Sika Limited
Target Market - Roofing
Watchmead
Welwyn Garden City
Hertfordshire AL7 1BQ

Tel: 01707 394444 Fax: 01707 329129
e-mail: sarnafilroofing@uk.sika.com
website: www.gbr.sika.com

Agrément Certificate
08/4530
Product Sheet 1

SARNAFIL WATERPROOFING MEMBRANES

SARNAFIL PROTECTED ROOF WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet(1) relates to Sarnafil Protected Roof Waterproofing Membranes, comprising single-ply polymeric sheets, for use in loose-laid and ballasted roof waterproofing applications on inverted roofs, green roofs, roof gardens and terraces on flat roofs.

(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 products, including joints, will resist the passage of moisture to the inside of the building (see section 6).

Properties in relation to fire — the products may enable a roof to be unrestricted under the national Building Regulations (see section 7).

Resistance to wind uplift — the products will resist the effects of any wind suction likely to occur in practice (see section 8).

Resistance to mechanical damage — the products will accept, without damage, regular foot traffic and associated loads and minor structural movements occurring in service (see section 9).

Resistance to penetration of roots — the products will adequately resist plant root penetration (see section 10).

Durability — under normal service conditions, Sarnafil G and Sarnafil TG66/Sarnafil AT roofing membranes will provide durable waterproof coverings with service lives in excess of 35 years and 25 years respectively (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 Fifth issue: 20 January 2022

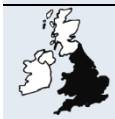
Originally certificated on 27 March 2008

Hardy Giesler
Chief Executive Officer

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA
©2022
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Sarnafil Protected Roof Waterproofing 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 substructures, the use of the products may enable a roof to be unrestricted under this Requirement. See sections 7.1 and 7.2 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The products, including joints, will enable a roof to satisfy this Requirement. See section 6 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The products are acceptable. See section 12 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		Use of the products satisfies the requirements of this Regulation. See sections 11.1 and 12 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 a suitable substructure, the products may enable a roof to be unrestricted under clause 2.8.1(1)(2). See sections 7.1 and 7.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The products, 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 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products 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.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to these 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 products are acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The products, including joints, will enable a roof to satisfy the requirements of this Regulation. See section 6 of this Certificate.

Regulation:	**36(b)**	**External fire spread**
Comment:		On suitable substructures, the use of the products may enable a roof to be unrestricted by the requirements of this Regulation. See sections 7.1 and 7.2 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 2022

In the opinion of the BBA, Sarnafil Protected Roof Waterproofing 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, terraces and balconies.*

The NHBC Standards do not cover the use of the products in the refurbishment of existing roofs.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13956 : 2012**.**

Registered Contractors Scheme(1)

The Certificate holder operates a Registered Contractors Scheme for these products under which contractors are trained, registered and regularly reviewed by the Certificate holder to demonstrate that they are competent to carry out installation in accordance with this Certificate. Details of registered Contractors are available from the Certificate holder. Registered contractors are responsible for each installation of the products they undertake.

(1) The Certificate holder's records relating to their Registered Contractors Scheme will be audited annually by the BBA as part of its programme of surveillance.

Technical Specification

1 Description

1.1 Sarnafil Protected Roof Waterproofing Membranes comprise:

- Sarnafil G410 — a multi-layer roof waterproofing membrane based on plasticised PVC, incorporating UV- and flame-retardant stabilisers and non-woven glass fibre inlay
- Sarnafil AT — a multi-layer synthetic roof waterproofing membrane based on flexible polyolefins (FPO), incorporating a combination of glass fibre matting and synthetic scrim and a polymer backing
- Sarnafil TG66 — a multi-layer synthetic roof waterproofing membrane based on FPO, incorporating UV-retardant stabilisers and a non-woven glass fibre inlay.

