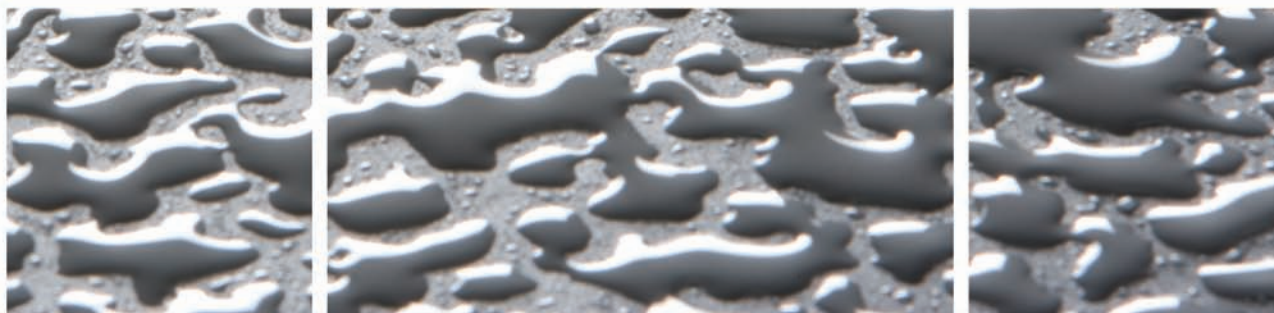




Roofing

performance



**High performance
roofing systems**



Sarnafil®



Sarnafil – high performance roofing from the innovator

With performance that's been proven over four decades, Sarnafil is the trusted roofing solution for buildings of all sizes and functions.

Trust Sarnafil roofing

We were early pioneers of single ply waterproofing membranes in the 1960's, at the company's Sarnafil roofing facility in Switzerland. Since then, the performance and longevity of Sarnafil roofs has been demonstrated in millions of successful applications worldwide, in every conceivable climate.

Many of the first Sarnafil installations are still providing reliable protection today – confirming Sarnafil's independent BBA certified life expectancy, in their opinion 'in excess of forty years'.

Long life expectancy contributes to lower whole life costs

Durability and low maintenance are two key factors in any whole life cost assessment. With their independent BBA certified 40* year life expectancy and minimal maintenance requirements, Sarnafil membranes consistently demonstrate a low whole life cost when calculated using the Whole Life Cost methodology.





The coastal location of Marine Park School in North Tyneside provides a tough test for roofing. Sarnafil undertakes responsibility for wind loading calculations as part of the company's specification service.

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Sarnafil – the specifier's system of choice

Some of Britain's best known buildings feature Sarnafil roofs, including The Emirates Stadium, London; St Davids Hotel, Cardiff; The Arndale Centre, Manchester; and the American Air Museum at Duxford amongst many others.

Sarnafil is the system of choice for applications in education, commerce, retail, leisure, travel and other sectors, as well as being widely specified for domestic dwellings.



* For full details of Sarnafil's BBA Certification, please visit www.sarnafil.co.uk



Top Right: St. Pancras Station, London

Below Right: Victoria Hall, University of Northumbria



Sarnafil roofing: long-term performance, guaranteed

Functional, practical roofing systems with performance advantages throughout the lifecycle of the roof.

Independent BBA certification confirms life expectancy, in their opinion 'in excess of 40 years'

The combination of expert Swiss polymer engineering, continual ongoing research and development and market-leading contractor training has created a range of roofing systems that we believe to be the best in the world.

To help demonstrate this, in the summer of 2006, samples were taken from the nineteen year old Sarnafil roof on Technical Building K at London Heathrow airport and a twenty year old Baptist Church in Bedford. These samples were sent to the British Board of Agrément (BBA) for testing and assessment as part of a five-year programme aimed at extending the durability statement for Sarnafil's G and S membranes.

