

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

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European Technical Assessment

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA

Product family
to which the construction product belongs

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

Manufacturer

SUPERGLASS DÄMMSTOFFE
Zweigniederlassung der SAINT-GOBAIN ISOVER G+H
Aktiengesellschaft
Industriestraße 12
64297 Darmstadt
DEUTSCHLAND

Manufacturing plant

Werk 1
Werk 2

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

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Specific Part

1 Technical description of the product

The multilayer extruded polystyrene foam boards are manufactured from up to three layers of extruded polystyrene foam boards (single boards). The single boards with thicknesses of 60 mm and 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), isobutane 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:

- "Superfoam 300 SF EXTRA",
- "Superfoam 500 SF EXTRA" and
- "Superfoam 700 SF EXTRA"

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

Nominal thicknesses:

"Superfoam 300 SF EXTRA"	140 mm to 200 mm
"Superfoam 500 SF EXTRA"	140 mm to 200 mm
"Superfoam 700 SF EXTRA"	140 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 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 and thermal insulation underneath foundation slabs up to 200 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 "Superfoam 300 SF EXTRA" "Superfoam 500 SF EXTRA" "Superfoam 700 SF EXTRA" 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 "Superfoam 300 SF EXTRA" thickness 140 mm ≤ d ≤ 200 mm "Superfoam 500 SF EXTRA" thickness 140 mm ≤ d ≤ 200 mm "Superfoam 700 SF EXTRA" thickness 140 mm < d ≤ 200 mm	$\sigma_{0,05} = 317 \text{ kPa}$ (n = 50; $\sigma_{\text{mean}} = 356 \text{ kPa}$; $s_{\sigma} = 22 \text{ kPa}$) $\sigma_{0,05} = 502 \text{ kPa}$ (n = 24; $\sigma_{\text{mean}} = 544 \text{ kPa}$; $s_{\sigma} = 23 \text{ kPa}$) $\sigma_{0,05} = 703 \text{ kPa}$ (n = 11; $\sigma_{\text{mean}} = 746 \text{ kPa}$; $s_{\sigma} = 21 \text{ kPa}$)
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 "Superfoam 300 SF EXTRA" "Superfoam 700 SF EXTRA"	$\tau_{\text{large}} = 105 \text{ kPa}$ $\tau_{\text{large}} = 162 \text{ kPa}$
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 "Superfoam 300 SF EXTRA" "Superfoam 500 SF EXTRA" "Superfoam 700 SF EXTRA"	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 $10 \text{ }^\circ\text{C}$ 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 $(90 \pm 2/-2)$ days prior to testing "Superfoam 300 SF EXTRA" "Superfoam 500 SF EXTRA" "Superfoam 700 SF EXTRA"	$\lambda_{D(90d)} = 0.034 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0.034 \text{ W/(m} \cdot \text{K)}$ $\lambda_{D(90d)} = 0.034 \text{ W/(m} \cdot \text{K)}$
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>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p> <p>Long term water absorption by diffusion test acc. to EN 12088:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>WL(T)0,7 ($W_{it} \leq 0.7$ Vol.%)</p> <p>WD(V)3 ($W_{dv} \leq 3.0$ 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>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</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>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p> <p>Reduction in shear strength of the re-dried specimens, when tested in accordance with EN 12090:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>FTCD1 ($W_v \leq 1.0$ Vol.%)</p> <p>≤ 10 %</p> <p>≤ 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>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p> <p>Length, width test acc. EN 822:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>tolerance</p> <p>+4/-2 mm</p> <p>± 8 mm</p>

Essential characteristic	Performance
<p>Geometrical properties</p> <p>Squareness</p> <p>in direction of length and width; in direction of thickness test acc. EN 824:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p> <p>Flatness</p> <p>in direction of length and width test acc. EN 825:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>tolerance</p> <p>5 mm/m</p> <p>3 mm</p>
<p>Deformation under specified compressive load and temperature conditions</p> <p>test acc. to EN 1605:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</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>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>temperature: 70 °C and 90% R.H.</p> <p>DS(70,90) ($\Delta\epsilon_l \leq 5 \%$, $\Delta\epsilon_b \leq 5 \%$, $\Delta\epsilon_d \leq 5 \%$)</p>
<p>Tensile strength perpendicular to faces</p> <p>test acc. to EN 1607:2013</p> <p>"Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"</p>	<p>TR150 ($\sigma_{mt} \geq 150 \text{ kPa}$)</p>

Essential characteristic	Performance
Volume percentage of closed cells test acc. to EN ISO 4590:2003 (method 1 with correction) "Superfoam 300 SF EXTRA", "Superfoam 500 SF EXTRA", "Superfoam 700 SF EXTRA"	$\geq 95\%$

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 2 February by Deutsches Institut für Bautechnik

Frank Iffländer
Head of Section

beglaubigt:
Wendler

**Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA**

Anlage A

1. Compressive creep
acc. to EN 1606:2013 and EAD, chapter 2.2.3.1

Superfoam 300 SF EXTRA	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

Superfoam 300 SF EXTRA	thickness 200 mm¹		
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

Superfoam 500 SF EXTRA	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

¹ The test was performed on the more critical specimen thickness of 300 mm (80+80+60+80 mm).

**Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA**

Anlage A

Superfoam 500 SF EXTRA	thickness 200 mm¹		
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

Superfoam 700 SF EXTRA	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

Superfoam 700 SF EXTRA	thickness 200 mm¹		
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

**Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA**

Annex A

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

Superfoam 300 SF EXTRA	thickness 200 mm¹
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_{τt50}(mm)	4.30

Superfoam 700 SF EXTRA	thickness 200 mm¹
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_{τt50}(mm)	5.47

**Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA**

Annex A

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

Superfoam 300 SF EXTRA		
thickness	200 mm¹	
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

Superfoam 700 SF EXTRA		
thickness	200 mm¹	
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

**Superfoam 300 SF EXTRA,
Superfoam 500 SF EXTRA and
Superfoam 700 SF EXTRA**

Annex A

4. Water vapour transmission
in accordance with EN 12086

Superfoam 300 SF EXTRA	thickness 140 mm (60 + 80 mm)	thickness 200 mm²
density (kg/m ³)	30	29
sliced thickness of the specimens in mm		
Skin layer	20	29
Adhesion layer	30	37
Core layer	25	27
water vapour diffusion resistance factor (mean values for the sliced thickness)		
μ_{skin}	130	140
μ_{ad}	130	150
μ_{core}	85	120

Superfoam 700 SF EXTRA	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

² The test was performed on specimen thickness of 240 mm (80+80+80 mm).