Classification report for roofs/roof coverings exposed to external fire No. 19901D

Owner of the classification report

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Introduction

This classification report defines the classification assigned to the roof/roof covering **«Börner Polymer Bitumen membranes»** in accordance with the procedures given in the standard EN 13501-5:2016 : Fire classification of construction products and building elements – Part 5: Classification using data from external fire exposure to roofs tests: Test 4: Method with two stages incorporating burning brands, wind and supplementary radiant heat

This classification report consists of 15 pages

1. DESCRIPTION OF THE ROOF/ROOF COVERING

This description is based on information given by the sponsor.

	Nominal value	Measured value
SUPPORTING DECK		
Material	Plywood	
Density (kg/m³)	600	
Thickness (mm)	18	
VAPOUR BARRIER		
Material	Bituminous vapour barrier with a composite aluminium reinforcement and a quartz sand finish	
Trade name	Daco-KSD-B	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Mineral finishing (material + g/m²)	Quartz sand 600 g/m²	
Reinforcement (material + g/m²)	Composite glass and aluminium 200 g/m²	
Thickness (mm)	2.5	(1)
Surface weight (g/m²)	600	(1)
Flame retardants	No	(1)
Fixing method	Self-adhesive	
Reaction to fire according to EN 13501-1	E	
GLUE		
Material	PU Bonding adhesive	
Trade name	PUK 3D	
Applied surface weight (g/m²) (dry)	Max 300 g/m²	
Density (kg/m³) (wet)	1,03	
Solid content (m/m %)	Not communicated	
Application	Strip wise	
INSULATING LAYER		
A) BACHL PUR/PIR INSULATION BOARDS MV		
Material	PIR insulation board with a mineral fleece facer	
Manufacturer	Bachl GmbH & Co KG	
Supplier	Georg Börner GmbH & Co KG	
Backing/facing material (g/m²)	Mineral fleece 300 g/m	
Thickness (mm)		
Thickness 1	50	(1)
Thickness 2	120	(1)
Thickness 3	50+120 (double layer)	(1)
Thickness 4	120+120 (double layer)	(1)
Density (kg/m³) of the foam	30	(1)
Flame retardants	No	(1)
Fixing method	Glued	
Reaction to fire according to EN 13501-1	E	

B) BACHL PIR/PUR INSULATION BOARDS ALU		
Material	PIR insulation board with an alu facer	
Manufacturer	Bachl GmbH & Co KG	
Supplier	Georg Börner GmbH & Co KG	
Backing/facing material (g/m²)	Aluminium 138 g/m	
Thickness (mm)	50	(1)
Density (kg/m³) of the foam	30	(1)
Flame retardants	No	(1)
Fixing method	Glued	
Reaction to fire according to EN 13501-1	E	
UNDER LAYER		
A) DACO-KSU		
Material	Bituminous SBS underlay with G200 glass reinforcement and a foil finish	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Reinforcement (material + g/m²)	Glass, 200 g/m²	
Thickness (mm)	3.0	(1)
Surface weight (g/m²)	4000	(1)
Flame retardants	No	(1)
Fixing method	Cold self-adhesive	
B) POLY ELAST PV200 S5		
Material	Elastomeric SBS bitumen with a polyester fleece reinforcement	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Reinforcement (material + g/m²)	Polyester fleece 250 g/m²	
Thickness (mm)	5.0	(1)
Surface weight (g/m²)	500	(1)
Flame retardants	No	(1)
Fixing method	Fully torched	
GLUE (OPTIONAL)		
Material	PU Bonding adhesive	
Trade name	PUK 3D	
Applied surface weight (g/m²) (dry)	Max 300 g/m²	
Density (kg/m³) (wet)	1,03	
Solid content (m/m %)	Not communicated	
Application	Strip wise	

TOP LAYER		
A) POLY ELAST PV180 S4		
Material	Elastomeric SBS bituminous membrane with a polyester fleece reinforcement	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Colour	Grey	
Reinforcement (material + g/m²)	Polyester fleece 180 g/m²	
Thickness (mm)	4.2	(1)
Surface weight (g/m²)	1600	(1)
Flame retardants	Yes	(1)
Fixing method	Fully torched	
Reaction to fire according to EN 13501-1	E	
B) ELMO STAR		
Material	Polymeric SBS bituminous membrane with a PV reinforcement	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Colour	Grey	
Reinforcement (material + g/m²)	Composite 300 g/m²	
Thickness (mm)	5.2	(1)
Surface weight (g/m²)	1600	(1)
Flame retardants	Yes	(1)
Fixing method	Fully torched	
Reaction to fire according to EN 13501-1	E	
C) DACO-KSO		
Material	Polymeric SBS bituminous membrane with a polyester reinforcement	
Manufacturer / Supplier	Georg Börner GmbH & Co KG	
Colour	Grey	
Reinforcement (material + g/m²)	Composite 280 g/m²	
Thickness (mm)	4.2	(1)
Surface weight (g/m²)	1600	(1)
Flame retardants	Yes	(1)
Fixing method	Fully torched / self-adhesive	
Reaction to fire according to EN 13501-1	E	

