

Sika Ltd

Watchmead
Welwyn Garden City
Hertfordshire AL7 1BQ
Tel: 01707 394444 Fax: 01707 329129
e-mail: technical@uk.sika.com
website: www.sika.co.uk



Agrément Certificate
09/4668
Product Sheet 2

SIKA ROOF WATERPROOFING SYSTEMS

SIKA-TROCAL ADHERED SYSTEM — SIKA-TROCAL SGK

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Sika-Trocral SGK, for use as an adhered waterproofing layer on pitched, flat and curved roofs with limited access.

AGRÉMENT 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

Weather-tightness — the system and joints in the system, when completely sealed and consolidated, will resist the passage of moisture to the interior of the building (see section 5).

Properties in relation to fire — tests indicate that the system will enable a roof to be unrestricted under Building Regulations (see section 6).

Resistance to wind uplift — the system will resist the effects of any wind suction likely to occur in practice (see section 7).

Resistance to foot traffic — the system will accept the limited foot traffic and loads associated with installation and maintenance of the system without damage (see section 8).

Durability — under normal service conditions the system will provide a durable waterproof covering with a service life of at least 30 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The system has been assessed by the BBA as being fit for its intended use provided it is 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'.

Simon Wroe
Head of Approvals — Materials

A handwritten signature in black ink, appearing to read 'Greg Cooper'.

Greg Cooper
Chief Executive

Date of First issue: 3 June 2009

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

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.

British Board of Agrément
Bucknalls Lane
Garston, Watford
Herts WD25 9BA

©2009

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Sika-Trocal SGK if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

| | | |
|--------------|---------------------|--|
| Requirement: | B4(2) | External fire spread |
| Comment: | | Test data to BS 476-3 : 2004 indicate that on suitable substructures the use of the system will enable a roof to be unrestricted under this Requirement. See sections 6.1 and 6.2 of this Certificate. |
| Requirement: | C2(b) | Resistance to moisture |
| Comment: | | Tests for water resistance on the system, including joints, indicate that the system meets this Requirement. See section 5.1 of this Certificate. |
| Requirement: | Regulation 7 | Materials and workmanship |
| Comment: | | The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate. |



The Building (Scotland) Regulations 2004 (as amended)

| | | |
|-------------|----------------|--|
| Regulation: | 8(1)(2) | Fitness and durability of materials and workmanship |
| Comment: | | The system can contribute to a construction meeting this Regulation. See sections 9, 10 and the <i>Installation</i> part of this Certificate. |
| Regulation: | 9 | Building standards – construction |
| Standard: | 2.8 | Spread from neighbouring buildings |
| Comment: | | Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the system can be regarded as having a low vulnerability under clause 2.8.1 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 and 6.2 of this Certificate. |
| Standard: | 3.10 | Precipitation |
| Comment: | | Tests for water resistance of the system, including joints, indicate that the use of the system can 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 5.1 of this Certificate. |
| Regulation: | 12 | Building standards – conversions |
| Comment: | | All comments given for this system under Regulation 9, 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) 2000 (as amended)

| | | |
|-------------|--------------|--|
| Regulation: | B2 | Fitness of materials and workmanship |
| Comment: | | The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate. |
| Regulation: | B3(2) | Suitability of certain materials |
| Comment: | | The system is acceptable. See section 9 of this Certificate. |
| Regulation: | C4(b) | Resistance to ground moisture and weather |
| Comment: | | Tests for water resistance on the system, including joints, indicate that the use of the system can enable a roof to satisfy the requirements of this Regulation. See section 5.1 of this Certificate. |
| Regulation: | E5(b) | External fire spread |
| Comment: | | Test data to BS 476-3 : 2004 indicate that on suitable substructures the use of the system will be unrestricted under the requirements of this Regulation. See sections 6.1 and 6.2 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 obligation under these Regulations.

See sections: 1 *Description* (1.3) and 2 *Delivery and site handling* (2.3).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Sika-Trocal SGK when installed and used in accordance with this Certificate, in relation to NHBC Standards, as meeting Technical Requirement R3 in relation to *NHBC Standards, Chapter 7.1 Flat roofs and balconies*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Sika-Trocal SGK, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual, Section 4, Superstructure, Sub-section Flat roofs.*

General

The Sika-Trocal S system is manufactured in Germany by SSC AG and marketed in the UK by the Certificate holder.

