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Agrément Certificate

18/5563

Product Sheet 1

DERBIGUM ROOF WATERPROOFING SYSTEMS

DERBIGUM HIGH PERFORMANCE ROOFING SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Derbigum High Performance Roofing System, a range of glass- and polyester-reinforced, atactic polypropylene (APP) polymer-modified bitumen waterproofing membranes, insulation boards and a vapour control layer (VCL), for use on flat, pitched or zero fall roofs, green roofs and roof gardens with limited or pedestrian access and with suitable protection.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Weathertightness — the system will resist the passage of moisture to the interior of the building (see section 6).

Thermal performance — the system can be used to improve the thermal performance of a roof (see section 7).

Condensation risk — roofs incorporating the system will adequately limit the risk of interstitial and surface condensation (see section 8).

Properties in relation to fire — The system, when used in a suitable specification, can enable a roof to be unrestricted under the national Building Regulations (see section 9).

Resistance to wind uplift — the system will enable a roof to be unrestricted under the national Building Regulations (see section 10).

Resistance to foot traffic — the system will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (see section 11).

Resistance to penetration of roots — the system will resist the penetration of roots (see section 12).

Durability — under normal service conditions, the system will provide a durable waterproof covering with a service life of at least 40 years (see section 14).



The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 18 September 2018

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 14 October 2020 to update zero fall wording and company name.

The BBA is a UKAS accredited certification body – Number 113.

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers **MUST** check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

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Regulations

In the opinion of the BBA, the Derbigum High Performance Roofing System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B4(2)	External fire spread
Comment:		On a suitable substructure, the use of the system can enable a roof to be unrestricted under this Requirement. See section 9 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system, including joints, will enable a roof to satisfy this Requirement. See section 6.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system can contribute to enabling a roof to satisfy this Requirement. See sections 8.1 and 8.2 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system is acceptable. See sections 7.2 and 7.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The system can enable a construction to satisfy the requirements of these Regulations, although compensating fabric/service measures may need to be taken. See sections 7.2 and 7.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 13.1 and 14 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The system, when applied to a suitable substructure, can be regarded as having low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 9.1, 9.2 and 9.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The use of the system, including joints, will enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.7 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system will enable a roof to satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.3 ⁽¹⁾ , 3.15.5 ⁽¹⁾ and 3.15.6 ⁽¹⁾ . See sections 8.1 and 8.3 of this Certificate.

Standard:	6.1	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The system can contribute to satisfying the requirements of these Standards, with reference to clauses, or parts of, 6.1.2 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽¹⁾⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See section 7.2 and 7.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See sections 7.2 and 7.3 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)	The system is acceptable. See section 14 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system, including joints, can satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The system can contribute to a roof satisfying this Regulation. See section 8.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On a suitable substructure, the use of the system can enable a roof to be unrestricted under the requirements of this Regulation. See section 9 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide Emissions Rate
Comment:		Roofs incorporating the system can satisfy or contribute to satisfying these Regulations. See sections 7.2 and 7.3 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2) and 3 *Delivery and site handling* (3.4) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, the Derbigum High Performance Roofing System, provided it is installed, used and maintained in accordance with this Certificate will satisfy or contribute to satisfying the requirements, in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies*.

CE marking

The Certificate holder has taken the responsibility of CE marking the system in accordance with harmonised European Standards EN 13165 : 2012, EN 13707 : 2013, EN 13970 : 2004 and EN 13984 : 2013. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 The Derbigum High Performance Roofing System consists of:

