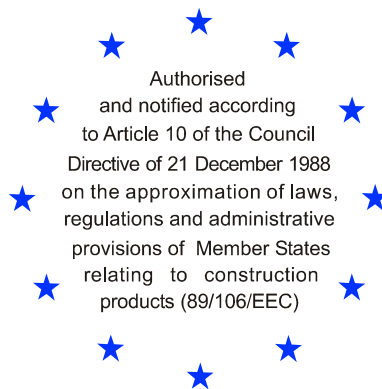


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DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-03/0038

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

Sikasil SG 500

Zulassungsinhaber
Holder of approval

SIKA SERVICES AG
Tüffenwies 16
8048 Zürich
SCHWEIZ

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Klebstoff zur Verwendung in geklebten Glaskonstruktionen
Structural sealant for use in structural sealant glazing kits

Geltungsdauer: vom
Validity: from
bis
to

16 March 2009
15 March 2014

Herstellwerk
Manufacturing plant

SIKA ENGINEERING SILICONES srl
Via L. Einaudi 6
20068 Peschiera Borromeo (MI)
ITALIEN

Diese Zulassung umfasst
This Approval contains

12 Seiten einschließlich 1 Anhang
12 pages including 1 annex

Diese Zulassung ersetzt
This Approval replaces

ETA-03/0038 mit Geltungsdauer vom 07.05.2007 bis 15.03.2009
ETA-03/0038 with validity from 07.05.2007 to 15.03.2009



Europäische Organisation für Technische Zulassungen
European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by law of 31 October 2006⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Structural sealant glazing systems - Part 1: Supported and unsupported systems", ETAG 002-01.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12

2 Official Journal of the European Communities L 220, 30 August 1993, p. 1

3 Official Journal of the European Union L 284, 31 October 2003, p. 25

4 *Bundesgesetzblatt Teil I 1998*, p. 812

5 *Bundesgesetzblatt Teil I 2006*, p.2407, 2416

6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the product and intended use

1.1 Definition of the construction product

The structural sealant SIKASIL SG 500 is a two-component silicone-based sealant to be used in structural sealant glazing kits (SSGK) for use as facades and roofs, or parts of them. The structural sealant is only one component of the kit. The kit as such is not covered by this ETA.

1.2 Intended use

The structural sealant SIKASIL SG 500 is to be used in structural sealant glazing kits within the scope of ETAG 002 to bond glazing products on metallic structural seal support frames.

The fitness for use of systems (or kits) in which the structural sealant is used, will have to be verified separately in particular by means of a complementary kit ETA based on ETAG 002.

The sealant SIKASIL SG 500 may be used in structural sealant glazing systems of any of the following four types referred to in ETAG 002 and shown in Figure 1. Whether devices to reduce danger in the event of bond failure are required or not depends on local national regulations.

Type I: Mechanical transfer of the dead load of the infill to the sealant-support frame and from there to the structure. The structural seal transfers all other actions. Devices are used to reduce danger in the event of a bond failure.

Type II: Mechanical transfer of the dead load of the infill to the sealant-support frame and from there to the structure. The structural seal transfers all other actions and no devices are used to reduce danger in the event of bond failure.

Type III: The structural seal transfers all actions including the dead load of the infill to the sealant support frame and from there to the structure. Devices are used to reduce danger in the event of a bond failure.

Type IV: The structural seal transfers all actions, including the dead load of the infill to the sealant-support frame and from there to the structure. No devices are used to reduce danger in the event of bond failure.

