

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-19/0250
of 25 July 2019

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Synthos XPS PRIME 30 G
Synthos XPS PRIME 50 G
Synthos XPS PRIME 70 G

Product family
to which the construction product belongs

Extruded polystyrene foam boards as load bearing layer
and/or thermal insulation outside the waterproofing

Manufacturer

Synthos S.A.
ul. Chemików 1
32-600 OSWIECIM
POLEN

Manufacturing plant

Synthos Kralupy a.s.,
O.Wichterleho 810
278 01 Kralupy nad Vltavou
CZECH REPUBLIC

This European Technical Assessment
contains

9 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 mixture is carbon dioxide (CO₂) and additives. The extruded polystyrene foam boards have a 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:

"Synthos XPS PRIME 30 G",

"Synthos XPS PRIME 50 G" and

"Synthos XPS PRIME 70 G".

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

| | |
|----------------------|--|
| Nominal thicknesses: | 50 mm to 160 mm for Synthos XPS PRIME 30 G, 50 mm to 120 mm for Synthos XPS PRIME 50 G, 50 mm to 100 mm for Synthos XPS PRIME 70 G |
| Nominal length: | 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 outside the waterproofing. The boards are laid uniformly on the substrate to which they are applied. In particular the following applications are intended:

- Load bearing and thermal insulation underneath foundation slabs for boards "Synthos XPS PRIME 30 G" and "Synthos XPS PRIME 50 G" up to 120 mm thickness and for boards "Synthos XPS PRIME 70 G" up to 100 mm thickness
- 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 manufacturer'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 waterproofing" 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 "Synthos XPS PRIME 30 G" thickness $50 \text{ mm} \leq d \leq 120 \text{ mm}$ "Synthos XPS PRIME 50 G" "Synthos XPS PRIME 70 G" | Level (individual values may fall below this level up to 10 %): $\geq 300 \text{ kPa}$ $\geq 500 \text{ kPa}$ $\geq 700 \text{ kPa}$ |
| Slip deformation | No performance assessed |
| Compressive stress or compressive strength in the transverse and longitudinal directions | No performance assessed |
| 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 "Synthos XPS PRIME 30 G" thickness $50 \text{ mm} \leq d < 100 \text{ mm}$ thickness $100 \text{ mm} \leq d \leq 120 \text{ mm}$ "Synthos XPS PRIME 50 G" thickness $50 \text{ mm} \leq d \leq 120 \text{ mm}$ "Synthos XPS PRIME 70 G" thickness $50 \text{ mm} \leq d \leq 100 \text{ mm}$ | $\sigma_{0,05} = 351 \text{ kPa}$ ($n= 50$; $\sigma_{\text{mean}}= 422 \text{ kPa}$; $s_{\sigma}=43 \text{ kPa}$) $\sigma_{0,05} = 373 \text{ kPa}$ ($n= 50$; $\sigma_{\text{mean}}= 442 \text{ kPa}$; $s_{\sigma}=42 \text{ kPa}$) $\sigma_{0,05} = 543 \text{ kPa}$ ($n= 50$; $\sigma_{\text{mean}}= 628 \text{ kPa}$; $s_{\sigma}= 52 \text{ kPa}$) $\sigma_{0,05} = 740 \text{ kPa}$ ($n= 22$; $\sigma_{\text{mean}}= 831 \text{ kPa}$; $s_{\sigma}= 53 \text{ kPa}$) |
| Compressive creep | See Annex A |
| Behaviour under shear load (large-sized specimen) | No performance assessed |
| Creep under shear load | No performance assessed |

| Essential characteristic | Performance |
|--|-------------------------|
| 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 "Synthos XPS PRIME 30 G" thickness $50 \text{ mm} \leq d \leq 120 \text{ mm}$ "Synthos XPS PRIME 50 G" "Synthos XPS PRIME 70 G" | density range: $30 \text{ kg/m}^3 - 36 \text{ kg/m}^3$ $39 \text{ kg/m}^3 - 43 \text{ kg/m}^3$ $44 \text{ kg/m}^3 - 52 \text{ kg/m}^3$ |
|--|---|

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 $10 \text{ }^\circ\text{C}$ 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 "Synthos XPS PRIME 30 G" thickness $50 \text{ mm} \leq d \leq 60 \text{ mm}$ thickness $60 \text{ mm} < d \leq 160 \text{ mm}$ "Synthos XPS PRIME 50 G" thickness $50 \text{ mm} \leq d \leq 60 \text{ mm}$ thickness $60 \text{ mm} < d \leq 120 \text{ mm}$ "Synthos XPS PRIME 70 G" thickness $50 \text{ mm} \leq d \leq 60 \text{ mm}$ thickness $60 \text{ mm} < d \leq 100 \text{ mm}$ | $\lambda_{D(90d)} = 0,032 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0,035 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0,032 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0,035 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0,033 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0,036 \text{ W/(m} \cdot \text{K)}$ |
| Moisture conversion coefficient | No performance assessed |
| Water absorption Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A) | WL(T)0,7 ($W_{it} \leq 0,7 \text{ Vol.}\%$) |