The system should only be installed by contractors who have been trained and approved/registered by the Certificate holder. The Registered Contractors Scheme records will be audited by the BBA as part of its programme of surveillance of the Certificate.

Technical Specification

1 Description

1.1 Sika-Trocal SGK membranes consist of glassfibre restrained calendared PVC of 1.5 mm thickness with a polyester fleece backing to the underside to provide a suitable base for separation and adhesion requirements. The sheets are manufactured by laminating two calendared PVC sheets sandwiching a plastisol saturated glassfibre restraint matrix. The polyester fleece is then thermally bonded to the underside. The sheet is then cut to size and reeled onto cardboard cores.

1.2 The nominal characteristics of the membranes are:

| | |
|---------------------------------|---------------------------|
| Thickness (mm) | 1.5 |
| Thickness including fleece (mm) | 2.4 |
| Roll length (m) | 15 |
| Roll width (m) | 2.0 |
| Weight (kgm ⁻²) | 2.1 |
| Colour | light grey and slate grey |

1.3 Ancillary items for use with Sika-Trocal SGK sheets include:

- Sika C300 Polyurethane Adhesive — for bonding the membrane to the surface of the substrate
- Sika-Trocal S and SG – sheets for use for detailing work (eg edges and upstands), as recommended by the Certificate holder
- Sika-Trocal HD WBP — a heavy-duty thicker version of Sika-Trocal WBP, available in dark grey to clearly define the walkway routes
- Sika-Trocal corner pieces – S membrane moulded corner pieces, for ensuring the waterproofing integrity of the corner details
- Sika-Trocal metal sheets – used to produce profiles for perimeter flashings, connections and fixings. Sheets consist of 0.6 mm thick sheet, galvanized steel with upper side coated with a 0.8 mm thick layer of plasticised PVC, coloured light grey and slate grey.

1.4 Quality control checks are carried out during production and on the final product. Checks on the final product include:

- tensile strength and elongation
- dimensions
- dimensional stability.

2 Delivery and site handling

2.1 The membranes are delivered to site in rolls on pallets either with a corrugated cardboard outer or wrapped in polyethylene film. The wrapper bears the manufacturer's name, product identification, width of roll, length of roll, colour and the BBA identification mark incorporating the number of this Certificate.

2.2 Rolls should be stored horizontally under cover and on a clean, level surface in a dry environment. Pallets may be stacked to a maximum of three high.

2.3 The ancillary items should be stored in a similar environment.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Sika-Trocal SGK.

Design Considerations

3 General

3.1 Sika-Trocal SGK is satisfactory for use as adhered roof waterproofing on pitched, flat and curved roofs with limited access.

3.2 The Sika-Trocal S and SG membranes are applied to vertical surfaces up to 1 m. For other applications, the Certificate holder's advice regarding the fire performance should be sought.

3.3 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged special precautions, such as additional protection to the sheets, must be taken.

3.4 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined as those having falls in excess of 1:6.

3.5 Decks to which the systems are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, *NHBC Standards 2008, Chapter 7.1 Flat roofs and balconies* and Chapter 7.2 Pitched roofs or the *Zurich Building Guarantee Technical Manual 2007, Section 4, Superstructure, Sub-sections Flat roofs*, pages 268 to 270.

3.6 Insulation materials used in conjunction with the membranes must meet the requirements stated by the Certificate holder and must be one of the following:

- as described in the relevant Clauses of BS 8217 : 2005, and/or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of that Certificate.

3.7 The membranes must not be laid directly onto certain materials, eg, bituminous felts, certain insulation boards or on timber substrates which have been impregnated with oil-based preservatives. If contact with such products is likely, a separating layer should be used. Where doubt arises, the advice of the Certificate holder should be sought.

4 Practicability of installation

The system should only be installed by installers who have been trained and approved by the Certificate holder. The records relating to this will be audited by the BBA as part of its programme of surveillance on the Certificate.