- Derbigum Black⁽¹⁾⁽²⁾ — an APP polymer-modified bitumen membrane reinforced with a glassfibre mat (55 g·m⁻²) and a non-woven polyester core (150 g·m⁻²)
- Derbigum Mineral⁽¹⁾ — an APP polymer-modified bitumen membrane reinforced with a mixed composite glass/polyester of 170 g·m⁻². Available in two finishes, slated and granules
- Derbigum NT⁽¹⁾ — an APP polymer-modified bitumen membrane reinforced with a glassfibre mat (55 g·m⁻²) and a non-woven polyester core (150 g·m⁻²)
- Derbigum Olivine⁽¹⁾ — an APP polymer-modified bitumen membrane reinforced with a mixed composite glass/polyester of 170 g·m⁻², finished with olivine granules
- Derbicoat NT — a polymer modified bitumen base sheet with mixed glass/polyester reinforcement
- Debicoat HP Selfix — an SBS self-adhesive base sheet with composite glass/non-woven polyester reinforcement
- Alumasc BGT PIR insulation — a rigid polyisocyanurate (PIR) foam board with a composite bitumen/glassfibre facing on both sides
- Derbitech FA — insulation adhesive
- Derbicoat Alu Selfix — a polymer modified bitumen self-adhesive VCL reinforced with glassfibre mat and aluminium, sanded upper surface
- Derbicoat Alu — APP polymer modified torch-applied VCL with aluminium reinforcement.
- Derbiprimer S — for use in preparation of the substrate prior to the application of the roof waterproofing membranes.

(1) Contain materials obtained from recycled old bituminous waterproofing membranes.

(2) An antiroot version is available.

1.2 The membranes are supplied in rolls and are manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of membranes

Parameter (unit)	Membrane							
	Derbigum Black EN 13707	Derbigum NT EN 13707	Derbigum Mineral EN 13707	Derbigum Olivine EN 13707	Derbicoat Alu Selfix EN 13970	Derbicoat NT EN 13707	Derbicoat ALU EN 13970	Derbicoat HP Selfix EN 13707
Standard CE marked against	EN 13707	EN 13707	EN 13707	EN 13707	EN 13970	EN 13707	EN 13970	EN 13707
Thickness (mm)	4.0	4.0	4.0	4.0	2.3	2.5	3	2.0
Length (m)	8	7.27	7.27	7.27	15	7.27	10	15
Width (m)	1.1	1.1	1.1	1.1	1.0	1.1	1.1	1.0
Mass per unit area (kg·m ⁻²)	4.2	4.5	5.5 ⁽¹⁾ , 6 ⁽²⁾	5.6	2.5	2.85	3.9	2.5
Roll weight (kg)	37	36	44 ⁽¹⁾ , 48 ⁽¹⁾	48	37.5	23	41	39
Tensile strength*(N·50 mm ⁻¹)								
longitudinal	700	700	900	900	900	600	350	600
transverse	650	650	700	700	800	400	350	500
Elongation at break (%)								
longitudinal	45	45	40	40	5	40	5	35
transverse	45	45	40	40	5	40	5	35
Nail Tear(N)								
longitudinal	≥150	≥150	≥150	≥150	≥210	≥150	—	≥140
transverse	≥150	≥150	≥150	≥150	≥210	≥150	—	≥140
Impact resistance* (mm)	>1250	>1250	>1750	≥1750	>900	>1000	>1000	>900
Static indentation (kg)	>20	>20	>20	>20	—	>10	—	—
Low temperature flexibility* (°C)	≤-15	≤-15	≤-18	≤-18	≤-15	≤-15	—	≤-25
Water vapour transmission S _d (m)	—	—	—	—	1500	—	3000	—

(1) Slated finish.

(2) Granular.

1.3 The insulation boards are manufactured to comply with the requirements of EN 13165: 2102 with the nominal characteristics given in Table 2.

Table 2 Nominal characteristics of insulation boards

Parameter (unit)	Alumasc BGT PIR insulation ⁽¹⁾⁽²⁾
Length (mm)	1200
Width (mm)	600
Thickness (mm)	30 to 160 mm in 5 mm increments
Compressive strength at 10% compression (kPa)	150

(1) Board sizes other than those shown may be available on request.