1.2 The membranes are manufactured to the nominal characteristics given in Tables 1 and 2.

Table 1 Nominal characteristics – PVC membranes

Characteristic (unit)	Sarnafil G410					
	Standard G410-EL			Fleece-backed G410-ELF		
Roll length (m)	20	20	20	15	15	15
Roll width (m)	2	2	2	2	2	2
Thickness (mm)(1)	1.5	1.8	2.0	1.5(1)	1.8(1)	2.0(1)
Weight ($kg \cdot m^{-2}$)	2.0	2.3	2.6	2.3	2.7	3.1
Roll weight (kg)	64	80	69	69	81	93
Colour upper face lower face	A range of colours is available					
Watertightness	Pass	Pass	Pass	Pass	Pass	Pass
Tensile strength ($N \cdot mm^{-2}$) longitudinal transverse	 ≥ 10 ≥ 9	 ≥ 10 ≥ 9	 ≥ 10 ≥ 9	 – –	 – –	 – –
Elongation (%) longitudinal transverse	 ≥ 220 ≥ 200	 ≥ 250 ≥ 230	 ≥ 250 ≥ 230	 – –	 – –	 – –
Tensile strength ($N \cdot 50\ mm^{-1}$) longitudinal transverse	 – –	 – –	 – –	 ≥ 700 ≥ 700	 ≥ 750 ≥ 750	 ≥ 750 ≥ 750
Elongation (%) longitudinal transverse	 – –	 – –	 – –	 ≥ 65 ≥ 65	 ≥ 65 ≥ 65	 ≥ 65 ≥ 65
Dimensional stability (%) longitudinal transverse	 ≤0.2 ≤0.1	 ≤0.2 ≤0.1	 ≤0.2 ≤0.1	 – –	 – –	 – –
Low temperature foldability (°C)	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25
Impact resistance soft substrate hard substrate	 – –	 – –	 – –	 – –	 – –	 – –
Static load resistance soft substrate hard substrate	 – –	 – –	 – –	 – –	 – –	 – –
Resistance to root penetration	Pass	Pass	Pass	Pass	Pass	Pass

(1) Excluding backing fleece.

Table 2 Nominal characteristics – FPO membranes

Characteristic (unit)	**Sarnafil TG66**			**Sarnafil AT**	
Roll length (m)	20	15	15	20	10
Roll width (m)	2	2	2	2	2
Thickness (mm)	1.5	1.8	2.0	1.5	2.5
Weight ($kg \cdot m^{-2}$)(1)	1.5	1.8	2.0	1.65	2.6
Roll weight (kg)	60	54	60	66	52
Colour	Standard RAL 7040 Window Grey				
Watertightness	Pass	Pass	Pass	Pass	Pass
Tensile strength ($N \cdot mm^{-2}$)					
longitudinal	≥ 9	≥ 9	≥ 9	-	-
transverse	≥ 7	≥ 7	≥ 7	-	-
Elongation (%)					
longitudinal	≥ 550	≥ 550	≥ 550	-	-
transverse	≥ 550	≥ 550	≥ 550	-	-
Tensile strength ($N \cdot 50\ mm^{-1}$)					
longitudinal	-	-	-	≥ 1000	≥ 950
transverse	-	-	-	≥ 900	≥ 900
Elongation (%)					
longitudinal	-	-	-	≥ 18	≥ 18
transverse	-	-	-	≥ 18	≥ 18
Dimensional stability (%)					
longitudinal	≤ 0.2	≤ 0.2	≤ 0.2	-	-
transverse	≤ 0.1	≤ 0.1	≤ 0.1	-	-
Low temperature foldability (°C)	≤ -30	≤ -30	≤ -30	≤ -50	≤ -50
Impact resistance (mm)					
soft substrate	≥ 1000	≥ 1250	≥ 1250	≥ 1750	≥ 4000
hard substrate	≥ 800	≥ 1000	≥ 1000	≥ 800	≥ 4000
Static load resistance (kg)					
soft substrate	≥ 20	≥ 20	≥ 20	≥ 20	≥ 20
hard substrate	≥ 20	≥ 20	≥ 20	≥ 20	≥ 20
Resistance to root penetration	Pass	Pass	Pass	-	Pass

1.3 Ancillary items necessary for installation of the products, and included in this assessment, are:

- Sarnacol 2142V — adhesive for bonding G410-ELF membranes to the substrate
- Sarnacol 2170 and SikaRoof Adhesive 400 Spray– for use at upstands.

