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Sika-Trocal Single Ply Roofing



Sika-Trocal

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The Sika-Trocal Concept

Introduction

The achievement of zero defects on site is critical not only to ensuring the project is completed on time and within budget, it also ensures a watertight building that will have stable thermal performance at roof level. With the increased focus on the environment, and particularly the reduction of carbon emissions, maintaining thermal performance over time is critical.

The purpose of this brochure is to highlight ways in which the **Sika-Trocal** concept can help the construction industry achieve zero defects. The **Sika-Trocal** Concept utilises lightweight, flexible and easy to install single ply membranes to provide a range of new and refurbishment roofing systems that are ideally suited to today's environmentally conscious fast track construction programmes.



Comprising a range of single ply membranes that can be attached in a number of ways, the **Sika-Trocal** Concept is suitable for most forms of flat, pitched, curved or even vertical roof surfaces.

Central to the **Sika-Trocal** Concept is the **Type S** membrane, first manufactured in Germany in 1962. Since then **Sika-Trocal** roofing membranes have been used in every type of environment throughout the world.



Introduced to the UK in 1972 under the brand name **Trocal**, the **Sika-Trocal** Concept has been at the forefront of the single ply roofing industry.

In the 1970's the company was amongst the first to achieve a British Board of Agrément Certificate for single ply membranes. Updated numerous times since, that document is still used to satisfy the requirements of the Building Regulations today.

In the 1980's the company introduced Field Engineers, a service team that not only train the Sika-Trocal Licensed Contractors but are also responsible for signing completed projects off for guarantee.

In the 1990's **Sika-Trocal's** oldest client, Tesco, carried out air leakage testing on its warehouses and stores. The results achieved were, and continue to be, significantly better than the building air tightness levels required by Building Regulations Approved Document L (Part L) 2006.

The new millennium saw the integration of Trocal into the **Sika Group**, a £1.59 billion turnover supplier of materials to the construction industry active in more than 70 countries, and **Sika-Trocal** can proudly claim its place as part of the largest single ply roofing manufacturer in the world with 4 factories in Europe, 2 in the Peoples Republic of China and one in the USA.

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The Sika-Trocal Concept

Benefits

- The roof can accommodate almost any thickness of thermal insulation, achieving 'U' values in excess of $0.10 \text{ W/m}^2\text{K}$ being possible. This enables insulation in other areas of the building to be offset against the roof or to significantly improve the thermal efficiency of the building, thus reducing carbon emissions.
- Thermal bridging caused by metallic elements is simply dealt with through correct detailing and the use of plastic tubes combined with metallic fasteners. Eliminating thermal bridges reduces heat loss and subsequent carbon emissions.



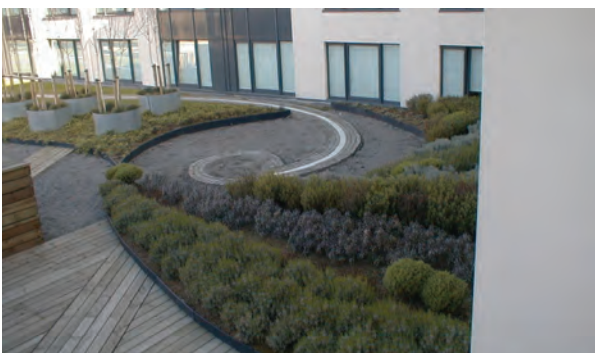
- Air leakage targets can be met with simple detailing; in fact buildings with **Sika-Trocal** roofs have been routinely tested over the past 15 years with results better $5 \text{ m}^3/\text{h}/\text{m}^2$ at 50 Pa being regularly recorded.
- Internal volume of the building is minimised, contributing to carbon reduction by cutting heating and cooling costs.
- Roofs can be very light in weight, saving on the supporting structure and reducing environmental impact.



- Complicated or large plan areas are easier to cover, reducing design and installation costs thus enabling more finance to be allocated to the productive areas of the building.