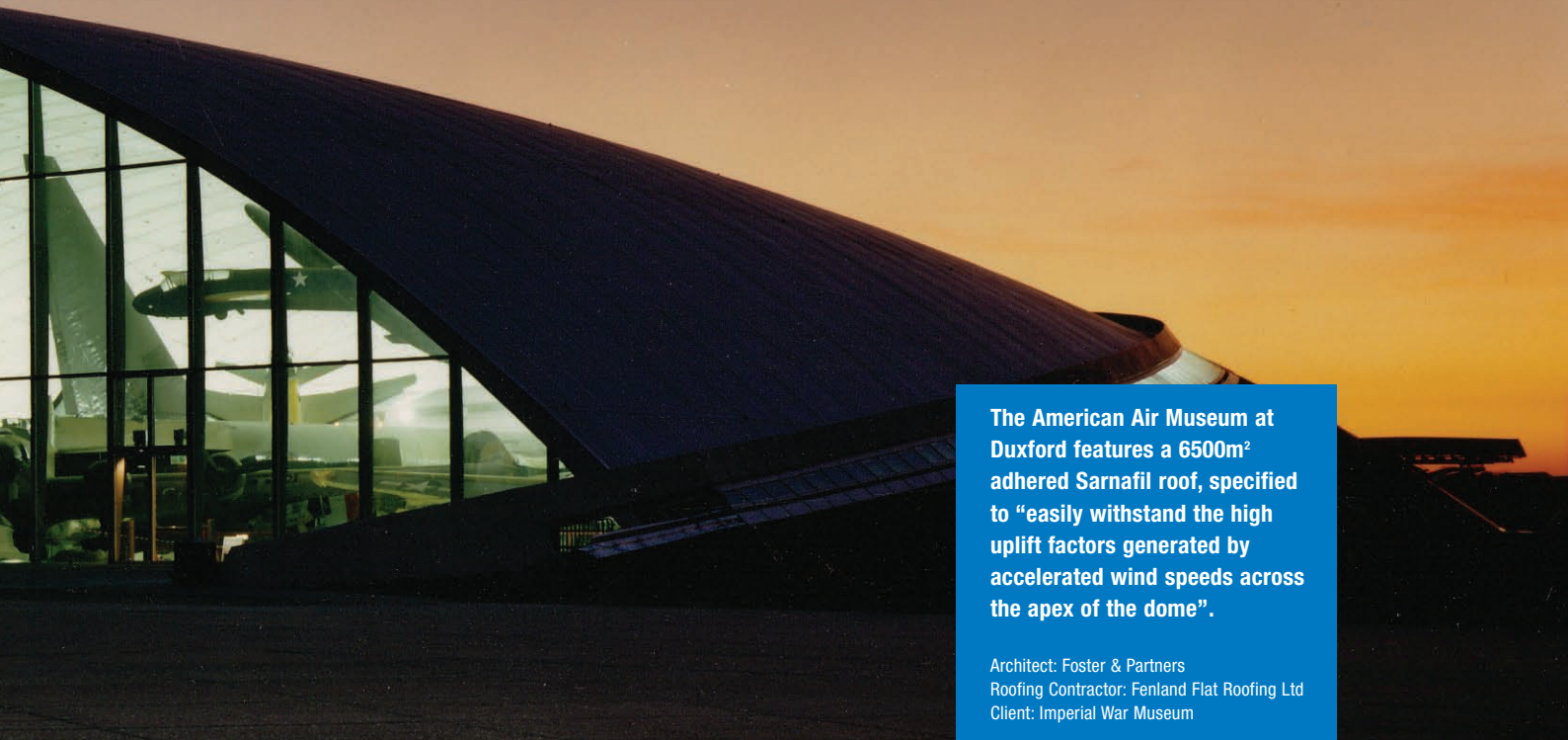
The membrane samples were artificially aged and tested in accordance with the standards for new membranes. These results were assessed alongside test data from a thirty-six year old Sarnafil membrane from a site in Switzerland and the results of a worldwide 40-roof study carried out by Sika.

Considered together, the test results enabled the BBA to award Sarnafil the longest period durability statement for a single ply roofing system, with the Certification for Sarnafil G and S membranes now stating:

"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 life in excess of 40 years can be achieved with periodic maintenance..."

"The Certificate holder can advise on methods of extending the service life. This could include the use of thicker membranes, specific maintenance requirements, eg maintenance coating or localised replacement or repair."





