Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-17/0910 of 2 April 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	FIBRANxps 300-L, FIBRANxps 500-L und FIBRANxps 700-L
Product family to which the construction product belongs	Extruded polystyrene foam boards as load bearing layer and/or thermal insulation outside the waterproofing
Manufacturer	FIBRAN proizvodnja izolacijskih materialov d.o.o. Kocevarjeva ulica 1 8000 NOVO MESTO SLOWENIEN
Manufacturing plant	FIBRAN d.o.o. PO Sodražica Cesta Notranjskega odreda 45 1317 Sodražica Slovenien
This European Technical Assessment contains	12 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-17/0910 issued on 22 November 2017

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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), isobutene and dimethyl ether.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 designation:

"FIBRANxps 300-L",

"FIBRANxps 500-L" and

"FIBRANxps 700-L".

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

Nominal thicknesses:	50 mm to 200 mm ("FIBRANxps 700-L" 80 mm to 120 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 on the substrate to which they are applied. In particular the following applications are intended:

- Load bearing and thermal insulation 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 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.

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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	Level (individual values may fall below this level up to 10 %):
test acc. to EN 826:2013	
"FIBRANxps 300-L"	≥ 300 kPa
"FIBRANxps 500-L"	≥ 500 kPa
"FIBRANxps 700-L"	≥ 700 kPa
Slip deformation (until the conventional elastic zone (distinct straight portion of the force-displacement curve)) in case of 2-3 layer installation thickness of the single boards ≤ 120 mm	See Annex A
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	
"FIBRANxps 300-L"	
thickness 50 mm ≤ d < 120 mm	$\sigma_{0,05}$ = 316 kPa (n= 50; σ_{mean}= 418 kPa; s_σ= 63 kPa)
thickness 120 mm ≤ d ≤ 200 mm	$\sigma_{0,05}$ = 395 kPa (n= 50; σ_{mean}= 461 kPa; s_σ= 40 kPa)
"FIBRANxps 500-L"	
thickness 50 mm ≤ d < 120 mm	$\sigma_{0,05}$ = 475 kPa (n= 35; σ_{mean}= 578 kPa; s_σ= 62 kPa)
thickness 120 mm ≤ d ≤ 200 mm	$\sigma_{0,05}$ = 483 kPa (n= 33; σ_{mean}= 594 kPa; s_σ= 65 kPa)
"FIBRANxps 700-L"	
thickness 80 mm ≤ d ≤ 120 mm	$\sigma_{0,05}$ = 678 kPa (n= 20; σ_{mean}= 784 kPa; s_σ= 57 kPa)
Compressive creep	See Annex A

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Essential characteristic	Performance
Behaviour under shear load (large-sized specimen) test acc. to the EAD and the guidelines in EN 12090:2013 "FIBRANxps 300-L", thickness 200 mm	 τ_{large} = 125 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 "FIBRANxps 300-L" (thickness 200 mm) "FIBRANxps 500-L", "FIBRANxps 700-L"	 τ = 104 kPa (SS 100) No performance assessed
Density test acc. to EN 1602:2013 "FIBRANxps 300-L" "FIBRANxps 500-L" "FIBRANxps 700-L"	 density range: 29 kg/m³ - 38 kg/m³ 31 kg/m³ - 40 kg/m³ 36 kg/m³ - 46 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 "FIBRANxps 300-L" thickness 50 – 120 mm thickness >120 – 200 mm	 $\lambda_{D(90d)}$ = 0,036 W/(m·K) $\lambda_{D(90d)}$ = 0,039 W/(m·K)

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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	
"FIBRANxps 500-L"	
thickness 50 mm	$\lambda_{D(90d)}$ = 0,036 W/(m · K)
thickness 60 – 120 mm	$\lambda_{D(90d)}$ = 0,037 W/(m · K)
thickness >120 – 160 mm	$\lambda_{D(90d)}$ = 0,039 W/(m · K)
"FIBRANxps 700-L"	
thickness 80 mm	$\lambda_{D(90d)}$ = 0,035 W/(m · K)
thickness 100 – 120 mm	$\lambda_{D(90d)}$ = 0,036 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)	
"FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	WL(T)0,7 (W_{lt} ≤ 0,7 Vol.%)
Long term water absorption by diffusion test acc. to EN 12088:2013	
"FIBRANxps 300-L", "FIBRANxps 500-L" "FIBRANxps 700-L"	WD(V)3 (W_{dV} ≤ 3,0 Vol.%)
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	
"FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	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	
"FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	≤ 10 %
Water vapour diffusion resistance factor	No performance assessed