(1) Not verifiable The other SBS top layers and under layers who have not been tested but are included in the field of application are mentioned in annex A and B

	A-1	A-2	A-3	A-4
Top layer	**Poly Elast PV180 S4**	**DACO KSO**	**ELMO STAR**	Poly Elast PV180 S4
Fixation	Torched	Cold self-adhesive	Torched	Torched
Under layer	DACO KSU	DACO KSU	DACO KSU	**Poly Elast PV 200 S5**
Fixation	Cold self-adhesive	Cold self-adhesive	Cold self-adhesive	Torched
Insulation	50 mm PIR fleece	50 mm PIR fleece	50 mm PIR fleece	50 mm PIR fleece
Fixation	PU adhesive	PU adhesive	PU adhesive	PU adhesive
Vapour barrier	DACO-KSD-B	DACO-KSD-B	DACO-KSD-B	DACO-KSD-B
Fixation	Self-adhesive	Self-adhesive	Self-adhesive	Self-adhesive
Substrate	Plywood			

	A-5	A-6	A-7	A-8
Top layer	Poly Elast PV180 S4	Poly Elast PV180 S4	Poly Elast PV180 S4	Poly Elast PV180 S4
Fixation	Torched	Torched	Torched	Torched
Under layer	DACO KSU	DACO KSU	DACO KSU	DACO KSU
Fixation	Cold self-adhesive	Cold self-adhesive	Cold self-adhesive	Cold self-adhesive
Insulation	**120 mm PIR fleece**	**50+120 mm PIR fleece**	**120+120 mm PIR fleece**	**50 mm PIR Alu**
Fixation	PU adhesive	PU adhesive	PU adhesive	PU adhesive
Vapour barrier	DACO-KSD-B	DACO-KSD-B	DACO-KSD-B	DACO-KSD-B
Fixation	Self-adhesive	Self-adhesive	Self-adhesive	Self-adhesive
Substrate	Plywood			

Summary of tested systems and parameters (project 20177)

	A-1	A-2	A-3
Top layer	**ELMO-Flex 4K**	POLY-Elast 3K	POLY-Elast 3K
Fixation	Mechanically	**Mechanically**	**Glued**
Insulation	120 mm PIR fleece	120 mm PIR fleece	120 mm PIR fleece
Fixation	PU adhesive	PU adhesive	PU adhesive
Vapour barrier	DACO- KSD-B	DACO- KSD-B	DACO- KSD-B
Fixation	Self-adhesive	Self-adhesive	Self-adhesive
Substrate	Plywood		

2. TEST REPORTS AND TEST RESULTS IN SUPPORT OF THIS CLASSIFICATION

a) Test reports

Name of the laboratory	Name of the sponsor	Test report ref. no.	Test method
WFRGENT nv Ghent - Belgium	Georg Börner GmbH & Co KG	19901A&B 20177A	CEN/TS 1187:2012: Test 4
WFRGENT nv Ghent - Belgium	Georg Börner GmbH & Co KG	19901C	CEN/TS 16459:2013

b) Test results

Test conditions: 19901A

Test date: 29/07/2019 & 03/09/2019 & 04/09/2019
Room temperature at start of test (°C): 18-20
Roof pitch: 0°

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)

Specimen No:	**A-1'**	**A-2'**	**A-3'**	**A-4'**
Duration of flaming after withdrawal of the test flame (min:sec)	00:00	00:00	00:00	00:00
Maximum flame spread distance (mm)	60	30	40	40
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.	N.a.

Specimen No:	**A-5'(*)**	**A-6'**	**A-7'**	**A-8'**
Duration of flaming after withdrawal of the test flame (min:sec)	00:00	00:00	00:00	00:00
Maximum flame spread distance (mm)	100	70	90	80
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.	N.a.