- Items of plant, such as air conditioning and machinery, can be accommodated on a flat roof. This provides more useable floor area.
- Access onto, and movement across, flat roofs is generally easier than alternatives. This can avoid the need for scaffolding, ladders or hoists to carry out simple maintenance tasks.
- Flat roof areas can be used for amenity purposes by creating a terrace or green roof, enhancing the working environment and improving the buildings 'green' credentials.



Sika-Trocal Single Ply Roofing

Roofing System Options

General

Sika-Trocal roofing membranes can be installed in a variety of new build and refurbishment roof, both warm and cold. Each installation option offers its own benefits to the specifier and client, with low maintenance and low whole life cost being demonstrated consistently across all applications.

Standards

The UK has recently seen the first introduction of standards directly relevant to single ply roofing materials with the launch of *BS EN 13956: 2005 Flexible sheet for waterproofing. Plastic and rubber sheets for roof waterproofing. Definitions and characteristics*.

Whilst this standard offers a multitude of test methods covering many aspects of a products performance and properties, currently there is no guidance provided on what constitutes a meaningful, satisfactory level.

Therefore, the use of independent product certification from a notified body, such as the British Board of Agrément, remains critically important. Current Agrément Certificates cover all **Sika-Trocal** single ply membranes.

- Certificate number 95/3092 covers **Sika-Trocal Type S** and **SG**.
- Certificate number 91/2649 covers **Sika-Trocal Type SGK**.
- Certificate number 94/3060 covers **Sika-Trocal Type SGmA**.

Durability

British Board of Agrément Certification provides a statement of durability for the products covered. In the case of the **Sika-Trocal Type S** family of membranes, which have been used in Great Britain since 1972, the BBA have recognised their demonstrated longevity. Consequently the BBA have given the **Sika-Trocal Type S, SG, SGK** and **SGmA** membranes a stated life expectancy 'in excess of 30 years'.

Mechanically Fastened Installations

The majority of **Sika-Trocal** installations are mechanically fastened; this is primarily due to the speed of installation of the **Sika-Trocal Disc System**.

The **Sika-Trocal Disc System** consisting of a 80 mm diameter flat plate manufactured from **Sika-Trocal** laminated metal and a fastener suitable for the substrate. The significant benefit of the **Sika-Trocal Disc System** over other conventional systems is that this single fastener and plate combination is used to mechanically attach the thermal insulation and membrane to the roof, saving the expense of two attachment systems.

Once the **Disc System** is installed the **Sika-Trocal** membrane is simply unrolled over the substrate and the discs welded to the underside of the waterproofing. Individual membrane rolls are overlapped by a minimum of 50 mm and welded together to create a watertight roof.



The 2006 revision of Part L of The Building Regulations demands that the thermal bridging created by the use of all metal fasteners be minimised and/or reduced. To assist the project meet this demand the fasteners used to restrain the **Sika-Trocal** membrane should be a combination of plastic tube and metallic fastener elements appropriate to the application. To assist **Sika-Trocal** Licensed Contractors and specifiers, ensure that suitable products are being used, **Sika-Trocal** publish a guidance document on the Internet (www.sika.co.uk/uk-home/roofing/roofing_download_centre.htm) and publish a list of suppliers who have met these requirements.

Sika-Trocal Single Ply Roofing

Roofing System Options

Adhered Installations

In situations where a Sika-Trocal mechanically fastened or ballasted membrane is not suitable for a particular project then the adhered Type SGK can offer a viable alternative solution. Typical examples of this are swimming pools and laundry rooms, where the high humidity requires the use of high cost stainless steel fasteners, renovation of existing failed roofs, concrete decks and where fasteners cannot be visible internally. The substrate requirements for use with adhered membranes are different to those of the other attachment methods, notably the selection of insulation boards and preparation and treatment of any existing roof surfaces. All specifications need to be agreed with Sika-Trocal before commencing installation.



