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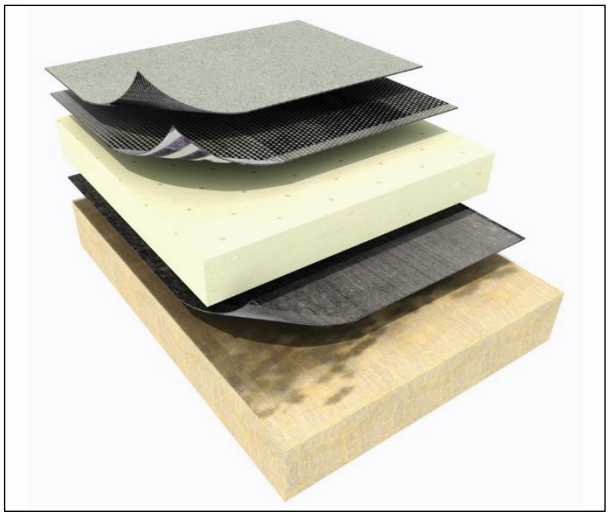
Agrément Certificate
12/4959
Product Sheet 9

LANGLEY'S ROOF WATERPROOFING SYSTEMS

TA-30 FLAT ROOFING SYSTEMS

This Agrément Certificate Product Sheet(1) relates to TA-30 Flat Roofing Systems, polymer modified bitumen waterproofing membranes and vapour control layers (vcls) for use on flat and pitched 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 systems will resist the passage of moisture into the building (see section 6).

Thermal performance — the systems will improve the thermal performance of a roof (see section 7).

Condensation risk — the systems components can contribute to limiting the risk of surface condensation (see section 8).

Properties in relation to fire — the systems can enable a roof to be unrestricted under the national Building Regulations (see section 9).

Resistance to wind uplift — the systems will resist the effects of any likely wind suction acting on the roof (see section 10).

Resistance to mechanical damage — the systems will accept the limited foot traffic and loads associated with installation and maintenance (see section 11).

Durability — under normal service conditions, the systems, kept under a mandatory continuous maintenance schedule, will provide a durable waterproofing with a service life of at least 40 years (see section 13).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems 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.

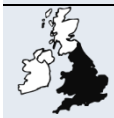
On behalf of the British Board of Agrément

Date of First issue: 3 February 2020

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, TA-30 Flat Roof Systems, 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 substructures, the use of the systems can enable a roof to be unrestricted under this Requirement. See section 9 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The membranes, including joints, satisfy this Requirement. See section 6.1 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The systems can contribute to a roof satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The systems can contribute to satisfying this Requirement. See sections 7.2 and 7.3 of this Certificate.
Regulation	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**26**	**CO_2 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 systems can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. 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 systems satisfies the requirements of this Regulation. See sections 12.1 and 13.1 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	2.8	Spread from neighbouring buildings
Comment:		When applied to suitable substructures, the systems are regarded as having a low vulnerability under clause 2.8.1(1)(2) of this Standard. See sections 9.1 to 9.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Use of the systems, 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 systems can contribute to a roof satisfying this Standard, with reference to clauses 3.15.1(1)(2), 3.15.3(1)(2), 3.15.4(1)(2), 3.15.5(1)(2) and 3.15.6(1)(2). See sections 8.1 and 8.3 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The systems can contribute to satisfying the requirements of these Standards, with reference to clauses, or parts of, 6.1.1(1) 6.1.2(1)(2), 6.1.4(1)(2), 6.1.5(1), 6.1.6(1)(2), 6.1.7(2), 6.1.8(2) to 6.1.10(2), 6.2.1(1)(2), 6.2.2(1)(2), 6.2.3(1(2)), 6.2.4(1)(2), 6.2.5(2), 6.2.6(1)(2) to 6.2.11(1)(2), 6.2.12(2) and 6.2.13(1)(2). See sections 7.2 and 7.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems 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. In addition, the systems 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 systems 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)(iii)b(i)**	**Fitness of materials and workmanship**
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The membranes, including joints, satisfy the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The systems can contribute to a roof satisfying this Regulation. See section 8.1 of this Certificate.
Regulation:	**36(b)**	**External fire spread**
Comment:		On suitable substructures, the use of the systems will enable a roof to be unrestricted under the requirements of this Regulation. See sections 9.1, 9.2, 9.4 and 9.5 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Comment:		Roofs incorporating the systems can 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* (3.5) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, TA-30 Flat Roofing Systems, 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 systems components in accordance with harmonised European Standard BS EN 13707 : 2013, BS EN 13970 : 2004 and BS EN 13165 : 2012.