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

- SikaRoof Adhesive 200 — a one-component polyurethane adhesive for bonding insulation boards
- Sarnacol 2116 — adhesive for bonding ballast in areas of high winds
- Sarnafil T Clean — cleaning agent for TG66/Sarnafil AT
- Sarnafil G445-13 — protection sheet for G410
- Sarnafil TG63-13 — protection sheet for TG66/Sarnafil AT
- Sarnavap 500E, 1000E and 2000E — polyethylene vapour control layers
- Sarnavap double-sided jointing tape — for sealing Sarnavap vapour control layers
- Sarnavap 5000E SA and Sikabit VB 724 SA— self-adhered bituminous vapour control layers
- Primer 600 and 610 — for use with SikaRoof Adhesive 200 and Sarnavap 5000E SA, and SikaBit VB 724 SA subject to substrate requirements
- SarnaFelt Type T — polyester felt for use as a barrier to bitumen and polystyrene insulation boards
- SarnaFelt Type GK — polypropylene-based felts for use as cushion separation layers
- SarnaFelt VS 140 — polypropylene filter layer to be used with ballast in inverted roof applications
- Sarnapad — paving support or levelling shim made of high-density polypropylene
- Sarnatherm — a range of thermal insulations comprising rigid urethane foam and extruded polystyrene.

2 Manufacture

2.1 The products are manufactured by extrusion coating plasticised PVC or FPO into sheets which are then reinforced with a scrim.

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 Sika Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 and BS EN ISO 14001 : 2015 by SQS (Certificate 31982).

2.4 The products are manufactured in Switzerland and Germany and marketed in the UK by the Certificate holder.

3 Delivery and site handling

3.1 The membranes are delivered to site in rolls packaged in polythene bearing a label with the product identification, stock number, lot number, bulk roll number, area, date code and the BBA logo incorporating the number of this Certificate.

3.2 Rolls should be stored in a cool, dry area on a clean, level surface, and kept under cover. They should only be unwrapped from packaging at the time of installation, and unused membrane should be returned to its packaging until required.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the products 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 Sarnafil Protected Roof Waterproofing Membranes.

Design Considerations

4 General

4.1 Sarnafil Protected Roof Waterproofing Membranes are satisfactory for use as a waterproofing on flat roofs with limited or pedestrian/amenity access on:

- loose-laid and ballasted roofs
- warm ballasted roofs
- inverted roofs
- green roofs and roof gardens
- terraces.

4.2 The membranes must be mechanically fixed at upstands and edges.

4.3 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2018 and, where appropriate, *NHBC Standards* 2022, Chapter 7.1.

4.4 The following terms are defined for the purpose of this Certificate, as:

- roof garden (intensive) — a roof with a substantial layer of growing medium with planting that can include shrubs and trees, generally accessible to pedestrians
- green roof (extensive) — a roof with a shallow layer of growing medium planted with low-maintenance plants such as mosses, sedums, grasses and some wild flower species.

4.5 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 (see section 9).

4.6 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80(1). 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 and direction of falls.

(1) *NHBC Standards* 2022 require a minimum fall of 1:60 for green roofs and roof gardens.

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

4.8 For the purpose of this Certificate, the finished falls of the roof bearing the drainage layer should be between 1:80 and 1:20. The falls are provided by the substrate.

4.9 Structural decks to which the systems are to be applied must be suitable to transmit the dead and imposed loads experienced in service. Allowance needs to be made for loading deflections to ensure that the free drainage of water is maintained.

