

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-18/0267
of 7 November 2022

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

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 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

Austrotherm GmbH
Friedrich-Schmid-Straße 165
2754 Waldegg/Wopfing
ÖSTERREICH

Manufacturing plant

Austrotherm GmbH Werk Purbach
Industriestraße 1
A-7083 Purbach

This European Technical Assessment
contains

13 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-18/0267 issued on 17 August 2020

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Specific Part

1 Technical description of the product

The multilayer extruded polystyrene foam boards are manufactured from up to five layers of extruded polystyrene foam boards (single boards). The single boards with thicknesses of 60 mm to 80 mm are bonded together by full-surface thermal welding. The single boards are made of rigid cellular plastics material extruded from polystyrene or one of its copolymers and which have a closed cell structure. The blowing agent mixture is carbon dioxide (CO₂), isobutene and additives.

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

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

The multilayer extruded polystyrene foam boards have the following designations:

- "Austrotherm XPS TOP 30 TB",
- "Austrotherm XPS TOP 50 TB" and
- "Austrotherm XPS TOP 70 TB"

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

Nominal thicknesses:

"Austrotherm XPS TOP 30 TB"	140 mm to 340 mm
"Austrotherm XPS TOP 50 TB"	140 mm to 300 mm
"Austrotherm XPS TOP 70 TB"	140 mm to 300 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 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 layer and thermal insulation underneath foundation slabs up to 300 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 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.

English translation prepared by DIBt

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 "Austrotherm XPS TOP 30 TB" "Austrotherm XPS TOP 50 TB" "Austrotherm XPS TOP 70 TB" Slip deformation Compressive stress or compressive strength in the transverse and longitudinal directions	Level (individual values may fall below this level up to 10 %): ≥ 300 kPa ≥ 500 kPa ≥ 700 kPa No performance assessed 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 "Austrotherm XPS TOP 30 TB" thickness 140 mm ≤ d ≤ 300 mm "Austrotherm XPS TOP 50 TB" thickness 140 mm ≤ d ≤ 300 mm "Austrotherm XPS TOP 70 TB" thickness 140 mm < d ≤ 300 mm	 σ _{0,05} = 317 kPa (n = 50; σ _{mean} = 356 kPa; s _σ = 22 kPa) σ _{0,05} = 502 kPa (n = 24; σ _{mean} = 544 kPa; s _σ = 23 kPa) σ _{0,05} = 703 kPa (n = 11; σ _{mean} = 746 kPa; s _σ = 21 kPa)
Compressive creep	See Annex A

Essential characteristic	Performance
Behaviour under shear load (large-sized specimen) test acc. to the EAD and the guidelines in EN 12090:2013 "Austrotherm XPS TOP 30 TB", thickness 300 mm "Austrotherm XPS TOP 70 TB", thickness 300 mm	$\tau_{\text{large}} = 105 \text{ kPa}$ $\tau_{\text{large}} = 162 \text{ kPa}$
Creep under shear load	See Annex A
Creep under combined compressive and shear load	See Annex A
Compressive modulus of elasticity	No performance assessed
Adhesion behaviour under compressive and shear load on large-sized samples	No performance assessed
Shear strength test acc. to EN 12090:2013	$\geq 200 \text{ kPa}$
Density test acc. to EN 1602:2013 "Austrotherm XPS TOP 30 TB" "Austrotherm XPS TOP 50 TB" "Austrotherm XPS TOP 70 TB"	density range: $29 \text{ kg/m}^3 - 33 \text{ kg/m}^3$ $32 \text{ kg/m}^3 - 36 \text{ kg/m}^3$ $36 \text{ kg/m}^3 - 41 \text{ kg/m}^3$

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 °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 "Austrotherm XPS TOP 30 TB" "Austrotherm XPS TOP 50 TB" "Austrotherm XPS TOP 70 TB"	$\lambda_{D(90d)} = 0.035 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0.035 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0.035 \text{ W/(m} \cdot \text{K)}$
Moisture conversion coefficient	No performance assessed

Essential characteristic	Performance
<p>Water absorption</p> <p>Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A)</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p> <p>Long term water absorption by diffusion test acc. to EN 12088:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</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 12091:2013</p> <p>using the wet test specimens from having done the water diffusion test in accordance with EN 12088:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</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>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p> <p>Reduction in shear strength of the re-dried specimens, when tested in accordance with EN 12090:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>FTCD1 ($W_v \leq 1.0 \text{ Vol.}\%$)</p> <p>$\leq 10 \%$</p> <p>$\leq 10 \%$</p>
<p>Water vapour diffusion resistance factor test acc. to EN 12086 and EAD</p>	<p>See Annex A</p>
<p>Geometrical properties</p> <p>Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3)</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p> <p>Length, width test acc. EN 822:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>tolerance</p> <p>+4/-2 mm</p> <p>$\pm 8 \text{ mm}$</p>