Technical Specification

1 Description

1.1 TA-30 Flat Roofing Systems comprise:

Torch-on application membranes

For use as a vapour control layer (vcl)

- Parevapo SBS — a double polyester reinforced, metal-lined polymer-modified bitumen vcl

For use as a base sheet

- HT – 180 — a polyester-fibre (180 g·m^{-2}) reinforced, oxidised bitumen sheet, sanded on both surfaces
- Paradiene SVV — a glass fibre (55 g·m^{-2}) reinforced, polymer-modified bitumen sheet, finished on both surfaces with a thermofusible film
- Paradiene 35 S R4 — a non-woven, polyester (160 g·m^{-2}) reinforced, polymer-modified bitumen sheet, finished on both surfaces with a thermofusible film

For use as a self-adhesive base sheet

- Adepar JS VV — a self-adhesive, partially bonded, polymer-modified bitumen base layer with a 130 g·m^{-2} glass reinforcement. The upper surface has a macro-perforated fusible film for torch applications. The lower surface has factory-applied self-adhesive edges and strips protected by a siliconised peel-off film
- Adepar JS — a self-adhesive, partially bonded, polymer-modified bitumen base layer with a 130 g·m^{-2} polyester reinforcement. The upper surface has a macro-perforated fusible film for torch applications. The lower surface has factory-applied self-adhesive edges and strips protected by a siliconised peel-off film

For use as a capsheet

- Parafor Solo GS — a polyester-fibre (180 g·m^{-2}) reinforced, polymer-modified bitumen sheet with a mineral granule or slate-finished upper surface and a macro-perforated thermofusible film under-surface
- Graviflex — a polyester-fibre (180 g·m^{-2}) reinforced, polymer-modified bitumen sheet with a slate-finished upper surface and a macro-perforated thermofusible film under-surface

Insulation boards(1)

- Parafoam Ultra and Parafoam Ultra Tapered — rigid thermoset polyisocyanurate insulation boards with glass-tissue facings on both sides, manufactured using CFC/HCFC-free materials, with zero ozone depletion potential (0 ODP) and a global warming potential (GWP) of less than 5.

(1) The thermal conductivities of the boards are given in Table 4.

1.2 The nominal characteristics of the systems components are shown in Tables 1 to 3.

Table 1 Nominal characteristics of membranes

Characteristic (unit)	HT-180	Paradiene SVV	Paradiene 35 S R4	Adepar JS	Adepar JS VV	Parafor Solo GS	Graviflex
Thickness (mm)	1.8	2.5	3.70	2.5	2.2	4.00	3.2/4
Roll width (m)	1	1	1	1	1	1	1
Roll length (m)	20	10	8	10	10	7	8
Roll weight (kg)	38	33	37.4	36	35	40/42	40
Mass per unit area ($kg \cdot m^{-2}$)	1.9	3.3	4.6	3.6	3.5	5.7/6.0(1)	5.0
Tensile strength (N per 50 mm)							
longitudinal	550	320	590	550	300	740	740
transverse	400	190	500	315	170	540	540
Elongation at break (%)							
longitudinal	15	2.5	40	35	2.5	40	40
transverse	15	2.0	45	35	2.0	49	49
Low temperature flexibility (°C)	-10	-20	-15	-15	-20	-15	-15
Flow resistance (°C)	—	—	100	—	≥100	100	≥100
Impact – soft substrate (mm)	—	700	1250	—	—	1500	≥1500
Static loading – soft substrate (kg)	—	<5	20	15	15	20	20
Upper surface finish	Sanded	Thermofusible film	Sanded	perforated fusible film	perforated fusible film	Mineral flakes or granules	Mineral
Lower surface finish	Sanded	Thermofusible film	Thermofusible film	Self-adhesive strips	Self-adhesive strips	Thermofusible film	Thermofusible film

