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Agrément Certificate

10/4787

Product Sheet 1

DANOSA REINFORCED BITUMINOUS MEMBRANE ROOF WATERPROOFING SYSTEMS

GLASDAN, ESTERDAN, POLYDAN ELAST AND ELAST+ MEMBRANES

This Agrément Certificate Product Sheet⁽¹⁾ relates to GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes, a range of polymer-modified bitumen membranes for use on flat and pitched roofs with limited access and loose-laid and ballasted roofs with limited access.

(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 membranes will resist the passage of moisture into the interior of a building (see section 6).

Resistance to water vapour — the membranes, when used as vapour control layers (VCLs), will provide an effective control to the passage of water vapour (see section 7).

Properties in relation to fire — the membranes, when used in a suitable specification, can enable a roof to be unrestricted under the national Building Regulations (see section 8).

Resistance to wind uplift — the membranes will resist the effects of any likely wind suction acting on the roof (see section 9).

Resistance to mechanical damage — the membranes will accept, without damage, the limited foot traffic and loads associated with installation and maintenance (see section 10).

Durability — under normal service conditions, the membranes will provide a durable waterproof covering with a service life of at least 30 years (see section 12).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 11 January 2019

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 8 October 2010

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 are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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Regulations

In the opinion of the BBA, GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes, 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 suitable non-combustible substructures, the use of the membranes can be unrestricted under this Requirement. See section 8 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The membranes, 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 VCLs can contribute to enabling a roof to satisfy this Requirement. See section 7 of this Certificate.
Regulation:	7	Materials and workmanship (applicable to Wales only)
Regulation:	7(1)	Materials and workmanship (applicable to England only)
Comment:		The membranes are acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The membranes satisfy the requirement of this Regulation. See sections 11.1 and 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		On suitable non-combustible substructures, the use of the membranes will be unrestricted by the requirements under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 8.1, 8.2, 8.3 and 8.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The membranes, 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 VCLs can contribute towards enabling a roof to satisfy this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.6 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The membranes can contribute to meeting 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.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments in relation to the products 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)(i)	The membranes are acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The membranes, including joints, will enable a roof to satisfy this Regulation. See section 6.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The membranes can contribute towards enabling a roof to satisfy this Regulation. See section 7 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On suitable non-combustible substructures, the use of the membranes will be unrestricted under the requirements of this Regulation. See section 8 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* (3.3) of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant 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 products, in accordance with harmonised European Standard EN 13707 : 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 GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes are torch-on and heat-activated self-adhesive membranes, manufactured from styrene-butadiene-styrene (SBS) copolymer modified bitumen sheet with reinforcement. The membranes are:

- GLASDAN 24 AP ELAST — for use as a base sheet, an intermediate layer, a VCL or an overlap band
- GLASDAN 30 P ELAST — for use as a base sheet, an intermediate layer, a VCL or an overlap band
- GLASDAN 30 AP ELAST — for use as a base sheet, an intermediate layer, a VCL or an overlap band
- GLASDAN 40/GP ERF ELAST — for use as a capsheet
- GLASDAN AL-80 TSOP E — for use as flashing, a capsheet, a waterproofing layer under concrete substrate with asphalt/sand-cement screed or under hot asphalt, or a VCL
- ESTERDAN 30 P ELAST — for use as a first layer or an intermediate layer

- ESTERDAN 30 P ELAST AUTOADHESIVO — for use as a heat-activated self-adhesive, fully bonded, first layer or an intermediate layer
- ESTERDAN 30 P ELAST SEMIADHESIVO — for use as a heat-activated self-adhesive, partially bonded, first layer or an intermediate layer
- ESTERDAN 40 P ELAST — for use as a first layer or an intermediate layer
- ESTERDAN 48 P ELAST — for use as a first layer, an intermediate layer, or in a single-layer system
- ESTERDAN PLUS 40/GP ELAST — for use as a capsheet
- ESTERDAN PLUS 50/GP ELAST — for use as a capsheet or in a single-layer system
- POLYDAN 180-30 P ELAST — for use as first layer or an intermediate layer
- POLYDAN 180-40 P ELAST — for use as a first layer or an intermediate layer
- POLYDAN 180-48 P ELAST — for use as a first layer, an intermediate layer or in a single-layer system
- POLYDAN 180-50/GP ELAST/ELAST+ — for use as a capsheet, a waterproofing layer under concrete substrate with asphalt/
sand-cement screed or under hot asphalt or in a single-layer system
- POLYDAN 180-60/GP ELAST/ELAST+ — for use as a capsheet, a waterproofing layer under concrete substrate with asphalt/sand-cement screed or under hot asphalt or in a single-layer system.

