

EXTENDED APPLICATION REPORT – EXTERNAL FIRE EXPOSURE TO ROOFS AND ROOF COVERING – No EUI-24-000503-REXAP

Report date: 06 May 2025

Owner of this report: **RYNO SYSTEMS LTD**

Castlepoint Global Headquarters, Castle way
Adress2
AB41 9RG, Ellon
UNITED KINGDOM

The extended application 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 standard: CEN/TS 16459:2019

The extended application process also applied rules as defined in the following product standard(s) and/or EAD: None

Document Tracking

Revision Index.	Modification	Comments	Date	Writer	Approver
0	Original document	/	06 May 2025	GRE	MKE

1. DETAILS OF THE PRODUCT CONCERNED

1.1. NATURE

Product technical specification: Inverted roof consisting of a resin-bound stone decking installed on pedestals, which are positioned above rigid foam insulation layers.

Product family: None

End-use application: Inverted roof consisting of a resin-bound stone decking installed on pedestals, which are positioned above rigid foam insulation layers.

1.2. DESCRIPTION

The information below were provided by the applicant who attests their accuracy.

Manufacturer / Supplier	RYNO SYSTEMS LTD Castlepoint Global Headquarters, Castle way Address2 AB41 9RG, Ellon UNITED KINGDOM	
Identification of the product	Resin Bound Gravel System	
General description	Description	The roof system consists of a resin-bound stone decking installed on pedestals, which are positioned above rigid foam insulation layers. This rigid foam insulation layers are placed over a waterproofing membrane, which was applied on top of an OSB deck.
	Thickness	180 mm & 495 mm
	Density	250 kg/m ³
	Mass per unit area	41 kg/m ²

1.3. DETAILED DESCRIPTION OF THE LAYERS

1.3.1. Roof covering details

Layers	Characteristics	Value/Description	Unit
Resin bound stone	Material	Resin bound stone	-
	Trade name	Resin bound gravel	-
	Manufacturer/supplier	Ryno ltd	-
	Thickness	25 mm	mm
	Colour	Breccia	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	41	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³

	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	The aggregate was mixed with the resin and discharge on top of the stabilisation mesh.	-
	Fixing reference and manufacturer/supplier (if applicable)	Resin part A, reference 67633 – Stonebound HB UV Part A (TERRACO). Resin part B, reference 67634 – Stonebound HB UV Part B (TERRACO). Catalyst, reference 67606 – Stonebound UV Catalyst (TERRACO).	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Stabilisation mesh	Material	PET (Polyethylene terephthalate)	-
	Trade name	Stabilisation mesh	-
	Manufacturer/supplier	Ryno Ltd	-
	Thickness	2	mm
	Colour	Black	-
	Coating reference and manufacturer/supplier (if applicable)	N.A	-
	Mass per unit area	Not provided by the sponsor of the test.	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	Loose laid on baseboard beneath	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Base board	Material	Aluminium 6063-T6	-
	Trade name	BB25 Baseboard	-
	Manufacturer/supplier	Ryno Ltd	-
	Thickness	25 mm overall, with 2 mm on top surface and 1.5 mm support legs.	mm
	Colour	Mill finished aluminium	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	10.3	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Class A	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	Screwed to aluminium joist	-
	Fixing reference and manufacturer/supplier (if applicable)	Reference: BBF baseboard screw Manufacturer: Ryno Ltd Dimension: Ø 6.3mm x 15 mm length	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Aluminium joist	Material	Aluminium 6063-T6	-
	Trade name	DS25 Aluminium joist	-
	Manufacturer/supplier	Ryno ltd	-
	Thickness	25 mm	mm
	Colour	Mill finished aluminium	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	2	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Class A	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	Clip into adjustable pedestals	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Self-levelling adjustable joist support pedestal with clip-on head	Material	Polypropylene	-
	Trade name	RDA-C self levelling adjustable pedestal	-
	Manufacturer/supplier	Ryno ltd	-
	Thickness	25 mm & 340 mm	mm
	Colour	Black	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	2	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	The pedestal was installed on the waterproofing membrane using a loose-laid method.	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Rubber pad (under pedestal)	Material	Rubber pad	-
	Trade name	Base rubber shockpad	-
	Manufacturer/supplier	Ryno ltd	-
	Thickness	3	mm
	Colour	Black	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	Not provided by the sponsor of the test.	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	The rubber pad was installed using a loose-laid method.	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Rigid insulation	Material	PIR insulation	-
	Trade name	Thermaboard	-
	Manufacturer/supplier	Kingspan	-
	Thickness	50 mm, incorporating 2 layers of 25 mm.	mm
	Colour	N/A	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	1.75	kg/m ²
	Density	70	Kg/m ³
	Thermal conductivity	0.022	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	F	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	The insulation boards were installed using a loose-laid method.	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