The **Sika-Trocal** adhered system uses **Type SGK** membrane, which has an integral polyester fleece backing that helps mask the appearance of insulation board or timber deck joints. The **Type SGK** membrane is adhered to the substrate using **Sika-Trocal Type C300** polyurethane adhesive.

Where thermal insulation is used it is important that suitable insulation boards are used to ensure compatibility between the adhesive, the face and the insulant core.

When bonding to an existing substrate the quality and suitability of the substrate is critical to the success of this system and the weakest lamination in any build up must always be considered.

Any substrate receiving an adhered membrane should be smooth and free of sharp objects like chippings and proud screw heads, the membrane should be able to achieve intimate contact with the substrate.

Green and Ballasted Installations

A ballasted roofing system will normally be surfaced with gravel or pavers and with the membrane laid above the insulation. In some cases when creating green roofs the membrane may be located under the insulation in an 'inverted' situation. Note that inverted constructions will require an insulant specifically designed for exposure to moisture such as Extruded Polystyrene (XPS).

Sika-Trocal Type SGmA membrane is loose laid over the substrate and fastened at the perimeters and around penetrations prior to the installation of the ballasting material, typically round washed stone, pavers or roof greening.



Roof greening systems are generally categorised as Intensive, Extensive or Biodiverse depending on the type of planting used and the level of amenity required.

Intensive systems are heavy and utilise high maintenance greenery such as shrubs, bushes and trees.

Extensive systems use lightweight growing mediums and sedum to provide a meadow like finish requiring minimal maintenance.

A Biodiverse system is generally specified to replicate the natural habitat of specific flora and fauna.



Sika-Trocal Single Ply Roofing Membranes and Accessories

The Sika-Trocal range of single ply roof waterproofing membranes is manufactured in our ISO 9001 accredited facilities in Troisdorf, Germany.

All membranes are manufactured from high quality plasticised PVC to exacting standards and tolerances on our fully automated calendaring plant. The resulting membranes have a proven long life and reliability, good vapour permeability, are lightweight and easy to install.

Together with a wide range of associated ancillary products these membranes provide a simple, effective means of specifying the most appropriate **Sika-Trocal** roofing system for almost any project.

Sika-Trocal Type S

Type S is a UV stabilised homogenous (without any internal carrier or restraint matrix) membrane for use in exposed, mechanically fastened applications.

Sika-Trocal Type SG

Type SG is a UV stabilised membrane for use on concave roof surfaces with a radius of 20 metres or less. In these applications the addition of an internal matrix of random glass fibres to the **Sika-Trocal Type S** makes the membrane ideal for mechanically fastened application or detailing work with the **Sika-Trocal Type SGK** membrane.

Sika-Trocal Type SGK

Polyester fleece to the underside of **Sika-Trocal Type SG** makes it ideal for a wide variety of adhered exposed applications. **Sika-Trocal C300** adhesive should be used to bond the membrane to a suitable substrate.

Sika-Trocal Type SGmA

Type SGmA is a glass fibre restrained membrane for use in covered (ballasted or green roof) applications. It is non UV stabilised but contains the necessary anti-bacterial properties required in these applications.

Colours

To compliment the design requirements of an individual project **Sika-Trocal** membranes are available in a range of standard colours, as shown below, each with a complementary range of coloured accessories. Other non standard colours are available to special order, subject to a minimum roof area requirement due to the limited requirements for these colours. Please contact Sika-Trocal for further information.

Colour Range	Membrane Type				Minimum Roof Area
	S	SG	SGK	SGmA	
Light Grey	X	X	X		N/A
Slate Grey	X	X	X		N/A
Beige				X	N/A
Anthracite	X	X	X		N/A
Reseda Green	X	X	X		>5,000m ²



Ancillary Products

To help the contractor and specifier meet the aesthetic, access and technical demands of a project **Sika-Trocal** provide a range of complimentary ancillary products. Where **Sika-Trocal** does not supply a component in the roofing system the company sets performance standards for those components. This helps specifiers with the generation of a specification and licensed contractors select from a range of suitable quality products.

