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Technical and Test Institute for Construction Prague, SOE
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Notified body 1020
Branch 0700, Ostrava

TEST REPORT

for assessment of performance

according to the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011, (Construction Products Regulation – CPR), Appendix V, Article 1.4 (system 3)

No. 1020 – CPR – 070061667

Product name:
SEMPRE TERM GRAFIT EPS 032
Type / variant: expanded polystyrene foam boards

Manufacturer:
SEMPRE Farby Sp. z o.o.
Company ID: 5471995321
Address: ul. Gen. J. Kustronia 60, 43-301 Bielsko-Biała, Poland
Manufacturing facility: SEMPRE Farby Sp. z o.o.
Address: ul. Gen. J. Kustronia 60, 43-301 Bielsko-Biała, Poland
Order: Z070220179

Number of pages of the report including the title page: 7 Number of annexes: 4

Person responsible for the contents of this report:

Ing. Tomáš Klepáč
Chief evaluator

Person responsible for correctness of this Report:

Stamp of notified body 1020

Ostrava, 12th August 2022

TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p. Oznámený subjekt ZÚS 1020

Ing. Vojtěch Šebek
deputy manager of notified body 1020

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Phone No.: +420 595 707200, Fax: +420 595 783065, Internat.: +420 595 783065, e-mail: sebek@tzus.cz, www.tzus.cz
Bank details (Bank): KB Prague 1 Czech Republic, Account No. 1501-931/0100, Company ID: 00015679, Tax ID: CZ00015679

1 Specification of the evaluated subject

Description and purpose of the product:

SEMPRE TERM GRAFIT EPS 032 polystyrene boards made of polystyrene foam are used for insulation requiring transmission of low mechanical loads, including thermal insulation of walls in External Thermal Insulation Composite Systems (ETICS, light - wet method), thermal insulation of multi-layer walls with a ventilated or non-ventilated air gap, thermal insulation of ring beams as stay-in-play formwork under the plastering, thermal insulation of lintels and panelling, external prefabricated composite sandwich panels, insulation of ceilings from below in External Thermal Insulation Composite Systems, insulation of sloped roof under the load-bearing structure.

Technical specification: EN 13163:2012+A2:2016.

Manufacturer: SEMPRE Farby Sp. z o.o., ul. Gen. J. Kustronia 60, 43-301 Bielsko-Biała, Poland.

Manufacturing facility: SEMPRE Farby Sp. z o.o., ul. Gen. J. Kustronia 60, 43-301 Bielsko-Biała, Poland.

2 Sampling:

Sampling date: 14 June 2022.

Sampling site: SEMPRE Farby Sp. z o.o., ul. Gen. J. Kustronia 60, 43-301 Bielsko-Biała, Poland.

Sample by AZL representative no. 1018.3 Ing. Tomáš Klepáč;
Aleksandra Dróżdż present as a representative of the manufacturer.

Method of transportation: client's vehicle.

Sampling procedure: random choice from the product warehouse.

Accepted by: AZL representative 1018.3 Ing. Tomáš Klepáč.

Acceptance date: 14 June 2022.

Sample registration number: the sample is designated number VZ070220413 from the sample book.

3 Assessment of properties based on testing, calculations, table values and documentation

Assessment of properties was performed based on testing.

3.1 Assessment of properties based on testing

3.1.1 Reaction to fire

Sample specifications: SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards).

The assessment was performed according to the test procedure of:

- EN 13501-1+A1:2018 Fire classification of construction products and building elements – Part 1 Classification using test data from reaction to fire tests.
- EN ISO 11925-2:2011 Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test Single-flame source test.

- EN 13238:2010 Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates.

Classification report approved by: Ing. Jaroslav Dufek.

Test completion date: 20 July 2022.

Further information about the test: This classification was performed pursuant to the Article 11 of ČSN EN 13501-1: 2018.

Test result: shown in the table below.

Table - Determination of reaction to fire - Classification

Determination of reaction to fire - Classification SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards)	
Class of reaction to fire	**E, E_{fl}**

3.1.2 Thermal conductivity and thermal resistance, thickness

Sample specifications: SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards).

The assessment was performed according to the test regulations of:

- EN 13163:2012+A2:2016 Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) 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 conducted by: Ing. Tomáš Klepáč (AZL no. 1018.3).

Test completion date: 05 August 2022.

Further information about the test: The test of thermal conductivity coefficient was carried out according to the regulations listed above at the mean temperature of measuring of 10 ^{0}C on one set of samples; the set contained 10 samples of SEMPRE TERM GRAFIT EPS 032 in total.

The test to determine thickness was carried out according to the regulations listed above at the mean temperature of measuring of 22 ^{0}C on one set of samples, the set contained 5 samples of SEMPRE TERM GRAFIT EPS 032 with the nominal thickness of 50 mm in total.

Test results: are stated in the tables that follow.