The American Air Museum at Duxford features a 6500m² adhered Sarnafil roof, specified to “easily withstand the high uplift factors generated by accelerated wind speeds across the apex of the dome”.

Architect: Foster & Partners
Roofing Contractor: Fenland Flat Roofing Ltd
Client: Imperial War Museum

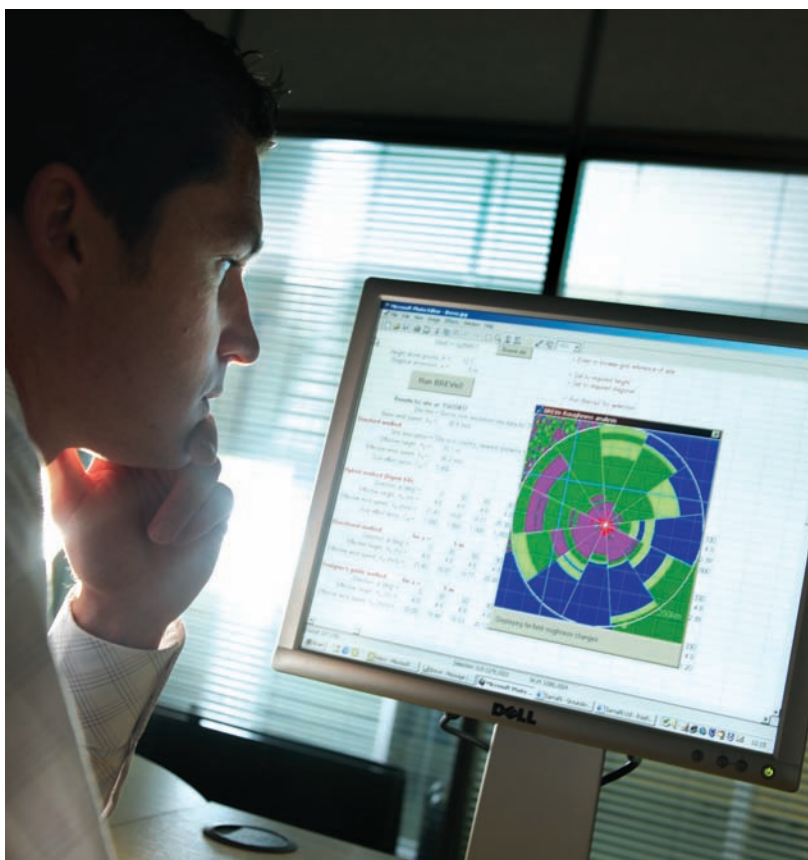
Guarantees without compromise

Sarnafil roofing systems' performance is covered by the industry's most comprehensive guarantees – including cover against error in wind uplift calculations which could lead to compromised performance.

Our unique Extended Products Guarantee has been developed to provide single-point cover for all elements within the roof system, to remove the risk of potential disputes that can arise when individual component manufacturers' guarantees are in operation.

Wind uplift calculation

All Sarnafil Guarantees cover against damage caused by errors in wind uplift calculation. These critical calculations are carried out in-house by our own experienced technical staff.





Physical performance characteristics to meet today's demands

Sarnafil roofing systems offer an excellent combination of performance characteristics, to facilitate compliance with the Building Regulations.

Reducing energy consumption and harmful emissions

Energy conservation and reductions in greenhouse gas emissions have become arguably the key considerations influencing the specification of construction products and materials. Sarnafil roofing systems can play an important role in helping specifiers to meet increasingly stringent legislation in these respects.

The wide range of SarnaTherm insulation options, available to suit virtually any application or roof construction, can assist in meeting zero carbon targets.

In addition to establishing requirements for increased thermal performance for lower 'U' Values, Building Regulations Part L (England and Wales) and Section 6 of the SBSA Technical Handbooks (Scotland) now require designers to consider both air leakage and the thermal bridging. This integrated approach to better management and conservation of energy is reflected in Sarnafil's 'system' approach to roofing. Sarnafil system components and accessories are all designed to minimise

air leakage and avoid thermal bridging. Sarnafil's accredited details thermally modelled by the BRE are available at www.sarnafil.co.uk.

