

Extended application report for roofs/roof coverings exposed to external fire No. 21538B

Owner of the extended application report

AXTER LIMITED
West Road, Ransomes Europark
IP3 9SX Ipswich
UNITED KINGDOM

Normative references

This extended application (EXAP) report concerns test results obtained in accordance with test method CEN/TS 1187:2012 – test method 4. The extended application process is carried out in conformity with the following extended application document: CEN/TS 16459:2019: External fire exposure of roofs and roof coverings – Extended application of test results from CEN/TS 1187. The extended application process also applies rules (if any) as defined in the following product standard(s) and/or EAD(s): EN 13707:2004.

This extended application report consists of 13 pages.

1. DETAILS OF PRODUCT CONCERNED

1.1. Nature

Product Technical Specifications: Bituminous waterproofing membrane

Product family: EN 13707:2004

End-use application: Waterproofing roof membrane

1.2. Description

		Nominal values (1)	Measured values (2)
SUPPORTING DECK			
Material	OSB		
Thickness (mm)	18		
Density (kg/m³)	600		
PRIMER			
A) VERNIS ANTAC			
Material	Cold bituminous adhering primer		
Manufacturer / Supplier	Axter Limited		
Weight percentage (w%)	54		
Applied surface weight (l/m²)	150-300		
Application	Roller applied		
B) VERNIS SA (*)			
Material	Cold bituminous adhering primer		
Manufacturer / Supplier	Axter Limited		
Weight percentage (w%)	Not communicated		
Applied surface weight (l/m²)	Known by laboratory		
Application	Spray applied		
C) WILOTEKT SURFACE CONDITIONING PRIMER (*)			
Material	Cold bituminous adhering primer		
Manufacturer / Supplier	Axter Limited		
Weight percentage (w%)	54		
Applied surface weight (l/m²)	150-200		
Application	Roller applied		
VAPOUR BARRIER			
Material	SBS Elastomeric bitumen with composite reinforcement		
Trade name	Vap Alu ADH		
Manufacturer / Supplier	Axter Limited		
Reinforcement (material + g/m²)	Composite aluminium and glass fibre 120 g/m²		
Thickness (mm)	2,2	(3)	
Surface weight (g/m²)	3175	(3)	
Flame retardants	No	(3)	
Fixing method	Self-adhesive		
Reaction to fire according to EN 13501-1	NPD		
ADHESIVE			
Material	PU Adhesive		
Trade name	Hyrastik EVO		
Manufacturer / Supplier	Axter Limited		
Flame retardants	N/A		
Weight percentage (w%)	100		
Surface weight (l/m²)	0,1 – 0,2		
Application	In Beads 20 to 30 mm wide		

INSULATING LAYER (ADHESIVE)		
Material	Polyisocyanurate (PIR) board covered with coated glass tissue and bituminised glass tissue with polypropylene fleece	
Trade name	Hytherm (ADH/BF)	
Backing/facing material (g/m²)	Coated glass tissue and bituminised glass tissue with polypropylene fleece (weight not provided)	
Manufacturer / Supplier	Axter Limited	
Thickness (mm)	120	(3)
Density (kg/m³) of the foam	30	(3)
Flame retardants	No	(3)
Fixing method	PU Adhered	
Reaction to fire according to EN 13501-1	E	
ROOF COVERING		
1.1) <u>First layer</u>		
A) <u>Hyranger spot ADH</u>		
Material	Elastomeric bitumen membrane with polyester reinforcement and a microperforated film and sand finishing on top.	
Manufacturer / Supplier	Axter Limited	
Mineral finish (material + g/m²)	Macroperforated film + sand 100 g/m²	
Reinforcement (material + g/m²)	Stabilised polyester 120 g/m²	
Thickness (mm)	2,69	(3)
Surface weight (g/m²)	3160	(3)
Flame retardants	No	(3)
Fixing method	Self-adhesive	
B) <u>Stickflex / Stickflex Sanded</u>		
Material	SBS Elastomeric bitumen with a glass fiber reinforcement	
Trade name	Stickflex / Stickflex Sanded	
Manufacturer / Supplier	Axter Limited	
Reinforcement (material + g/m²)	Glass fiber 50 g/m²	
Mineral finish (material + g/m²)	Sand, quantity known by laboratory	
Thickness (mm)	2,0	(1)
Surface weight (g/m²)	3075	(1)
Flame retardants	No	(1)
Fixing method	Self-adhesive	
1.2) <u>Top layer</u>		
Material	SBS Elastomeric bitumen with a polyester reinforcement and a mineral slate finishing on top.	
Trade name	Hyranger 40 PY FP / Hyranger 40 Flame Free / Hyranger 40 FR	
Manufacturer / Supplier	Axter Limited	
Mineral finish (material + g/m²)	Mineral slate 1000	
Reinforcement (material + g/m²)	Stabilised polyester 180 g/m²	
Thickness (mm)	3,5	(3)
Surface weight (g/m²)	5075	(3)
Flame retardants	No	(3)
Fixing method	Torched + heat activated	