4.10 Imposed loads, dead loading and wind loads are calculated by a suitably experienced and competent 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.

4.11 Recommendations for the design of green roofs 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*.

4.12 The drainage systems for inverted roofs, green roofs or roof gardens must be correctly designed, and the following points should be addressed:

- provision made for access for maintenance purposes
- dead loads for green roof and roof gardens can increase if the drains become partially or completely blocked causing waterlogging of the drainage layer
- additional guidance for inverted roof specifications is given in BBA Information Bulletin No 4 *Inverted roofs – Drainage and U value corrections.*

4.13 Insulation materials to be used in conjunction with the membranes must be in accordance with the Certificate holder's instructions and be either:

- as described in the relevant clauses of BS 6229 : 2018, or
- the subject of a current BBA Certificate and used in accordance with, and within the scope of, that Certificate

4.14 Sarnafil G410 membranes can be adversely affected by contact with bituminous products and polystyrene insulation boards. In these cases, the G410 felt-backed version or a suitable separating layer such as SarnaFelt Type T must be used. Where doubt arises, the advice of the Certificate holder should be sought.

4.15 Sarnafil TG66/Sarnafil AT membranes should not come into direct contact with new bituminous or coal tar products or plasticised PVC. In these cases, a suitable separating layer such as SarnaFelt Type T must be used.

4.16 The membranes must not be laid directly onto timber substrates impregnated with substances containing solvents or oil (eg oil-based preservatives). In these cases, a felt-backed version or a suitable separating layer must be used.

4.17 The NHBC requires that the roof membranes, once installed, are inspected in accordance with *NHBC Standards* 2022, Chapter 7.1, Clause 7.1.12, and undergo an appropriate integrity test, where required. Any damage to the membrane is repaired in accordance with section 19 of this Certificate and reinspected.

5 Practicability of installation

The membranes should only be installed by members of the Certificate holder's Registered Contractors Scheme (see the *Additional Information* part of this Certificate).

6 Weathertightness

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.

7 Properties in relation to fire

7.1 A roof incorporating the systems will also be unrestricted under the national Building Regulations with respect to proximity to a boundary in the following circumstances:

- when used in protected or inverted roof specifications including an inorganic covering listed in the Annex of Commission Decision 2000/553/EC,
- a roof garden covered with a drainage layer of gravel 100 mm thick and a soil layer 300 mm thick
- irrigated roof gardens and green roofs.

7.2 The designation of other specifications should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

7.3 If allowed to dry, plants used in roof gardens may allow flame spread across the roof. This should be taken into consideration when selecting plants for the garden. Appropriate protection should be applied to ensure the overall fire-rating of the roof is not compromised.

8 Resistance to wind uplift

8.1 The ballast requirements for inverted roof systems should be calculated by a suitably competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex. When gravel ballast is used, the system should always be loaded 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.

8.2 In loose-laid and ballasted systems, the precise ballast requirements should be calculated by a suitably competent and experienced individual in accordance with the relevant parts of BS EN 1991-1-4 : 2005 and its UK National Annex.

8.3 The use of concrete slabs on suitable supports should be considered in areas of high wind exposure, and the advice of the Certificate holder should be sought. In such areas, the gravel may be bonded at the edges for a distance of one metre, using Sarnacol 2116. The membranes should always be ballasted with a minimum depth of 50 mm of aggregate.

8.4 The soil used in green roofs and roof gardens and ballast on inverted/protected roofs must not be of a type that will be removed or become delocalised owing to wind scour experienced on the roof.

8.5 It should be recognised that the type of plants used in roof gardens could significantly affect the expected wind loads experienced in service.

9 Resistance to mechanical damage

9.1 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 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). When paviours are used, a suitable protective sheet, or filter layer, must be laid over the waterproofing, prior to installation of the paviours, on paving pad supports. For inverted applications, an appropriate water control membrane should be used on the insulation.