Layers	Characteristics	Value/Description	Unit
Waterproofing membrane	Material	Waterproofing membrane	-
	Trade name	Bituminous Roof Membrane	-
	Manufacturer/supplier	IKO	-
	Thickness	4 mm	mm
	Colour	Black	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	3.2	kg/m ²
	Density	80	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	N/A	-
	Fixing/application method	Loose laid onto OSB boards.	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

1.3.2. Decking/supporting construction

Layers	Characteristics	Value/Description	Unit
Oriented Strand Board	Material	Plywood	-
	Trade name	18 mm OSB 3 board	-
	Manufacturer/supplier	Cordiners timber & building supplies	-
	Thickness	18 mm	mm
	Colour	N/A	-
	Coating reference and manufacturer/supplier (if applicable)	N/A	-
	Mass per unit area	Not provided by the sponsor of the test.	kg/m ²
	Density	Not provided by the sponsor of the test.	Kg/m ³
	Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
	PCS value	Not provided by the sponsor of the test.	MJ/m ²
	Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
	Fire retardant treatment (if applicable)	Not provided by the sponsor of the test.	-
	Fixing/application method	The OSB board was installed on the sample holder using a loose-laid method.	-
	Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

2. TEST REPORTS AND TEST RESULTS IN SUPPORT OF THIS EXTENDED APPLICATION REPORT

2.1. TEST REPORTS

Name of laboratory	Name of sponsor	Test report reference number	Date
Efectis UK/Ireland	RYNO SYSTEMS LTD	EUI-24-RT4-000503	14 th of March 2025

Deviation from the standard: Number of tested samples¹

2.2. TEST SAMPLES

Test report reference number	Sampling procedure	Conditioning	Number of samples tested
EUI-24-RT4-000503	AVCP 3	Conditioning to constant mass, as per the §4.2 of the EN 13238:2010 standard	Stage 1: 2 indicative tests Stage 2: • 2 indicative tests • 2 worst case scenario tests

2.3. TEST RESULTS IN ACCORDANCE WITH CEN/TS 1187: 2012 – TEST METHOD 4.

2.3.1. Test report ref no. EUI-24-RT4-000503

2.3.1.1. Preliminary test (Stage 1):

2.3.1.1.1. Results

Parameters	Test 1	Test 2
Specimen reference	180 mm	495 mm
Test date	08/11/2024	08/11/2024
Sample number	A	B
Including of joint	No	No
Burning brand location	Centre	Centre
Tested pitch (°)	0°	0°
Room temperature (°C)	16	16
Room relative humidity (%)	73	73
Duration of flaming (mins) (If it exceeds 5 min ¹)	No flaming observed.	No flaming observed.
Flame spread in any direction (mm)	0	0
Maximum flame spread > 381 mm	No	No
Time to penetration (mins)	No penetration observed	No penetration observed
Nature of fire penetration	N/A	N/A

N/A Not applicable

2.3.1.1.2. Observation

No specific observation.

¹ The test program consisted of a series of indicative tests conducted to identify the worst-case scenario. The full classification test(s) were then performed on the worst-case scenario.