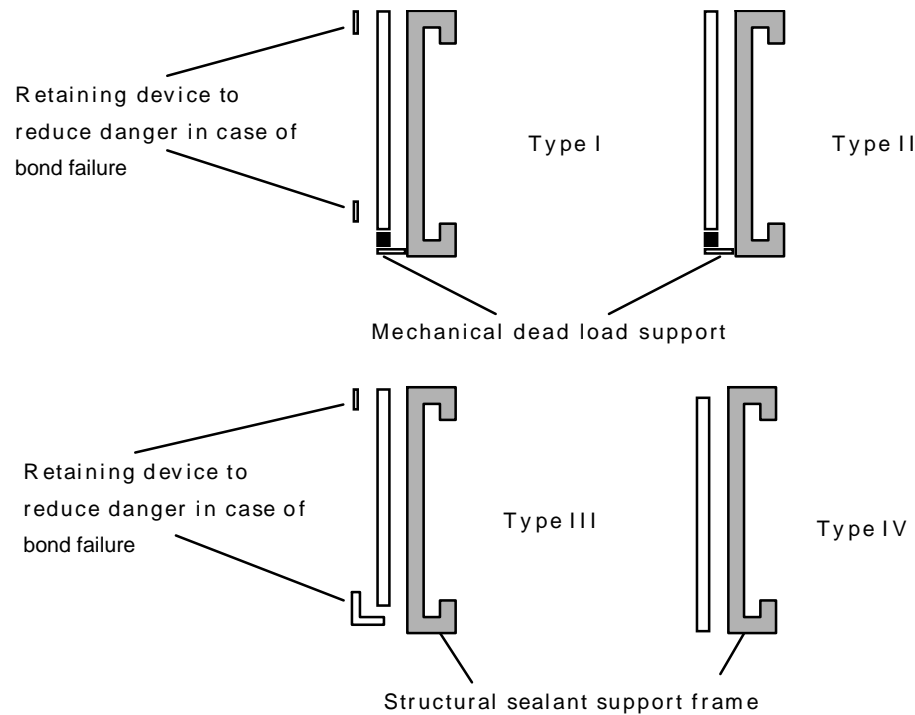


Figure 1 - Schematic examples of the different types of SSGK

The essential requirements ER2 (Safety in case of fire), ER3 (Hygiene, health and the environment), ER4 (Safety in use) and ER6 (Energy economy and heat retention) shall be fulfilled, and failure of the structural seal would cause risk to human life and/or have considerable economic consequences.

The provisions made in this European Technical Approval are based on the assumed working life of the SSGS of 25 years. The indications given on the working life of a product cannot be interpreted as a guarantee given by the producer, but are regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

2 Characteristics of the product and method of verification

2.1 Characteristics of the products

2.1.1 Characteristics of structural sealant SIKASIL SG 500:

- Design stress in tension: $\sigma_{des} = 0.14 \text{ MPa}$
- Design stress in dynamic shear: $\tau_{des.} = 0.105 \text{ MPa}$
- Design stress in static shear: $\tau_{\infty} = 0.0105 \text{ MPa}$
- Modulus of elasticity in tension or compression tangential to the origin: $E_o = 1.5 \text{ MPa}$
- Modulus of elasticity in shear tangential to the origin: $G_o = 0.5 \text{ MPa}$
- Working time (at 25 °C, 50 % R.H.) 20 minutes
- Skin over time (at 25 °C, 50 % R.H.) two-components - not applicable
- Tack-free time (at 25 °C, 50 % R.H.) 120 to 240 minutes
- Time before transport of the bonded frame: The minimum time before transport is normally 7 days.

Nevertheless, earlier transportation on work site is possible if the following two conditions are respected (see ETAG Table 10 Checks during the production): The tested H-samples give the following result: Rupture 100 % cohesive and breaking stress $\geq 0.7 \text{ MPa}$.

Structural sealant – identification characteristics

Test	ETAG ref.	Result
Specific mass (mixed at 13/1 ratio)	5.2.1.1	$V_{\text{mean}} = 1,36 \pm 0,025 \text{ g/cm}^3$
Hardness A	5.2.1.2	Mean of 39 (minimum of 34)
Thermogravimetric	5.2.1.3	Curve kept in ETA technical file
Colour	5.2.1.4	Black colour

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited with the DIBt, which identifies the product that has been assessed and judged. Changes to the product/production process, which could result in the deposited data/information being incorrect, should be notified to the DIBt before the changes are introduced. The DIBt will decide whether or not such changes affect the European Technical Approval and consequently the validity of the CE marking on the basis of the European Technical Approval and if so whether further assessment/alterations of the European Technical Approval, shall be necessary.

2.1.2 Complementary Products of Structural Seal Adhesion Surface Preparation

The following products have to be used as Cleaning products and Primer:

Cleaning products: Sika® Cleaner G & M (for glass, anodised aluminium, stainless steel substrates)

Sika® Cleaner P (for powder-coated metal substrates)

Primer: Sika® Primer-790 (only on stainless steel and on powder-coated substrates)

2.1.3 Dangerous Substances

In addition to the specific clauses relating to dangerous substances contained in this European Technical Approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.1.4 Chemical Compatibility

The chemical compatibility of the following materials in contact with the structural sealant are assessed according ETAG 002, Part 1, 5.1.4.2.5:

- NORTON spacer V2100 (spacer tape)
- Vito Glazingmount 400 (spacer tape)
- Polyisobutylene Sika Glaze IG-5 PIB, Fa. Sika Services AG (butyl tape for the inner seal)

The chemical compatibility of all materials in contact with the structural sealant are to be assessed in the framework of the ETA for systems.

