

## Sika Limited

Target Market – Roofing

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Agrément Certificate  
**08/4531**  
Product Sheet 1

## SARNAFIL WATERPROOFING MEMBRANES

### SARNAFIL ADHERED ROOF WATERPROOFING MEMBRANES

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Sarnafil Adhered Roof Waterproofing Membranes, comprising single-ply polymeric sheets for use on flat or 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 membranes will resist the passage of moisture into the building (see section 6).

**Properties in relation to fire** — test results indicate that the membranes will enable a roof to be unrestricted under the Building Regulations (see section 7).

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

**Resistance to foot traffic** — the membranes will accept the limited foot traffic and loads associated with installation and maintenance (see section 9).

**Durability** — under normal service conditions the Sarnafil G410 and Sarnafil TG76 membranes will provide durable roof waterprooings with service lives in excess of 35 and 25 years respectively (see section 11).

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

A handwritten signature in black ink, appearing to read 'Simon Wroe'.

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Date of Third issue: 12 September 2014

Simon Wroe  
Head of Approvals — Materials

Claire Curtis-Thomas  
Chief Executive

Originally certificated on 28 March 2008

*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](http://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, Sarnafil Adhered Roof Waterproofing Membranes, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting 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 membranes will enable a roof to be unrestricted under this Requirement. See section 7 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The membranes, including joints, will enable a roof to meet this Requirement. See section 6.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The membranes are acceptable. See section 11 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 use of the membranes satisfies the requirements of this Regulation. See sections 10 and 11 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.8	Spread from neighbouring buildings
Comment:		The membranes, when applied to a suitable substructure, are classified as having low vulnerability and will enable a roof to be unrestricted under this Standard, with reference to clause 2.8.1 <sup>(1)(2)</sup> . See section 7 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 <sup>(1)(2)</sup> and 3.10.7 <sup>(1)(2)</sup> . See section 6.1 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 made in relation to the membranes under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The membranes are acceptable. See section 11 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 meet the requirements of this Regulation. See section 6.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		On a suitable substructure, the use of the membranes will enable a roof to be unrestricted under the requirements of this Regulation. See section 7 of this Certificate.

## Construction (Design and Management) Regulations 2007

## Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors 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 2014

NHBC accepts the use of Sarnafil Adhered Roof Waterproofing Membranes, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 7 Roofs, Chapter 7.1 Flat roofs and balconies* and *Chapter 7.2 Pitched roofs*.

## CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 13956 : 2005. An asterisk (\*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

## Registered Contractors Scheme<sup>(1)</sup>

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 Adhered Roof Waterproofing Membranes comprise:

- Sarnafil G410-EL — a multi-layer roof waterproofing membrane based on plasticised PVC incorporating UV- and flame-retardant stabilisers and a non-woven glassfibre inlay. The product is available in Standard, Fleece-backed (G410-ELF) and with a self-adhesive polyester fleece backing (G410-EL FSA)
- Sarnafil TG76 — a multi-layer synthetic roof waterproofing membrane based on flexible polyolefins (FPO) with a non-woven glassfibre inlay.

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

*Table 1 Nominal characteristics*

Characteristic (unit)	Sarnafil G										Sarnafil TG76	
	Standard G410-EL				Fleece backed G410-ELF				G410-EL FSA			
*Thickness (mm)	1.2	1.5	1.8	2.0	1.2	1.5	1.8	2.0	1.5	1.8	1.2	1.5
Roll length (m)	20	20	15	15	20	15	15	15	15	15	20	20
Roll width (m)	2, 3	2, 3	2, 3	2, 3	2	2	2	2	2	2	2	2
Mass per unit area (kg·m <sup>-2</sup> )	1.6	2.0	2.3	2.6	1.9	2.3	2.7	3.1	2.7	2.3	1.5	1.8
Colour	A range of colours is available								Light grey is standard		Grey is standard	
*Tensile stress (N·mm <sup>-2</sup> )												
longitudinal	≥9.5	≥10	≥10	≥10	–	–	–	–	–	–	–	–
transverse	≥9.0	≥9.0	≥9.0	≥9.0	–	–	–	–	–	–	–	–
*Elongation (%)												
longitudinal	≥220	≥220	≥250	≥250	–	–	–	–	–	–	–	–
transverse	≥200	≥200	≥230	≥230	–	–	–	–	–	–	–	–
*Tensile strength (N per 50 mm)												
longitudinal	–	–	–	–	≥650	≥700	≥750	≥750	≥700	≥750	≥800	≥800
transverse	–	–	–	–	≥650	≥700	≥750	≥750	≥700	≥750	≥600	≥600
*Elongation												
longitudinal	–	–	–	–	≥65	≥65	≥65	≥65	≥65	≥65	≥50	≥50
transverse	–	–	–	–	≥65	≥65	≥65	≥65	≥65	≥65	≥50	≥50
*Joint peel resistance (N per 50 mm)	≥300	≥300	≥300	≥300	≥300	≥300	≥300	≥300	≥300	≥300	≥300	≥300
*Joint shear resistance (N per 50 mm)	≥600	≥600	≥600	≥600	≥600	≥600	≥600	≥600	≥600	≥600	≥500	≥500
*Foldability at low temperature (°C)	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -25	≤ -30	≤ -30
*Watertightness	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