(1) Higher weight corresponds to the mineral granules and the lower to the slate flakes

Table 2 Nominal characteristics of Vapour Control Layer

Characteristic (unit)	Parevapo SBS
Thickness (mm)	3
Roll width (m)	1
Roll length (m)	10
Roll weight (kg)	38
Mass per unit area ($kg \cdot m^{-2}$)	3.8
Tensile strength (N per 50 mm)	
longitudinal	320
transverse	190
Elongation at break (%)	
longitudinal	3.0
transverse	2.0
Low temperature flexibility (°C)	-15
Impact – soft substrate (mm)	800
Water vapour diffusion-equivalent air layer thickness (m)	2500
Watertightness	Pass
Upper surface finish	Sanded
Lower surface finish	Thermofusible film

Table 3 Nominal characteristics of Insulation Boards

Characteristic (unit)	Parafoam Ultra	Parafoam Ultra Tapered (cut to falls)(1)
Length (mm)	2400 and 600(2)	1200(2)
Width (mm)	1200(2)	1200(2)
Thickness (mm)	30 to 150 in 5 mm increments	30 to 150 in 5 mm increments
Compressive strength at 10% compression (kPa)	150	150
Density ($kg \cdot m^{-3}$)	32	32

(1) Available in falls of 1:80, 1:60, 1:40 and 1:30.
(2) Other board sizes may be available on request.

1.3 Other items or components which may be used with the systems, within the scope of this Certificate, are:

- Langley Bitumen Primer — used to prime concrete and screeded decks
- LangStik — a cold-applied bituminous glue for bonding insulation.

1.4 Other items or components which may be used with the systems, but which are outside the scope of this Certificate, are:

- Langley Neodyl — an expansion joint membrane
- Langley SCR Alliance — a polyester reinforced elastomeric modified styrene-butadiene-styrene (SBS) reinforced bitumen membrane
- Langley Adequerre — an SBS elastomeric adhesive panel joint membrane
- Langley Supracoating RLV System — a liquid-applied bitumen polyurethane membrane used for detailing
- Langley Gap-Seal Mastic — a low modulus neutral cure silicone sealant
- Langley ParaFlash B3 Lap Adhesive — a low modulus lap adhesive
- Langley Metal Hard Edge — a pre-fabricated metal angle that protects insulation board edges
- Langley Lightning Conductor Pads — pads used to protect the roof and building from lightning strikes
- Langley ParaFurb Parapet Outlet — a 0.7mm stainless steel spigot with a factory bonded SBS bitumen membrane flange
- Langley ParaFurb Refurbishment Outlet — a 0.7mm stainless steel spigot with a factory bonded SBS bitumen membrane flange
- Langley ParaTrim — a GRP roof edge trim
- Langley Lang-Vent — a refurbishment pipe sleeve for soil/vent pipes, not for use with flues
- Langley Lang-Tile — hard wearing protective porous concrete tile
- Langley-Tile Paving Support Pads — paving support pads/adjustable paving support pad
- Langley LangGuard — a free standing handrail system
- mineral wool insulation — high density mineral insulation without facing, which can be used with Parafoam Ultra and Parafoam Ultra Tapered over party walls.

2 Manufacture

2.1 The membranes are manufactured by saturating and coating the reinforcement with SBS modified bitumen, then calendering to the correct thickness. The surfaces are finished by the application of sand or thermofusible film to the lower surface, and sand, mineral granules or slate flakes to the upper surface. The sheets are cooled, trimmed and rolled for packaging.

2.2 The insulation boards are manufactured by the injection of the raw materials onto the lower tissue facer on a conveyor belt. The exothermic reaction expands the foam, which then comes into contact with the upper tissue facer. An automated process cures and cuts the product to the required size.

2.3 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

Membranes

3.1 The membranes are delivered to site in wrapped rolls on pallets. Roll labels are colour-coded and bear the product name, marketing company name and the BBA logo incorporating the number of this Certificate.