(') Preliminary test corresponding with the penetration test in stage 2

PENETRATION TEST WITH BURNING BRANDS, WIND AND SUPPLEMENTARY RADIANT HEAT (STAGE 2)

Specimen No:	**A-1**	**A-2**	**A-3**	**A-4**	**Average**
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.	N.a.	N.a.
Additional observations: Panels did not ignite, top layer contracts, carbonization, melting, samples swell up Marked variability between the specimen: None					

Specimen No:	A-5(*)	A-6	A-7	A-8	Average
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.	N.a.	N.a.
Additional observations: Panels did not ignite, carbonization, melting Marked variability between the specimen: None					

(*) reused in the official test 19901B

Test conditions: 20177A (single layer system)

Test date: 17/02/2020
Room temperature at start of test (°C): 18
Roof pitch: 0°

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)

Specimen No:	A-1’	A-2’	A-3’
Duration of flaming after withdrawal of the test flame (min:sec)	00:00	00:00	00:00
Maximum flame spread distance (mm)	60	80	70
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.

(‘) preliminary test corresponding with the penetration test in stage 2

PENETRATION TEST WITH BURNING BRANDS, WIND AND SUPPLEMENTARY RADIANT HEAT (STAGE 2)

Specimen No:	A-1	A-2	A-3	Average
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	N.a.	N.a.	N.a.
Additional observations: Panels did not ignite, carbonization, melting Marked variability between the specimen: None				

Test conditions: 19901B

- Test dates: 04/09/2019 & 14/10/2019
- Test pitch: 0°
- Deck: Plywood (18 mm, 600 kg/m^3)
- Build-up: DACO KSD-B + 120 mm PIR fleece + DACO KSU + Poly Elast PV180 S4

PRELIMINARY TEST (STAGE 1)

Parameter	Criteria				Test [(a)] results	Compliance			
	Class B_{ROOF}(t4)	Class C_{ROOF}(t4)	Class D_{ROOF}(t4)	Class E_{ROOF}(t4)	Spec. 1	Class B_{ROOF}(t4)	Class C_{ROOF}(t4)	Class D_{ROOF}(t4)	Class E_{ROOF}(t4)
Burn time	< 5 min	< 5 min	< 5 min	< 5 min	00:00	Yes	Yes	Yes	Yes
Flame spread distance	< 0,38 m	< 0,38 m	< 0,38 m	No limit	0,10	Yes	Yes	Yes	Yes
Penetration	None	None	None	None	None	Yes	Yes	Yes	Yes

(a) Not for extended application.

PENETRATION TEST (STAGE 2)

Parameter	Criteria			
	Class B_{ROOF}(t4)	Class C_{ROOF}(t4)	Class D_{ROOF}(t4)	Class E_{ROOF}(t4)
Penetration	≥ 60 min	< 60 min ≥ 30 min	< 30 min	< 30 min
Parameter	**Test [(a)] results**			
	Spec. 1	Spec. 2	Spec. 3	Mean [a]
Penetration	None	None	None	None
Parameter	**Compliance**			
	Class B_{ROOF}(t4)	Class C_{ROOF}(t4)	Class D_{ROOF}(t4)	Class E_{ROOF}(t4)
Penetration	Yes	Yes	Yes	Yes

(a) If one or two of the specimens have not failed at one hour, a time of 60 min shall be used in calculating the mean time of penetration.

3. CLASSIFICATION AND FIELD OF APPLICATION

a) Reference

This classification has been carried out in accordance with clause 9 test 4 of EN 13501-5:2016 and EN 13707:2004.

b) Classification

The roof / roof covering **«Börner Polymer – Bitumen membranes»** in relation to its external fire performance is classified:

B_{ROOF} (t4)

c) Direct field of application

The classification is valid for the system as described in §1 for the following conditions:

- Range of pitches: ≤ 10°

d) Extended field of application

➢ **Range of layer 0 (Top layer)** :POLY Elast 3K, Elmo-Flex 4K, Poly Elast PV180S4, ELMO Star, DACO KSO,… also included are the top layers mentioned in annex A:

Thickness	4,2-5,2 mm
Surface weight	1200-1800 g/m²
Reinforcement	- 300 g/m² polyester or less - Additional glass fleece allowed
Fixing method	- Fully adhered by torching - Glued - Mechanical

➢ **Range of layer 1 Glue (OPTIONAL):** used in single layer systems with top layer: ELMO-Flex 4K or Poly Elast 3K

Product:	PU Bonding adhesive
Surface weight applied (g/m²)	Max 300 g/m²
Mass percentage %	Not communicated
Application method	Strip wise

➢ **Range of layer 2 (Under layer, optional in double layer systems):** modified bitumen with a polyester composite, glass fleece or glass fibre reinforcement, also included are the under layers mentioned in annex B

Thickness	2,9-5,0 mm
Surface weight	500-4000 g/m²
Reinforcement	- Glass fibre 200 g/m² or more - Polyester fleece 250 g/m² or less - Additional glass fleece allowed
Fixing method	Self-adhesive / Torched / mechanical