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Essential characteristic	Performance
Geometrical properties Thickness test acc. EN 823:2013 (clause 7.2, figure 2, measuring set-up 3) "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L" Thickness ≤ 120 mm Thickness > 120 mm Length, width test acc. EN 822:2013 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L" Squareness in direction of length and width; in direction of thickness test acc. EN 824:2013 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L" Flatness in direction of length and width test acc. EN 825:2013 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	tolerance ± 2 mm +4/-2 mm ± 8 mm 5 mm/m 2 mm
Deformation under specified compressive load and temperature conditions test acc. to EN 1605:2013 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	 load: 40 kPa; temperature: (70 ± 1) °C; time: (168 ± 1) h ≤ 5 %
Dimensional stability under specified conditions test acc. to EN 1604:2013 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	 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 "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	 TR400 ($\sigma_{mt} \geq 400$ kPa)
Volume percentage of closed cells test acc. to EN ISO 4590:2003 (method 1 with correction) "FIBRANxps 300-L", "FIBRANxps 500-L", "FIBRANxps 700-L"	 ≥ 95%

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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 2 April 2020 by Deutsches Institut für Bautechnik

Maja Tiemann
Head of Department

beglaubigt:
Wendler

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FIBRANxps 300-L, FIBRANxps 500-L und FIBRANxps 700-L **Annex A**

1. Compressive stress

Slip deformation

Deformation until the conventional elastic zone(distinct straight portion of the force-displacement curve) is reached

FIBRANxps 300-L				
thickness (mm)	120	2x120	100	3x100
compressive stress, σa	50	75	50	70
initial displacement Xa (mm)	**0,291**	**0,757**	**0,352**	**0,346**
FIBRANxps 700-L				
thickness (mm)	120	2x120	100	3x100
compressive stress, σa	45	60	35	60
initial displacement Xa (mm)	**0,405**	**0,911**	**0,446**	**1,074**

2. Compressive creep

2.1 Compressive creep (single-layer board)

FIBRANxps 300-L	**thickness 50 mm**			**thickness 120 mm**		
density (kg/m³)	29			30		
compressive stress/ deformation acc. EN 826 (kPa / %)	390/3			515/3		
load stage (kPa)	**90**	**130**	**170**	**90**	**130**	**170**
X_0 (mm)	0,43	0,53	0,68	0,49	0,62	0,85
X_{ct} (mm)	0,13	0,20	0,31	0,24	0,33	0,49
X_{ct50}(mm)	0,28	0,43	0,79	0,56	0,83	1,29
X_{t50}(mm)	**0,71**	**0,96**	**1,47**	**1,05**	**1,45**	**2,14**

FIBRANxps 300-L	**thickness 200 mm**		
density (kg/m³)	31,5		
compressive stress/ deformation acc. EN 826 (kPa / %)	510/2		
load stage (kPa)	**85**	**115**	**145**
X_0 (mm)	0,80	1,03	1,34
X_{ct} (mm)	0,36	0,51	0,65
X_{ct50}(mm)	1,58	1,54	1,87
X_{t50}(mm)	**2,38**	**2,57**	**3,21**

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FIBRANxps 300-L, FIBRANxps 500-L und FIBRANxps 700-L **Annex A**

FIBRANxps 500-L	**thickness 50 mm**			**thickness 120 mm**		
density (kg/m³)	32			36		
compressive stress/ deformation acc. EN 826 (kPa / %)	595/2			746/2		
load stage (kPa)	**130**	**180**	**210**	**130**	**180**	**210**
X_0 (mm)	0,29	0,37	0,49	0,48	0,58	0,74
X_{ct} (mm)	0,14	0,20	0,23	0,21	0,30	0,37
X_{ct50}(mm)	0,26	0,45	0,56	0,47	0,24	0,90
X_{t50}(mm)	**0,55**	**0,82**	**1,05**	**0,95**	**0,82**	**1,64**