1.2 The membranes are manufactured to the nominal characteristics given in Tables 1 to 3.

Table 1 GLASDAN membranes — nominal characteristics

Nominal characteristic (unit)	Membrane grade				
	24 AP ELAST	30 P ELAST	30 AP ELAST	40/GP ERF ELAST	AL-80 T50P E
Thickness (mm)	2.0	2.5	2.5	2.5	3.5
Roll width (m)	1.0	1.0	1.0	1.0	1.0
Roll length (m)	15	12	12	10	8
Mass per unit area (kg·m ⁻²)	2.4	3.0	3.0	4.0	4.5
Roll weight (kg)	36.0	36.0	36.0	40.0	36.0
Watertightness*	pass	pass	pass	pass	pass
Reaction to fire*	Euroclass E	Euroclass E	Euroclass E	Euroclass E	Euroclass E
Tensile strength* (N per 50 mm)					
longitudinal	350	350	350	350	900
transverse	250	250	250	250	900
Vapour resistance* (μ)	NPD	100000	100000	NPD	300000
Low temperature flexibility* (°C)	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15
Reinforcement type	glass	glass	glass	glass	glass
Reinforcement mass per unit area (g·m ⁻²)	60	60	60	60	100
Top surface finish	sand	polyethylene film	sand	mineral	aluminium foil
Lower surface finish	polyethylene film	polyethylene film	polyethylene film	polyethylene film	polyethylene film
Mineral finish colour	N/A	N/A	N/A	grey, light grey, red, white, green	N/A

Table 2 — ESTERDAN membranes — nominal characteristics

Nominal characteristic (unit)	Membrane grade						
	30 P ELAST	30 P ELAST AUTOADHESIV O	30 P ELAST SEMIADHESIV O	40 P ELAST	48 P ELAST	PLUS 40/GP ELAST	PLUS 50/GP ELAST
Thickness (mm)	2.5	2.5	2.5	3.3	4.0	2.5	3.5
Roll width (m)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Roll length (m)	12	12	12	10	8	10	8
Mass per unit area (kg·m ⁻²)	3.0	3.0	3.0	4.0	4.8	4.0	5.0
Roll weight (kg)	36.0	36.0	36.0	40.0	38.4	40.0	40.0
Watertightness*	pass	pass	pass	pass	pass	pass	pass
Reaction to fire*	Euroclass E	Euroclass E	Euroclass E	Euroclass E	Euroclass E	Euroclass E	Euroclass E
Tensile strength* (N per 50 mm)							
longitudinal	700	700	700	700	700	700	700
transverse	450	450	450	450	450	450	450
Elongation* (%)							
longitudinal	45	45	45	45	45	45	45
transverse	45	45	45	45	45	45	45
Static loading* (kg)							
Method A	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15
Method B	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15	≥ 15
Impact* (mm)							
Method A	≥ 900	≥ 900	≥ 900	≥ 900	≥ 900	≥ 900	≥ 900
Method B	≥ 900	≥ 900	≥ 900	≥ 1000	≥ 1000	≥ 1000	≥ 1000
Low temperature flexibility* (°C)	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15	≤ -15
Reinforcement type	polyester	polyester	polyester	polyester	polyester	polyester	polyester
Reinforcement mass per unit area (g·m ⁻²)	140	140	140	140	140	160	160
Top surface finish	polyethylene film	polyethylene film	polyethylene film	polyethylene film	polyethylene film	mineral	mineral
Lower surface finish	polyethylene film	siliconised releasable polypropylene film	siliconised releasable polypropylene film	polyethylene film	polyethylene film	polyethylene film	polyethylene film
Mineral finish colour	N/A	N/A	N/A	N/A	N/A	grey, light grey, red, white, green	grey, light grey, red, white, green