(2) Thermal conductivity values (λ_D) are given in Table 3.

1.4 Ancillary products for use with the system but outside the scope of the Certificate are as follows:

- Monoscreed – a quick curing screed comprising of PMMA resin
- V-Therm VIP - Vacuum insulated panel
- Harmer AV- a range of high performance metal roof outlets
- Alumasc Multi-fix Dual Density mineral wool – non-combustible thermal insulation
- Skyline – a polyester powder coated aluminium coping, soffit and fascia system
- Modulock – fully engineered raised adjustable pedestal system for paving and decking
- Blackdown Green Roofs – extensive, biodiverse and intensive green roof system.

2 Manufacture

2.1 The membranes are manufactured by saturating and coating the reinforcement with a mixture of bitumen, polypropylene resins and inert filler.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls with either paper wrappers or tape bands bearing the product name and production code. The rolls are packed on pallets and shrink-wrapped in UV-protective (white) polythene.

3.2 The insulation boards are delivered to site packaged shrink-wrapped in plastic and must be stored on a firm, clean, level base, off the ground and under cover until required for use. Care must be taken when handling to avoid damage.

3.3 Rolls must be stored upright on a clean, level surface, away from excessive heat and under cover.

3.4 The boards must be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting. Care must be taken to avoid contact with solvents or materials containing volatile organic components. The boards must not be exposed to open flame or other ignition sources.

3.5 The Certificate holder has taken the responsibility of classifying and labelling the system components under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Derbigum High Performance Roofing System.

Design Considerations

4 Use

4.1 The Derbigum High Performance Roofing System is satisfactory for use as a warm roof waterproofing system, incorporating VCLs and thermal insulation in:

- fully adhered waterproofing specifications on flat and pitched with limited access
- protected roof specifications, eg covered by pavers or other suitable protection on flat and zero fall roofs with limited access
- pedestrian access roofs with additional protection on flat and zero fall roofs
- green roof and roof garden specifications.

4.2 Limited access roofs are defined for the purposes of this Certificate as those subjected only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc. Where traffic in excess of this is envisaged, such as pedestrian access roofs, additional protection must be provided (see sections 11 and 16.6 of this Certificate and the relevant clauses of the Certificate holder's installation instructions).

4.3 Pedestrian access roofs are defined for the purposes of this Certificate as those not subjected to vehicular traffic.

4.4 Flat roofs are defined for the purposes of this Certificate as those having a minimum finished fall of 1:80. Pitched roofs are defined for the purpose of this Certificate as those having falls greater than 1:6. Zero fall roofs are defined as those having a finished fall of between 0 and 0.7°. Reference should also be made to the appropriate clauses in Liquid Roofing and Waterproofing Association (LRWA) Note 7- *Specifier Guidance for Flat Roof Falls*.

4.5 When designing flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available including, for example, overall and local deflection and direction of falls.

4.6 Structural decks to which the system is to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards* 2018, Chapter 7.1.

4.7 Imposed loads, dead loading and wind loads specifications are calculated by a suitably competent and experienced individual in accordance with BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and their UK National Annexes.

4.8 Contact with coal tar and oil-based products must be avoided as the membrane is not compatible with lower grades of bitumen. If contact with such products is likely, a separating layer must be interposed before installing the waterproofing sheet. Where doubt arises, the advice of the Certificate holder must be sought.

4.9 For zero fall roofs it is particularly important to identify the correct drainage system to ensure that it is effective.

4.10 Recommendations for the design of green roof and roof garden specifications are available within the latest edition of the GRO *Green Roof code – Green Roof Code of Best Practice for the UK*.

4.11 The drainage system for zero fall green roofs or roof gardens must be correctly designed, and provision made for access for maintenance purposes. Dead loads for green roofs and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer.

5 Practicability of installation

The system must only be installed by contractors who have been trained and approved by the Certificate holder or their appointed agent.

