Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

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European Technical Assessment

ETA-22/0569 of 14 November 2024

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General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	SOPRA XPS AM SL SOPRA XPS AM 500 SOPRA XPS AM 700 SOPRA XPS AM SL TB SOPRA XPS AM 500 TB SOPRA XPS AM 700 TB
Product family to which the construction product belongs	Extruded polystyrene foam boards as load bearing layer and/or thermal insulation outside the waterproofing
Manufacturer	SOPREMA SAS 14, Rue de Saint Nazaire 67025 STRASBOURG CEDEX 1 FRANKREICH
Manufacturing plant	Soprema NV Mammoetstraat 1 B-3700 Tongeren
This European Technical Assessment contains	11 pages including 2 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	040650-00-1201
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Specific Part

1 Technical description of the product

The extruded polystyrene foam boards are made of rigid cellular plastics material extruded from polystyrene or one of its copolymers and which has a closed cell structure. The blowing agent mixture is carbon dioxide (CO_2), isobutane and additives. The extruded polystyrene foam boards are produced in single or multiple layers and have a skin on both surfaces and a special edge treatment (shiplap).

The extruded polystyrene foam boards do not contain Hexabromocyclododecane (HBCD).

Single-layer extruded polystyrene foam boards have the following designations:

"SOPRA XPS AM SL",

"SOPRA XPS AM 500" and

"SOPRA XPS AM 700".

Single-layer extruded polystyrene foam boards are manufactured in the following nominal thicknesses:

Nominal thicknesses:	50 mm to 120 mm for SOPRA XPS AM SL,
	60 mm to 120 mm for SOPRA XPS AM 500,
	60 mm to 120 mm for SOPRA XPS AM 700

Multi-layer extruded polystyrene foam boards have the following designations:

"SOPRA XPS AM SL TB",

"SOPRA XPS AM 500 TB" and

"SOPRA XPS AM 700 TB".

Multi-layer boards are manufactured from two, three or four layers (single-layer boards) of extruded polystyrene which are bonded together by full-surface thermal welding. Multi-layer extruded polystyrene foam boards "SOPRA XPS AM SL TB" are made of single-layer boards with thicknesses from 40 mm to 70 mm, the boards "SOPRA XPS AM 500 TB" are made of single-layer boards with thicknesses from 50 mm to 80 mm and the boards "SOPRA XPS AM 700 TB" are made of single-layer boards with thicknesses from 60 mm to 80 mm.

Multi-layer extruded polystyrene foam boards are manufactured in the following nominal thicknesses:

Nominal thicknesses:	80 mm to 280 mm for SOPRA XPS AM SL TB,
	100 mm to 280 mm for SOPRA XPS AM 500 TB,
	120 mm to 280 mm for SOPRA XPS AM 700 TB

Single-layer and multi-layer extruded polystyrene foam boards are manufactured in the following nominal length and widths:

Nominal length:	1250 mm (primarily)
Nominal widths:	600 mm

The European Technical Assessment has been issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed. The European Technical Assessment applies only to products corresponding to this agreed data/information.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The extruded polystyrene foam boards are intended to be used as thermal insulation outside the waterproofing. The boards are laid uniformly and even on the substrate to which they are applied. In particular the following applications are covered:

- Load bearing and thermal insulation underneath foundation slabs for extruded polystyrene foam boards "SOPRA XPS AM SL", "SOPRA XPS AM 500" und "SOPRA XPS AM 700"
- External horizontal and vertical thermal insulation of in-ground constructions in non-structural applications (also in case of groundwater)
- Inverted roof insulation (including park deck and green roof applications)

The performance according to section 3 only applies if the thermal insulation boards are installed according to the manufacture's installation instructions and if they are protected from precipitation, wetting or weathering during transport and storage before installation.

Concerning the application of the thermal insulation boards, also the respective national regulations shall be observed.

