Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-19/0118 of 4 June 2020

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	URSA XPS D N-III URSA XPS D N-V URSA XPS D N-VII
Product family to which the construction product belongs	Extruded polystyrene foam boards as load bearing layer and/or thermal insulation outside the waterproofing
Manufacturer	URSA Deutschland GmbH Carl-Friedrich-Benz-Straße 46-48 04509 Delitzsch DEUTSCHLAND
Manufacturing plant	Werk Queis Uralitastraße 1 D-06188 Queis Werk St. Avold Zone industrielle de l'europort F-57500 Saint-Avold
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
This version replaces	ETA-19/0118 issued on 25 July 2019

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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) 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:

"URSA XPS D N-III ",
"URSA XPS D N-V" and
"URSA XPS D N-VII".

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

Nominal thicknesses:	50 mm to 160 mm for URSA XPS D N-III,
	50 mm to 140 mm for URSA XPS D N-V,
	60 mm to 120 mm for URSA XPS D N-VII
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 "URSA XPS D N-III " boards up to 160 mm thickness, for boards "URSA XPS D N-V" and "URSA XPS D N-VII" up to 120 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 extruded polystyrene foam 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 extruded polystyrene foam boards, also the respective national regulations shall be observed.

Where extruded polystyrene foam 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	Level (individual values may fall below this level up to 10 %):
test acc. to EN 826:2013	
"URSA XPS D N-III "	≥ 300 kPa
"URSA XPS D N-V"	≥ 500 kPa
"URSA XPS D N-VII"	≥ 700 kPa
Slip deformation	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	
"URSA XPS D N-III "	
thickness 50 mm ≤ d ≤ 120 mm	$\sigma_{0,05}$ = 357 kPa (n= 50; σ_{mean}= 413 kPa; s_σ=34 kPa)
thickness 120 mm < d ≤ 160 mm	$\sigma_{0,05}$ = 352 kPa (n= 50; σ_{mean}= 413 kPa; s_σ=35 kPa)
"URSA XPS D N-V"	
thickness 50 mm ≤ d ≤ 120 mm	$\sigma_{0,05}$ = 508 kPa (n= 33; σ_{mean}= 562 kPa; s_σ= 33 kPa)
"URSA XPS D N-VII"	
thickness 60 mm ≤ d ≤ 120 mm	$\sigma_{0,05}$ =705 kPa (n= 50; σ_{mean}= 734 kPa; s_σ= 17 kPa)
Compressive creep	See Annex A
Behaviour under shear load (large-sized specimen)	See Annex A
Creep under shear load	See Annex A
Creep under combined compressive and shear load	See Annex A

Essential characteristic	Performance
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 "URSA XPS D N-III " "URSA XPS D N-V" "URSA XPS D N-VII"	 density range: 33 kg/m³ - 40 kg/m³ 36 kg/m³ - 42 kg/m³ 40 kg/m³ - 49 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	
"URSA XPS D N-III "	
thickness 50 mm ≤ d ≤ 60 mm	$\lambda_{D(90d)}$ = 0.033 W/(m·K)
thickness 60 mm < d ≤ 80 mm	$\lambda_{D(90d)}$ = 0.035 W/(m·K)
thickness 80 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0.036 W/(m·K)
thickness 120 mm < d ≤ 160 mm	$\lambda_{D(90d)}$ = 0.037 W/(m·K)
"URSA XPS D N-V"	
thickness 50 mm ≤ d ≤ 60 mm	$\lambda_{D(90d)}$ = 0.034 W/(m·K)
thickness 60 mm < d ≤ 80 mm	$\lambda_{D(90d)}$ = 0.036 W/(m·K)
thickness 80 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0.037 W/(m·K)
thickness 120 mm < d ≤ 140 mm	$\lambda_{D(90d)}$ = 0.039 W/(m·K)
"URSA XPS D N-VII"	
thickness 60 mm ≤ d ≤ 80 mm	$\lambda_{D(90d)}$ = 0.035 W/(m·K)
thickness 80 mm < d ≤ 100 mm	$\lambda_{D(90d)}$ = 0.036 W/(m·K)
thickness 100 mm < d ≤ 120 mm	$\lambda_{D(90d)}$ = 0.037 W/(m·K)