Sika-Trocal Single Ply Roofing

Roofing Membranes and Accessories

Sika-Trocal SE Profile

A PVC extruded profile to create a standing seam effect. This is simply welded to the finished **Sika-Trocal Type S, SG or SGK** roof.



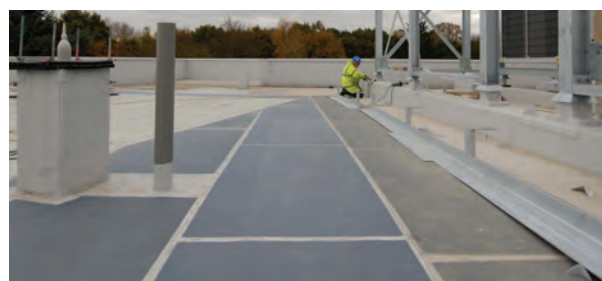
Sika-Trocal Metal

Galvanised steel sheet with a layer of **Sika-Trocal Type S** membrane factory laminated to it. **Sika-Trocal Metal** is used to fabricate upstands, perimeter profiles and other details.



Sika-Trocal WBP Walkway

A 1.5 mm thick slip resisting embossed surface walkway material. Before installation of the **Sika-Trocal WBP** a steel reinforcing plate should be installed between the thermal insulation and **Sika-Trocal Type S** or **SG** membrane. The **Sika-Trocal WBP** is then simply welded onto the finished roof membrane.



Sika-Trocal HD Walkway

For walkways applications where the use of the steel plate is not possible, such as retrofit applications or adhered systems the 4 mm thick **Sika-Trocal** slip resisting embossed walkway surfacing material can be welded on top of **Sika-Trocal Type S, SG or SGK** membrane.



Sika-Trocal Type P Fleece

A 300 g/m² polyester fleece for use as a protection or separation layer.

Sika-Trocal SBv Fleece

PVC skinned polyester fleece sheet for use as a heavy duty protection or separation layer.

S-Vap 500E

Polyethylene vapour control layer for mechanically fastened applications.

Sika-Trocal DS-Alu

Aluminium foil faced reinforced polyethylene high performance vapour barrier.

Accessories

To compliment the range of **Sika-Trocal** ancillary products a range of pre-fabricated corners, double sided tape and drainage goods are available.



Sika-Trocal Single Ply Roofing

Design & Specification

Factors Affecting Roof Design

A great many factors can affect the performance of any roof, including wind uplift, thermal and structural movement. General advice covering these key areas is given below, for project specific advice please contact your local **Sika-Trocal** Area Sales Manager.

- Wind uplift forces will put the roof membrane under suction pressure and the attachment system needs to be designed to resist these forces.
- Movement and stress between the individual components of the roof buildup will be induced from the structure, temperature cycling, shrinkage and settlement.
- Increasing insulation levels isolate the waterproofing from the heat sink effect of the deck, creating severe temperature cycling ranging from -20°C up to +80°C. **Sika-Trocal** membranes are designed to continue to work within these temperature ranges for many years without detrimental affect to the performance.
- Roof waterproofing needs to be flexible yet strong, able to resist the cyclic structural loadings, movement, temperature fluctuations, UV exposure and bacterial attack depending on whether it is exposed or buried while retaining its integrity even at vulnerable points as upstands and penetrations. With **Sika-Trocal** materials, this is never in doubt.
- The majority of single ply roofing projects are installed utilising mechanical fixings as the method of restraint against wind uplift forces as is the case with **Sika-Trocal Type S**.