- **Range of layer 3: The insulation**: PIR board

Products:	PIR Mineral fleece PIR Alu
Thickness	
One layer	50-120 mm
Two layers	≥ 120 mm
Density of the foam	30 kg/m^3
Facer	
PIR Mineral glass fleece	Mineral glass fleece, 250-350 g/m²
PIR Alu	Aluminium foil 120-150 g/m²
Reaction to fire classification	E or better
Fixing method	Glued with PU adhesive

- **Range of layer 4: Glue**

Product:	PU bonding adhesive
Surface weight applied (g/m²)	Max 300 g/m²
Mass percentage %	Not communicated
Application method	Strip wise

- **Range of layer 5: vapour barrier:**

Range of vapour barriers	Any bituminous vapour barrier according to EN13707:2004
Reaction to fire according to EN13501-1	E or better

- **Range of layer 5: Supporting deck**

Range of supporting deck:	Plywood (18 mm or more, 600 kg/m^3)

4. LIMITATIONS

At the time the standard EN 13501-5:2016 was published, no decision was made concerning the duration of validity of a classification document.

Provisions of Regulation (EU) 305/2011, commonly known as the Construction Products Regulation (CPR), prevail over any conflicting provisions in the harmonized standards and technical specifications.

5. WARNING

This classification report does not represent type approval nor certification of the product.

6. CONCERNING DECLARATION OF PERFORMANCE (DoP) ACCORDING TO THE CONSTRUCTION PRODUCT REGULATION (CPR)

Annex ZA of the harmonized standard

- EN 13707: 2004 – "Flexible sheets for waterproofing - Reinforced bitumen sheets for roof waterproofing"

declares that a System 3 Attestation of Conformity (AoC) under the Construction Products Directive (CPD: 89/106/EEC) is required for all external fire performance declarations better than class F_{roof} (t1, t2, t3, t4). Under the Construction Products Regulation (CPR: EU 305/2011) this corresponds with a System 3 of Assessment and Verification of Constancy of Performance (AVCP) as basis for a Declaration of Performance (DoP).

The classification assigned to the product in this report is appropriate to such a Declaration of Performance of the essential characteristics of the construction product by the manufacturer within the context of a System 3 Assessment and Verification of Constancy of Performance. Under the Construction Products Regulation a Declaration of Performance (DoP) is a requirement for affixing the CE marking.

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Annex A: SBS membranes (top layers)

1) POLY ELAST PV180 S4
Thickness: approx.: 4,2 mm
Reinforcement: Polyester 180 g/m²
Compound: SBS
Application: torch on membrane

2) DACO KSO+
Thickness: approx.: 4,2 mm
Reinforcement: Glass fibre 200g
Compound: SBS
Application: Self- adhesive

3) DACO KSO
Thickness: approx.: 4,2 mm
Reinforcement: Polyester Compound
Compound: SBS
Application: Self- adhesive

4) POLY ELAST RAPID O
Thickness: approx.: 5,0 mm
Reinforcement: Polyester Compound
Compound: SBS
Application: torch on membrane

5) SK BIT 105 PV Wurzelschuts (root resistant)
Thickness: approx.: 5,2 mm
Reinforcement: Polyester
Compound: SBS compound
Application: torch on membrane

6) POLY ELAST 3K
Thickness: approx.: 5,2 mm
Reinforcement: 3 K compound
Compound: SBS
Application: torch on membrane

7) ELMO STAR
Thickness: approx.: 5,2 mm
Reinforcement: 4 K comound
Compound: SBS
Application: torch on membrane

8) POLY – Elast PV 250 S5
Thickness: approx.: 5,2 mm
Reinforcement: polyester
Compound: SBS
Application: torch on membrane

Annex B: SBS membranes (under layers)

1) Inter Stick SK 3 Extra
Thickness: approx.: 3,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Self adhesive

2) DACO KSU+
Thickness: approx.: 3,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Self adhesive

3) DACO KSU
Thickness: approx.: 3,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Self adhesive

4) DACO KSU-SI
Thickness: approx.: 3,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Self adhesive

5) Monoplex SBS PV 180 S4
Thickness: approx.: 4,0 mm
Reinforcement: Polyester 180
Compound: SBS
Application: Torch on membrane

6) POLY ELAST GG 200 S4
Thickness: approx.: 4,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Torch on membrane

7) MONOPLEX SBS GG 200 S4
Thickness: approx.: 4,0 mm
Reinforcement: Glass fibre 200 g
Compound: SBS
Application: Torch on membrane

8) Poly Elast PV 200 S5
Thickness: approx.: 5,0 mm
Reinforcement: Polyester 250g
Compound: SBS
Application: Torch on membrane

9) DACO-KSU-FO
Thickness: approx.: 3,0 mm
Reinforcement: Glass fibre 200g
Compound: SBS
Application: Self-adhesive