6 Weathertightness



6.1 The system, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so satisfy the requirements of the national Building Regulations.

6.2 The system is impervious to water and will give a weathertight roof capable of accepting minor structural movements without damage.

7 Thermal performance

7.1 Calculations of thermal transmittance (U value) must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006 using the declared thermal conductivity (λ_D value) of the insulation component as shown in Table 3.

Table 3 Thermal conductivity (λ_D values)

Insulation thickness (mm)	Thermal conductivity ($\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)
< 80	0.026
80 to 119	0.025
≥ 120	0.024



7.2 The U value of a completed roof will depend on the thickness of insulation used, the number and type of fixings and the insulating value of other roof components/layers. Example U values of roofs incorporating the system are shown in Table 4.

Table 4 Example U values for a fully adhered system

U value requirement ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Deck construction/insulation thickness ⁽¹⁾ (mm)		
	Concrete ⁽²⁾	Timber ⁽³⁾	Metal ⁽⁴⁾
0.13	— ⁽⁵⁾	— ⁽⁵⁾	— ⁽⁵⁾
0.15	150	145	155
0.16	140	135	145
0.18	125	120	125
0.20	115	110	120
0.25	95	85	95

(1) Nearest available thickness.

(2) 150 mm concrete deck — $1.33 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$, VCL, insulation, 3-layer bitumen felt waterproofing system.

(3) 12.5 mm plasterboard, 150 mm timber joists (12.5%)/air cavity (87.5%), 18 mm plywood decking, VCL, insulation, 3 layer bitumen reinforced membrane waterproofing system.

(4) Metal deck, VCL, insulation, 3-layer bitumen felt waterproofing system.

(5) For improved thermal/carbon emission performance, additional insulation thicknesses may be considered.

Junctions



7.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

8 Condensation risk

Interstitial condensation



8.1 The system will adequately reduce the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2011, Appendix D and Appendix H Section H9, and BRE Report BR 262 : 2002, in England and Wales. When carrying out condensation risk analysis, calculations to BS 5250 : 2011, the following vapour resistance values elements should be used:

- | | |
|---------------------------------|-----------------------------|
| • VCL | 7500 MN·s·g ⁻¹ |
| • bitumen/glass tissue-facing | 6.6 MN·s·g ⁻¹ |
| • insulation core of the boards | 300 MN·s·g ⁻¹ |
| • capsheet | 1000 MN·s·g ⁻¹ . |

Surface condensation



8.2 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 W·m⁻²·K⁻¹ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in section 7.3.



8.3 For buildings in Scotland, constructions will be acceptable where the thermal transmittance (U value) does not exceed 1.2 W·m⁻²·K⁻¹ at any point, and the junctions with other elements are designed in accordance with the guidance referred to in BS 5250 : 2011, Annex H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 7.3 of this Certificate.

9 Properties in relation to fire



9.1 The constructions described below each achieved a classification of B_{ROOF(t4)} in accordance with BS EN 13501-5 : 2016:

- a 16 mm wood particle board primed with Derbiprimer S
- a layer of Derbicoat Alu Selfix , self adhesively bonded
- a 130 mm thick Alumasc BGT PIR board adhesively fixed with PUR adhesive Derbitech FA
- a fully bonded layer of Derbicoat NT
- a fully bonded layer of Derbigum Mineral

or

- a 16 mm wood particle board primed with Derbiprimer S
- a layer of Derbicoat Alu Selfix , self-adhesively bonded
- a 120 mm thick Alumasc BGT PIR board adhesively fixed with PUR adhesive Derbitech FA
- a fully bonded layer of Derbicoat NT
- a fully bonded layer of Derbigum Black.

9.2 The following construction will be unrestricted under the national Building Regulations:

- a 18 mm plywood board
- a layer of Derbicoat HP Selfix, self adhesively bonded vapour control layer
- a 120 thick Alumasc BGT PIR board adhesively fixed with PUR adhesive Derbitech FA
- a fully bonded layer of Derbicoat NT
- a fully bonded layer of Derbigum NT.