Essential characteristic	**Performance**
Moisture conversion coefficient	No performance assessed
Water absorption Long term water absorption by total immersion test acc. to EN 12087:2013 (method 2A) Long term water absorption by diffusion test acc. to EN 12088:2013	 WL(T)0,7 (W_{lt} ≤ 0.7 Vol.%) 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 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 ≤ 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 (thickness ≤120 mm) +4/-2 mm (thickness >120 mm) ± 10 mm 5 mm/m 2 mm (thickness ≤120 mm) 3 mm (thickness >120 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 %

Essential characteristic	Performance
Dimensional stability under specified conditions test acc. to EN 1604:2013	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	TR100 ($\sigma_{mt} \geq 100$ kPa)
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/EC[1].

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 4 June 2020 by Deutsches Institut für Bautechnik

Maja Tiemann
Head of Department

beglaubigt:
Wendler

[1] as amended

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URSA XPS D N-III
URSA XPS D N-V
URSA XPS D N-VII

Annex A

1. Compressive stress

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

URSA XPS D N-III (φ =34 kg/m^3)			
thickness (mm)	1x100	2x100	3x100
compressive stress, σa	130	102	90
initial displacement X_a (mm)	**0.7**	**0.8**	**0.9**
URSA XPS D N-VII (φ = 41 kg/m^3)			
thickness (mm)	1x100	2x100	3x100
compressive stress, σa	135	114	113
initial displacement X_a (mm)	**0.47**	**0.92**	**1.05**

2. Compressive creep

2.1 Compressive creep (single-layer board)

URSA XPS D N-III	**thickness 50 mm**			**thickness 50 mm**	**thickness 80 mm**
density (kg/m^3)	34			33	34
compressive stress/ deformation acc. EN 826 (kPa / %)	380/2			350/3	422/2
load stage (kPa)	**105**	**125**	**150**	**143**	**130**
X_0 (mm)	0.26	0.25	0.32	0.38	0.37
X_{ct} (mm)	0.10	0.15	0.13	0.33	0.29
X_{ct50}(mm)	0.36	0.34	0.80	0.75	1.06
X_{t50}(mm)	**0.62**	**0.59**	**1.12**	**1.13**	**1.43**

URSA XPS D N-III	**thickness 120 mm**		
density (kg/m^3)	39		
compressive stress/ deformation acc. EN 826 (kPa / %)	492/2		
load stage (kPa)	**100**	**130**	**150**
X_0 (mm)	0.51	0.66	0.77
X_{ct} (mm)	0.39	0.42	0.56
X_{ct50}(mm)	1.67	1.68	1.71
X_{t50}(mm)	**2.18**	**2.34**	**2.48**

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URSA XPS D N-III
URSA XPS D N-V
URSA XPS D N-VII

Annex A

URSA XPS D N-III	**thickness 160 mm**				
density (kg/m³)	41			39	38,5
compressive stress/ deformation acc. EN 826 (kPa / %)	492/-			478/3	359/2
load stage (kPa)	**100**	**130**	**150**	**130**	**143**
X_0 (mm)	0.71	0.68	0.79	0.81	0.90
X_{ct} (mm)	0.66	0.68	0.77	0.60	0.77
X_{ct50}(mm)	2.97	2.99	3.23	2.19	2.45
X_{t50}(mm)	**3.68**	**3.67**	**4.00**	**3.00**	**3.35**

URSA XPS D N-V	**thickness 50 mm**			**thickness 60 mm**
density (kg/m³)	40			37
compressive stress/ deformation acc. EN 826 (kPa / %)	550/2			517/3
load stage (kPa)	**125**	**175**	**200**	**198**
X_0 (mm)	0.24	0.34	0.39	0.37
X_{ct} (mm)	0.60	0.80	0.74	0.34
X_{ct50}(mm)	1.02	1.42	1.44	0.98
X_{t50}(mm)	**1.26**	**1.76**	**1.83**	**1.35**

URSA XPS D N-V	**thickness 120 mm**			**thickness 100 mm**
density (kg/m³)	40			36
compressive stress/ deformation acc. EN 826 (kPa / %)	596/3			557/3
load stage (kPa)	**140**	**180**	**220**	**198**
X_0 (mm)	0.53	0.67	0.91	0.67
X_{ct} (mm)	0.48	0.59	0.71	0.57
X_{ct50}(mm)	1.71	1.98	2.28	1.54
X_{t50}(mm)	**2.24**	**2.65**	**3.19**	**2.21**