Table 3 — POLYDAN membranes — nominal characteristics

Nominal characteristic (unit)	Membrane grade				
	180-30 P ELAST	180-40 P ELAST	180-48 P ELAST	180-50/GP ELAST/ELAST+	180-60/GP ELAST/ELAST+
Thickness (mm)	2.5	3.3	4.0	2.5	3.5
Roll width (m)	1.0	1.0	1.0	1.0	1.0
Roll length (m)	12	10	8	10	8
Mass per unit area (kg·m ⁻²)	3.0	4.0	4.8	4.0	5.0
Roll weight (kg)	36.0	40.0	38.4	40.0	40.0
Watertightness*	pass	pass	pass	pass	pass
Reaction to fire*	Euroclass E	Euroclass E	Euroclass E	Euroclass E	Euroclass E
Tensile strength* (N per 50 mm)					
longitudinal	900	900	900	900	900
transverse	650	650	650	650	650
Elongation* (%)					
longitudinal	45	45	45	45	45
transverse	45	45	45	45	45
Static loading* (kg)					
Method A	≥ 20	≥ 20	≥ 20	≥ 20	≥ 20
Method B	≥ 20	≥ 20	≥ 20	≥ 20	≥ 20
Impact* (mm)					
Method A	≥ 1000	≥ 1000	≥ 1000	≥ 1000	≥ 1000
Method B	≥ 1500	≥ 1500	≥ 1500	≥ 1500	≥ 1500
Low temperature flexibility* (°C)	≤ -15	≤ -15	≤ -15	≤ -15	≤ -20
Reinforcement type	polyester	polyester	polyester	polyester	polyester
Reinforcement mass per unit area (g·m ⁻²)	180	180	180	180	180
Top surface finish	polyethylene film	polyethylene film	polyethylene film	mineral	mineral
Lower surface finish	polyethylene film	polyethylene film	polyethylene film	polyethylene film	polyethylene film
Mineral finish colour					
ELAST	N/A	N/A	N/A	grey, light grey, red, white, green	grey, light grey, red, white, green
ELAST+	N/A	N/A	N/A	black	black

1.3 Ancillary products used in conjunction with the membranes are:

- BITUMEN PRIMER – a high penetration bituminous primer for preparation of porous surfaces
- BITUMEN PRIMER SA – a fast drying synthetic primer for use with the self-adhesive membranes
- BITUMEN PRIMER HM – a high penetration synthetic primer
- BITUMEN PRIMER+ – a fast drying bituminous primer, available in drums or a sprayable version in canisters
- GLASDAN 30 P POL – a glass-reinforced polymer modified bitumen membrane with a polyethylene film finish on both sides, for use as an alternative underlay
- GLASDAN 40 P POL – a glass-reinforced polymer-modified bitumen membrane with a polyethylene film finish, for use as an alternative underlay
- GLASDAN 800 P PERFORADO – a glass-reinforced oxidised bitumen perforated venting layer with a polyethylene film finish, for use in partial-bond specifications.

1.4 Ancillary products used in conjunction with the membranes, but outside the scope of this Certificate, are:

- SELF-DAN AL+ 1200 – a self-adhesive modified bitumen membrane with aluminium foil on the upper surface, for use in detailing around penetrations in the waterproofing system and as a vapour control layer
- MINERAL WOOL ANGLE FILLET – for use at upstands to give a 45° angle to aid membrane detailing
- DANOFELT PY 300 – a needle punched polyester geotextile for use as separation layer
- SBS LIGHTNING CLIP – a lightning conductor clip to hold a lightning conductor strip, incorporating a SBS membrane flange to allow welding to the waterproofing membrane

- DANOLOSA – a paving slab incorporating an extruded polystyrene insulation.