FIBRANxps 500-L	**thickness 200 mm**		
density (kg/m³)	35		
compressive stress/ deformation acc. EN 826 (kPa / %)	693/2		
load stage (kPa)	**130**	**180**	**210**
X_0 (mm)	0,84	1,11	1,40
X_{ct} (mm)	0,52	0,68	0,79
X_{ct50}(mm)	1,46	1,73	2,00
X_{t50}(mm)	**2,30**	**2,84**	**3,40**

FIBRANxps 700-L	**thickness 80 mm**			**thickness 120 mm**		
density (kg/m³)	40			36,5		
compressive stress/ deformation acc. EN 826 (kPa / %)	739/2			815/2		
load stage (kPa)	**185**	**235**	**285**	**185**	**235**	**285**
X_0 (mm)	0,43	0,54	0,66	0,57	0,64	0,82
X_{ct} (mm)	0,24	0,32	0,59	0,28	0,38	0,53
X_{ct50}(mm)	0,61	0,89	1,74	0,68	0,95	1,36
X_{t50}(mm)	**1,04**	**1,43**	**2,40**	**1,25**	**1,59**	**2,18**

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FIBRANxps 300-L, FIBRANxps 500-L und FIBRANxps 700-L **Annex A**

2.2. Compressive creep (multi-layer installation)

FIBRANxps 300-L	**thickness 2x120 mm**			**thickness 3x 100 mm**		
density (kg/m³)	31			30		
compressive stress/ deformation acc. EN 826 (kPa / %)	385/-			385/-		
load stage (kPa)	**77**	**115**	**153**	**77**	**115**	**153**
X_0 (mm)	1,37	1,76	2,25	2,52	3,59	4,15
X_{ct} (mm)	0 0,72	0,94	1,15	1,19	1,69	2,25
X_{ct50}(mm)	1,71	2,16	2,38	2,92	3,78	4,67
X_{t50}(mm)	**3,08**	**3,92**	**4,63**	**5,44**	**7,37**	**8,82**

FIBRANxps 700-L	**thickness 2x120 mm**			**thickness 3x 100 mm**		
density (kg/m³)	39			39		
compressive stress/ deformation acc. EN 826 (kPa / %)	780/-			795/-		
load stage (kPa)	**156**	**234**	**312**	**159**	**238**	**318**
X_0 (mm)	1,07	1,35	1,70	2,45	2,70	3,16
X_{ct} (mm)	0,39	0,59	0,88	0,77	1,08	1,99
X_{ct50}(mm)	0,83	1,54	2,44	2,16	3,39	5,42
X_{t50}(mm)	**1,90**	**2,89**	**4,14**	**4,61**	**6,09**	**8,58**

3. Creep under shear load

FIBRANxps 300-L	**thickness 200 mm**
density (kg/m³)	33
shear strength/ deformation acc. EN 12090 (kPa)	104/-
load stage (kPa)	**36,4**
$X_{\tau 0}$ (mm)	1,70
$X_{\tau ct}$ (mm)	0,82
$X_{\tau ct50}$(mm)	2,65
$X_{\tau t50}$(mm)	**4,35**

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FIBRANxps 300-L, FIBRANxps 500-L und FIBRANxps 700-L **Annex A**

4. Creep under combined compressive and shear load

FIBRANxps 300-L		
thickness	**200 mm**	
density (kg/m³)	33	
load stage (kPa)	**36,4**	**130**
deformation under	shear load	compressive load
$X_{\tau 0}$ /X_0 (mm)	1,40	1,97
$X_{\tau ct}$ /X_{ct} (mm)	1,41	0,86
$X_{\tau ct50}$/X_{ct50}(mm)	4,28	1,93
$X_{\tau t50}$/X_{t50}(mm)	**5,68**	**3,90**

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