(1) Based on the information given by the sponsor

(2) Values verified by the laboratory

(3) Unverifiable by the laboratory

(*) Classified through extended application

Summary of parameters and tested systems:

	A-1	R-2
Top layer	Hyranger 40 PY FP	Hyranger 40 PY FP
Fixation	Torched +heat activated	Torched +heat activated
Under layer	Hyranger Spot ADH	Stickflex Sanded
Fixation	Self-adhesive	Self-adhesive
Insulation	PIR (120 mm)	PIR (120 mm)
Fixation	PU adhered	PU adhered
Vapour barrier	Vap Alu ADH	Vap Alu ADH
Fixation	Self-adhesive	Self-adhesive
Primer	Vernis Antac	N/A
Substrate	OSB (18 mm ; 600 kg/m ³)	

2. REPORTS & RESULTS IN SUPPORT OF THIS EXTENDED APPLICATION

2.1. Reports

Name of the laboratory	Name of the sponsor	Test report ref. No.	Test date	Test method
WFRGENT N.V. Ghent, Belgium	Axter Limited	21538A	15/09/2021	CEN/TS 1187:2012-test method 4
WFRGENT N.V. Ghent, Belgium	Axter Limited	20295R	19/03/2020 & 20/03/2020	CEN/TS 1187:2012-test method 4
WFRGENT N.V. Ghent, Belgium	Axter Limited	20295S	19/03/2020 & 27/04/2020	CEN/TS 1187:2012-test method 4
WFRGENT N.V. Ghent, Belgium	Axter Limited	20295T	N/A	CEN/TS 16459:2019

Deviations from test standard: Number of tested samples for report 20295R & 21538A. Only one preliminary and one penetration test have been carried out instead of the standard one preliminary and three penetration tests.

2.2. Test samples

Test report ref. No.	Sampling procedure	Conditioning	Number of samples tested
20295R	AVCP 3	according to CEN/TS 1187:2012 test 4	4 x 2
20295S	AVCP 3	according to CEN/TS 1187:2012 test 4	4
21538A	AVCP 3	according to CEN/TS 1187:2012 test 4	2 x 1

2.3. Test results

2.3.1. Test results on CEN/TS 1187:2012 – test method 4

Test conditions: 21538A

Test date: 15/09/2021

Room temperature at start of test (°C): 19

Roof pitch: 0°

Substrate: OSB (18 mm ; 600 kg/m³)

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)

Specimen No:	A-1'
Duration of flaming after withdrawal of the test flame (min:sec)	00:00
Maximum flame spread distance (mm)	90
Time to fire penetration (min:sec)	Did not penetrate
Nature of the penetration	N.a.

(') The results of preliminary test correspond with the obtained results of the penetration test.

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

Specimen No:	A-1	Average
Time to fire penetration (min:sec)	Did not penetrate	Did not penetrate
Nature of the penetration	N.a.	-
Additional observations: The specimen ignited. Carbonization and melting of the top layer were visible. Additionally, burning particles persisting both longer and shorter than 5 seconds were visible. The specimen extinguished after 27:28.		

Test conditions: 20295R

Test date: 19/03/2020 & 20/03/2020
Room temperature at start of test (°C): 18
Roof pitch: 0°.
Substrate: OSB (18 mm ; 600 kg/m³)

PRELIMINARY IGNITION TEST WITH BURNING BRANDS (STAGE 1)

Specimen No:	R-1'	R-2'(*)	R-3'	R-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)	40	110	80	90
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.

(*) The results of preliminary test correspond with the obtained results of the penetration test.

(*) Reused in the official test 20295S.

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

Specimen No:	R-1	R-2(*)	R-3	R-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: None of the specimens ignited. Carbonization and melting of the top layer were visible for all specimens.					

(*) Reused in the official test 20295S.

Test conditions: 20295S

Test dates: 19/03/2020 & 27/04/2020

Room temperature at start of test (°C): 18

Roof pitch: 0°.