Table - Thermal conductivity

Thermal conductivity of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards)											
Sample identification (TZÚS)		EPS 032/1	EPS 032/2	EPS 032/3	EPS 032/4	EPS 032/5	EPS 032/6	EPS 032/7	EPS 032/8	EPS 032/9	EPS 032/10
Measured thermal conductivity coefficient of the sample λ_i	[W/m.K]	0.03079	0.03098	0.03058	0.03095	0.03086	0.03111	0.03088	0.03089	0.03109	0.03094
Mean thermal conductivity coefficient of the samples λ_{mean}	[W/m.K]	0.03091									
Sample standard deviations s_λ	[W/m.K]	0.00015									
Value k for 10 test results	[-]	2.07									
Thermal conductivity coefficient $\lambda_{90/90}$ $\lambda_{90/90} = \lambda_{mean} + k \times s_\lambda$	[W/m.K]	0.03122									
Thermal conductivity coefficient $\lambda_{90/90}$ (rounded)	[W/m.K]	**0.031**									

Table - Thermal resistance

Thermal resistance of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards)		
Nominal thickness of the product d_N	[m]	0.050
Thermal conductivity coefficient $\lambda_{90/90}$	[W/m.K]	0.03122
Thermal resistance $R_{90/90}$ $R_{90/90} = d_N / \lambda_{90/90}$	[m².K/W]	1.602
Thermal resistance $R_{90/90}$ (rounded)	[m².K/W]	**1.6**

Table - Thickness

Thickness of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards)						
Sample identification (TZÚS)		EPS 032/1	EPS 032/2	EPS 032/3	EPS 032/4	EPS 032/5
Sample thickness	[mm]	49.8	49.9	49.6	49.8	49.9
		49.7	49.8	49.8	49.6	49.8
		49.6	49.7	49.8	49.7	49.7
		49.9	49.6	49.7	49.7	49.7
Sample thickness - mean	[mm]	**49.8**	**49.8**	**49.7**	**49.7**	**49.8**

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3.1.3 Compressive strength - compressive stress at 10% compression

Sample specifications: SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards).

The assessment was performed according to the test procedures of:

- EN 13163:2012+A2:2016 Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) products – Specification.
- EN 826:2013 Thermal insulating products for building applications - Determination of compression behaviour.

Test conducted by: Ing. Tomáš Klepáč (AZL no. 1018.3).

Test completion date: 05 August 2022.

Further information about the test: The test of compressive strength - compressive stress at 10% compression was carried out according to the regulations listed above on one set of samples; the set contained 5 samples of SEMPRE TERM GRAFIT EPS 032 in total.

Test result: shown in the table below.

Table - Compressive strength - compressive stress at 10% compression

Compressive strength - compressive stress at 10% compression of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards), nominal thickness 50 mm				
Sample identification (TZÚS)	Force corresponding to 10% compressive strain F_{10}	Sample cross-section A_0	Compressive strength σ_{10} $\sigma_{10} = 10^3 \times F_{10} / A_0$	Compressive strength σ_{10} $\sigma_{10} = 10^3 \times F_{10} / A_0$ (mean)
	[N]	[mm^2]	[kPa]	[kPa]
EPS 032/1a,b,c	1850	22710	81.5	80.9
	1830	22786	80.3	
	1840	22725	81.0	
EPS 032/2a,b,c	1870	22860	81.8	81.5
	1870	22725	82.3	
	1840	22892	80.4	
EPS 032/3a,b,c	1850	22680	81.6	80.8
	1830	22800	80.3	
	1850	22967	80.5	
EPS 032/4a,b,c	1850	22831	81.0	81.7
	1890	22801	82.9	
	1850	22801	81.1	
EPS 032/5a,b,c	1840	22725	81.0	81.2
	1860	22846	81.4	
	1850	22740	81.4	
Mean compressive strength - compressive stress at 10% compression σ_{10d}			[kPa]	81.2
Mean compressive strength - compressive stress at 10% compression σ_{10d} (rounded)			[kPa]	**81**

3.1.4 Water permeability - long-term water absorption by immersion

Sample specifications: SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards).

The assessment was performed according to the test regulations of:

- EN 13163:2012+A2:2016 Thermal insulation products for buildings – Factory made expanded polystyrene (EPS) products – Specification.
- EN ISO 16535:2019 Thermal insulating products for building applications – Determination of long-term water absorption by immersion.

Test conducted by: Ing. Tomáš Klepáč (AZL no. 1018.3).

Test completion date: 05 August 2022.

Further information about the test: The test was carried out according to the regulations listed above on samples of SEMPRE TERM GRAFIT EPS 032 according to methods 1A and 2A.

Test result: shown in the tables bellow.

Table - Water permeability - long-term water absorption by immersion

Water permeability - long-term absorption by immersion of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards) - Method 1A		
Sample identification (TZÚS)		EPS 032/1 EPS 032/2 EPS 032/3 EPS 032/4
Water permeability - absorption Method 1A W_{lp}	[kg/m^2]	0.7
		0.6
		0.7
		0.5
Water permeability - absorption Method 1A W_{lp} (mean)	[kg/m^2]	**0.6**

Water permeability - long-term absorption of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards) - Method 2A		
Sample identification (TZÚS)		EPS 032/1 EPS 032/2 EPS 032/3 EPS 032/4
Water permeability - absorption Method 2A W_{lt}	[% vol.]	2.4
		2.1
		2.7
		2.5
Water permeability - absorption Method 2A W_{lt} – (mean)	[% vol.]	**2.4**

4 Annexes

4.1 Report no. 070-061663 on classification according to ČSN EN 13501-1 for the product SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards). Issued by TZÚS Praha, s.p., Test laboratory TZÚS Praha, s.p. Ostrava branch no. 1018.3.

4.2 Report no. 070-061664 on test of thermal conductivity, thermal resistance, and thickness of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards). Issued by TZÚS Praha, s.p., Test laboratory TZÚS Praha, s.p. Ostrava branch no. 1018.3.

4.3 Report no. 070-061665 on test of compressive strength - compressive stress at 10% compression of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards). Issued by TZÚS Praha, s.p., Test laboratory TZÚS Praha, s.p. Ostrava branch no. 1018.3.

4.4 Report no. 070-061666 on test of water permeability - long-term absorption by immersion of SEMPRE TERM GRAFIT EPS 032 (expanded polystyrene foam boards). Issued by TZÚS Praha, s.p., Test laboratory TZÚS Praha, s.p. Ostrava branch no. 1018.3.