URSA XPS D N-VII	**thickness 50 mm**			**thickness 60 mm**
density (kg/m³)	42			46
compressive stress/ deformation acc. EN 826 (kPa / %)	767/-			719/3
load stage (kPa)	**200**	**245**	**280**	**275**
X_0 (mm)	0.19	0.23	0.23	0.41
X_{ct} (mm)	0.20	0.22	0.21	0.37
X_{ct50}(mm)	0.52	0.59	0.67	0.87
X_{t50}(mm)	**0.71**	**0.82**	**0.90**	**1.28**

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URSA XPS D N-III
URSA XPS D N-V
URSA XPS D N-VII

Annex A

URSA XPS D N-VII	**thickness 120 mm**			**thickness 100 mm**
density (kg/m³)	41			42
compressive stress/ deformation acc. EN 826 (kPa / %)	832/10			744/2
load stage (kPa)	**200**	**250**	**300**	**275**
X_0 (mm)	0.61	0.91	1.38	0.56
X_{ct} (mm)	0.48	0.72	1.08	0.64
X_{ct50}(mm)	1.35	1.80	2.75	1.87
X_{t50}(mm)	**1.96**	**2.71**	**4.13**	**2.43**

2.2 Compressive creep (multi-layer installation)

URSA XPS D N-III	**thickness 3x 100 mm**		
density (kg/m³)	37	36	37
compressive stress/ deformation acc. EN 826 (kPa / %)	502/2	522/2	506/3
load stage (kPa)	**90**	**135**	**170**
X_0 (mm)	1.44	1.58	2.16
X_{ct} (mm)	0.84	0.86	1.26
X_{ct50}(mm)	2.65	4.20	4.84
X_{t50}(mm)	**4.09**	**5.78**	**7.00**
URSA XPS D N-V	**thickness 3x 100 mm**		
density (kg/m³)	39	40	40
compressive stress/ deformation acc. EN 826 (kPa / %)	661/5	660/5	674/5
load stage (kPa)	**140**	**180**	**220**
X_0 (mm)	1.08	2.06	2.80
X_{ct} (mm)	1.02	1.14	1.48
X_{ct50}(mm)	3.91	4.84	6.18
X_{t50}(mm)	**4.99**	**6.91**	**8.98**
URSA XPS D N-VII	**thickness 3x 100 mm**		
density (kg/m³)	42	42	42
compressive stress/ deformation acc. EN 826 (kPa / %)	843/10	841/10	844/10
load stage (kPa)	**200**	**250**	**300**
X_0 (mm)	1.94	2.19	2.50
X_{ct} (mm)	1.10	1.42	2.11
X_{ct50}(mm)	3.57	4.60	7.58
X_{t50}(mm)	5.51	6.79	10.09

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URSA XPS D N-III
URSA XPS D N-V
URSA XPS D N-VII

Annex A

3. Behaviour under shear load (large-sized specimen)

URSA XPS D N-III	**thickness 160 mm**	
density (kg/m^3)	40	38
shear strength τ_{large} acc. EAD chapter 2.2.4 and the guidelines in EN 12090 (kPa)	**250**	**165**

4. Creep under shear load

URSA XPS D N-III	**thickness 160 mm**
density (kg/m^3)	40
shear strength τ_{large} (kPa)	250
load stage (kPa)	**87,5**
$X_{\tau 0}$ (mm)	1.59
$X_{\tau ct}$ (mm)	1.96
$X_{\tau ct50}$(mm)	3.48
$X_{\tau t50}$(mm)	**5.07**

5. Creep under combined compressive and shear load

URSA XPS D N-III		
thickness	**160 mm**	
density (kg/m^3)	40	
shear strength τ_{large} (kPa)	250	
load stage (kPa)	**87.5**	**118**
deformation under	shear load	compressive load
$X_{\tau 0}$ /X_0 (mm)	2.01	1.36
$X_{\tau ct}$ /X_{ct} (mm)	2.28	0.68
$X_{\tau ct50}$/X_{ct50}(mm)	3.39	1.44
$X_{\tau t50}$/X_{t50}(mm)	**5.40**	**2.80**