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

- Sarnacol 2170 — adhesive for bonding G410 membrane to the substrate
- Sarnacol 2142S — adhesive for bonding G410-ELF and TG76 membrane to the substrate
- Primer 600 — for use on PIR insulation boards, OSB and insulated metal sandwich panels.

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

- Sarnacol 2162UK — one-component polyurethane adhesive for bonding insulation boards
- Sarnafil T Clean — cleaning agent for the TG76 membrane
- Sarnafil G445 — protection sheet for G410 membranes

- Sarnafil T Prep — seam preparation for use prior to hot-air welding Sarnafil TG76 and degreasing metal
- SarnaVap 500E, 1000E and 2000E — polyethylene vapour control layers
- SarnaVap 5000E SA — self-adhered, bituminous vapour control layer
- SarnaTred Walkway pads — for roof maintenance/access
- Sarnatherm — a range of thermal insulations comprising rigid urethane foam, expanded polystyrene and extruded polystyrene.

## 2 Manufacture

2.1 The products are manufactured by extrusion coating plasticised PVC and FPO into sheets. The sheets are then reinforced with a scrim in between.

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: 2008 and BS EN ISO 14001 : 2004 by SQS (Certificate 31982).

2.4 The product is manufactured in Switzerland and marketed in 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 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 properties of the adhesives in relation to *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP4)/Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009* are given in Table 2. These products should be stored in accordance with *The Dangerous Substances and Explosive Atmospheres Regulations 2002*.

Product	Flashpoint (°C)	Classification
Sarnacol 2142S	-18	Highly flammable/Harmful
Sarnafil T Prep	-4	Highly flammable/Irritant
Sarnacol 2170	-4	Highly flammable/Irritant
Sarnacol 2162UK	-	Harmful

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Sarnafil Adhered Roof Waterproofing Membranes.

### Design Considerations

#### 4 General

4.1 Sarnafil Adhered Roof Waterproofing Membranes are satisfactory for use as adhered waterproofing installations on flat and pitched roofs with limited access.

4.2 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 9).

4.3 Flat roofs are defined for the purpose of this Certificate as those having a minimum finished fall of 1:80. Pitched roofs are defined as those having a fall in excess of 1:6. 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.

4.4 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2003 or BS 8217 : 2005 and, where appropriate, *NHBC Standards 2014*, Chapter 7.1.

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

- 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 scope of, that Certificate
- included in the Certificate holder's *Adhered Systems Insulation List*. The insulation must be attached independently to the substrate.

4.6 The Sarnafil G410 membrane must not be laid directly onto expanded polystyrene or on timber substrates impregnated with substances containing solvents or oil (eg oil-based preservatives) and can be adversely affected by contact with bituminous or coal tar products or polystyrene insulation boards. In these situations the felt-backed membrane or a suitable separation layer must be used. Where doubt arises, the advice of the Certificate holder should be sought.

## 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



6.1 Results of tests confirm that 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:

**England and Wales** — Approved Document C, Requirement C2(b), Section 6

**Scotland** — Mandatory Standard 3.10, clauses 3.10.1<sup>(1)(2)</sup> and 3.10.7<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Regulation 28(b).