3.2 The rolls must be stored on end, on a clean, level surface and kept under cover.

Insulation boards

3.3 The insulation boards are delivered to site in packs, shrink-wrapped in polythene. Each pack carries a label bearing the company's name, product code and batch number, and the BBA logo incorporating the number of this Certificate.

3.4 The boards must be stored flat, off the ground on a clean, level surface under cover, preferably within a building, to protect them from precipitation, moisture, high winds, mechanical damage and prolonged exposure to sunlight.

3.5 Boards must not be exposed to naked flame or other ignition sources.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on TA-30 Flat Roofing Systems.

Design Considerations

4 General

4.1 TA-30 Flat Roofing Systems are satisfactory for use as:

- a fully or partially bonded waterproofing system with limited access, as part of a built-up specification
- a loose-laid, three-layer roof waterproofing system, ballasted with aggregate, on flat roofs with limited access, or under heavy protection (eg concrete tiles) on flat roofs with pedestrian traffic.

4.2 Decks to which the systems are to be applied must comply with the relevant requirements of either BS 6229 : 2018 or BS 8217 : 2005 and, where appropriate, NHBC Standards 2020, Chapter 7.1

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, additional protection to the membrane must be provided (see section 11).

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.

4.5 Pitched roofs are defined for the purpose of this Certificate as those having a fall greater than 1:6.

4.6 Tapered insulation boards may be used where appropriate to achieve the minimum finished falls required. If using the tapered insulation board, a fall of 1:60 will be acceptable to achieve at least 1:80 post-construction falls.

4.7 Imposed loads, dead loading and wind load 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 and BS EN 1991-1-4 : 2005, and their UK National Annexes.

5 Practicability of installation

The systems are designed to be installed by a competent roofing contractor experienced with these types of systems.

6 Weathertightness

6.1 The membranes, including joints, when completely sealed and consolidated, 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.

7 Thermal performance

7.1 Calculations of thermal transmittance (U value), should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006 using the declared thermal conductivity ($\lambda_{90/90}$ value) of the systems as shown in Table 4.

Table 4 Thermal conductivity ($\lambda_{90/90}$ value)

Characteristic (unit)	Value
<80	0.026
≤80 <120	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 systems are shown in Tables 5 and 6.

Table 5 Example U values — mechanically fixed

U value requirement ($W \cdot m^{-2} \cdot K^{-1}$)	Deck construction/insulation thickness (mm)[1]		
	Concrete[2]	Timber[3]	Metal[4]
0.13	—[5]	—[5]	—[5]
0.15	—[5]	—[5]	—[5]
0.16	—[5]	—[5]	—[5]
0.18	145	140	150
0.20	130	125	135
0.25	110	100	110

(1) Includes 5.55 steel (λ = 50 $W \cdot m^{-1} \cdot K^{-1}$) insulation fixings per m^2 with a 4.8 mm diameter and a subsequent cross-sectional area of 18.1 mm^2.
(2) Suspended ceiling with no thermal performance, 150 mm concrete decking (λ = 2.0 $W \cdot m^{-1} \cdot K^{-1}$), vcl, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(3) 12.5 mm plasterboard (λ = 0.25 $W \cdot m^{-1} \cdot K^{-1}$), vcl, 150 mm timber joists, 18 mm plywood decking (λ = 0.17 $W \cdot m^{-1} \cdot K^{-1}$), vcl, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(4) Suspended ceiling with no thermal performance, 0.7 mm metal deck (λ = 50 $W \cdot m^{-1} \cdot K^{-1}$), VCL, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(5) An additional layer of insulation boards is required to achieve this U value.

Table 6 Example U values — adhesively fixed

U value requirement ($W \cdot m^{-2} \cdot K^{-1}$)	Deck construction/insulation thickness (mm)		
	Concrete[1]	Timber[2]	Metal[3]
0.13	—[4]	—[4]	—[4]
0.15	150	145	—[4]
0.16	140	135	145
0.18	125	120	130
0.20	120	110	120
0.25	95	90	95

(1) Suspended ceiling with no thermal performance, 150 mm concrete decking (λ = 2.0 $W \cdot m^{-1} \cdot K^{-1}$), VCL, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(2) 12.5 mm plasterboard (λ = 0.25 $W \cdot m^{-1} \cdot K^{-1}$), vcl, 150 mm timber joists, 18 mm plywood decking (λ = 0.17 $W \cdot m^{-1} \cdot K^{-1}$), vcl, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(3) Suspended ceiling with no thermal performance, 0.7 mm metal deck (λ = 50 $W \cdot m^{-1} \cdot K^{-1}$), VCL, Parafoam Ultra PIR Board and 7 mm waterproofing membranes.
(4) An additional layer of insulation boards is required to achieve this U value.