9.2 Once the green roof or roof garden is installed, it can be regarded as a suitable protection for the membrane in use. However, it should be recognised that the membrane is taken up beyond the level of the soil (at least 150 mm) and therefore is vulnerable to damage in those areas.

9.3 The systems in which the membranes are installed are capable of accepting minor structural movement, while remaining weathertight.

10 Resistance to penetration of roots

Results of tests on the membranes indicate that they are resistant to root penetration and can be used in a roof waterproofing system for roof gardens and green roofs.

11 Maintenance

11.1 The roof systems must be the subject of six-monthly inspections and maintenance in accordance with the recommendations made in BS 6229 : 2018, Chapter 7 and the manufacturers own maintenance requirements, where relevant, to ensure continued satisfactory performance.

11.2 A planned maintenance cycle, including inspections by the Certificate holder at minimum intervals of five years, should be introduced if an extended service life is required. The Certificate holder can advise on methods of extending the service life. This could include the use of thicker membranes, specific maintenance requirements, or localised replacement and repair.

11.3 Where damage has occurred, it should be repaired in accordance with section 16 of this Certificate and the Certificate holder's instructions**.**

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

12 Durability

Sarnafil G410

12.1 Under normal service conditions, the Sarnafil G roofing system, will provide a durable roof waterproofing with a service life in excess of 35 years.

12.2 Provided the roof is covered by, and maintained in accordance with, the Certificate holder's maintenance scheme, the products will have a service life in excess of 40 years (see 11.2).

Sarnafil TG66 and Sarnafil AT

12.3 Under normal service conditions, Sarnafil TG 66/Sarnafil AT will provide a durable roof waterproofing with a service life in excess of 25 years.

13 Reuse and recyclability

The products comprise polyvinyl chloride, flexible polyolefins, polyester and glass, all of which can be recycled.

Installation

14 General

14.1 Installation of Sarnafil Protected Roof Waterproofing Membranes (see Figure 1) must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions, BS 8000-0 : 2014, BS 8000-4 : 1989 and the Single Ply Roofing Association (SPRA) *Single Ply : Design Guide.*

14.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads or concrete nibs. When used over a rough or bitumen substrate, a suitable protection layer must be laid first.

15 Procedure

15.1 Horizontal laps must be a minimum of 80 mm wide with all flashings raised a minimum of 150 mm above the finished roof level.

15.2 The membranes are mechanically fixed at perimeters, at all penetrations and at changes of level, and the laps welded together. Finally, the detail work is carried out.

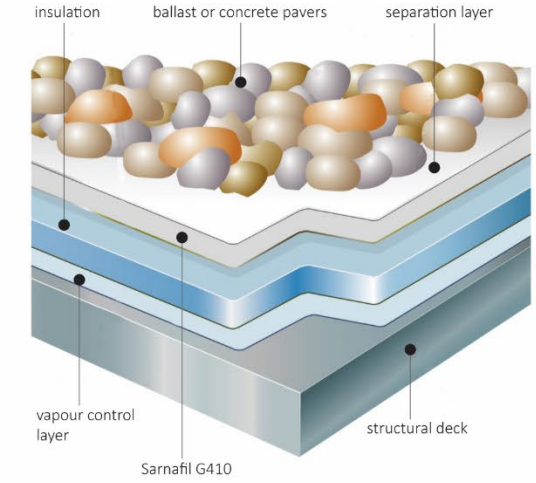
15.3 The membranes must be covered with a suitable protective sheet or filter layer. For inverted roof applications, a suitable water-control layer should be used prior to the application of at least 50 mm of washed, well-rounded gravel. In areas of high wind exposure, a heavier gravel may be used and/or the gravel may be bonded at the edges for a distance of one metre using Sarnacol 2116. Alternatively, paving slabs set on suitable supports may be considered.

15.4 When used in loose-laid applications, account must be taken in the design of the deck with regard to the extra dead loading, owing to the weight of the aggregate and/or paving.

