TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague, SOE
Akreditovaná zkušební laboratoř, Autorizovaná osoba, Notifikovaná osoba, Oznámený subjekt, Subjekt pro technické posuzování, Certifikační orgán, Inspekční orgán • Accredited Testing Laboratory, Authorized Body, Notified Body, Technical Assessment Body, Certification Body, Inspection Body • Prosecká 811/76a, 190 00 Praha 9 - Prosek, Czech Republic

Notified Body 1020
Branch 0700 – Ostrava

REPORT

on the assessment of performance

according to the Regulation (EU) 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), Art. 1.4 of the Annex V (system 3)

No. 1020–CPR–070058379

Trade name:

Boards from extruded polystyrene (XPS)

type / variation: Factory made extruded polystyrene boards

Manufacturer:

Elit Plast Ltd.co

INo:	314885021034
Address:	23 Vostochnaya, 41-a, Kherson, Ukraine
Plant:	Elit Plast Ltd.co
Address:	St. Mykulynetska 46, Ternopol, Ukraine
Order:	Z070200155

Number of report pages including tittle-page: 8 Number of Annexes: 5

The person taking responsibility for the content of this report:

Ing. Tomáš Klepáč
Head Assessor

The person taking responsibility for the correctness of this report:

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Stamp of the Notified Body 1020

Ostrava, October 26, 2020

Ing. Vojtěch Šebek
Deputy Manager of the Notified Body 1020

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Bank Name: KB Praha 1 Czech Republic, Account Number: 1501-931/0100, INo: 000 15679, VAT: CZ00015679

1. Specification of tested subject

Description and intended use of the product: Boards from extruded polystyrene (XPS) are used for thermal insulation of floors, walls, foundations, production of sandwich panels and for thermal insulation of installations and industrial equipment. The minimum thickness is 20 mm.

Technical specification: EN 13164:2012+A1:2015.

Manufacturer: Elit Plast Ltd.co, 23 Vostochnaya, 41-a, Kherson, Ukraine.

Plant: Elit Plast Ltd.co, St. Mykulynetska 46, Ternopol, Ukraine

2. Sampling

Date of sampling: August 31, 2020.

Place of sampling: Elit Plast Ltd.co, St. Mykulynetska 46, Ternopol, Ukraine.

Sampler: manufacturer's representative Yulia Garanenko.

Sampling method: random selection from the product warehouse.

Transport mode: car.

Date of the taking over: September 1, 2020 and September 3, 2020.

Sample Registration number: VZ070200561 and VZ070200562.

3. The assessment of performance on basis of testing, calculation, tabuled values, descriptive documentation

The assessment was carried out on the basis of tests.

3.1 The assessment on basis of testing

3.1.1. Reaction to fire

Sample specification: Boards from extruded polystyrene (XPS).

Assessment according to the test method:

- EN 13501-1:2018 Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests.
- ČSN EN ISO 11925-2:2020 Reaction to fire tests - Ignitability of building products subjected to direct impingement of flame - Part 2: Single-flame source test.

Classification protocol approved by: Ing. Jaroslav Dufek.

Date of the test ending: September 16, 2020.

Another date about the test: This classification has been carried out in accordance with EN 13501-1:2018.

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Test result: is given in the following table.

Table - Reaction to fire - Classification

Reaction to fire - Classification Boards from extruded polystyrene (XPS)	
Reaction to fire class	**E**

3.1.2. Thermal conductivity and thermal resistance, thickness

Sample specification: Boards from extruded polystyrene (XPS).

Assessment according to the test method:

- EN 13164:2012+A1:2015 Thermal insulation products for buildings – Factory made extruded polystyrene foam (XPS) products – Specification.
- EN 12667:2001 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.
- EN 823:2013 Thermal insulating products for building applications – Determination of thickness.

Test was carried out by: Ing. Tomáš Klepáč (AZL 1018.3).

Date of the test ending: October 14, 2020.

Another date about the test: The thermal conductivity coefficient test was performed according to the above regulations at a mean measurement temperature of 10 ° C on one set of samples; the set contained a total of 10 pieces of XPS samples.

The thickness determination test was performed according to the above regulations at a measuring temperature of 22 ° C on one set of samples, the set contained a total of 5 pieces of XPS samples with a nominal thickness of 50 mm.

Test results: are given in the following tables.