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 systems 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:

- Parevapo SBS — 3.5×10^6
- individual tissue layer of the boards — 1
- insulation core of the boards — 306
- underlay — 625[1]
- capsheet — 750[2].

(1) Based on a book value for 2.5 mm bitumen membrane.
(2) Based on a book value for 3 mm bitumen membrane.

Surface condensation

8.2 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 $W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with other elements are designed in accordance with section 7.3.

8.3 Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011, Section 8, and BRE Report BR 262 : 2002.

9 Properties in relation to fire

9.1 When classified in accordance with BS EN 13501-5 : 2016, the following specifications is designated $B_{ROOF}(t4)$:

- a system(1) comprising a 16 mm wood particle board, a layer of HT 180 mechanically fixed, a layer of Paradiene SVV fully torch bonded and a capsheet of Parafor Solo GS fully torch bonded
- a system(1) comprising an 8 mm fibre cement board, a layer of Paradiene SVV fully torch bonded and a capsheet of Parafor Solo GS fully torch bonded
- a system(2) comprising a 16 mm wood particle board, a layer of HT 180 mechanically fixed, a layer of Parevapo SBS fully torch bonded, mineral wool insulation (30 to 150 mm) mechanically fixed, a layer of self-adhered Adepar JS/Adepar JS VV and a capsheet of Parafor Solo GS or Graviflex fully torch bonded
- a system(2) comprising an 8 mm fibre cement board, a layer of Parevapo SBS fully torch bonded, mineral wool insulation (30 to 150 mm) mechanically fixed, a layer of self-adhered Adepar JS/Adepar JS VV and a capsheet of Parafor Solo GS or Graviflex fully torch bonded
- a system(2) comprising a 16 mm wood particle board, a layer of HT 180 mechanically fixed, a layer of Parevapo SBS fully torch bonded, one layer of Parafoam Ultra LPC/FM (30 to 150 mm) or two layers [(bottom layer 30 to 100 mm) and (top layer 50 to 150 mm)] bonded with LangStik, a layer of self-adhered Adepar JS/Adepar JS VV and a capsheet of Parafor Solo GS or Graviflex fully torch bonded
- a system(2) comprising an 8 mm fibre cement board, a layer of Paradiene SVV fully torch bonded, one layer of Parafoam Ultra LPC/FM (30 to 150 mm) or two layers [(bottom layer 30 to 100 mm) and (top layer 50 to 150 mm)] bonded with LangStik, a layer of self-adhered Adepar JS/Adepar JS VV and a capsheet of Parafor Solo GS or Graviflex fully torch bonded.

(1) Warringtonfiregent – Classification Report Number 19821X. The Report is available from the Certificate holder.
(2) Warringtonfiregent – Classification Report Number 19821W. The Report is available from the Certificate holder.

9.2 The systems, when used in protected or inverted roof specifications, including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC, can be considered to be unrestricted under the national Building Regulations.

9.3 In England and Scotland, the designation of all individual specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

9.4 When used for flat roofs with one of the constructions detailed in Approved Document B, Appendix A, Table A5, part iii (Wales)and Technical Booklet E, Table 5.6, Part IV (Northern Ireland), including the surface finishes listed below, the roof is deemed to be unrestricted:

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

9.5 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations for Wales and Northern Ireland.

10 Resistance to wind uplift

10.1 The adhesion of the bonded systems is sufficient to resist the effects of wind suction, thermal cycling or other minor structural movements likely to occur in service.

10.2 The ballast requirement for loose-laid systems must be calculated in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. The membrane must 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.

10.3 The resistance to wind uplift forces of a mechanically fastened insulation board is calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. The resistance to wind uplift is provided by the fasteners passing through the board into the substrate. The number and type of fixings will depend on a number of factors including:

- wind uplift forces to be restrained
- pull-out strength of the fasteners
- appropriate calculation of safety factors.