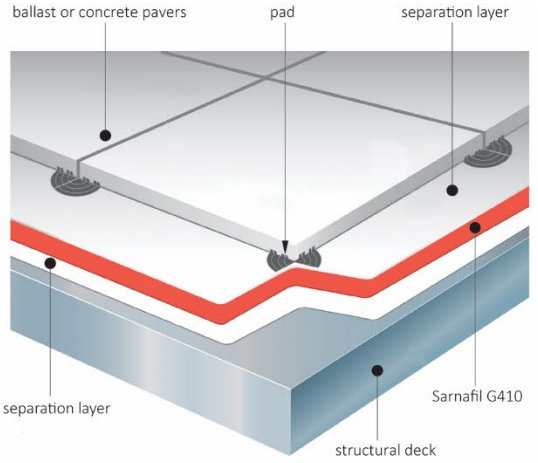
15.5 For green roof or roof garden applications, the Certificate holder's instructions must be strictly followed.

15.6 Flashing and detailing must be formed in accordance with the Certificate holder's instructions.

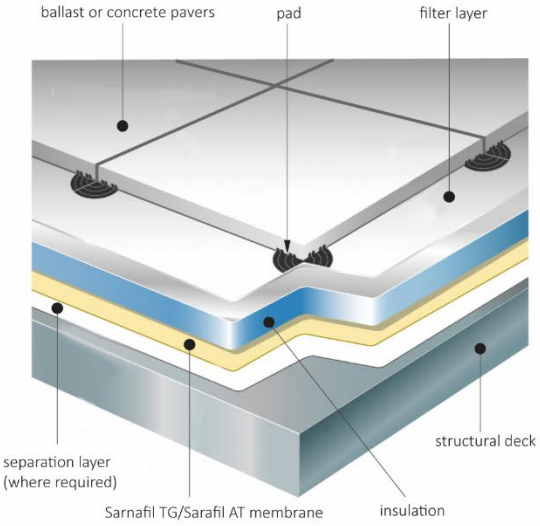
Figure 1 Typical installations



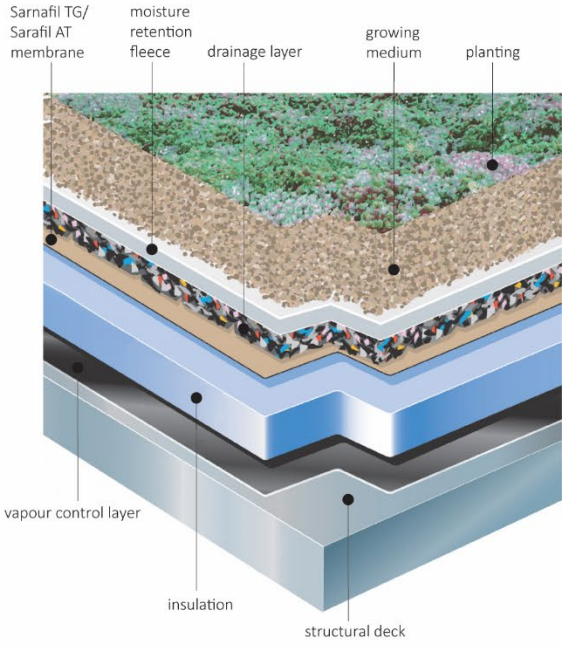
Sarnafil G410 – ballasted roof



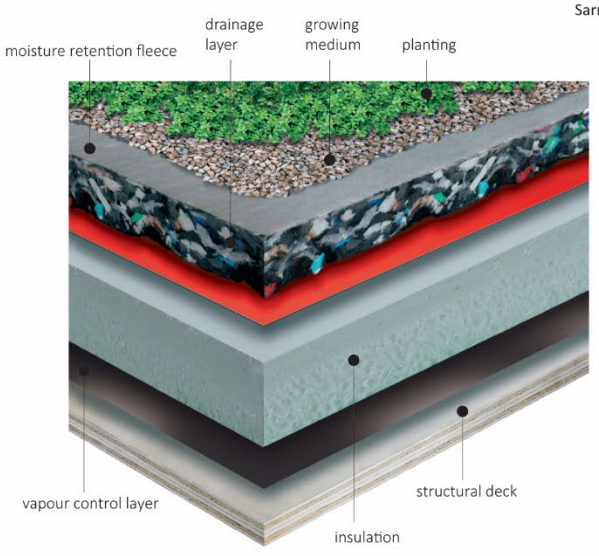
Sarnafil G410 – loose-laid



Sarnafil TG/Sarafil AT – inverted roof



Sarnafil TG/Sarafil AT – green roof



Sarnafil G410 – green roof

16 Repair

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

Technical Investigations

17 Tests

17.1 Tests were carried out on samples of Sarnafil G410 and the results assessed to determine:

- tensile strength
- elongation at break
- tear resistance
- dimensional stability
- heat ageing (56 days at 80°C) followed by tensile strength and elongation
- UV ageing (500 light hours using UVB 313 lamps cycling 4 hours UV at 45°C and 4 hours condensation at 40°C) followed by tensile strength and elongation
- apparent density
- water vapour permeability
- ash content
- static indentation on hard and soft substrate
- low temperature flexibility
- thickness
- resistance to root penetration
- peel resistance of joints
- shear resistance of joints
- dynamic indentation on perlite board and expanded polystyrene
- resistance to wind uplift
- thermal shock
- water vapour resistance
- resistance to sliding at 90°C
- resistance to water pressure (6 m head)
- peel resistance when applied to chipboard, concrete, perlite and polyisocyanurate (asbestos-faced) substrates (using Sarnacol 2170 adhesive applied to Sarnafil G410-12EL)
- peel resistance from a concrete substrate without ageing, after 56 days heat ageing at 80°C and after 28 days water soak at 20°C (using Sarnacol 2170 adhesive)
- resistance to cyclic movement
- air pressure resistance of joints
- tensile strength of welded joint after 28 days heat ageing at 80°C
- tensile strength of welded joint (longitudinal and transverse) after 7 days water soak at 60°C.

17.2 Tests were carried out on samples of Sarnafil AT and the results assessed to determine:

- thickness
- mass per unit area
