

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

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European Technical Assessment

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English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

swissporXPS 300 SF
swissporXPS 500 SF
swissporXPS 700 SF

Product family
to which the construction product belongs

Extruded polystyrene foam boards as load bearing layer
and / or thermal insulation outside the water-proofing

Manufacturer

swisspor AG
Bahnhofstraße 50
6312 Steinhausen
SCHWEIZ

Manufacturing plant

Alporit AG
Industriestrasse 559
CH-5623 Boswil

This European Technical Assessment
contains

11 pages including 1 annex 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

EAD 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 is carbon dioxide (CO₂) and additives.

Extruded polystyrene foam boards with a thickness up to 100 mm are manufactured in a single layer.

Multi-layer boards with thicknesses greater than 100 mm up to 280 mm are manufactured from two, three or four layers (single-layer boards) of extruded polystyrene which are bonded together by full-surface bonding with a special adhesive (amount of adhesive 50 - 100 g/m²). Multi-layer boards "swissporXPS 300 SF" and "swissporXPS 500 SF" are made of single-layer boards with thicknesses from 50 mm to 70 mm, "swissporXPS 700 SF" are made of single-layer boards with thicknesses from 50 mm to 60 mm. Multi-layer boards are composed of single layer boards with a maximum difference in layer thickness of 10 mm.

The extruded polystyrene foam boards have a foam skin on both surfaces and a special edge treatment (shiplap).

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

The extruded polystyrene foam boards have the following designations:

- "swissporXPS 300 SF",
- "swissporXPS 500 SF" and
- "swissporXPS 700 SF".

The extruded polystyrene foam boards are manufactured with the following dimensions:

Single-layer boards:

Nominal thicknesses:	50 mm to 100 mm
Nominal length ¹ :	1250 mm
Nominal widths:	600 mm

Multi-layer boards:

Nominal thicknesses:	
"swissporXPS 300 SF", "swissporXPS 500 SF"	110 mm to 280 mm
"swissporXPS 700 SF"	110 mm to 240 mm
Nominal length ¹ :	1250 mm
Nominal widths:	600 mm

The European Technical Assessment has been issued for the products 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 load bearing layer and /or thermal insulation also outside the waterproofing. The boards are laid uniformly on the substrate to which they are applied. In particular the following applications are intended:

¹ greater length dimensions are possible

English translation prepared by DIBt

- Load bearing and thermal insulation underneath foundation slabs for boards "swissporXPS 500 SF" (thickness 60 to 120 mm) and "swissporXPS 700 SF" (thickness 50 to 120 mm)
- 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 test acc. to EN 826:2013 "swissporXPS 500 SF" thickness $60 \text{ mm} \leq d \leq 120 \text{ mm}$	Level (individual values may fall below this level up to 10 %): $\geq 500 \text{ kPa}$
"swissporXPS 700 SF" thickness $50 \text{ mm} \leq d \leq 120 \text{ mm}$	$\geq 700 \text{ kPa}$
Slip deformation	No performance assessed
Compressive stress or compressive strength in the transverse and longitudinal directions	No performance assessed

Essential characteristic	Performance
<p>Characteristic value of compressive stress or compressive strength</p> <p>5%-fractile value for a one-sided confidence level of 75 % under unknown or known variance using ISO 12491:1997</p> <p>"swissporXPS 500 SF" (single-layer boards) thickness $60 \text{ mm} \leq d \leq 100 \text{ mm}$</p> <p>"swissporXPS 500 SF" (multi-layer boards) thickness $100 \text{ mm} < d \leq 120 \text{ mm}$</p> <p>"swissporXPS 700 SF" (single-layer boards) thickness $50 \text{ mm} \leq d \leq 100 \text{ mm}$</p> <p>"swissporXPS 700 SF" (multi-layer boards) thickness $100 \text{ mm} < d \leq 120 \text{ mm}$</p>	<p>$\sigma_{0,05} = 505 \text{ kPa}$ ($n = 50$; $\sigma_{\text{mean}} = 538 \text{ kPa}$; $s_{\sigma} = 19 \text{ kPa}$)</p> <p>$\sigma_{0,05} = 498 \text{ kPa}$ ($n = 39$; $\sigma_{\text{mean}} = 546 \text{ kPa}$; $s_{\sigma} = 27 \text{ kPa}$)</p> <p>$\sigma_{0,05} = 703 \text{ kPa}$ ($n = 36$; $\sigma_{\text{mean}} = 749 \text{ kPa}$; $s_{\sigma} = 26 \text{ kPa}$)</p> <p>$\sigma_{0,05} = 709 \text{ kPa}$ ($n = 35$; $\sigma_{\text{mean}} = 766 \text{ kPa}$; $s_{\sigma} = 32 \text{ kPa}$)</p>
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
<p>Shear strength</p> <p>test acc. EN 12090:2013</p> <p>"swissporXPS 500 SF" thickness $100 \text{ mm} < d \leq 120 \text{ mm}$</p> <p>"swissporXPS 700 SF" thickness $100 \text{ mm} < d \leq 120 \text{ mm}$</p>	<p>$\tau \geq 200 \text{ kPa}$</p> <p>$\tau \geq 250 \text{ kPa}$</p>
<p>Density</p> <p>test acc. to EN 1602:2013</p> <p>"swissporXPS 500 SF" thickness $60 \text{ mm} \leq d \leq 120 \text{ mm}$</p> <p>"swissporXPS 700 SF" thickness $50 \text{ mm} \leq d \leq 120 \text{ mm}$</p>	<p>density range:</p> <p>$36 \text{ kg/m}^3 - 43 \text{ kg/m}^3$</p> <p>$38 \text{ kg/m}^3 - 46 \text{ kg/m}^3$</p>