11 Resistance to mechanical damage

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

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

11.3 The boards have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plant, water tanks etc. Such loads should be supported directly on the roof construction. The boards are not suitable when permanent roof access is required.

11.4 When profiled decking is used, boards will need to span across the ribs. Maximum permissible spans between ribs for various board thicknesses are shown in Table 7.

Table 7 Maximum clear span

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

12 Maintenance

12.1 The systems must be the subject of six monthly inspections and maintenance in accordance with BS 6229 : 2018, Chapter 7, to ensure continued satisfactory performance.

12.2 When maintenance is required to the roof waterproofing, protective boarding should be laid over the roof surface to avoid concentrations of load.

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

12.4 The other components of the systems, once installed, do not require any regular maintenance and have suitable durability, provided the roof waterproofing layers are maintained as described in this section.

13 Durability

13.1 The systems will have a service life of at least 40 years as part of a compulsory maintenance schedule.

13.2 When using the mineral finished membrane, 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.

14 Reuse and recyclability

The membranes are made from bitumen, polyester and glass, which can be recycled.

Installation

15 General

15.1 Installation of TA-30 Flat Roofing Systems must be in 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 and BS 8217 : 2005, the Certificate holder's instructions and this Certificate.

15.2 Substrates to which the membranes are to be applied must be sound, dry and clean, and free from sharp projections such as nail heads and concrete nibs. Wet insulation boards should not be used. For the tapered insulation 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.

15.3 Installation should not be carried out during inclement weather (eg rain, fog or snow), or when the temperature is below 5°C, unless suitable precautions against surface condensation are taken.

15.4 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 clauses 8.19 and 9.2 of the Code must be used.

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

15.6 On completion of the roof, the sanded-finished membrane, when used as a top layer, may have a surface finish applied in accordance with BS 8217 : 2005, clauses 8.19 and 9.2. Surface finishes in the Code of Practice include:

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

15.7 When using the mineral-surface finished membrane on roofs with limited access, further surface protection is not required.

15.8 Boards can be cut with a sharp knife or fine-toothed saw, to fit around projections through the roof.

16 Procedure (insulation)

Timber decks (eg tongue-and-groove boards, plywood)

16.1 Parevapo SBS is nailed to the deck and the nail heads blanked out with hot bitumen. Laps are sealed using the appropriate grade of bitumen, a polyurethane adhesive or a suitable solvent-based adhesive. Care must be taken to ensure continuity of the vcl at joints, upstands and roof penetrations.

16.2 The boards, when installed, are close butted and bonded to the vcl using hot bitumen (maximum temperature of 240°C), a polyurethane adhesive or a suitable solvent-based adhesive. Parafoam Ultra insulation boards should be laid break-bonded, whilst Parafoam Ultra Tapered insulation boards are laid using a chequerboard pattern.

Concrete and screeded concrete decks

16.3 Before applying Parevapo SBS, a screed graded to the appropriate fall should be applied where necessary and, when adhering the vcl and insulation boards, the whole deck treated with Langley Bitumen Primer.

16.4 For adhered systems, Parevapo SBS is fully bonded by torching, a polyurethane adhesive or a suitable solvent-based adhesive. The laps are sealed, and the boards are applied in the manner described for timber decks (see section 16.2).

Metal decks

16.5 When adhering Parevapo SBS and the insulation boards, the deck is coated with Langley Bitumen Primer before applying the vcl.

16.6 Parevapo SBS vcl is fully bonded to the metal deck by torching, a polyurethane adhesive or a suitable solvent-based adhesive, and the boards are applied in the manner described for timber decks (see section 16.2).

16.7 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.

16.8 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 8.