Substrate: OSB (18 mm ; 600 kg/m³)

Build-up: OSB + bituminous primer + VAP ALU ADH + Hyrastik EVO + Hytherm (ADH/BF) + Stickflex Sanded + Hyranger 40 PY FP

	Specimen number	Time to fire penetration (min:sec)	Duration of flaming after withdrawal of test flame (min:sec)	Maximum flame spread distance (mm)
Stage 1	1	Did not penetrate	00:00	110
Stage 2	2	Did not penetrate	(-)	(-)
	3	Did not penetrate	(-)	(-)
	4	Did not penetrate	(-)	(-)
	Average	Did not penetrate	(-)	(-)

(-) not applicable

2.4. Additional supporting data used in the extended application process

2.4.1. Observations and additional supporting data

- The reaction to fire classification of Hytherm ADH is Euroclass E, according to the declaration of performance by the manufacturer.

3. RESULTS OF THE EXTENDED APPLICATION

3.1. Principles applied for the extension of the field of application

This extended application procedure is based on:

CEN/TS 16459:2019 §D3.3: by use of additional test results which, together with the initial test result, enables consideration of a larger range of one or several product parameters and end-use application parameters.

3.2. Procedure

Under annex D of the above-mentioned standard, extrapolation rules are stated which are relevant to the test method and type of product used for this extrapolation. The paragraphs below are relevant for the extrapolation, performed in this report.

3.2.1 Rules for extrapolation according to §D.3.3 and annex D of CEN/TS 16459:2019 - method 3

Product / End-use parameter for which an extended application is obtained	Extended application based on	Rule or statement
Thickness or Mass per unit area or Density	§ D.2 General rules of CEN/TS 16459:2019	"Following the classification of the roofing systems to EN 13501–5 using the maximum and minimum values of the given parameter for the component layer under investigation, where no change in class occurs, the resulting classification for the roofing system is valid within and including the limits of the component layer."
Reaction-to-fire classification (EN 13501–1) of any layer in the roofing system	§ D.2 General rules of CEN/TS 16459:2019	Substitution is possible for a component or layer with the same or better reaction-to-fire classification when tested in the same end use application provided that the substitute component or layer is of the same generic product group. Note that this rule excludes the substitution of the external (top) layer.
Surfacing on lower side (backing) of any layer in the roof system.	§ D.2 General rules of CEN/TS 16459:2019	The % of organic content of the surfacing product (by mass) shall not be increased. Note that this rule excludes the substitution of the external (top) layer.
Surfacing on upper side (facing) of any layer in the roof system.	§ D.2 General rules of CEN/TS 16459:2019	The % of organic content of the surfacing product (by mass) shall not be increased. Note that this rule excludes the substitution of the external (top) layer.
Number of layers	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	"As tested"
Substrate or underlying construction details	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	"Where the roofing system is laid directly onto a combustible substrate such as plywood or particle board of a tested thickness, the classification results apply to all such roof covering systems using thicker boards made from the same type of combustible substrate." Test with vapour control layer with defined reaction to fire class E or better. The vapour control layer can then be replaced with product of equal or better performance. Where the roof covering system is laid and tested on an insulation layer, the classification obtained shall apply to the insulation thicknesses between those tested provided that the generic insulation product remains unchanged, see insulation layer information below.
Type of product Product composition Binder content	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	The product shall be tested with the maximum % organic content by mass or volume. The results shall be applicable to any similar product with lower organic content.
Colour (consider also pigments)	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	No influence, but refer to product composition
Reinforcement: mass per unit area, type of material; position within layer etc.	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	Tests on a given mass of reinforcement per unit area will apply to lower masses. Limits to be agreed

Product / End-use parameter for which an extended application is obtained	Extended application based on	Rule or statement
Spacing and type of mechanical fixing (fasteners)	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019	As tested.
Thickness Insulation	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019 Insulation	Where the roof covering system is laid and tested on an insulation layer, the classification obtained shall apply to the insulation thicknesses between those tested provided that the generic insulation product remains unchanged.
Density Insulation	§ D.3.3. Reinforced bitumen sheets of CEN/TS 16459:2019 Insulation	As tested at nominal density as defined in the relevant Product standards The classification obtained shall apply to the insulation densities between those tested provided that the generic insulation product remains unchanged.

In project 20295R/S/T/U/V, an EXAP program was carried out to cover a thickness range of the insulation. The 120 PIR insulation obtained the worst-case results and this build-up was officialized.

In this project, testing was performed with a cold bituminous primer (Vernis Antac), which according to the sponsor has the highest organic content and highest applied amount, compared to Vernis SA & Wilotekt surface conditioning primer. As no penetration nor any damage to this layer was observed in the tests, the obtained results can be considered valid for any bituminous primer in the extended field of application, in conformity with the general reaction to fire rules.