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Table - Thermal conductivity

Thermal conductivity Boards from extruded polystyrene (XPS)											
Marking of the sample in the laboratory		XPS/1	XPS/2	XPS/3	XPS/4	XPS/5	XPS/6	XPS/7	XPS/8	XPS/9	XPS/10
The measured value of the thermal conductivity of the sample λ_i	[W.m^{-1}.K^{-1}]	0,03337	0,03346	0,03339	0,03354	0,03351	0,03362	0,03338	0,03341	0,03336	0,03338
The average value of thermal conductivity of samples λ_{mean}	[W.m^{-1}.K^{-1}]	0,03344									
Selection standard deviation s_λ	[W.m^{-1}.K^{-1}]	0,00009									
Value k for 10 test results	[-]	2,07									
Coefficient of thermal conductivity $\lambda_{90/90}$ $\lambda_{90/90} = \lambda_{mean} + k \times s_\lambda$	[W.m^{-1}.K^{-1}]	0,03362									
Coefficient of thermal conductivity $\lambda_{90/90}$ (rounded)	[W.m^{-1}.K^{-1}]	**0,034**									

Table - Thermal resistance

Thermal resistance Boards from extruded polystyrene (XPS)		
Nominal product thickness d_N	[m]	0,050
Coefficient of thermal conductivity $\lambda_{90/90}$	[W.m^{-1}.K^{-1}]	0,03344
Thermal resistance $R_{90/90}$ $R_{90/90} = d_N / \lambda_{90/90}$	[m^2.K. W^{-1}]	1,487
Thermal resistance $R_{90/90}$ (rounded)	[m^2.K. W^{-1}]	**1,5**

Table – Thickness

Thickness Boards from extruded polystyrene (XPS)						
Marking of the sample in the laboratory		XPS/1	XPS/2	XPS/3	XPS/4	XPS/5
Sample thickness	[mm]	49,9	49,9	49,9	50,0	49,9
		49,9	50,0	49,9	50,0	50,0
		50,0	50,0	50,0	49,9	49,9
		50,0	49,9	49,9	50,0	50,0
Sample thickness - average value	[mm]	**50,0**	**50,0**	**49,9**	**50,0**	**50,0**

3.1.3. Release of hazardous substances

Sample specification: Boards from extruded polystyrene (XPS).

Assessment according to the test method:

- EN 13164:2012+A1:2015 Thermal insulation products for buildings – Factory made extruded polystyrene foam (XPS) products – Specification.
- Methodology No. 100660 (AZL 1018.9) according to ČSN EN ISO 16000-9, Indoor air - Part 9: Determination of volatile organic compound emissions from building materials and furniture - Test chamber method

Test was carried out by: V. Všetečková M.Sc., M. Pfeiferová (AZL 1018.9).

Date of the test ending: September 21, 2020.

Another date about the test: Total VOCs were measured on a GC-MS gas chromatograph by thermodesorption. Formaldehyde and other aldehydes and ketones were measured on an HPLC liquid chromatograph. Sampling time after 72 hours, at a temperature of 23 °C and a relative humidity of 50 %.

Test results: is given in the following table.

Table - Emissions of volatile organic compounds

Emissions of volatile organic compounds Boards from extruded polystyrene (XPS)	
Type of VOC	Concentration mg/m^3
- formaldehyde	< 0,0012
- aldehydes, ketones	< 0,01
- benzene	< 0,001
- toluene	< 0,01
- total xylenes	< 0,01
- styrene	< 0,01
- etylbenzene	< 0,01
- trichlorethylene	< 0,01
- tetrachlorethylene	< 0,01
- other volatile organic substances (VOC)	< 0,01
- total volatile organic substances (TVOC)	< 0,01
complied with the requirements for the total content of volatile organic compounds	

3.1.4. Compressive strength - compressive stress at 10% compression

Sample specification: Boards from extruded polystyrene (XPS).

Assessment according to the test method:

- EN 13164:2012+A1:2015 Thermal insulation products for buildings – Factory made extruded polystyrene foam (XPS) products – Specification.
- EN 826:2013 Thermal insulating products for building applications – Determination of compression behaviour.

Test was carried out by: Ing. Tomáš Klepáč (AZL 1018.3).

Date of the test ending: October 14, 2020.

Another date about the test: Compressive strength test - compressive stress at 10% compression was performed according to the above regulations on one set of samples, the set contained a total of 5 pieces of XPS samples.