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

## 7 Properties in relation to fire



7.1 The following will be unrestricted:

- an 18 mm thick OSB deck, one layer of SarnaVap 5000E SA vapour control layer, one layer of 100 mm thick PIR insulation and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2170
- an 18 mm thick OSB deck, one layer of bitumen vapour control layer, one layer of 100 mm PIR insulation and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2170
- an 18 mm thick OSB deck, one layer of SarnaVap 500E vapour control layer, one layer of 150 mm thick EPS insulation and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2142S
- an 18 mm thick OSB deck, one layer of SarnaVap 5000E SA vapour control layer, one layer of 100 mm thick PIR insulation and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2170
- an 18 mm thick plywood deck and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2170
- an 18 mm thick OSB deck, one layer of SarnaVap 5000E SA vapour control layer, one layer of 100 mm PIR insulation and one layer of Sarnafil G410-12EL fully bonded using Sarnacol 2142S
- an 18 mm thick plywood deck, one layer of bitumen vapour control layer, one layer of 75 mm thick mineral wool insulation and one layer of polyester fleece-backed Sarnafil TG76 fully bonded using Sarnacol 2142S
- an 18 mm thick plywood deck, one layer of bitumen vapour control layer, one layer of 100 mm thick PIR insulation and one layer of polyester fleece-backed Sarnafil TG76 fully bonded using Sarnacol 2142S
- an 18 mm thick plywood deck, one layer of Sarnavap 500E vapour control layer, one layer of 100 mm thick PIR insulation board primed with Primer 600, and one layer of Sarnafil G410-15 EL FSA
- an 18 mm thick plywood deck, one layer of Sarnavap 500E vapour control layer, one layer of 100 mm thick PIR insulation board, and one layer of Sarnafil G410-15 EL FSA.

7.2 When tested and classified in accordance with EN 13501-5, the following systems achieved a B<sub>ROOF</sub> t(4) classification:

- an 18 mm thick plywood deck, one layer of Sarnavap 500E vapour control layer, one layer of 100 mm thick PIR insulation board primed with Primer 600, and one layer of Sarnafil G410-15 EL FSA
- an 18 mm thick plywood deck, one layer of Sarnavap 500E vapour control layer, one layer of 100 mm thick PIR insulation board, and one layer of Sarnafil G410-15 EL FSA.

7.3 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 A1

**Scotland** — test to conform to Mandatory Standard 2.8, clause 2.8.1<sup>(1)(2)</sup>, Annex 2C

(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.

## 8 Resistance to wind uplift

The adhesion of the membranes will be limited by the cohesive strength of the substrate. On substrates with high cohesive strength, the adhesion of the membrane or of a fleece-backed version of the membrane is sufficient to resist the effect of wind suction, thermal cycling or minor structural movements likely to occur in service. The Certificate holder assumes liability for the calculations for the adhered system and provides a project specific design service which takes into account all the relevant information supplied.

## 9 Resistance to foot traffic

Results of tests indicate that the membranes 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 using SarnaTred walkway pads or concrete slabs on paving support pads.

## 10 Maintenance



10.1 The systems must be the subject of annual inspections and maintenance to ensure continued performance. Exposed membrane must be free from the build-up of silt, unwanted vegetation and other debris.

10.2 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.

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

## 11 Durability



11.1 The durability of all roofing materials is dependent on the roof design, installation, immediate environment, maintenance and use. Other specific factors assessed by the BBA relating to the durability of individual products include formulation, thickness, and life to first maintenance.

### Sarnafil G410

11.2 Accelerated weathering tests and performance in use confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the membrane will have a service life in excess of 35 years.

11.3 The products have been in use in Switzerland and the UK since 1968 and 1980 respectively. The BBA has examined the oldest available sites where the material has been installed. Tests conducted on the naturally aged material taken from existing sites and naturally aged material which has been subjected to further ageing conditions confirm satisfactory retention of properties, indicating that a service life in excess of 40 years can be achieved with periodic maintenance as stated in section 10.

### Sarnafil TG76

11.4 Sarnafil TG76 has been used in Switzerland and the UK since 1989 and 1992 respectively. Accelerated weathering tests and performance in use confirm satisfactory retention of physical properties is achieved. Available evidence indicates that the membrane will have a service life in excess of 25 years.