9.3 When used for flat roofs with the surface finishes listed below, defined in Part iii of Table 5 of Appendix A of Approved Document B of the Building Regulations, Northern Ireland, the roof is deemed to be of classification B_{ROOF} (t4):

- bitumen-bedded stone chippings covering the whole surface to a depth of not less than 12.5 mm
- bitumen-bedded tiles of a non-combustible material
- sand and cement screed, or
- macadam.

9.4 When used in protected roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, the system can be considered to be unrestricted under the national Building Regulations.



9.5 The designation of other specifications (eg on combustible substrates) should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, clause 1

Scotland — tests to confirm compliance with Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — test or assessment by a UKAS-accredited laboratory, or an independent consultant with appropriate experience.

10 Resistance to wind uplift

10.1 The adhesion of the bonded system is sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice.

10.2 For mechanically fastened insulation installations, the requirement for the number of fixings should be assessed by a suitably competent and experienced individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. The minimum fixing requirements are given in section 17.8 of this Certificate.

10.3 The ballast on protected roofs must be of a type that will not be removed or become delocalised owing to wind scour experienced on the roof.

11 Resistance to foot traffic

11.1 The system can accept the limited foot traffic and light concentrated loads associated with installation and maintenance. Where traffic in excess of this is envisaged, such as for maintenance of lift equipment, a walkway must be provided (for example, using concrete slabs supported on bearing pads or the manufacturer's walkway sheets). Reasonable care must be taken to avoid puncture of the membranes by sharp objects or concentrated loads.

11.2 For design purposes, the insulation boards may be assumed to have an allowable compressive strength of 150 kPa at 10% compression.

11.3 The insulation boards have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plants, water tanks, etc. Such loads must be supported directly on the roof construction or design support system.

11.4 When profiled decking is used, boards will needed to span ribs. Maximum permissible spans between ribs for various board thicknesses are shown in Table 5.

Table 5 Maximum clear span

Maximum clear span (mm)	Minimum board thickness (mm)
< 75	25
> 75 ≤ 100	30
> 100 ≤ 125	35
> 125 ≤ 150	40
> 150 ≤ 175	45
> 175 ≤ 200	50
> 200 ≤ 225	55
> 225 ≤ 250	60

12 Resistance to root penetration

The system, when used with an antiroot version of Derbigum Black, will resist penetration by plant roots and can be used as a waterproofing system in green roof and roof garden specifications.

13 Maintenance



13.1 The system must be the subject of annual inspections and maintenance in accordance with BS 6229 : 2003, Annex B1-B5, to ensure continued performance. Maintenance should include checks and operations to ensure that, where applicable:

- protection layers are in good condition
- exposed membrane is free from the build-up of silt, and other debris and unwanted vegetation are cleared.

13.2 Where damage has occurred to the waterproof layer, it should be repaired in accordance with section 18 and the Certificate holder's instructions.

13.3 The other system components, once installed, do not require any regular maintenance provided the roof waterproofing layers are maintained as described above.

13.4 Green roofs and roof gardens must be the subject of regular inspections, particularly in autumn after leaf fall and in spring, to ensure unwanted vegetation and other debris are cleared from the roof and drainage outlets (see section 4.11). Guidance is available within the latest edition of The GRO Green Roof Code - Green Roof Code of Best Practice for the UK.

14 Durability



14.1 When installed on stable substrates and regularly maintained, the system will have a service life of at least 40 years.

14.2 In situations where maintenance or repair of any of the components in the roof structure is necessary (eg the protection layer or insulation), the waterproof integrity of the membrane may be reduced. In these circumstances, the Certificate holder should be consulted.

14.3 An estimate cannot be given for the life of the membrane in green roof and roof garden specifications owing to the nature of use. However, under normal circumstances, it should be significantly greater than for open coverings.

