

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-18/0015
of 21 February 2020

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

XENERGY SLP,
RAVATHERM XPS X 300 SL

Product family
to which the construction product belongs

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

Manufacturer

Ravago Building Solutions Germany GmbH
Value Park Y51
06258 Schkopau
DEUTSCHLAND

Manufacturing plant

RAVAGO Building Solutions Germany GmbH
Industriestraße 1
06258 Schkopau
DEUTSCHLAND

This European Technical Assessment
contains

8 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

This version replaces

ETA-18/0015 issued on 10 April 2018

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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 isobutane. 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:

"XENERGY SLP" and
"RAVATHERM XPS X 300 SL".

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

| | |
|----------------------|-----------------|
| Nominal thicknesses: | 80 mm to 200 mm |
| Nominal length: | 1250 mm |
| 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 load bearing layer and/or thermal insulation inside or 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 layer and thermal insulation with a thickness from 80 mm to 120 mm underneath foundation slabs
- 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 thickness $80 \leq d \leq 120$ mm | Level (individual values may fall below this level up to 10 %): ≥ 300 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 thickness $80 \leq d \leq 120$ mm | $\sigma_{0,05} = 364$ kPa (n= 50); $\sigma_{\text{mean}} = 471$ kPa; $s_{\sigma} = 64$ 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 thickness $80 \leq d \leq 120$ mm | density range: $35 \text{ kg/m}^3 - 38 \text{ kg/m}^3$ |

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 |
|---|---|
| <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>thickness 80 ≤ d ≤ 120 mm</p> <p>thickness 120 < d ≤ 200 mm</p> | <p>$\lambda_{D(90d)} = 0,031 \text{ W/(m} \cdot \text{K)}$</p> <p>$\lambda_{D(90d)} = 0,032 \text{ W/(m} \cdot \text{K)}$</p> |
| Moisture conversion coefficient | No performance assessed |
| <p>Water absorption</p> <p>Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A)</p> <p>Long term water absorption by diffusion test acc. to EN 12088:2013</p> | <p>WL(T)0,7 ($W_{it} \leq 0,7 \text{ Vol.}\%$)</p> <p>WD(V)3 ($W_{dv} \leq 3,0 \text{ Vol.}\%$)</p> |
| <p>Freeze-thaw resistance test acc. to EN 12091</p> <p>using the wet test specimens from having done the water diffusion test in accordance with EN 12088: 2013</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 ($W_v \leq 1,0 \text{ Vol.}\%$)</p> <p>≤ 10 %</p> |
| Water vapour diffusion resistance factor | No performance assessed |
| <p>Geometrical properties</p> <p>Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3)</p> <p>Length, width test acc. EN 822:2013</p> <p>Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013</p> <p>Flatness in direction of length and width test acc. EN 825:2013</p> | <p>tolerance</p> <p>± 2 mm</p> <p>± 8 mm</p> <p>5 mm/m</p> <p>2 mm</p> |

| Essential characteristic | Performance |
|---|--|
| Deformation under specified compressive load and temperature conditions test acc. to EN 1605:2013 | load: 40 kPa; temperature: $(70 \pm 1) ^\circ\text{C}$; time: $(168 \pm 1) \text{ h}$ $\leq 5 \%$ |
| Dimensional stability under specified conditions test acc. to EN 1604:2013 | temperature: $70 ^\circ\text{C}$ and 90 % R.H. DS(70,90) ($\Delta\varepsilon_l \leq 5 \%$, $\Delta\varepsilon_b \leq 5 \%$, $\Delta\varepsilon_d \leq 5 \%$) |
| Compressive stress at 10 % deformation or compressive strength test acc. to EN 826:2013 thickness $120 < d \leq 200 \text{ mm}$ | $\geq 300 \text{ kPa}$ |
| Tensile strength perpendicular to faces | No performance assessed |
| Density test acc. to EN 1602:2013 thickness $120 < d \leq 200 \text{ mm}$ | density range: $35 \text{ kg/m}^3 - 38 \text{ kg/m}^3$ |
| Volume percentage of closed cells test acc. to EN ISO 4590:2016 (method 1 with correction) | $\geq 95 \%$ |

English translation prepared by DIBt

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 21 February 2020 by Deutsches Institut für Bautechnik

Maja Tiemann
Head of Department

beglaubigt:
Wendler

¹ as amended

**XENERGY SLP,
RAVATHERM XPS X 300 SL**

Annex A

Compressive creep

test acc. to EN 1606:2013 and EAD 040650-00-1201

| XENERGY SLP RAVATHERM XPS X 300 SL | thickness 80 mm | | | thickness 140 mm | | |
|---|------------------------|-------------|-------------|-------------------------|-------------|-------------|
| density (kg/m ³) | 34 | | | 36 | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 561/4 | | | 473/2 | | |
| load stage (kPa) | 80 | 110 | 140 | 80 | 110 | 140 |
| X ₀ (mm) | 0,12 | 0,22 | 0,29 | 0,26 | 0,42 | 0,63 |
| X _{ct} (mm) | 0,14 | 0,17 | 0,24 | 0,16 | 0,20 | 0,28 |
| X _{ct50} (mm) | 0,32 | 0,40 | 0,58 | 0,3 | 0,39 | 0,52 |
| X_{t50}(mm) | 0,44 | 0,61 | 0,87 | 0,55 | 0,81 | 1,14 |

| XENERGY SLP RAVATHERM XPS X 300 SL | thickness 80 mm | | thickness 120 mm | | |
|---|------------------------|--|-------------------------|-------------|-------------|
| density (kg/m ³) | 35,5 | | 38 | | |
| compressive stress/ deformation acc. EN 826:2013 (kPa / %) | 504/- | | 552/- | | |
| load stage (kPa) | 145 | | 130 | 150 | 180 |
| X ₀ (mm) | 0,45 | | 0,53 | 0,55 | 0,60 |
| X _{ct} (mm) | 0,26 | | 0,28 | 0,32 | 0,42 |
| X _{ct50} (mm) | 0,53 | | 0,44 | 0,53 | 0,76 |
| X_{t50}(mm) | 0,98 | | 0,97 | 1,08 | 1,36 |