2 Manufacture

2.1 The membranes are manufactured using conventional continuous bitumen coating techniques.

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.

2.3 The management system of Derivados Asfálticos Normalizados SA t/a DANOSA has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by Bureau Veritas Certification (Certificate ES083321-1).

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls on pallets shrink-wrapped in polythene. Every roll has a label bearing the product name, Certificate holder's name, production identification numbers, CE Marking details, product characteristics and the BBA logo incorporating the number of this Certificate.

3.2 Individual rolls should be stored upright on a clean, level surface, away from excessive heat and kept dry.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the products under the *CLP Regulation (RC) 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 GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes.

Design Considerations

4 Use

4.1 GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes are satisfactory for use as fully or partially torch-bonded waterproofing as part of built-up specifications including VCLs, and where necessary in conjunction with appropriate roofing membranes supplied by the Certificate holder or to BS 8747 : 2007 for:

- flat and pitched roofs with limited access
- pedestrian access roofs with additional protection
- loose-laid and ballasted waterproofing for flat roofs with limited access.

4.2 The mineral finished membranes are satisfactory for use, where appropriate, as exposed capsheets or in detail work.

4.3 Limited access roofs are defined for the purpose 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, special precautions, such as additional protection to the membrane, must be taken.

4.4 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. For design

purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined as those having falls greater than 1:6.

4.5 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2018, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2019*, Chapter 7.1.

4.6 Structural decks to which loose-laid and ballasted specifications are to be applied must be suitable to transmit the dead and imposed loads experienced in service.

4.7 Insulation systems or materials used in conjunction with the membranes must be either :

- as described in the relevant Clauses of BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

5 Practicability of installation

Installation of GLASDAN ELAST, ESTERDAN, ELAST AND POLYDAN ELAST and ELAST+ Membranes must only be carried out by experienced roofing contractors.

6 Weathertightness



6.1 The membranes will adequately resist the passage of moisture into the building and enable a roof to comply with the requirements of the national Building Regulations.

6.2 The membranes are impervious to water and will achieve a weathertight roof capable of accepting minor structural movement without damage.

7 Resistance to water vapour



The membranes that are used as VCLs, provide effective control to the passage of water vapour.

8 Properties in relation to fire



8.1 When tested in accordance with ENV 1187 : 2002, Test 4⁽¹⁾, a system comprising a 20 mm thick chipboard deck, 40 mm thick mineral wool insulation (145 kg·m⁻³), a torch-applied layer of ESTERDAN 30 P ELAST and a torch-applied layer of GLASDAN 40/GP ERF ELAST achieved a classification of B_{ROOF(t4)} to BS EN 13501-5 : 2016⁽¹⁾.

(1) Fire report reference 192522 issued by Exova Warringtonfire and is available from the Certificate holder.

8.2 The roof coverings can be used without restriction with one of the following additional protective layers, as defined in Commission Decision 2000/553/EC:

- loose-laid gravel with a thickness of at least 50 mm (minimum aggregate size 4 mm and maximum 32 mm)
- cast stone or mineral slabs of at least 40 mm thickness.



8.3 When used for flat roofs with one of the surface finishes defined in Part iii of Table A5 of Appendix A of Approved Document B of the Building Regulations (England and Wales) or Technical Booklet E, Table 4.6, Part iv of the Building Regulations (Northern Ireland) and listed below, the roof is deemed to be of designation 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.



8.4 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, with reference to clause 2.8.1⁽¹⁾⁽²⁾

- (1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

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

9 Resistance to wind uplift

9.1 The adhesion of the bonded membranes are sufficient to resist the effects of wind suction, elevated temperature and thermal shock conditions likely to occur in practice.

9.2 Where the membranes are fully adhered to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This should be taken into account when the insulation material is selected.

9.3 The ballast requirements for loose-laid systems should be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and the UK National Annex. The membrane should always be ballasted with a minimum depth of 50 mm of aggregate. In areas of high-wind exposure, the Certificate holder's advice should be sought. Alternatively, concrete slabs on suitable supports can be used.