To evaluate the product parameter “**Underlayer and primer on substrate**” tests were performed according to CEN/TS 1187:2012 on:

- A-1: system with Hyranger Spot ADH with Vernis Antact
- R-2: system with Stickflex Sanded without primer

Other parameters of the system were kept the same between the samples.

As a conclusion, there were no significant differences, based on visual observations the laboratory selected the system **Stickflex Sanded without primer**.

Therefore, this worst-case result can be considered the upper limit for results of the range underlayers. The laboratory concludes the EXAP program. The worst-case system is already officialized in 20295S.

System/ parameter	A-1	R-2
Parameters of the system: Underlayer and primer on substrate	Hyranger Spot ADH with Vernis Antact	Stickflex Sanded without primer
Maximum flame spread distance (in preliminary test) (mm)	90	110
Percentage (%) of maximal flame spread (380 mm)	23,7	28,9
After withdrawal of the test flame, specimens burn for < 5 min (in preliminary test) (min :sec)	00:00	00:00
Penetration (Yes/No)	No	No
Within the Broof(T4) classification	Yes	Yes

4. **EXTENDED APPLICATION RESULTS**

4.1. Application range – product family

This extended application for the product as described in §1.2, is valid for the following end-use applications:

- Range of layer 0: bituminous top layer: Hyranger 40 PY FP / Hyranger 40 Flame Free/ Hyranger 40 FR

Thickness:	3,5 mm
Surface weight:	5075 g/m ²
Reinforcement:	Polyester 180 g/m ²
Fixing method:	Torched + heat activated

- Range of layer 1: bituminous under layer: Stickflex / Stickflex Sanded

Thickness:	2,0 mm
Surface weight:	3075 g/m ²
Mineral finish	
<i>Sand</i>	Known by laboratory
<i>No mineral finish</i>	N/A
Reinforcement:	Glass fiber 50 g/m ²
Fixing method:	Self-adhesive

OR

- Range of layer 1: bituminous under layer: Hyranger Spot ADH

Thickness:	2,69 mm
Surface weight:	3160 g/m ²
Mineral finish	Macroperforated film and sand 100 g/m ²
Reinforcement:	Polyester 120 g/m ²
Fixing method:	Self-adhesive

- Range of layer 2: Coated glass tissue and bitumenised glass tissue with polypropylene fleece faced PIR insulation

Thickness (single & double layer):	50 mm or more
Mineral finish	Coated glass tissue and bitumenised glass tissue with polypropylene fleece (weight not provided)
Density of the foam:	30 kg/m ³
Reaction to fire according to EN13501-1	E or better
Fixing method:	PU adhered

- Range of layer 3: Hyrastik EVO (PU adhesive)

Weight percentage (w%)	100
Surface weight applied:	30-60 m ² / 6 L
Flame retardant	No
Application method	In beads 20 to 30 mm wide

- Range of layer 4: bituminous vapour barrier (Hyranger Spot ADH, Roll 25 Alfa Alu, Force line 2VV, Force line 3VV, Hyranger 25/25 TS, Stickflex Sanded, Stickflex, Force SA and Force Line 2S, SK Vap)

Reaction to fire according to EN13501-1	NPD
---	-----

- Range of layer 5: Cold bituminous primer, as tested and described in §1.2

- Range of layer 6: Supporting deck

Range of supporting decks:	OSB (18 mm or more, 600 kg/m ³)
----------------------------	---

4.2. Fire performance parameters

All products as described in §1.2. and within the field of application as defined in §4.1. , can be considered to obtain reaction to fire test results that are better comply with the following :

PRELIMINARY TEST (STAGE 1)

Parameter	Criteria				Compliance			
	Class B _{ROOF} (t4)	Class C _{ROOF} (t4)	Class D _{ROOF} (t4)	Class E _{ROOF} (t4)	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	Yes	Yes	Yes	Yes
Flame spread distance	< 0,38 m	< 0,38 m	< 0,38 m	No limit	Yes	Yes	Yes	Yes
Penetration	None	None	None	None	Yes	Yes	Yes	Yes

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	Compliance			
	Class B _{ROOF} (t4)	Class C _{ROOF} (t4)	Class D _{ROOF} (t4)	Class E _{ROOF} (t4)
Penetration	Yes	Yes	Yes	Yes

5. ADDITIONAL STATEMENT

The extended application results relate to the behaviour of a product/product family under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product/product family in use.

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

PREPARED BY

APPROVED BY

This document is the original version of this extended application report and is written in English.

This report may be used only literally and completely for publications. For publications of certain texts, in which this report is mentioned, our permission must be obtained in advance.

The authenticity of the electronic signatures is assured by Belgium Root CA.