Where the thermal insulation boards are fixed by using adhesives, only such adhesions shall be used, which are suitable for this purpose. The assessment of these fixings is not subject of this European Technical Assessment.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the extruded polystyrene foam boards of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

For sampling, conditioning and testing the provisions of the EAD No 040650-00-1201 "Extruded polystyrene foam boards as load bearing layer and/or thermal insulation outside the water-proofing" apply.

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Compressive stress at 10 % deformation or compressive strength	Level (individual values may fall below this level up to 10 %):
test acc. to EN 826:2013	
"SOPRA XPS AM SL"	
thickness 50 mm ≤ d ≤ 120 mm	≥ 300 kPa
"SOPRA XPS AM 500"	
thickness 60 mm ≤ d ≤ 120 mm	≥ 500 kPa
"SOPRA XPS AM 700"	
thickness 60 mm ≤ d ≤ 120 mm	≥ 700 kPa
Slip deformation	No performance assessed
Compressive stress or compressive strength in the transverse and longitudinal directions	No performance assessed

Essential characteristic	**Performance**
Characteristic value of compressive stress or compressive strength 5 %-fractile value for a one-sided confidence level of 75 % under unknown or known variance using ISO 12491:1997 "SOPRA XPS AM SL" thickness 50 mm ≤ d ≤ 80 mm thickness 100 mm ≤ d ≤ 120 mm "SOPRA XPS AM 500" thickness 60 mm ≤ d ≤ 120 mm "SOPRA XPS AM 700" thickness 60 mm ≤ d ≤ 120 mm	 $\sigma_{0,05}$ = 423 kPa (n= 18; σ_{mean}= 469 kPa; s_σ= 24 kPa) $\sigma_{0,05}$ = 521 kPa (n= 15; σ_{mean}= 556 kPa; s_σ= 18 kPa) $\sigma_{0,05}$ = 625 kPa (n= 16; σ_{mean}= 657 kPa; s_σ= 16 kPa) $\sigma_{0,05}$ = 787 kPa (n= 16; σ_{mean}= 840 kPa; s_σ= 27 kPa)
Compressive creep	See Annex A
Behaviour under shear load (large-sized specimen)	No performance assessed
Creep under shear load	No performance assessed
Creep under combined compressive and shear load	No performance assessed
Compressive modulus of elasticity	No performance assessed
Adhesion behaviour under compressive and shear load on large-sized samples	No performance assessed
Shear strength	No performance assessed
Density test acc. to EN 1602:2013 "SOPRA XPS AM SL" thickness 50 mm ≤ d ≤ 120 mm "SOPRA XPS AM 500" thickness 60 mm ≤ d ≤ 120 mm "SOPRA XPS AM 700" thickness 60 mm ≤ d ≤ 120 mm	 density range: 33 kg/m³ - 36 kg/m³ 37 kg/m³ - 41 kg/m³ 43 kg/m³ - 47 kg/m³

3.2 Safety in case of fire (BWR 2)

Essential characteristic	**Performance**
Reaction to fire test acc. to EN ISO 11925-2:2010	Class E acc. to EN 13501-1:2007 + A1:2009

3.3 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity at mean reference temperature of 10 °C test acc. to EN 12667:2001 or EN 12939:2001 and aging procedure acc. EN 13164:2012+A1:2015, Annex C with deviating storage time period (sliced specimen) of (90 +2/-2) days prior to testing	
"SOPRA XPS AM SL"	
thickness 50 mm ≤ d ≤ 60 mm	$\lambda_{D(90d)}$ = 0,033 W/(m ·K)
thickness 60 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
"SOPRA XPS AM SL TB"	
thickness 80 mm	$\lambda_{D(90d)}$ = 0,033 W/(m ·K)
thickness 80 mm < d ≤ 280 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
"SOPRA XPS AM 500"	
thickness 60 mm	$\lambda_{D(90d)}$ = 0,034 W/(m ·K)
thickness 60 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
"SOPRA XPS AM 500 TB"	
thickness 100 mm	$\lambda_{D(90d)}$ = 0,034 W/(m ·K)
thickness 100 mm < d ≤ 280 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
"SOPRA XPS AM 700"	
thickness 60 mm	$\lambda_{D(90d)}$ = 0,034 W/(m ·K)
thickness 60 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
"SOPRA XPS AM 700 TB"	
thickness 120 mm < d ≤ 280 mm	$\lambda_{D(90d)}$ = 0,035 W/(m ·K)
Moisture conversion coefficient	No performance assessed
Water absorption Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A) Long term water absorption by diffusion test acc. to EN 12088:2013	 WL(T)0,7 (W_{lt} ≤ 0,7 Vol.%) WD(V)3 (W_{dV} ≤ 3,0 Vol.%)