10 Resistance to mechanical damage

The membranes can accept, without damage, the limited foot traffic associated with installation and maintenance operations. Reasonable care should be taken to avoid sharp objects or concentrated loads. Where regular traffic is envisaged, eg for maintenance of lift equipment, a walkway, such as DANOLOSA or concrete slabs supported on bearing pads should be used.

11 Maintenance



11.1 The system must be the subject of biannual inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, to ensure continued performance.

11.2 Where damage has occurred it should be repaired in accordance with section 15 and the Certificate holder's instructions.

12 Durability



12.1 The membranes, when subjected to normal conditions of use in a roof, will provide a durable waterproof covering with a service life of at least 30 years.

12.2 On capsheets it is possible that some localised loss of the mineral surfacing may occur, after some years, in areas where complex detailing of the roof design is incorporated.

Installation

13 General

13.1 Installation of GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes and detailing is carried out in accordance with the Certificate holder's instructions, the relevant clauses of BS 8000-0 : 2014, BS 8000-4 : 1989 and BS 8217 : 2005, and this Certificate.

13.2 Substrates to which the membranes are to be applied must be, sound, dry, clean and free from sharp projections such as nail heads and concrete nibs. The substrate should be prepared using the appropriate primer, in accordance with the Certificate holder's instructions, prior to installation of the waterproofing system.

13.3 The membranes may be laid in conditions normal to roofing work and must not be laid in rain, snow or heavy fog, nor if the temperature falls below 5°C, unless precautions against surface condensation have been taken.

13.4 The roofing layers must always be installed with staggered overlaps and in such a manner that no counter-seams in the direction of the outlets are made.

13.5 At falls in excess of 5° (1:11), precautions against slippage and requirements for mechanical fixing as required by BS 8217 : 2005 should be observed.

13.6 If the roof is likely to be subjected to uncontrolled pedestrian access, the substructure must satisfy the requirements of BS 8217 : 2005, Clauses 6.12 and 6.13, and to prevent damage to the roof covering one of the surface finishes described in Clauses 8.19.3 and 8.19.4 of the Code must be used.

13.7 On completion of the roof, the non-mineral-finished membranes should have a surface finish applied in accordance with BS 8217 : 2005, Clauses 6.12 and 8.19. Surface finishes in the Code of Practice include:

- stone aggregate in dressing compound
- precast concrete paving slabs
- proprietary tiles in bonding compound.

14 Procedure

Fully bonded

14.1 Bonding is achieved by melting the lower surface by torching and pressing the membrane down ensuring no trapped air beneath the membrane. Care must be taken not to overheat the membrane.

14.2 The first layer is installed with side laps of 80 mm and end laps of 100 mm with an offset of a minimum of 300 mm between end laps. The top layer/capsheet is laid over the first layer in the same direction and fully bonded. The top layer/capsheets are installed with side laps a minimum of 80 mm and end laps 100 mm wide. Laps between the membrane and any base sheets should be offset by a minimum of 300 mm. A bead of molten material must extrude from all laps to indicate a satisfactory seal.

Partially bonded

14.3 When partially bonding, a layer of either GLASDAN 800 P PERFORADO or ESTERDAN 30 P ELAST SEMIADHESIVO is loose laid across the substrate edge to edge. The GLASDAN 800 P PERFORADO is laid with 100 mm wide side and end laps and terminated at the base of the MINERAL WOOL ANGLE FILLET. ESTERDAN 30 P ELAST SEMIADHESIVO is installed in accordance with sections 14.1 and 14.2

14.4 Where no MINERAL WOOL ANGLE FILLET is used the GLASDAN 800 P PERFORADO is terminated 100 mm from the roof edge and around all penetrations.

14.5 The first layer is fully bonded over the venting layer in the same direction with side laps of 80 mm and end laps of 100 mm.

14.6 The top layer/capsheet is laid over the first layer in the same direction and fully bonded. The top layer/capsheets are installed with, for the mineral surfaced membranes, side laps determined by the selvedge edge, and, for sanded top layers, side laps a minimum of 80 mm and end laps 100 mm wide. Laps between the membrane and any base sheets should be offset by a minimum of 300 mm. A bead of molten material must extrude from all laps to indicate a satisfactory seal.

