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance	Determination of thermal resistance by means of guarded hot plate and heat flow meter methods
ČSN EN 823	Thermal insulating products for building applications - Determination of thickness	Determination of thickness

Additions, deviations or exclusions from the standard procedure or use of non-standardized methods: were not applied.

### Other, related standards:

ČSN EN 13163+A1:2016 (EN 13163:2012+A1:2015)	Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products - Specification
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## 3. Test results

The tests were performed on: 11.07.2022 – 21.10.2022  
 Place of testing: Laboratories of Testing Department Prague  
 The tests were performed by: Michal Kadeřávek, Jiří Novák, Tomáš Simaichl

Data on the test conditions and equipment used are listed in the Test Minutes. Apparatuses and measuring instruments that were used have been calibrated and verified pursuant to the valid plan of Testing Department Prague.

Laboratory conditions: Temperature (23 ± 2) °C, Relative humidity (50 ± 5) %



### 3.1 Determination of compressive stress at 10 % deformation according to ČSN EN 826

The test was performed at  $(23 \pm 2)$  °C and relative air humidity  $(50 \pm 5)$  %.

Controlled environment of  $(23 \pm 2)$  °C and relative air humidity  $(50 \pm 5)$  % was used to condition the samples for min. 6 hours before the test.

Initial pressure:  $(250 \pm 10)$  kPa

Table No. 1: XPS 30 – thickness 20 mm

Sample No.	1	2	3	4	5	Mean value*
Compressive stress at 10% strain $\sigma_{10}$ [kPa]	242.45	265.65	239.95	225.45	236.60	242.00

Note: Mean value rounded to the nearest 0.05 kPa

Table No. 2: XPS 30 – thickness 50 mm

Sample No.	1	2	3	4	5	Mean value*
Compressive stress at 10% strain $\sigma_{10}$ [kPa]	257.85	249.20	246.40	246.15	287.70	257.45

Note: Mean value rounded to the nearest 0.05 kPa

Table No. 3: XPS 30 – thickness 100 mm

Sample No.	1	2	3	4	5	Mean value*
Compressive stress at 10% strain $\sigma_{10}$ [kPa]	369.80	335.45	341.25	338.85	338.55	344.80

Note: Mean value rounded to the nearest 0.05 kPa

Table No. 4: XPS 30 – thickness 200 mm

Sample No.	1	2	3	4	5	Mean value*
Compressive stress at 10% strain $\sigma_{10}$ [kPa]	423.90	436.75	458.3	434.20	437.70	438.15

Note: Mean value rounded to the nearest 0.05 kPa

### 3.2 Determination of long-term water absorption by immersion according to ČSN EN ISO 16535 (method 2A)

Duration of testing: 28 days

Bottom part of the test specimens was always in contact with water. Both sides A and B of test sample were tested. Tests were performed at  $(23 \pm 2)$  °C. Samples were stored before beginning of the test for at least 6 hours at  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative air humidity.

Table No. 5: XPS 30 – thickness 20 mm

Sample No.	1	2	3
Individual values of $W_{it}$ [%]	1.71	1.60	1.61
Arithmetic mean of $W_{it}$ [%]			1.6



Table No. 6: XPS 30 – thickness 50 mm

Sample No.	1	2	3
Individual values of $W_{it}$ [%]	1.15	1.15	1.14
Arithmetic mean of $W_{it}$ [%]			1,1

Table No. 7: XPS 30 – thickness 100 mm

Sample No.	1	2	3
Individual values of $W_{it}$ [%]	1.33	1.31	1.33
Arithmetic mean of $W_{it}$ [%]			1.3

Table No. 8: XPS 30 – thickness 200 mm

Sample No.	1	2	3
Individual values of $W_{it}$ [%]	0.93	0.99	0.93
Arithmetic mean of $W_{it}$ [%]			1.0

### 3.3 Determination of thermal resistance according to ČSN EN 12667 and apparent density according to ČSN EN 1602

A heat flow meter testing device was used for the test. It consists of a heating unit and a cooling unit with a single sample and a single heat flow meter. Measurement was taken at 10 °C mean test temperature. No significant changes in sample weight were observed during the test.

Test on apparent density was performed at  $(23 \pm 2)$  °C and relative air humidity  $(50 \pm 5)$  %.

Controlled environment of  $(23 \pm 2)$  °C and relative air humidity  $(50 \pm 5)$  % was used to condition the samples for min. 6 hours before the test.