Sika-Trocal Advantages

- **Sika-Trocal** roof waterproofing provides flexibility of design, construction and programming for new and renovation projects.
- With new build projects, the lightweight nature of the **Sika-Trocal Type S** waterproofing combined with rigid plastic foamed insulation and profiled metal decking can offer substantial reductions in the amount of steelwork required in the supporting structure.
- When used on new build projects, the ability to lay air sealed metal decking that then provides a virtually waterproof umbrella, allows the ground works to start early and proceed uninterrupted. This is a major advantage for fast track projects in speeding progress on site.
- The membrane is essentially loose laid which provides a level of separation from the surface of the substrate, which helps isolate the membrane from damage caused by building movements.
- **Sika-Trocal** details are remarkably simple and straightforward thus making it one of the quickest and easiest single ply membranes to install.
- **Sika-Trocal** is economical and can be installed quickly, easily and neatly to satisfactory aesthetic standards.
- **Sika-Trocal** waterproofing has proved successful in Europe and many different parts of the world.
- **Sika-Trocal** resists normal atmospheric pollution.
- **Sika-Trocal** will not rot.



Sika-Trocal Single Ply Roofing

Design & Specification

Specification

The range of **Sika-Trocal** roofing systems enables the specifier to produce clear, concise specifications for new and refurbishment applications.

By using the **Sika-Trocal** NBS format specifications can be written for almost any shaped roof, including flat, sloped, vertical, curved, waveform or domed, and incorporating commonly used substrates, such as metal deck, concrete and timber.

To assist specifiers there are a number of pre-formatted standard **Sika-Trocal** NBS specifications on the **Sika-Trocal** internet site. These are in a PDF format and are quick to download (www.sikarofing.com). These standard and non standard details are ready for designers to use and manipulate are required.

Where a more complex specification is required a **Sika-Trocal** Area Sales Manager is available to assist in the creation of a bespoke specification, to locate your local Area Sales Manager please check the Internet or contact **Sika-Trocal** on 01707 363846.



Renovation

The **Sika-Trocal** concept is ideal for the renovation of existing roofs that have reached the end of their working life. The lightweight nature of **Sika-Trocal** waterproofing will generally permit the overlaying of existing roofs without the need to strengthen the structure. The minimum additional weight imposed by a 1.5 mm thick membrane is only 1.9 kg/m². Probably more important is the ability of the sheet, when used un-ballasted, to breathe entrapped water vapour through the actual membrane itself. This aids the prevention of blistering and delamination in the future.



Sika-Trocal Single Ply Roofing

Training, Installation and Inspection

To help achieve zero defects on site Sika-Trocal membranes are only supplied to Sika-Trocal Licensed Contractors. Each of these companies is a specialist roofing sub contractor who has had their employees trained in the design, estimation, procurement and installation of Sika-Trocal membranes.

Covering the entire UK mainland the Sika-Trocal network of licensed contractors can provide a complete supply and fix package, including the deck, vapour control layer, insulation and appropriate Sika-Trocal membrane, for anything from a small works package to a multi million pound contract.

Design, Estimation, Procurement and Project Management Training

Carried out at our Welwyn Garden City offices this course educates proprietors, estimators, buyers and contracts managers about Sika-Trocal roofing membranes.

The course provides guidance on system selection, detailing the products and their applications and also includes the wind uplift loading assessment.



Upon completion of the course all attendees are issued with an attendance certificate and an identification card stating their qualification.

Product Installation Training

The key to a successful installation is the training of the site installation team. That is why all Sika-Trocal membranes are installed by Sika-Trocal trained operatives and each of these operative is issued with a photo ID card in recognition of their achievement.

Carried out at the Sika Training Academy in Welwyn Garden City the course covers both the theory and the principles underlying the detailing and correct installation of Sika-Trocal products.



The depth of training includes not only the standard selection and installation of the membrane for the main roof areas; it covers both liquid and hot air welding of joints and the other critical areas including:

- Fastener selection and installation
- Upstand and penetration details
- Drainage installation
- Lightning conductor installation



Sika-Trocal Single Ply Roofing

Training, Installation and Inspection



Upon satisfactory completion of training the operative is issued with an Operatives ID Card. This ID card is valid for a period of five years and is automatically renewed if the operative has been satisfactorily installing **Sika-Trocal** throughout this period.



Life Long Learning

To ensure that licensees and their trained operatives are kept up to date with developments within both **Sika-Trocal** product range and the market **Sika-Trocal** carry out ongoing training for new products.