2.3.1.2. Penetration test (Stage 2):

2.3.1.2.1. Results

Parameters	Test 1	Test 3	Test 4	Test 5
Specimen reference	180 mm	180 mm	180 mm	495 mm
Test date	07/11/2024	08/11/2024	15/11/2024	22/11/2024
Sample number	C	E	F	G
Including of joint	No	No	No	No
Burning brand location	Centre	Centre	Centre	Centre
Tested pitch (°)	0°	0°	0°	0°
Room temperature (°C)	24	21.5	24	20
Room relative humidity (%)	53	52	45	34
Time to penetration by fire (min:s)	≥ 60 min	≥ 60 min	≥ 60 min	≥ 60 min
Nature of fire penetration	N/A	N/A	N/A	N/A
Occurrence of melting	No	No	No	No
Production of flaming molten droplets or debris	No	No	No	No
Production of non-flaming molten droplets or debris	No	No	No	No
Time of mechanical failure or development of holes without penetration by fire	≥ 60 min	≥ 60 min	≥ 60 min	≥ 60 min

N/A Not applicable

Note: Test 2 was terminated prematurely due to an apparatus failure during the testing process. Consequently, an additional test was conducted to replace it. To avoid any confusion in the results, the test 2 (sample D) was removed from this test report.

2.3.1.2.2. Observations

Test 1	
Time (min)	Observation
00 min 00 s	Sample exposed to radiant heat.
06 min 00 s	No sustained flaming observed during or after the application of the burning brand.
19 min 00 s	Deformation noticed on the surface of the specimen. Slight discoloration also noticed.
21 min 00 s	Smoke noticed.
27 min 00 s	Dark discoloration noticed on the surface of the specimen.
29 min 30 s	No smoke or penetration observed on the underside of the specimen.
39 min 20 s	Crack noticed on the surface of the specimen. Small spalling also noticed.
45 min 00 s	N.N.T.R.
59 min 30 s	No smoke or penetration observed on the underside of the specimen.
60 min 00 s	End of the test.

N.N.T.R. Nothing New To Report

Test 3	
Time (min)	Observation
00 min 00 s	Sample exposed to radiant heat.
06 min 00 s	No sustained flaming observed during or after the application of the burning brand.
15 min 00 s	Deformation noticed on the surface of the specimen.
26 min 00 s	Dark discoloration noticed on the surface of the specimen. Small spalling noticed.
29 min 30 s	No smoke or penetration observed on the underside of the specimen.
45 min 00 s	N.N.T.R.
59 min 30 s	N.N.T.R.
60 min 00 s	End of the test.

N.N.T.R. Nothing New To Report

Test 4	
Time (min)	Observation
00 min 00 s	Sample exposed to radiant heat.
06 min 00 s	No sustained flaming observed during or after the application of the burning brand.
15 min 00 s	Deformation noticed on the surface of the specimen.
26 min 00 s	Dark discoloration noticed on the surface of the specimen.
29 min 30 s	No smoke or penetration observed on the underside of the specimen.
45 min 00 s	N.N.T.R.
59 min 30 s	No smoke or penetration observed on the underside of the specimen.
60 min 00 s	End of the test.

N.N.T.R. Nothing New To Report

Test 5	
Time (min)	Observation
00 min 00 s	Sample exposed to radiant heat.
06 min 00 s	No sustained flaming observed during or after the application of the burning brand.
07 min 00 s	Deformation noticed on the surface of the specimen.
23 min 00 s	Dark discoloration noticed on the surface of the specimen.
29 min 30 s	No smoke or penetration observed on the underside of the specimen.
45 min 00 s	N.N.T.R.
59 min 30 s	No smoke or penetration observed on the underside of the specimen.
60 min 00 s	End of the test.