Essential characteristic	Performance
<p>Geometrical properties</p> <p>Squareness</p> <p>in direction of length and width; in direction of thickness</p> <p>test acc. EN 824:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p> <p>Flatness</p> <p>in direction of length and width</p> <p>test acc. EN 825:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>tolerance</p> <p>5 mm/m</p> <p>3 mm</p>
<p>Compressive stress at 10 % deformation or compressive strength</p> <p>test acc. to EN 826:2013</p> <p>"Austrotherm XPS TOP 30 TB", thickness 300 mm < d ≤ 340 mm</p>	<p>≥ 300 kPa</p>
<p>Density</p> <p>test acc. to EN 1602:2013</p> <p>"Austrotherm XPS TOP 30 TB" thickness 300 mm < d ≤ 340 mm</p>	<p>density range:</p> <p>29 kg/m³ - 33 kg/m³</p>
<p>Deformation under specified compressive load and temperature conditions</p> <p>test acc. to EN 1605:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>load: 40 kPa; temperature: (70 ± 1) °C; time: (168 ± 1) h</p> <p>≤ 5 %</p>
<p>Dimensional stability under specified conditions</p> <p>test acc. to EN 1604:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>temperature: 70 °C and 90% R.H.</p> <p>DS(70,90) (Δε_l ≤ 5 %, Δε_b ≤ 5 %, Δε_d ≤ 5 %)</p>
<p>Tensile strength perpendicular to faces</p> <p>test acc. to EN 1607:2013</p> <p>"Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"</p>	<p>TR150 (σ_{mt} ≥ 150 kPa)</p>

Essential characteristic	Performance
Volume percentage of closed cells test acc. to EN ISO 4590:2003 (method 1 with correction) "Austrotherm XPS TOP 30 TB", "Austrotherm XPS TOP 50 TB", "Austrotherm XPS TOP 70 TB"	$\geq 95\%$

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 system to be applied is:

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

System 3 for 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 7 November 2022 by Deutsches Institut für Bautechnik

Frank Iffländer
Referatsleiter

beglaubigt:
Wendler

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 TB

Anlage A

1. Compressive creep (single-layer and multi-layer boards)
acc. to EN 1606:2013 and EAD, chapter 2.2.3.1

Austrotherm XPS TOP 30 TB (multi-layer boards)	thickness 140 mm			thickness 180 mm		
density (kg/m ³)	30.5			30.5		
compressive stress/ deformation acc. EN 826 (kPa / %)	443/8			393/8		
load stage (kPa)	94	141	188	83	125	166
X ₀ (mm)	0.63	0.94	1.16	0.76	1.28	1.43
X _{ct} (mm)	0.53	1.01	3.37	0.87	1.33	2.15
X _{ct50} (mm)	1.39	2.32	9.63	1.48	2.32	4.92
X_{t50}(mm)	2.02	3.26	10.79	2.56	3.60	6.35

Austrotherm XPS TOP 30 TB (multi-layer boards)	thickness 300 mm		
density (kg/m ³)	31		
compressive stress/ deformation acc. EN 826 (kPa / %)	412/5		
load stage (kPa)	87	131	174
X ₀ (mm)	1.04	1.53	2.14
X _{ct} (mm)	0.69	1.18	2.55
X _{ct50} (mm)	1.48	2.58	6.35
X_{t50}(mm)	2.52	4.11	8.49

Austrotherm XPS TOP 50 TB (multi-layer boards)	thickness 140 mm			thickness 180 mm		
density (kg/m ³)	33.5			33.5		
compressive stress/ deformation acc. EN 826 (kPa / %)	635/9			614/10		
load stage (kPa)	134	202	269	130	195	260
X ₀ (mm)	0.67	0.83	1.26	0.60	1.27	1.26
X _{ct} (mm)	0.45	0.55	2.91	0.51	0.85	2.97
X _{ct50} (mm)	1.33	1.41	7.00	1.24	2.40	8.10
X_{t50}(mm)	2.00	2.24	8.26	1.84	3.67	9.36

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 TB

Anlage A

Austrotherm XPS TOP 50 TB (multi-layer boards)	thickness 300 mm		
density (kg/m ³)	33.5		
compressive stress/ deformation acc. EN 826 (kPa / %)	606/8		
load stage (kPa)	128	192	257
X ₀ (mm)	1.17	1.41	1.75
X _{ct} (mm)	0.71	1.29	3.18
X _{ct50} (mm)	1.89	3.24	8.00
X_{t50}(mm)	3.06	4.65	9.75