Table No. 9: XPS 30 – thickness 20 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220256/1	0.02010	0.03479	0.578	30.5	30.6
VZ010220256/2	0.02006	0.03491	0.575	30.6	30.7
VZ010220256/3	0.02005	0.03491	0.574	30.6	30.6
VZ010220256/4	0.02007	0.03490	0.575	30.6	30.7



Table No. 10: XPS 30 – thickness 100 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220258/1	0.09898	0.03404	2.908	32.1	32.1
VZ010220258/2	0.09904	0.03409	2.905	32.0	32.1

Table No. 11: XPS 30 – thickness 200 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220259/1	0.19562	0.03596	5.440	33.0	33.1
VZ010220259/2	0.19586	0.03577	5.476	32.9	33.0
VZ010220259/3	0.19605	0.03582	5.473	33.0	33.0
VZ010220259/4	0.19601	0.03587	5.464	32.8	32.8

### 3.4 Determination of the aged values of thermal resistance according to ČSN EN 12667 and apparent density according to ČSN EN 1602

A heat flow meter testing device was used for the test. It consists of a heating unit and a cooling unit with a single sample and a single heat flow meter. Measurement was taken at 10 °C mean test temperature. No significant changes in sample weight were observed during the test.

Test on apparent density was performed at  $(23 \pm 2)$  °C and relative air humidity  $(50 \pm 5)$  %.

Each test specimen was cut into slices  $(10 \pm 1)$  m, retaining the surface skins, when present.

Store the individual slices at  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % relative air humidity for the following time periods:

- $(90 +2/-2)$  days for XPS foam thicknesses of 20 to 70 mm
- $(50 +2/-1)$  days for XPS foam thicknesses of > 70-120 mm
- $(30 +2/-0)$  days for XPS foam thicknesses > 120 mm

Table No. 12: XPS 30 – thickness 20 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220256/1	0.02042	0.03486	0.586	32.1	32.7
VZ010220256/2	0.02050	0.03488	0.588	33.4	33.5
VZ010220256/3	0.02034	0.03489	0.583	32.9	33.1
VZ010220256/4	0.02040	0.03486	0.585	33.1	33.2



Table No. 13: XPS 30 – thickness 100 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220258/1	0.09910	0.03866	2.563	32.7	32.7
VZ010220258/2	0.09914	0.03866	2.564	32.7	32.8

Table No. 14: XPS 30 – thickness 200 mm

Insulation product:	XPS 30				
Sample No.	Measurement results				
	Thickness during the test	Thermal conductivity coefficient	Thermal resistance	Apparent density before the test	Apparent density after the test
	[m]	[W/(m·K)]	[m <sup>2</sup> ·K/W]	[kg/m <sup>3</sup> ]	[kg/m <sup>3</sup> ]
VZ010220259/1	0.19561	0.04282	4.568	32.7	32.7
VZ010220259/2	0.19570	0.04244	4.611	32.1	32.1
VZ010220259/3	0.19595	0.04236	4.626	32.2	32.2
VZ010220259/4	0.19567	0.04229	4.627	32.2	32.2

### 3.5 Determination of thickness according to ČSN EN 823

Table No. 15: XPS 30 – thickness 20 mm

Insulation product:	XPS 30				
Sample No.	Measurement results [mm]				
	Points of the test specimen				Mean value
	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	
VZ010220256/1	20.1	20.2	20.0	20.0	20
VZ010220256/2	20.2	20.2	19.9	19.9	20
VZ010220256/3	19.8	19.9	20.2	20.3	20
VZ010220256/4	19.9	20.0	20.2	20.2	20



Table No. 16: XPS 30 – thickness 100 mm

Insulation product:	XPS 30				
Sample No.	Measurement results [mm]				
	Points of the test specimen				Mean value
	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	
VZ010220258/1	99.3	99.6	99.4	98.6	99
VZ010220258/2	99.4	99.3	98.8	98.6	99

Table No. 17: XPS 30 – thickness 200 mm

Insulation product:	XPS 30				
Sample No.	Measurement results [mm]				
	Points of the test specimen				Mean value
	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	
VZ010220259/1	195.3	195.8	195.5	195.9	196
VZ010220259/2	195.5	195.1	196.6	196.2	196
VZ010220259/3	196.2	196.2	195.9	195.9	196
VZ010220259/4	196.2	196.0	196.0	195.8	196

END OF THE TEST REPORT