Thermally efficient SarnaLite rooflights can also be incorporated into a design to further reduce energy consumption by reducing the requirement for artificial lighting inside the building.

When specifying SarnaTherm, Sarnafil Technical Advisers will also take additional factors, such as fire ratings and acoustic performance, into consideration.

Acoustic performance

The flexibility of on-site construction enables Sarnafil roofing systems to accommodate most acoustic requirements for a building, for both internal and external sources.





Thermal upgrades to meet Building Regulations were carried out as part of a major roof refurbishment project at Aberdeen University.

Fire performance

Sarnafil membranes are self extinguishing on all common insulants and meet the Building Regulations requirements for external fire spread resistance, enabling the specifier to meet the client's insurance demands without compromising on aesthetics, acoustics or installed cost requirements. Many of the Sarnafil systems are also LPCB and Factory Mutual tested and approved.

Other performance considerations

Sarnafil roofing systems can incorporate integrated rainwater management systems to help combat flooding in urban areas, as well as solar reflective membranes. They can also be specified as green roofs (SarnaVert) and solar roofs (Sika SolarRoof™), to meet a variety of project-specific performance criteria.



Gatwick Airport North Terminal

Sarnafil roofing has been specified for demanding applications at many of the UK's major airports, including Gatwick, Heathrow, Stansted and Glasgow.



Environmental performance of Sarnafil roofing

From specification to construction

The Green Guide to Specification uses Life Cycle Assessment to provide environmental ratings for common specifications of individual major construction elements such as a roof, wall, floor, etc. The process utilises the 'cradle to gate' ratings calculated in the Environmental Profiling (Ecopoints) process and adds into the assessment the impacts of transport to site, installation, maintenance and disposal at end of life. The resulting output of the whole specification is expressed as an A+, A, B, C, D or E rating. Typical whole roofing element specification ratings, as published in the Green Guide for Specification, June 2008, are shown in the table opposite.

BRE whole roof specification ratings

Primary Waterproofing	Rating
EPDM Single Ply	A+
TPO FPO Single Ply	A+
PVC Single Ply	A+
Asphalt	A
Oxidised Reinforced Bitumen	A+
Polymer Modified Reinforced Bitumen	A+
Liquid Applied Roofing	Not available
Aluminium, mill finish standing seam (steel inner)	A
Aluminium, coated standing seam (aluminium inner)	A
Aluminium, mill finish standing seam (steel inner)	A+
Composite panel, (steel inner and outer)	A+
Twin Skin coated steel (steel inner)	A+
Copper, coated standing seam (steel inner)	A

Typical BRE Green Guide ratings for waterproofing, insulation, vcl, steel deck and steel trusses. Metal systems exclude vcl. Green Guide ratings will vary according to individual specification: consult a BRE assessor for project specific ratings. Source: Green Guide for Specification, June 2008.





Sarnafil roofing systems achieve low 'Ecopoint' scores and can provide excellent contributions to BREEAM ratings. This SarnaVert green roof at the Queen Elizabeth Hospital Birmingham is an excellent example.

BREEAM and the Code for Sustainable Homes

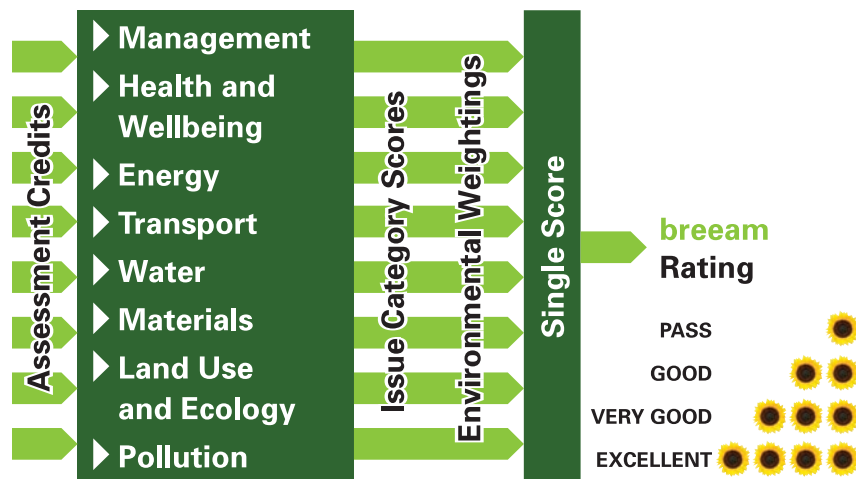
The BRE Environmental Assessment Method (BREEAM) is an environmental assessment method for entire buildings, not individual building elements or materials.