Essential characteristic	Performance
Freeze-thaw resistance test acc. to EN 12091 using the wet test specimens from having done the water diffusion test in accordance with EN 12088: 2013 single-layer boards: "SOPRA XPS AM SL", "SOPRA XPS AM 500" and "SOPRA XPS AM 700"	FTCD1 (W_V ≤ 1,0 Vol.%)
Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013	≤ 10 %
multi-layer boards: "SOPRA XPS AM SL TB", "SOPRA XPS AM 500 TB" and "SOPRA XPS AM 700 TB"	FTCD2 (WV ≤ 2,0 Vol.%)
Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013	≤ 10 %
Reduction of shear strength of the re-dried specimens, when tested in accordance with EN 12090:2013	≤ 10 %
Reduction of tensile strength of the re-dried specimens, when tested in accordance with EN 1607:2013	≤ 10 %
Water vapour diffusion resistance factor acc. to EN 12086:2013 multi-layer boards: "SOPRA XPS AM SL TB", "SOPRA XPS AM 500 TB" and "SOPRA XPS AM 700 TB"	see Annex B
Geometrical properties	tolerance
Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3)	± 2 mm
Length, width test acc. EN 822:2013	± 8 mm
Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013	5 mm/m
Flatness in direction of length and width test acc. EN 825:2013	2 mm

Essential characteristic	**Performance**
Compressive stress at 10 % deformation or compressive strength test acc. to EN 826:2013 "SOPRA XPS AM SL TB" "SOPRA XPS AM 500 TB" "SOPRA XPS AM 700 TB"	Level ≥ 300 kPa ≥ 500 kPa ≥ 700 kPa
Density test acc. to EN 1602:2013 "SOPRA XPS AM SL TB "SOPRA XPS AM 500 TB" "SOPRA XPS AM 700 TB"	 density range: 33 kg/m³ - 36 kg/m³ 37 kg/m³ - 43 kg/m³ 44 kg/m³ - 48 kg/m³
Deformation under specified compressive load and temperature conditions test acc. to EN 1605:2013	 load: 40 kPa; temperature: (70 ± 1) °C; time: (168 ± 1) h ≤ 5 %
Dimensional stability under specified conditions test acc. to EN 1604:2013	 temperature: 70 °C and 90 % R.H. DS(70,90) ($\Delta\varepsilon_l \leq 5$ %, $\Delta\varepsilon_b \leq 5$ %, $\Delta\varepsilon_d \leq 5$ %)
Tensile strength perpendicular to faces test acc. to EN 1607:2013 multi-layer boards: "SOPRA XPS AM SL TB", "SOPRA XPS AM 500 TB" and "SOPRA XPS AM 700 TB"	 TR200 ($\sigma_{mt} \geq 200$ kPa)
Shear strength test acc. to EN 12090:2013 multi-layer boards: "SOPRA XPS AM SL TB", "SOPRA XPS AM 500 TB" and "SOPRA XPS AM 700 TB"	 ≥ 150 kPa
Volume percentage of closed cells test acc. to EN ISO 4590:2016 (method 1 with correction)	 ≥ 95 %

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No. 040650-00-1201, the applicable European legal acts are: 1995/467/EC and 1999/91/EC[1].