Mechanical fixings

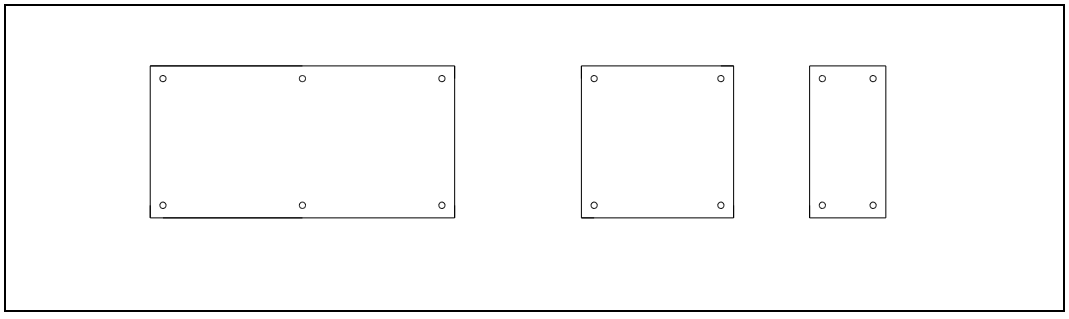
16.9 Alternatively, boards can be secured to timber, metal and concrete decks by means of mechanical fastenings.

16.10 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 8 and fixing layouts are shown in Figure 1, with the requirement of additional fixings assessed by a suitably experienced and competent 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 and less than 150 mm from the edges and corners of the board, eg giving a minimum fixing rate of 5.55 fixings per square metre for 1200 by 600 mm boards.

Table 8 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)



17 Procedure

Partially bonded applications — flat and pitched roofs

17.1 A base sheet of Adepar JS or Adepar JS VV with 50 mm laps is loose-laid over the substrate. It should be terminated 500 mm from the edge and around all penetrations.

17.2 A capsheet of Parafor Solo GS or Graviflex is fully torch-bonded directly to the base sheet. Side laps are determined by the exposed selvedge, with 100 mm end laps offset by a minimum 300 mm to those of the base sheet below.

17.3 On nailable substructures a base sheet of HT - 180 is fastened in accordance with the relevant clauses of BS 8217 : 2005, then a base sheet of Paradiene SVV is fully torch-bonded to the base sheet. A capsheet of Parafor Solo GS or Graviflex is fully torch-bonded to the base sheet.

Fully bonded applications — flat and pitched roofs

17.5 A first layer of Paradiene SVV, is fully torch-bonded to the substrate with side laps a minimum of 50 mm and end laps a minimum of 75 mm.

17.6 A top layer of Parafor Solo GS or Graviflex is fully torch-bonded to the first layer. Side laps are determined by the exposed selvedge, with 100 mm end laps offset by a minimum 300 mm to those of the base sheet below.

18 Repair

Should the systems be damaged, repairs can be made after cleaning the membrane, by applying a bonded patch of the same membrane to the damaged area with the recommended overlap.

Technical Investigations

19 Tests

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

- low temperature flexibility of coating mass
- elastic recovery of coating mass
- ring and ball of coating mass
- low temperature flexibility — unaged and heat aged (for 90 days at 80°C)
- heat resistance — unaged and heat aged (for 90 days at 80°C)
- dimensional stability
- static indentation
- dynamic indentation
- resistance to sliding
- fatigue resistance — unaged and heat aged (for 28 days at 80°C)
- peel from support — unaged and heat aged (for 28 days at 80°C).

19.2 An assessment was made of test data for the insulation boards, in relation to:

- density
- compressive strength at 10% compression
- dimensional stability with temperature
- dimensional accuracy
- thermal conductivity (unaged and aged)
- water vapour resistance/resistivity
- adhesive bonding
- mechanical fixings
- resistance to loading (free span)
- resistance to peel.

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 Independent laboratory data were evaluated in the context of UK roofing practice and Building Regulations.

20.3 UK data on the fire performance of the systems components were assessed.

20.4 Visits to existing sites were carried out to assess performance in use and durability of the waterproofing.

20.5 Condensation risk analysis was carried out on the insulation component of the systems.

Bibliography

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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*

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BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1 — Actions on structures — General actions — Snow loads*
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BS EN 13707 : 2013 *Flexible sheets for waterproofing — Reinforced bitumen sheets for roof waterproofing — Definitions and characteristics*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

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EN 13970 : 2004 *Flexible sheets for waterproofing. Bitumen water 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
- 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.

21.2 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.

21.3 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.

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

21.5 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.

21.6 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.