The family of assessments includes specific assessments for offices,

ecohomes, courts, industrial buildings, prisons, retail units/shops, schools, multi-residential, international and bespoke constructions. It also includes the Code for Sustainable Homes, a mandatory assessment for all new housing in England and Wales, while EcoHomes is still valid for Scotland and Northern Ireland. BREEAM assesses the overall performance of buildings using the factors shown in the

table below, awarding credits in each area according to performance. The process then uses a set of environmental weightings to enable the credits to be added together to produce a single overall score of Excellent, Very Good, Good or Pass. Due to the wide nature of the assessment, every individual building must be subject to an individual assessment by a BRE licensed assessor.

Factors governing BREEAM ratings for buildings



Source: BRE Environmental Assessment Method (BREEAM)



Environmental performance (continued)

ISO 14001 accredited production facilities

All Sarnafil roofing membranes are manufactured in our production facilities, which are ISO 14001 accredited. An additional benefit of manufacturing in Switzerland is its energy production, 85% of which harnesses the forces of nature through hydropower. This significantly reduces greenhouse gas emissions (carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and chlorofluorocarbons (CFCs) and reduces the nuclear waste figure in the generic PVC Ecopoint assessment in the table which can be found at www.sarnafil.co.uk.

Low embodied energy

Embodied energy is a measurement of the amount of energy required to produce a tonne or square metre of a product. Typical examples of embodied energy figures are shown in the table opposite, together with Sarnafil figures.

Product	Embodied Energy	Embodied Carbon
Sarnafil G410-12EL	63.4 MJ/Kg	†
Sarnafil S327-12EL	63.2 MJ/Kg	†
Sarnafil G476-20	61.3 MJ/Kg	†
Sarnafil TS77-12E	48.2 MJ/Kg	†
Sarnafil TG66-15	71.5 MJ/Kg	†
Calendered PVC Sheet	68.6 MJ/Kg	2.60 KgCO ₂ /Kg
Synthetic Rubber (EPDM)	120.0 MJ/Kg	4.25 KgCO ₂ /Kg
GRP	100.0 MJ/Kg	8.07 KgCO ₂ /Kg
Reinforced Bitumen	75.0 MJ/Kg	3.80 KgCO ₂ /Kg
Aluminium - Extruded	153.5 MJ/Kg	8.49 KgCO ₂ /Kg
Aluminium - Rolled	150.2 MJ/Kg	8.35 KgCO ₂ /Kg
Lead	25.0 MJ/Kg	1.29 KgCO ₂ /Kg
Copper	40.0 to 55.0 MJ/Kg	3.18 to 4.38 KgCO ₂ /Kg
Polycarbonate	112.9 MJ/Kg	6.00 KgCO ₂ /Kg

Source: Inventory of Carbon & Energy report, Department of Mechanical Engineering, University of Bath, 2006. † Sarnafil products were not assessed in the University of Bath study. The Sarnafil Embodied Energy figures are quoted to SIA 493.08, Declaration of Environmental Attributes of Building Products (1997 edition).