Loose-laid and ballasted

14.7 A separation layer is loose-laid over the substrate in accordance with the Certificate holder's instruction with side and end overlaps of 100 mm.

14.8 The first layer is loose-laid over the separation layer with side laps of 80 mm and end laps of 100 mm wide. The laps are sealed by torch welding.

14.9 The top layer is laid over the first layer in the same direction and fully bonded. The top layer/capsheets are installed with side laps of 80 mm and end laps 100 mm wide. Laps between the membrane and any base sheets should be offset by a minimum of 300 mm. A bead of molten material must extrude from all laps to indicate a satisfactory seal.

14.10 The waterproofing system is ballasted with a minimum of 50 mm depth of rounded aggregate graded 20 to 40 mm.

14.11 Where concrete tiles are used, the waterproofing system is first covered with either DANOFELT PY 300 of sand into which the tiles are set.

14.12 Only POLYDAN 180-48 P ELAST, POLYDAN 180-50/GP ELAST/ELAST+ and POLYDAN 180-60/GP ELAST/ELAST+ are suitable for use under permanent heavy protection such as paving slabs.

Heat-activated self-adhesive

14.13 The first strip of ESTERDAN 30 P ELAST AUTOADHESIVO or ESTERDAN 30 P ELAST SEMIADHESIVO is laid out in the correct position of the roof deck. The membrane is rolled back towards the centre revealing the release film underneath. At a point close to the centre of the roll, the release film is carefully cut across the width of the roll without cutting through the membrane.

14.14 The release film is peeled back to expose part of the lower surface, which is then pressed down onto the decking and the release film is gradually peeled back, ensuring that no air is trapped beneath the membrane and brushed and/or rolled onto the substrate.

14.15 Overlaps for the underlay must be a minimum of 80 mm for side laps and 100 mm end laps.

14.16 The capsheet is then applied as described in section 14.6. The heat from the application of the capsheet will activate the adhesive on the lower face of the first layer to give a full bond.

15 Repair

Clean area of debris and prime with the recommended primer. The damaged area is patched using underlay and capsheet, the patch should extend a minimum of 100mm past the area of damage. The patch is torch-bonded to the original membrane. The Certificate holder recommends that the patch is the full width of the roll for the best aesthetics.

16 Tests

16.1 Tests were carried out on GLASDAN, ESTERDAN, POLYDAN ELAST and ELAST+ Membranes and the results assessed to determine:

Coating mass

- ring and ball temperature
- penetration at 25°C
- low temperature flexibility
- elasticity recovery
- ring and ball temperature after heat ageing at 70°C for six months
- low temperature flexibility after heat ageing at 70°C for six months
- elasticity recovery after heat ageing at 70°C for six months

Membrane

- tensile strength and elongation
- nail tear
- static indentation
- dynamic indentation
- fatigue cycling
- heat resistance
- dimensional stability
- fatigue cycling after heat ageing at 70°C for six months.

16.2 Test data for wind uplift was assessed for ESTERDAN 30 P ELAST AUTOADHESIVO and ESTERDAN 30 P ELAST SEMIADHESIVO.

16.3 Heat ageing at 70°C for 240 days was carried out and low temperature flexibility and heat resistance to assess an extension of durability.

17 Investigations

17.1 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.

17.2 An assessment was made of reports of fire tests.

17.3 An assessment was made of declared values for CE Marking.

Bibliography

- BS 6229 : 2018 *Flat roofs with continuously supported flexible waterproof coverings — Code of practice*
- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*
- BS 8217 : 2005 *Reinforced bitumen membranes for roofing — Code of practice*
- BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*
- BS EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roof tests*
- BS EN ISO 9001 : 2015 *Quality management systems — Requirements*
- DD ENV 1187 : 2002 *Test methods for external fire exposure to roofs*
- EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

18 Conditions

18.1 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
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- 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.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.