3.2 Safety in case of fire (BWR 2)

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

3.3 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
<p>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</p> <p>"swissporXPS 300 SF" thickness $50 \leq d \leq 60$ mm thickness $60 < d \leq 280$ mm</p> <p>"swissporXPS 500 SF" thickness $50 \leq d \leq 60$ mm thickness $60 < d \leq 280$ mm</p> <p>"swissporXPS 700 SF" thickness $50 \leq d \leq 60$ mm thickness $60 < d \leq 240$ mm</p> <p>Moisture conversion coefficient</p>	<p>$\lambda_{D(90d)} = 0,033$ W/(m·K) $\lambda_{D(90d)} = 0,035$ W/(m·K)</p> <p>$\lambda_{D(90d)} = 0,033$ W/(m·K) $\lambda_{D(90d)} = 0,035$ W/(m·K)</p> <p>$\lambda_{D(90d)} = 0,033$ W/(m·K) $\lambda_{D(90d)} = 0,035$ W/(m·K)</p> <p>No performance assessed</p>
<p>Water absorption</p> <p>Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A) "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p> <p>Long term water absorption by diffusion test acc. to EN 12088:2013 "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p>	<p>WL(T)0,7 ($W_{it} \leq 0,7$ Vol.%)</p> <p>WD(V)3 ($W_{dv} \leq 3,0$ Vol.%)</p>
<p>Freeze-thaw resistance test acc. to EN 12091:2013</p> <p>using the wet test specimens from having done the water diffusion test in accordance with EN 12088:2013 single-layer boards, thickness ≤ 100 mm</p> <p>Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013</p>	<p>FTCD1 ($W_v \leq 1,0$ Vol.%) ≤ 10 %</p>

Essential characteristic	Performance
<p>Freeze-thaw resistance test acc. to EN 12091:2013 using the wet test specimens from having done the water diffusion test in accordance with EN 12088:2013 multi-layer boards, thickness $d > 100$ mm Reduction of shear strength of the wet and re-dried specimens, when tested in accordance with EN 12090:2013 Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013</p>	<p>FTCD2 ($W_V \leq 2,0$ Vol.%) ≤ 10 % ≤ 10 %</p>
<p>Water vapour diffusion resistance factor acc. to EN 12086:2013 "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF" thickness > 100 mm (multi-layer boards)</p>	<p>climatic condition A ≤ 220</p>
<p>Geometrical properties</p> <p>Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3) "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF" thickness ≤ 100 mm (single-layer boards) thickness > 100 mm (multi-layer boards)</p> <p>Length, width test acc. EN 822:2013 "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p> <p>Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013 "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p> <p>Flatness in direction of length and width test acc. EN 825:2013 "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p>	<p>tolerance</p> <p>± 2 mm $+ 3/-2$ mm</p> <p>± 8 mm</p> <p>5 mm/m</p> <p>3 mm</p>