## 12 Reuse and recyclability

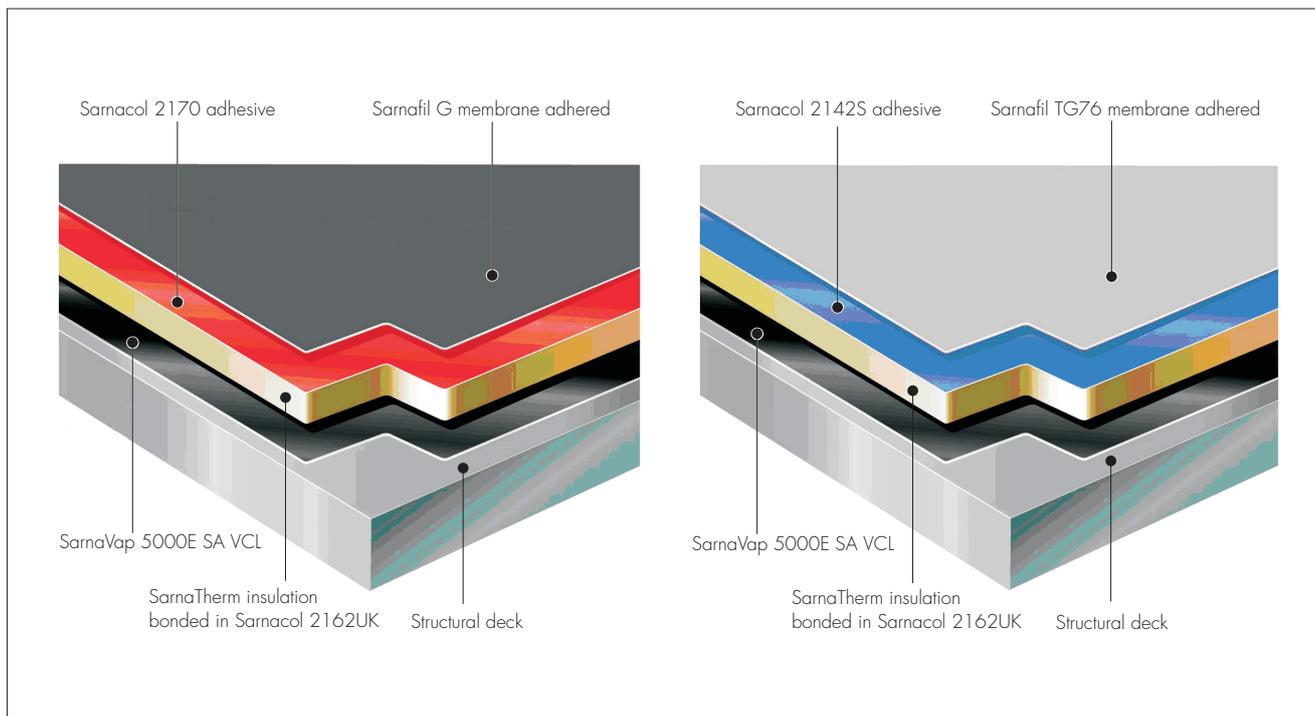
The products comprise polyvinyl chloride, flexible polyolefins, polyester and glass, which can be recycled.

## Installation

## 13 General

13.1 Installation of Sarnafil Adhered 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 and BS 8217 : 2005 and BS 8000-4 : 1989.

Figure 1 Typical installations



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.

13.3 Installation should not be carried out during wet weather (eg rain, fog or snow) or when the temperature is below 5°C.

## 14 Procedure

### Sarnafil G410

14.1 Sarnacol 2170 is applied to the substrate and allowed to dry. Sarnafil G410-12EL is unrolled onto the surface and approximately one-third of its length folded back to expose the underside. Sarnacol 2170 is applied to the membrane ( $200 \text{ g}\cdot\text{m}^{-2}$ ), and substrate ( $300 \text{ g}\cdot\text{m}^{-2}$  to  $800 \text{ g}\cdot\text{m}^{-2}$ ) depending on texture. When the adhesive has dried to the point that strings are formed on touching with a finger, the two adhesive-coated surfaces are brought into contact and the surface of the membrane is rolled with a water-filled roller. This is then repeated over the rest of the sheet.

14.2 When the adhered membrane is used over insulation products, the resistance to wind uplift will be limited by the cohesive strength of the insulation, and the method of attachment. These factors should be taken into account when selecting the insulation material. Insulation boards can be either fully adhered, using Sarnacol 2162UK or hot bitumen, or be mechanically fastened. Sarnacol 2170 must not be used directly on polystyrene products.

14.3 The membrane is mechanically fixed at the perimeter and then lap jointed.

14.4 Sarnafil G410-ELF can be fully adhered using Sarnacol 2170 or Sarnacol 2142S adhesives, depending upon the substrate.