5 Weathertightness



5.1 Tests confirm that the membrane and joints in the membrane when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations (see section 14 Table 1 *Physical properties — general*):

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

Scotland — Mandatory Standard 3.10, clauses 3.10.1 and 3.10.7

Northern Ireland — Regulation C4(b).

5.2 The membrane is impervious to water and, when used in the system described, will achieve a weathertight roof capable of accepting minor structural movement without damage.

6 Properties in relation to fire



6.1 When tested in accordance with BS 476-3 : 2004, a system comprising one layer of Sika-Trocal SGK membrane, fully bonded to 147 mm thick glassfibre fabric faced high-density mineral fibre insulation board using Sika-Trocal C300 Polyurethane Adhesive, a layer of bituminous felt as a vapour control layer adhered with liquid bitumen to 18 mm thick exterior grade plywood, achieved an EXT.F.AB rating.

6.2 The designation of other specifications (eg when used 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

Northern Ireland — Test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

7 Resistance to wind uplift

7.1 The adhesion of an adhered system to a substrate will normally be limited by the cohesive strength of the substrate. On decking or bituminous felt, the adhesion of the membrane using Sika C300 adhesive is sufficient to resist the effect of wind suction, thermal cycling or minor structural movements occurring in practice.

7.2 Where the membrane is adhered to insulation boards, the resistance to wind uplift will be dependent on the cohesive strength of the insulation and the method by which it is secured to the roof deck. This should be taken into account when the insulation material is selected.

8 Resistance to foot traffic

Tests indicate that the membranes can withstand, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Where traffic in excess of this is envisaged (eg, maintenance of roof-mounted plant or regular access to plant rooms), walkways must be provided (eg using the HD WBP materials), as recommended by the Certificate holder. However, reasonable care should be taken to avoid puncture by sharp objects or concentrated loads (see section 14, Table 1 *Physical properties — general*).

9 Maintenance



Roofs covered with the system should be the subject of annual inspections, as is good practice with all roof waterproofing systems, to ensure continued security and performance.

10 Durability



Sika-Trocal SGK has been used in the United Kingdom since 1982. Accelerated weathering tests and performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that the sheets should have a life in excess of 30 years.

Installation

11 General

11.1 Installation of Sika-Trocal SGK must be carried out by trained and licensed installers in accordance with the Certificate holder's instructions and the relevant Clauses of BS 8000-4 : 1990.

11.2 The membranes may be laid in conditions normal to roofing work and should not be laid in wet or damp weather, or at temperatures below 5°C, unless suitable precautions are taken.

11.3 Deck surfaces should be clean, dry, and free from sharp projections such as nail heads, concrete nibs.

11.4 The membranes are mechanically fastened at the perimeters by standard details and any joints in the membranes are lapped and solvent or heat welded, in accordance with the Certificate holder's instructions.

12 Procedure

12.1 The substrate will not require priming. However, some existing bituminous surfaces may along with some non-standard surfaces, require priming. In these cases, the Certificate holder's advice should be sought.

12.2 The membrane should be unrolled onto the substrate and folded back for half the length of the roll, exposing the underside.

12.3 The Sika C300 Polyurethane Adhesive should be applied in strips onto the substrate at a rate of 200 gm⁻² to 300 gm⁻² and then spread evenly with a squeegee.

12.4 The surface should be lightly misted with a water spray to activate the adhesive. The membrane is then laid back into position and allowed to settle by its own weight.

12.5 A range of PVC laminated metal trims are available for completing edge details. These are fixed in accordance with the Certificate holder's instructions.

13 Repair

In the event of accidental damage, repairs should be carried out in accordance with the Certificate holder's instructions. Repair is by applying a patch of the relevant membrane extending at least 50 mm beyond the defect. The damaged area should be cleaned back to the unweathered material and the patch hot-air or solvent welded to the roofing sheet.

Technical Investigations

14 Tests

Details of tests on Sika-Trocal S GK carried out by the BBA or assessed by the BBA, which show typical results for the materials, are summarised in Tables 2 and 3.