- tensile strength
- elongation at break
- tear resistance
- resistance to impact
- low temperature flexibility

17.3 Tests were carried out on samples of Sarnafil membrane of similar composition and the results assessed to determine:

- dynamic indentation on perlite board and expanded polystyrene
- static indentation on concrete and expanded polystyrene

- tensile strength of joints.

17.4 Tests were carried out on samples of Sarnafil TG66 and the results assessed to determine:

- tensile strength
- elongation at break
- 28 days water soak at 60°C followed by tensile strength and elongation
- dimensional stability
- tear strength (nail)
- static indentation on concrete and expanded polystyrene
- dynamic indentation on perlite board and expanded polystyrene
- water vapour permeability
- water vapour resistance.

18 Investigations

18.1 Tests were conducted on a material of similar formulation to the Sarnafil TG66 material and the results assessed to determine:

- tensile strength and elongation
- resistance to water pressure
- resistance to nail tear
- resistance to folding at low temperature
- resistance to leakage at joints
- tensile strength of joints
- peel strength of joints.

18.2 Existing data relating to resistance of the membranes to root penetration and reaction to fire test data were evaluated.

18.3 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.

18.4 A survey of known users was carried out to assess the performance in use of the products.

18.5 Visits were made to existing sites in Switzerland and in the UK, and the results of tests conducted on Sarnafil G410 unaged, naturally-aged and accelerated-aged material, and on a material of similar formulation to Sarnafil TG66 unaged and naturally-aged material.

Bibliography

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BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

EN 13501-5 : 2016 *Fire classification of construction products and building elements — Classification using data from external fire exposure to roofs tests*

19 Conditions

19.1 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
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- is subject to English Law.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.