N.N.T.R. Nothing New To Report

2.4. ADDITIONAL SUPPORTING TEST DATA USED IN THE EXTENDED APPLICATION PROCESS

None

3. EXTENDED APPLICATION

3.1. PRINCIPLES APPLIED FOR THE EXTENSION OF THE FIELD OF APPLICATION

This extended application procedure is based on: §5 of the CEN/TS 16459:2019, by the use of additional test results which, together with the initial test result, enables consideration of a larger of one or several product parameters and end-use application parameters

Establishment influence(s) of products and end use parameters in accordance with: Annexe D of the CEN/TS 16459:2019.

3.2. PROCEDURE

Under the §D.2 and table D.1 of the CEN/TS 16459:2019, the extension is claimed for the following general rules:

General rule / product parameter	Rules
Thickness	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 the class occurs, the resulting classification for the roofing system is valid within and including the limits of the component layer.

To evaluate the product parameters mentioned above, tests were conducted in accordance with CEN/TS 1187 (T4): 2012 on:

- The minimum cavity thickness between the inverted metal roof decking and the waterproofing roof covering
- The maximum cavity thickness between the inverted metal roof decking and the waterproofing roof covering

Two indicative tests were performed for both stage(s) of the Test Method 4 of CEN/TS 1187 (T4): 2012. During these tests, no change in classification was observed between the minimum and maximum cavity configurations.

Additional testing was subsequently carried out to meet the requirements of the test and classification standard regarding the minimum number of tests to be performed. These additional tests were conducted on the minimum cavity thickness, as greater damage was observed on the waterproofing roof covering during the dismantling phase.

3.3. EXTENDED APPLICATION RESULTS

3.3.1. Application range – product family

The extended application for the product roof system as describe in the §1 of this document, is valid for the following product parameters:

- Exposed layer: Resin bound stone: As tested
- Layer 1: Stabilisation mesh: As tested
- Layer 2: Base board: As tested
- Layer 3: Aluminium joist: As tested
- Layer 4: Self-levelling adjustable joist support pedestal with clip-on head

Characteristics	Value/Description	Unit
Material	Polypropylene	-
Trade name	RDA-C self levelling adjustable pedestal	-
Manufacturer/supplier	Ryno ltd	-
Thickness	Valid for any thickness between 25 mm & 340 mm	mm
Colour	Black	-
Coating reference and manufacturer/supplier (if applicable)	N/A	-
Mass per unit area	2	kg/m ²
Density	Not provided by the sponsor of the test.	Kg/m ³
Thermal conductivity	Not provided by the sponsor of the test.	W/m.K
PCS value	Not provided by the sponsor of the test.	MJ/m ²
Reaction to fire classification, according to EN 13501-1	Not provided by the sponsor of the test.	-
Fire retardant treatment (if applicable)	N/A	-
Fixing/application method	The pedestal was installed on the waterproofing membrane using a loose-laid method.	-
Fixing reference and manufacturer/supplier (if applicable)	N/A	-

N/A: Not applicable

- Layer 5: Rubber pad (under pedestal): Base rubber shockpad, as tested
- Layer 6: Rigid insulation: PIR insulation, as tested
- Layer 7: Waterproofing membrane: Bituminous Roof Membrane, as tested
- Supporting deck layer: OSB, as tested

3.3.2. Fire performance parameters

The roof system, as describe in the §1 of this document and within the field of field of application of defined in the §3.3.1 of this document, can be considered to obtain a fire performance equal or greater than the following:

3.3.2.1. 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 (min:s)	< 5 min	< 5 min	< 5 min	≥ 5 min	Yes	Yes	Yes	Yes
Flame spread distance (mm)	< 0.38 m	< 0.38 m	< 0.38 m	No limit	Yes	Yes	Yes	Yes
Penetration	None	None	None	None	Yes	Yes	Yes	Yes

3.3.2.2. Penetration test (Stage 2):

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)
Penetration time (min:s)	≥ 60 min	< 60 min	< 30 min	< 30 min	Yes	Yes	Yes	Yes
		≥ 30 min						

3.3.3. 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.

X 

Project leader
Signed by: Guillaume REMY

X 

Testing Technical Supervisor
Signed by: Maurice McKee

END OF REPORT