| Essential characteristic | Performance |
|--|--|
| Long term water absorption by diffusion test acc. to EN 12088:2013 | WD(V)3 ($W_{dv} \leq 3,0$ Vol.%) |
| 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 Reduction in compressive stress at 10 % deformation or in compressive strength of the re-dried specimens, when tested in accordance with EN 826:2013 | FTCD1 ($W_v \leq 1,0$ Vol.%) ≤ 10 % |
| Water vapour diffusion resistance factor | No performance assessed |
| Geometrical properties Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3) Length, width test acc. EN 822:2013 Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013 Flatness in direction of length and width test acc. EN 825:2013 | tolerance ± 2 mm ± 8 mm 5 mm/m 2 mm |
| 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) ($\Delta \epsilon_l \leq 5$ %, $\Delta \epsilon_b \leq 5$ %, $\Delta \epsilon_d \leq 5$ %) |
| Compressive stress at 10 % deformation or compressive strength test acc. to EN 826:2013 " Synthos XPS PRIME 30 G" thickness $120 \text{ mm} < d \leq 160 \text{ mm}$ | ≥ 300 kPa |
| Tensile strength perpendicular to faces | No performance assessed |

| Essential characteristic | Performance |
|---|---|
| Density test acc. to EN 1602:2013 "Synthos XPS PRIME 30 G" thickness 120 mm < d ≤ 160 mm | density range: 32 kg/m ³ - 37 kg/m ³ |
| 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/EC¹.

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 25 July 2019 by Deutsches Institut für Bautechnik

Maja Tiemann
Head of Department

beglaubigt:
Wendler

¹ as amended

Synthos XPS PRIME 30 G
Synthos XPS PRIME 50 G
Synthos XPS PRIME 70 G
Synthos XPS PRIME 50 G
Synthos XPS PRIME 70 G

Annex A

1 Compressive creep

1.1 Compressive creep (single-layer board)

| Synthos XPS PRIME 30 G | thickness 50 mm | | | thickness 50 mm | thickness 100 mm | thickness 120 mm |
|--|-----------------|-------------|------------------------|-----------------|------------------|------------------|
| density (kg/m ³) | 31 | | | 30 | 32 | 33 |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 457 | | | 421 | 497 | 580 |
| load stage (kPa) | 120 | 150 | 180 | 110 | 110 | 110 |
| X ₀ (mm) | 0,24 | 0,33 | 0,39 | 0,47 | 0,41 | 0,37 |
| X _{ct} (mm) | 0,24 | 0,35 | 0,61 | 0,36 | 0,32 | 0,15 |
| X _{ct50} (mm) | 0,46 | 0,64 | 1,17 | 0,56 | 0,57 | 0,34 |
| X_{t50}(mm) | 0,70 | 0,97 | 1,56 | 1,03 | 0,98 | 0,71 |
| Synthos XPS PRIME 30 G | | | | | | |
| thickness 160 mm | | | | | | |
| density (kg/m ³) | 35 | | | | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 465 | | | | | |
| load stage (kPa) | 120 | 150 | 180 | | | |
| X ₀ (mm) | 1,85 | 2,31 | 2,78 | | | |
| X _{ct} (mm) | 2,23 | 2,78 | 4,28 | | | |
| X _{ct50} (mm) | 3,12 | 4,34 | 7,23 | | | |
| X_{t50}(mm) | 4,97 | 6,65 | 10,01 | | | |
| Synthos XPS PRIME 50 G | | | | | | |
| thickness 50 mm | | | thickness 80 mm | | | |
| density (kg/m ³) | 41 | | | 37 | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 656 | | | 667 | | |
| load stage (kPa) | 190 | 220 | 250 | 175 | | |
| X ₀ (mm) | 0,26 | 0,30 | 0,35 | 0,35 | | |
| X _{ct} (mm) | 0,33 | 0,36 | 0,48 | 0,16 | | |
| X _{ct50} (mm) | 0,59 | 0,68 | 0,89 | 0,42 | | |
| X_{t50}(mm) | 0,85 | 0,98 | 1,24 | 0,77 | | |

Synthos XPS PRIME 30 G
Synthos XPS PRIME 50 G
Synthos XPS PRIME 70 G
Synthos XPS PRIME 50 G
Synthos XPS PRIME 70 G

Annex A

| Synthos XPS PRIME 50 G | thickness 120 mm | | |
|---|------------------|-------------|-------------|
| density (kg/m ³) | 36 | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 590 | | |
| load stage (kPa) | 170 | 200 | 230 |
| X ₀ (mm) | 0,84 | 1,06 | 0,96 |
| X _{ct} (mm) | 0,97 | 1,83 | 1,85 |
| X _{ct50} (mm) | 1,70 | 3,21 | 3,77 |
| X_{t50}(mm) | 2,54 | 4,27 | 4,73 |

| Synthos XPS PRIME 70 G | thickness 50 mm | | | thickness 100 mm | | |
|---|-----------------|-------------|-------------|------------------|-------------|-------------|
| density (kg/m ³) | 43 | | | 36 | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 733 | | | 706 | | |
| load stage (kPa) | 210 | 240 | 270 | 210 | 240 | 270 |
| X ₀ (mm) | 0,27 | 0,31 | 0,34 | 0,55 | 0,63 | 0,77 |
| X _{ct} (mm) | 0,28 | 0,39 | 0,47 | 0,50 | 0,68 | 0,89 |
| X _{ct50} (mm) | 0,61 | 0,81 | 0,97 | 0,81 | 1,12 | 1,71 |
| X_{t50}(mm) | 0,88 | 1,12 | 1,31 | 1,36 | 1,75 | 2,48 |