Table 1 Physical properties — general

| Test (units) | Mean result ⁽¹⁾ | | Method ⁽²⁾ |
|--|----------------------------|------------|-----------------------|
| | Longitudinal | Transverse | |
| Ash content (%) | 10.52 | | MOAT 29 : 4.5 |
| Dehydrochlorination (DHC) (mins) | 64.2 | | MOAT 29 : 4.1 |
| Water vapour transmission at 25°C/75% RH (gm ⁻² day ⁻¹) | 2.01 | | BS 3177 |
| Vapour resistance (MNsg ⁻¹) | 102 | | BS 3177 |
| Resistance to water pressure | pass | | MOAT 27 : 5.1.4 |
| Unrolling at low temperatures | satisfactory | | MOAT 27 : 5.4.3 |
| Dynamic indentation | | | MOAT 27 : 5.1.10 |
| perlite substrate | I ₃ | | |
| EPS substrate | I ₄ | | |
| Static indentation | | | MOAT 27 : 5.1.9 |
| hard substrate | L ₄ | | |
| soft substrate | L ₄ | | |
| Low temperature flexibility (°C) (20 mm diameter mandrel) | -25 | | MOAT 29 : 4.1.0 |
| Resistance to peel (N) | | | MOAT 27 : 5.1.3 |
| concrete | | | |
| unaged | 112 | | |
| aged ⁽³⁾ | 116 | | |
| Felt | | | |
| unaged ⁽⁴⁾ | 38 | | |
| Resistance to leakage at joints (air pressure) | satisfactory | | MOAT 27 : 5.2.1 |
| Wind uplift – up to 10 kPa | no failure | | MOAT 27 : 5.1.2 |
| Thermal shock – up to 9 kPa | no failure | | MOAT 27 : 5.1.5 |

(1) Material tested was manufactured to a thinner specification.

(2) Test documents are detailed in the *Bibliography*. Numbers in the table refer to section/parts of the various documents.

(3) 28 days at 80°C.

(4) 100% delamination of the top surface.

Table 3 Physical properties — directional

| Test (units) | Mean result ⁽¹⁾ | | Method ⁽²⁾ |
|---|----------------------------|------------|-----------------------|
| | Longitudinal | Transverse | |
| Tensile strength (N per 50 mm) | | | MOAT 29 : 4.8 |
| unaged | 670 | 950 | |
| Elongation (%) | | | MOAT 29 : 4.8 |
| unaged | 143 | 80 | |
| Modulus of elasticity (1–2%) (Nmm ⁻²) | 3.10 | 2.50 | MOAT 29 : 4.9 |
| Tear strength (Nmm ⁻²) | 192 | 190 | BS 2782-3 : 360B |
| Dimensional stability free (%) | -0.05 | -0.01 | MOAT 27 : 5.1.6 |

(1) Material tested was manufactured to a thinner specification.

(2) Test documents are detailed in the *Bibliography*. Numbers in the table refer to section/parts of the various documents

15 Investigations

15.1 A re-examination was made of the data and investigations on which the previous Certificate 91/2649 was based.

15.2 Existing data on the fire performance to BS 476-3 : 2004 were examined.

15.3 Data on ageing of other Sika-Trocal membranes using the same PVC compound were examined.

15.4 The manufacturing process was assessed, including the method adopted for quality control, and details were obtained of the quality and composition of the materials used.

15.5 Visits were made to sites in progress to assess the methods of application.

15.6 Visits were made to existing sites to assess the products' performance in use.

15.7 A survey of known users of Sika-Trocal SGK was carried out to assess the performance in United Kingdom conditions.

15.8 A reassessment of the *Durability* statement was made based on visits to old existing sites and results of tests conducted on unaged and natural-aged materials.

Bibliography

- BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
- BS 2782-3.360B : 1991 *Methods of testing plastics — Mechanical properties — Determination of tear resistance of plastics film and sheeting by the trouser tear method*
- BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*
- 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*
- MOAT No 27 : 1983 *General Directive for the Assessment of Roof Waterproofing Systems*
- MOAT No 29 : 1984 *Directives for the Assessment of Roofing Systems using PVC sheets without reinforcement, loose laid under heavy protection and not compatible with bitumen*

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

16.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.