Test results: is given in the following table.

Table - Compressive strength - compressive stress at 10% compression

Compressive strength - compressive stress at 10% compression Boards from extruded polystyrene (XPS), nominal thickness 50 mm				
Marking of the sample in the laboratory	Force corresponding to 10% compression F_{10}	The cross section of the sample A_0	Compressive strength σ_{10} $\sigma_{10} = 10^3 \times F_{10} / A_0$	Compressive strength σ_{10} $\sigma_{10} = 10^3 \times F_{10} / A_0$ (average value)
	[N]	[mm^2]	[kPa]	[kPa]
XPS/1a,b,c	12790	39940	320,2	319,7
	12861	40020	321,4	
	12742	40120	317,6	
XPS/2a,b,c	12894	39940	322,8	321,0
	12765	40220	317,4	
	12910	39980	322,9	
XPS/3a,b,c	12912	39960	323,1	323,3
	12895	39860	323,5	
	12945	40060	323,1	
XPS/4a,b,c	12862	39920	322,2	322,2
	12864	40100	320,8	
	12934	39960	323,7	
XPS/5a,b,c	12963	40180	322,6	323,0
	12899	39760	324,4	
	12911	40100	322,0	
Průměrná hodnota pevnosti v tlaku - napětí v tlaku při 10% stlačení σ_{10d}			[kPa]	321,9
Průměrná hodnota pevnosti v tlaku - napětí v tlaku při 10% stlačení σ_{10d} (zaokrouhleno)			[kPa]	**322**

3.1.5. Water permeability – long term water absorption by immersion

Sample specification: Boards from extruded polystyrene (XPS).

Assessment according to the test method:

- EN 13164:2012+A1:2015 Thermal insulation products for buildings – Factory made extruded polystyrene foam (XPS) products – Specification.
- ČSN EN 12087:2013 Thermal insulating products for building applications - Determination of long term water absorption by immersion.

Test was carried out by: Ing. Tomáš Klepáč (AZL 1018.3).

Date of the test ending: October 14, 2020.

Another date about the test: The test was performed according to the above regulations on samples XPS according to methods 1A and 2A.

Test results: are given in the following tables.

Table - Water permeability – long term water absorption by immersion

Water permeability – long term water absorption by immersion Boards from extruded polystyrene (XPS) - Method 1A		
Marking of the sample in the laboratory		XPS/1 XPS/2 XPS/3 XPS/4
Water permeability - absorbency - Method 1A W_{lp}	[kg/m^2]	0,5 0,4 0,3 0,4
Water permeability - absorbency - Method 1A W_{lp} (average value)	[kg/m^2]	**0,4**

Water permeability – long term water absorption by immersion Boards from extruded polystyrene (XPS) - Method 2A		
Marking of the sample in the laboratory		XPS/1 XPS/2 XPS/3 XPS/4
Water permeability - absorbency - Method 2A W_{lt}	[obj. %]	0,9 0,8 0,8 1,0
Water permeability - absorbency - Method 2A W_{lt} – (average value)	[obj. %]	**0,9**

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4. Attachments

4.1 Protocol No. 070-058374 on classification according to ČSN EN 13501-1+A1 for the product Boards from extruded polystyrene (XPS). Published by TZÚS Praha, s.p., testing laboratory TZÚS Praha, s.p. Ostrava branch No. 1018.3.

4.2 Protocol No. 070-058375 on the test of thermal conductivity, thermal resistance and thickness of Boards from extruded polystyrene (XPS). Published by TZÚS Praha, s.p., testing laboratory TZÚS Praha, s.p. Ostrava branch No. 1018.3.

4.3 Protocol No. 070-058376 on the determination of volatile organic compounds for the material Boards from extruded polystyrene (XPS). Published by TZÚS Praha, s.p., testing laboratory TZÚS Praha, s.p. Ostrava branch No. 1018.3.

4.4 Protocol No. 070-058377 on compressive strength test - compressive stress at 10% compression Boards from extruded polystyrene (XPS). Published by TZÚS Praha, s.p., testing laboratory TZÚS Praha, s.p. Ostrava branch No. 1018.3.

4.5 Protocol No. 070-058378 on the test for determination of water permeability - long-term water absorption by immersion of Boards from extruded polystyrene (XPS). Published by TZÚS Praha, s.p., testing laboratory TZÚS Praha, s.p. Ostrava branch No. 1018.3.

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