14.4 The membrane component is resistant to acidic and alkali conditions it is likely to encounter during its service life, as well as chemicals, such as liquid fertiliser, it may come into contact with.

15 Reuse and recyclability

The membranes which contain APP polymer-modified bitumen and glassfibre/polyester reinforcement, can be recycled.

Installation

16 General

16.1 Installation of the Derbigum High Performance Roofing System must be carried out by installers trained and approved by the Certificate holder in accordance with the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989, BS 8217 : 2005, the Certificate holder or appointed agent's instructions and this Certificate.

16.2 Substrates to which the system is to be applied must be sound, dry and clean, and free from sharp projections such as nail heads and concrete nibs. Wet insulation boards must not be used. For the tapered boards to be effective in providing a uniform fall, it is essential that the structural deck is true and even. Any hollows, depressions or backfalls found in the roof deck must be rectified prior to laying the insulation.

16.3 Installation must not be carried out during inclement weather (eg rain, fog or snow). When the temperature is below 5°C, suitable precautions against surface condensation must be taken.

16.4 Detailing must be formed in accordance with the Certificate holder's instructions.

16.5 Bulk material must not be stored on one area of the roof prior to installation, to ensure that localised overloading does not occur.

16.6 If the roof is likely to be subjected to uncontrolled pedestrian access, the substructure must satisfy the requirements of BS 8217 : 2005, and to prevent damage to the roof covering one of the appropriate surface finishes referred to in clause 6.12 of that Standard must be used.

16.7 At falls in excess of 1:11, the provision for mechanical fixings as required by BS 8217 : 2005 should be observed.

16.8 Insulation boards can be cut to fit around projections through the roof, using either a sharp knife or a fine-toothed saw.

17 Procedure

Vapour control layer

17.1 Before adhering the Derbicoat Alu Selfix VCL, the deck must be treated with Derbiprimer S.

17.2 The VCL is applied by removing the siliconised film and bonding to the deck, with side laps of 100 mm and end laps of 150 mm.

17.3 At perimeters and penetrations, the VCL is detailed to envelop the insulation boards.

Insulation

17.4 The insulation boards are installed in a close-butted break-bonded pattern.

17.5 On metal decks the boards are laid either with the long axis at right angles to the corrugations of the metal deck or diagonally across the corrugations of the deck, ensuring that all end joints and corners are sufficiently supported on the crown flats of the decking. The thickness of the board to be used is dependent on the width of the trough openings of the metal deck, as indicated in Table 5.

Fully bonded

17.6 The installed boards are bonded to the VCL using Derbitech FA Adhesive.

Mechanically fastened

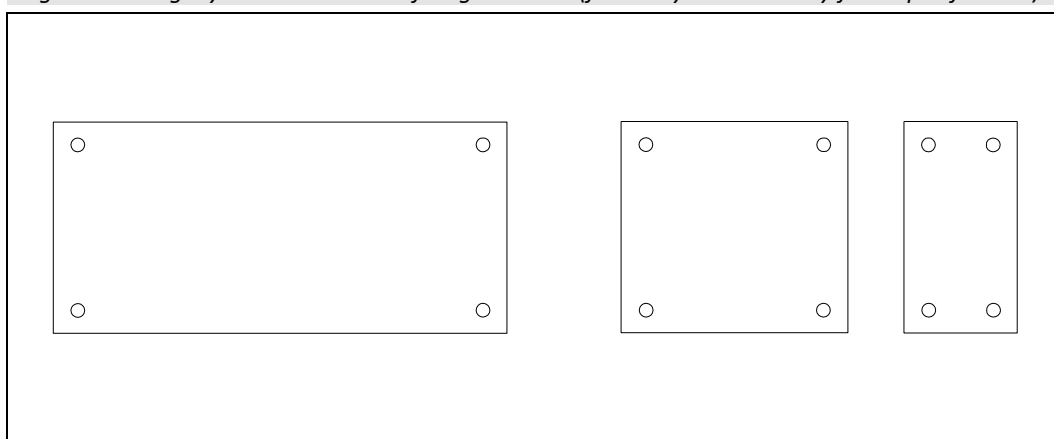
17.7 The boards are secured to the substrate by means of mechanical fastenings.