Austrotherm XPS TOP 70 TB (multi-layer boards)	thickness 140 mm			thickness 180 mm		
density (kg/m ³)	39			36		
compressive stress/ deformation acc. EN 826 (kPa / %)	799/5			761/9		
load stage (kPa)	169	254	338	161	242	322
X ₀ (mm)	0.55	0.75	1.11	0.78	1.06	1.42
X _{ct} (mm)	0.37	0.82	1.98	0.44	0.83	2.26
X _{ct50} (mm)	1.21	2.27	5.71	1.02	2.02	6.88
X_{t50}(mm)	1.76	3.02	6.82	1.80	3.08	8.30

Austrotherm XPS TOP 70 TB (multi-layer boards)	thickness 300 mm		
density (kg/m ³)	40		
compressive stress/ deformation acc. EN 826 (kPa / %)	769/5		
load stage (kPa)	163	244	326
X ₀ (mm)	1.15	1.36	2.05
X _{ct} (mm)	0.57	0.83	2.70
X _{ct50} (mm)	1.49	2.12	6.71
X_{t50}(mm)	2.64	3.48	8.76

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 TB

Annex A

2. Creep under shear load
acc. to EAD, chapter 2.2.5

Austrotherm XPS TOP 30 TB (multi-layer boards)	thickness 300 mm
density (kg/m ³)	31
shear strength/ deformation acc. EN 12090 (kPa)	105/2
load stage (kPa)	36.8
X _{τ0} (mm)	2.19
X _{τct} (mm)	1.07
X _{τct50} (mm)	2.11
X_{τ50}(mm)	4.30

Austrotherm XPS TOP 70 TB (multi-layer boards)	thickness 300 mm
density (kg/m ³)	41
shear strength/ deformation acc. EN 12090 (kPa)	162.3/3
load stage (kPa)	56.8
X _{τ0} (mm)	3.38
X _{τct} (mm)	1.23
X _{τct50} (mm)	2.09
X_{τ50}(mm)	5.47

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 TB

Annex A

3. Creep under combined compressive and shear load
acc. to EAD, chapter 2.2.6

Austrotherm XPS TOP 30 TB (multi-layer boards)		
thickness	300 mm	
density (kg/m ³)	31	
compressive stress/ deformation acc. EN 826 (kPa / %)	436/-	
shear strength/ deformation acc. EN 12090 (kPa)	105.2/2	
load stage (kPa)	36.8	130.8
deformation under	shear load	compressive load
X _{τ0} /X ₀ (mm)	2.34	2.88
X _{τct} /X _{ct} (mm)	2.05	2.55
X _{τct50} /X _{ct50} (mm)	3.94	2.89
X_{τ50}/X_{t50}(mm)	5.99	5.77

Austrotherm XPS TOP 70 TB (multi-layer boards)		
thickness	300 mm	
density (kg/m ³)	41	
compressive stress/ deformation acc. EN 826 (kPa / %)	813/-	
shear strength/ deformation acc. EN 12090 (kPa)	162.3/3	
load stage (kPa)	56.8	244.1
deformation under	shear load	compressive load
X _{τ0} /X ₀ (mm)	3.68	3.68
X _{τct} /X _{ct} (mm)	3.10	2.47
X _{τct50} /X _{ct50} (mm)	4.76	4.29
X_{τ50}/X_{t50}(mm)	8.44	7.97

Austrotherm XPS TOP 30 TB
Austrotherm XPS TOP 50 TB
Austrotherm XPS TOP 70 TB

Annex A

4. Water vapour transmission
in accordance with EN 12086

Austrotherm XPS TOP 30 TB	thickness 140 mm (60 + 80 mm)	thickness 240 mm (3x 80 mm)	thickness 400 mm (5x 80 mm)
density (kg/m ³)	30	29	30
sliced thickness of the specimens in mm			
Skin layer	20	29	20
Adhesion layer	30	37	40
Core layer	25	27	40
water vapour diffusion resistance factor (mean values for the sliced thickness)			
μ_{skin}	130	140	160
μ_{ad}	130	150	140
μ_{core}	85	120	105

Austrotherm XPS TOP 70 TB	thickness 180 mm (3x 60 mm)
density (kg/m ³)	36
sliced thickness of the specimens in mm	
Skin layer	20
Adhesion layer	20
Core layer	30
water vapour diffusion resistance factor (mean values for the sliced thickness)	
μ_{skin}	115
μ_{ad}	120
μ_{core}	65