Essential characteristic	Performance
<p>Deformation under specified compressive load and temperature conditions</p> <p>test acc. to EN 1605:2013</p> <p>"swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p> <p>thickness ≤ 100 mm (single-layer boards) thickness > 100 mm (multi-layer boards)</p>	<p>load: 40 kPa; temperature: (70 ± 1) °C; time: (168 ± 1) h</p> <p>≤ 5 % ≤ 3 %</p>
<p>Compressive stress at 10 % deformation or compressive strength</p> <p>test acc. to EN 826:2013</p> <p>"swissporXPS 300 SF" thickness $50 \text{ mm} \leq d \leq 280 \text{ mm}$</p> <p>"swissporXPS 500 SF" thickness $d = 50 \text{ mm}$, $120 \text{ mm} < d \leq 280 \text{ mm}$</p> <p>"swissporXPS 700 SF" thickness $120 \text{ mm} < d \leq 240 \text{ mm}$</p>	<p>Level</p> <p>≥ 300 kPa ≥ 500 kPa ≥ 700 kPa</p>
<p>Dimensional stability under specified conditions</p> <p>test acc. to EN 1604:2013</p> <p>"swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"</p>	<p>temperature: 70 °C and 90% R.H.</p> <p>DS(70,90) ($\Delta\epsilon_l \leq 5$ %, $\Delta\epsilon_b \leq 5$ %, $\Delta\epsilon_d \leq 5$ %)</p>
<p>Tensile strength perpendicular to faces</p> <p>test acc. to EN 1607:2013</p> <p>"swissporXPS 300 SF" (multi-layer boards) thickness $100 \text{ mm} < d \leq 280 \text{ mm}$,</p> <p>"swissporXPS 500 SF" (multi-layer boards) thickness $100 \text{ mm} < d \leq 280 \text{ mm}$,</p> <p>"swissporXPS 700 SF" (multi-layer boards) thickness $100 \text{ mm} < d \leq 240 \text{ mm}$</p>	<p>TR200 ($\sigma_{mt} \geq 200$ kPa) TR200 ($\sigma_{mt} \geq 200$ kPa) TR200 ($\sigma_{mt} \geq 200$ kPa)</p>
<p>Density</p> <p>test acc. to EN 1602:2013</p> <p>"swissporXPS 300 SF" thickness $50 \text{ mm} \leq d \leq 280 \text{ mm}$</p> <p>"swissporXPS 500 SF" thickness $d = 50 \text{ mm}$, $120 \text{ mm} < d \leq 280 \text{ mm}$</p> <p>"swissporXPS 700 SF" thickness $120 \text{ mm} < d \leq 240 \text{ mm}$</p>	<p>density range:</p> <p>$31 \text{ kg/m}^3 - 36 \text{ kg/m}^3$ $36 \text{ kg/m}^3 - 43 \text{ kg/m}^3$ $38 \text{ kg/m}^3 - 46 \text{ kg/m}^3$</p>

Essential characteristic	Performance
Shear strength test acc. to EN 12090:2013 "swissporXPS 300 SF" (multi-layer boards) thickness 100 mm < d ≤ 280 mm "swissporXPS 500 SF" (multi-layer boards) thickness 120 mm < d ≤ 280 mm "swissporXPS 700 SF" (multi-layer boards) thickness 120 mm < d ≤ 240 mm	 ≥ 150 kPa ≥ 200 kPa ≥ 250 kPa
Volume percentage of closed cells test acc. to EN ISO 4590:2016 (method 1 with correction) "swissporXPS 300 SF", "swissporXPS 500 SF", "swissporXPS 700 SF"	 ≥ 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

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 October 2022 by Deutsches Institut für Bautechnik

Frank Iffländer
Head of Section

beglaubigt:
Wendler

swissporXPS 300 SF
swissporXPS 500 SF
swissporXPS 700 SF

Annex A

1 Compressive creep

1.1 Compressive creep (single-layer and multi-layer boards)

swissporXPS 500 SL (single-layer boards)	thickness 60 mm			thickness 100 mm		
Density (kg/m ³)	40			36		
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	564/2			550/2		
Load stage (kPa)	130	180	230	130	180	230
X ₀ (mm)	0.28	0.39	0.51	0.43	0.57	0.72
X _{ct} (mm)	0.17	0.30	0.43	0.25	0.35	0.53
X _{ct50} (mm)	0.45	0.70	1.14	0.60	0.94	1.31
X_{t50}(mm)	0.73	1.09	1.65	1.03	1.51	2.03
swissporXPS 500 SL (multi-layer boards)	thickness 120 mm (2x 60 mm)					
Density (kg/m ³)	41					
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	542/2					
load stage (kPa)	130	180	230			
X ₀ (mm)	0.47	0.64	0.84			
X _{ct} (mm)	0.49	0.73	1.08			
X _{ct50} (mm)	1.26	1.85	2.51			
X_{t50}(mm)	1.73	2.49	3.35			
swissporXPS 700 SL (single-layer boards)	thickness 53 mm			thickness 105 mm		
Density (kg/m ³)	46			38		
Compressive stress/ deformation acc. EN 826:2013 (kPa / %)	802/2			773/3		
load stage (kPa)	200	250	300	200	250	300
X ₀ (mm)	0.31	0.36	0.42	0.58	0.64	0.73
X _{ct} (mm)	0.20	0.25	0.36	0.28	0.36	0.50
X _{ct50} (mm)	0.51	0.73	0.95	0.68	0.85	1.25
X_{t50}(mm)	0.82	1.09	1.37	1.26	1.49	1.98

swissporXPS 300 SF
swissporXPS 500 SF
swissporXPS 700 SF

Annex A

swissporXPS 700 SL (multi-layer boards)	thickness 120 mm (2x 60 mm)		
Density (kg/m ³)	46		
Compressive stress/ deformation acc. EN 826: 2013 (kPa / %)	762/2		
Load stage (kPa)	200	250	300
X ₀ (mm)	0.56	0.66	0.78
X _{ct} (mm)	0.56	0.68	0.96
X _{ct50} (mm)	1.80	2.12	2.78
X_{t50}(mm)	2.36	2.77	3.56