Generally, the lower the embodied energy of a product, the less it will contribute to global warming. The method used to manufacture Sarnafil membranes results in a low embodied energy, with the amount varying according to membrane

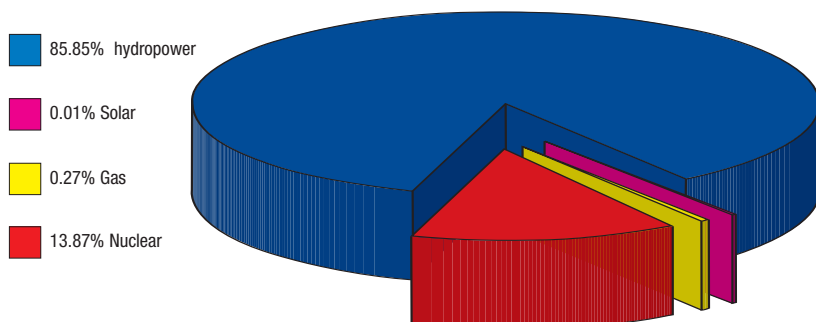
thickness. However, when assessing the embodied energy of each membrane it is important to balance the increased value against the increased life expectancy of thicker membranes.





The Sika Solar Park in Stuttgart, Germany, utilises Sarnafil solar reflective membrane on the roof.

Sources of power generation in Switzerland



Sarnafil is manufactured in Switzerland, a country that sources 85% of its energy production from nature. Swiss use of hydropower significantly reduces greenhouse gas emissions and reduces the nuclear waste figure in the generic PVC Ecopoint assessment in the table which can be found at www.sarnafil.co.uk.

Life cycle analysis

In 2004, an independent life cycle analysis study assessed six roofing systems: Sarnafil S327 over PIR, Sarnafil S327 over EPS, an FPO membrane over PIR, an EPDM membrane over PIR and two bitumen based systems over PIR. The conclusion of the Carbotech study was that Sarnafil S327 provided the lowest life cycle cost option.

Low whole life costs

A whole life cost evaluation enables the assessment of different systems, from initial construction through cost in use, over a defined period. This is important, as a product with a low installed cost and a short life may require high maintenance or an earlier replacement period than a longer lasting-product with a higher initial installation cost. The use of a long life, low maintenance Sarnafil roofing solution has the potential to reduce the Cost in Use,

ultimately providing a low whole life cost solution that meets the needs of the triple bottom line (economic, social and environmental) requirements of sustainability.

Numerous assessments have proven that Sarnafil roofing systems provide roofing solutions that meet the three pillars of sustainability.

Economically they require low maintenance and have a long life, with an independent BBA certified life expectancy, in their opinion "in excess of 40 years".

Socially they minimise impact by providing continuous long-term protection of the occupants, and the long life minimises replacement requirements.

Environmentally they have low embodied energy and a low environmental profile, demonstrated by an A+ rating in the BRE Green Guide for Construction and Code for Sustainable Homes.

* For full details of Sarnafil's BBA Certification, please visit www.sarnafil.co.uk

Draw on our knowledge and expertise

We offer a comprehensive range of information and support resources for architects, contractors and other specifiers, including:

- Experienced Technical Advisers, who can help you to develop specifications
- Comprehensive technical literature
- Scaleable, layered CAD detail drawings thermally modelled by the BRE available to download free online at www.sarnafil.co.uk

We are the complete single ply roofing specialist for:

- Surveys and site inspections
- Specification and design support
- New installations
- Refurbishment
- Solar roofing solutions
- CPD Seminars
- Installer training
- ISO 9000:2000 quality management system
- ISO 14001 environmental management system

The Single Ply Roofing Association (SPRA) represents membrane manufacturers, associated component manufacturers and specialist sub contractors and aims, through a quality assured partnership, to ensure the delivery of best value single ply roofing systems.

By specifying products and specialist installation by SPRA Manufacturer, Associate and Contractor members you can be assured that all parties meet strict quality criteria. Compliance with these criteria and with the Code of Conduct is assessed at application, by annual audit and by random spot checks.

For further information, and to obtain copies of the SPRA Design Guide and other documents, go to www.spra.co.uk or call 0115 914 4445.



For further information about Sarnafil products and our range of services, please call us on 01603 709360 or visit www.sarnafil.co.uk.

To the best of our knowledge all information contained in this brochure was correct at the time of issue. Printed on paper from sustainable forests.



Sika Limited
Bankside 300, Peachman Way, Broadland Business Park, Norwich, NR7 0WF
Telephone: 01603 709360 Fax: 01603 433436

Registered Office: Sika Limited, Watchmead, Welwyn Garden City, Hertfordshire, AL7 1BQ
Registered in England: Number 226822

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