Licensed Contractors also receive regular technical and product information from **Sika-Trocal** through the licensee only communication 'Update'.

Guarantee

Sika-Trocal offer a product guarantee for every installation, matched in duration by the licensee's own workmanship guarantee. To enable **Sika-Trocal** to offer this guarantee the company employs a team of Field Engineers whose role is to monitor the installation prior to signing the project off for guarantee. The guarantee itself is issued to the **Sika-Trocal** Licensed Contractor, enabling it to follow the contractual chain to the client.



Maintenance

Sika-Trocal membranes require no maintenance themselves. However, it is considered good roofing practice to monitor the overall condition of the roof throughout its life. **Sika-Trocal** recommends that the construction itself, along with associated parapet upstands, counter flashings and mastic seals, are inspected on a bi-annual basis. During these inspections rainwater outlets, leaf guards and gutters should be inspected and cleared as required.

SPRA

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 this 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.

Sika® Capabilities

Additional Information

The information, and, in particular the recommendations relating to the application and end use of Sika® products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information or from any written recommendations or from any other advice offered. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users should always refer to the most recent issue of the Product Data Sheet for the product concerned, copies of which will be supplied on request.

Our promise

Sika® is a global company with a world-wide network of subsidiaries active in the fields of speciality chemicals and products for construction and industry.

Sika® is committed to quality, service, safety and environmental care. Our world-leading branded products are all proven solutions and are based on our core capability in the following areas.

Admixtures for Concrete

Additives designed to provide control over, and improve the performance of concrete mixes. The Sika® range includes water reducers, high performance and super plasticisers, retarders and accelerators, air entraining and permeability reducers.

Sealing and Bonding

Polyurethane and silicone based sealants for a range of applications in buildings, including structural glazing, joints in curtain wall panels and masonry, also for fire resistant applications. Now includes the AT, (Advanced Technology), range of high performance sealants.

Concrete repair and protection

Products to renovate or upgrade existing or damaged floors in any application, from car park decks to concrete floors in factories, warehouses and retail units

- Specialist screed mixtures and resins.
- Mortars for the renovation of damaged cladding and structural concrete.
- Decorative waterproof coatings.
- Corrosion prevention treatments for concrete reinforcement.

Grouting and Anchoring

Cementitious and epoxy resin grouts for a wide variety of applications. The product range includes:

- Polyester and epoxy grouts for anchoring applications.
- Elastomeric anti-vibration rail grouts.

Steel Protection

Protective finishes available for factory or site application along with a range of primers. Specialist finishes that can be applied to galvanised steel without primers. Finishes based on PVC acrylic, two-part epoxy including the anthracene type, one-part PU alkyds, two and one-part polyurethane.

Sealing, Rigid Bonding and Strengthening

Permanent solutions for the repair or renovation of existing concrete or steel structures including:

- The reinforcing of major concrete or steel structures such as bridges or beams, increasing their load potential or correcting deficiencies.
- The prevention of water penetration through concrete or masonry construction through the application of specialist mortars and renders.
- The creating of waterproof concrete through a combination of additives and specialist water bars.
- Swellable sealants and profiles, cavity drainage systems and re-injectable joint sealant systems.

Flooring

Sika's wide range of materials for flooring applications includes:

- Dry shake hardeners and resin finishes for cementitious floors, achieving a wide variety of performances and appearances.
- Specialist treatments such as hardeners, sealers, dustproofers, curing agents, primers and coatings.
- Self smoothing mortar screeds, including polymer based products.
- The creation of specialist mixes and treatments to form chemically resistant and anti-static flooring.
- Adhesives for bonding timber based flooring materials that include sound deadening properties.

Further information on all Sika® products, or the details of your local Area Sales Manager, can be obtained from our office at Welwyn Garden City.

All orders are accepted subject to our current terms of sale and delivery. Users should always refer to the most recent issue of the Product Data Sheet for the product concerned, copies of which will be supplied on request.

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