17.8 Each fixing must incorporate a minimum 50 by 50 mm square, or 50 mm diameter, circular plate countersunk washer, which must not restrain more than one board. The minimum number of fixings for each board size is given in Table 6 and fixing layouts are shown in Figure 1, with the requirement for additional fixings assessed by a suitably competent and experienced individual in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. These are placed within the individual board area and sited more than 50 mm, but less than 150 mm, from the edges and corners of the board, giving a minimum fixing rate of 5.55 fixings per square metre for 1200 by 600 mm boards.

Table 6 Minimum number of fixings

Board dimensions (mm)	Minimum number of fixings
2400 x 1200	6
1200 x 1200	4
1200 x 600	4

Figure 1 Fixing layouts — minimum fixing numbers (for solely mechanically fixed specification)



Membrane

Fully bonded

17.9 Where required, the substrate should be primed using Derbiprimer S.

17.10 Bonding is achieved by melting the lower surface by torching, and pressing down.

17.11 The Derbigum capsheet is fully bonded to the Derbicoat NT underlay, which is fully bonded to the Alumasc BGT PIR insulation.

17.12 Side laps should be a minimum overlap of 100 mm and end laps a minimum overlap of 150 mm. All laps should be pressure rolled using a 15 kg long-handled lap roller. On zero fall roofs, all overlaps (side and end) must be a minimum of 150 mm and also pressure rolled.

17.13 When used as a cap sheet in a multi-layer system, the membranes are always bonded to a base layer complying with BS 8747 : 2007 or high-performance bituminous reinforced membrane. Polyester-reinforced felts should not be used.

18 Repair

In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch as described in the Certificate holder's instructions.

19 Tests

19.1 An assessment was made of test data for the membranes in relation to:

- thickness
- width
- mass per unit area
- tensile strength
- elongation
- nail tear strength
- unrestricted shrinkage (%)
- static indentation (expanded perlite substrate and expanded polystyrene substrate)
- dynamic indentation (expanded perlite substrate and expanded polystyrene substrate)
- fatigue cycling
- low temperature flexibility
- flow temperature
- tensile strength of joints
- peel strength of joints
- heat ageing followed by fatigue resistance, low temperature flexibility, flow temperature, tensile strength of joints and peel strength of joints
- UV ageing followed by low temperature flexibility
- water soak followed by tensile strength of joints and peel strength of joints
- wind uplift
- resistance to water penetration
- water exposure at 60°C for 180 days (joint strength, joint leakage, peel strength repeated)
- root resistance.

19.2 Tests were carried out on the insulation boards and results assessed to determine:

- thermal conductivity
- compressive strength
- dimensional stability
- wind uplift
- tensile strength perpendicular to faces
- water vapour transmission.

20 Investigations

20.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

20.2 Data on the fire performance of the system were evaluated.

20.3 U-value calculations have been carried out on Alumasc BGT PIR insulation.

Bibliography

- BRE Report BR 262 : 2002 *Thermal insulation : avoiding risks*
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- BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*
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- BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*
- BS EN 1991-1-1 : 2002 *Eurocode 1 — Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
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- EN 13165 : 2012 + A1 : 2015 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*
- EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*
- EN 13970 : 2004 *Flexible sheets for waterproofing — Bitumen water vapour control layers — Definitions and characteristics*
- EN 13984 : 2013 *Flexible sheets for waterproofing — Plastic and rubber vapour control layers — Definitions and characteristics*

21 Conditions

21.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
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- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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