14.5 When using Sarnacol 2170 adhesive, a primer coat of the adhesive is applied to the substrate and allowed to dry. The membrane is unrolled onto the surface and approximately half of its length folded back to expose the underside. Sarnacol 2170 is applied to the previously primed area. The membrane is immediately unrolled directly onto the wet adhesive and the surface of the membrane is rolled with a water-filled roller. The other half of the membrane is folded back and the procedure is repeated.

14.6 When using Sarnacol 2142S, the membrane is unrolled onto the substrate and approximately half of its length is rolled back to expose the underside. A coat of Sarnacol 2142S is applied to the substrate, covering only the area where the membrane is to be laid. The membrane is immediately unrolled onto the wet adhesive, ensuring that the weld area is kept adhesive free, and the surface of the membrane is rolled with a water-filled roller. The other half of the membrane is folded back and the procedure repeated.

14.7 When using Sarnafil G410-EL FSA self-adhesive membranes, the substrate is cleaned if required and the membrane is unrolled and laid in position. The substrate may require preparing with Primer 600 subject to wind uplift. The protective liner is removed from the self-adhesive backing and the surface of the membrane is brushed with a broom for full contact with the substrate. The surface is then pressed down with a weight roller of approximately 50 kg to ensure full surface bond to the substrate. Adjoining sheets are overlapped by 60 mm. Seams overlaps are welded by hot air (see section 15).

### Sarnafil TG76

14.8 Sarnafil TG76 is unrolled onto the substrate and approximately half its length rolled back to expose the underside.

14.9 A coat of Sarnacol 2142S is applied to the substrate covering only one area where the membrane is to be laid.

14.10 The membrane is immediately unrolled onto the wet adhesive, ensuring that the weld area is kept adhesive-free, and the surface of the membrane is rolled with a water-filled roller. The other half of the membrane is folded back and the procedure repeated.

## 15 Jointing and flashing

15.1 Jointing is achieved by hot-air welding with the temperature set in accordance with the Certificate holder's instructions.

15.2 The welding area must be dry and clean. If the membrane in the welding area is oxidised owing to prolonged outdoor exposure, or contaminated, it must be cleaned in the prescribed manner. When installing Sarnafil TG76 only, Sarnafil T Prep should be allowed to totally flash off prior to welding.

15.3 The welded width of the joint must be a minimum of 25 mm. Care must be taken to ensure that overheating of the membrane does not occur, as scorching and carbonisation of the membrane will result.

15.4 The seam must be tested with a suitable metal probe and any weakness immediately repaired.

15.5 Flashing and detailing are formed in accordance with the Certificate holder's instructions.

## 16 Repair

Any damage must be repaired by cleaning the affected area and applying a patch as described in the Certificate holder's instructions.

# Technical Investigations

## 17 Tests

The following tests were carried out on samples of the membranes and the results assessed:

- on Sarnafil G410
  - 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 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

- on Sarnafil G410-18EL FSA
  - wind uplift test
  - peel strength from concrete on controls and after 28 days ageing at 70°C
- on Sarnafil TG76
  - tensile strength
  - elongation
  - dimensional stability
  - tear strength
  - static indentation on EPS and concrete
  - dynamic indentation on EPS and perlite board
  - water vapour permeability
  - water vapour resistance
  - resistance to cyclic movement
  - peel resistance
  - heat ageing (28 days at 80°C) followed by resistance to peel and resistance to cyclic movements (200 cycles)
  - water soak (28 days at 60°C) followed by resistance to peel.

## 18 Investigations

18.1 Tests were conducted on a material of similar formulation to Sarnafil TG76 and the results were assessed for:

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

18.2 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.

18.3 An evaluation was made of existing data on fire performance.

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

18.5 A reassessment of the *Durability* statement for Sarnafil G410 was based on visits to existing sites in Switzerland and in the UK and the results of tests conducted on unaged, naturally-aged and accelerated-aged material.

18.6 A reassessment of the *Durability* statement for Sarnafil TG76 was based on visits to existing sites in Europe and on the results of tests conducted on a material of similar formulation in both unaged and naturally-aged conditions.

## Bibliography

BS 6229 : 2003 *Flat roofs with continuously supported coverings — Code of practice*

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 EN 13956 : 2005 *Flexible sheet for waterproofing — Plastic and rubber sheets for roof waterproofing — Definitions and characteristics*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 14001 : 2004 *Environmental management systems — Requirements with guidance for use*

EN 13501-5 : 2005 *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
- is copyright of the BBA
- 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.