The systems to be applied are:

System 1 for Essential characteristics concerning Mechanical resistance and stability (BWR 1)

System 3 all other Essential characteristics

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 14 November 2024 by Deutsches Institut für Bautechnik

Frank Iffländer
Head of Section

beglaubigt:
Meyer

[1] as amended

Deutsches Institut für Bautechnik DIBt

SOPRA XPS AM SL
SOPRA XPS AM 500
SOPRA XPS AM 700
SOPRA XPS AM SL TB
SOPRA XPS AM 500 TB
SOPRA XPS AM 700 TB

Annex A

1 Compressive creep

1.1 Compressive creep (single-layer board)

SOPRA XPS AM SL	**Thickness 50 mm**			**Thickness 120 mm**		
Density (kg/m³)	35			34.5		
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	430/8			546/2		
Load stage (kPa)	**100**	**130**	**180**	**100**	**130**	**180**
X_0 (mm)	0.28	0.37	0.46	0.42	0.49	0.62
X_{ct} (mm)	0.20	0.27	0.73	0.25	0.30	0.47
X_{ct50}(mm)	0.49	0.66	2.14	0.79	0.88	1.42
X_{t50}(mm)	**0.77**	**1.03**	**2.60**	**1.21**	**1.37**	**2.04**

SOPRA XPS AM 500	**Thickness 60 mm**			**Thickness 120 mm**		
Density (kg/m³)	39.7			38.2		
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	650/2			660/2		
Load stage (kPa)	**130**	**180**	**250**	**130**	**180**	**250**
X_0 (mm)	0.27	0.36	0.40	0.40	0.61	0.79
X_{ct} (mm)	0.08	0.10	0.16	0.28	0.39	0.63
X_{ct50}(mm)	0.16	0.26	0.36	0.87	1.21	1.87
X_{t50}(mm)	**0.43**	**0.62**	**0.76**	**1.27**	**1.82**	**2.66**

SOPRA XPS AM 700	**Thickness 60 mm**			**Thickness 120 mm**		
Density (kg/m³)	47.2			43		
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	805/5			840/2		
Load stage (kPa)	**180**	**250**	**350**	**180**	**250**	**350**
X_0 (mm)	0.29	0.39	0.49	0.50	0.66	0.86
X_{ct} (mm)	0.20	0.31	0.60	0.30	0.41	0.59
X_{ct50}(mm)	0.56	0.77	1.71	0.96	1.39	1.62
X_{t50}(mm)	**0.86**	**1.16**	**2.20**	**1.46**	**2.05**	**2.48**

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SOPRA XPS AM SL
SOPRA XPS AM 500
SOPRA XPS AM 700
SOPRA XPS AM SL TB
SOPRA XPS AM 500 TB
SOPRA XPS AM 700 TB

Annex B

Water vapour transmission in accordance with EN 12086

SOPRA XPS AM SL TB	**thickness 80 mm (2x 40 mm)**	**thickness 280 mm (4x 70 mm)**	
sliced thickness of the specimens in mm			
Skin layer	9	10	
Adhesion layer	27	170	
Core layer	37	90	
water vapour diffusion resistance factor (mean values for the sliced thickness)			
μ_{skin}	338	244	
μ_{ad}	203	141	
μ_{core}	171	119	

SOPRA XPS AM 500 TB	**thickness 100 mm (2x 50 mm)**	**thickness 160 mm (2x 80 mm)**	**thickness 280 mm (4x 70 mm)**
sliced thickness of the specimens in mm			
Skin layer	10	10	10
Adhesion layer	50	34	170
Core layer	33	110	92
water vapour diffusion resistance factor (mean values for the sliced thickness)			
μ_{skin}	298	165	254
μ_{ad}	260	182	162
μ_{core}	243	169	135

SOPRA XPS AM 700 TB	**thickness 120 mm (2x 60 mm)**	**thickness 160 mm (2x 80 mm)**	**thickness 280 mm (4x 70 mm)**
sliced thickness of the specimens in mm			
Skin layer	10	10	10
Adhesion layer	35	34	170
Core layer	69	111	91
water vapour diffusion resistance factor (mean values for the sliced thickness)			
μ_{skin}	264	171	202
μ_{ad}	207	191	155
μ_{core}	168	197	137