2.1.5 Stepped insulated glass units

For the manufacture of stepped insulating glass units the adhesion surface may be coated – before the actual sealing – with a (1.5 ± 0.5) mm thick sealant layer according to the method deposited with Deutsches Institut für Bautechnik. For the coating the structural sealant SIKASIL SG 500 as well as SIKASIL IG 25 of the company SIKA Services AG may be used. Only one of the following combinations (glass face – aluminium face) may be used thereby:

- SIKASIL SG 500 – SIKASIL SG 500
- SIKASIL IG 25 – SIKASIL SG 500

2.2 Method of verification

The assessment of the fitness for use of the structural sealant for the intended use in relation to the requirements concerning safety in case of fire, safety in use, hygiene, health and the environment, energy economy and heat retention; within the meaning of the Essential Requirements 2, 3, 4 and 6 has been made in accordance with the "Guideline for European Technical Approval for Structural Sealant Glazing Systems" (ETAG 002).

Where the guideline allows for classifications and/or choice, the following performances have been determined.

ER2 SAFETY IN CASE OF FIRE

Reaction to fire: class F according European standards (no performance determined).

For Germany: DIN 4102 – B1

The resistance to fire shall be assessed within the framework of the European Technical Approval for the kit.

ER3 HYGIENE, HEALTH AND THE ENVIRONMENT

Concerning "Dangerous substances", the structural sealant manufacturers made a declaration of conformity to the Council Directive 76/769/EEC published in the "Official Journal of the European Communities" of 27/07/1976 and its amendments.

ER4 SAFETY IN USE

The following tests relevant for sealant assessment have been passed by reference to ETAG 002: 5.1.4.1.1, 5.1.4.1.2, 5.1.4.2.1, 5.1.4.2.2, 5.1.4.2.3, 5.1.4.2.4, 5.1.4.2.5, 5.1.4.6.4, 5.1.4.6.5, 5.1.4.6.1, 5.1.4.6.2, 5.1.4.6.3 and 5.1.4.6.7.

Further tests shall be passed within the framework of the complementary European Technical Approval of the kit.

ER6 ENERGY ECONOMY AND HEAT RETENTION:

Determination of thermal insulation and susceptibility to condensation:

The generally accepted value of the thermal conductivity (λ value) of the structural sealant to be used in thermal modelling for the assessment of thermal performance is 0.35 W/(m K).

3 Attestation of conformity and CE marking

3.1 Systems of Attestation of Conformity

Within the framework of the mandate for structural sealant glazing kits, the systems of attestation of conformity specified by the European Commission detailed in the mandate are as follows [Commission decision of 24/06/96, published in the EC Official Journal L 254 of 08/10/96]:

- System 1 (without audit-testing of samples) for SSG kits Types II and IV
- System 2+ (first possibility, including certification of the factory production control (FPC) by an approved body on the basis of its continuous surveillance, assessment and approval) for SSG kits Types I and III.

Remark: The systems being as described in Council Directive 89/106 EEC Annex III.2.(i) and (ii).

The structural sealant being a component put on the market as such, it is impossible to determine the type of the kits in which the sealant is to be used in advance.

As a consequence, only the system 1 shall apply.

System 1

(a) tasks for the manufacturer

- factory production control;
- testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.

(b) tasks for the approved body

- initial type-testing of the product;
- initial inspection of the factory and of factory production control;
- continuous surveillance, assessment and approval of the factory production control.

3.2 Responsibilities

3.2.1 Tasks for the manufacturer

3.2.1.1 Factory production control

The sealant manufacturer exercises permanent internal control of the production.

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval (European Technical Approval). The Factory production control (FPC) involves the following tests.

base: Colour, appearance, viscosity, flow

catalyst: Colour, appearance, viscosity, flow

mixture: snap time, Shore A hardness, tensile and elongation at rupture at initial state and after 7 days immersion in water at 23 °C, peel adhesion to glass and anodised aluminium after 24 hours immersion in water at 70 °C.

3.2.1.2 Testing of samples taken at the factory - Prescribed Test Plan

In the context of structural sealant, it is necessary for the manufacturer to undertake adhesion/cohesion tests to rupture after thermal conditioning as described in ETAG 002 paragraph 8.3.2.4, check on incoming material (i) on each batch of sealant. The testing of "H" pieces, peel tests, as part of the FPC provides the necessary evidence.

3.2.2 Tasks for the approved body

3.2.2.1 Initial Type Testing

The approval tests have been assessed by the approval body (DIBt).

As required by the System 1, this work is to be validated by the approved body for Certificate of Conformity purposes.

3.2.2.2 Assessment of the factory production control system - initial inspection and continuous surveillance

Assessment of the factory production control is the responsibility of an approved body.

An assessment shall be carried out on the particular manufacturing process of each manufacturing plant to demonstrate that the factory production control is in conformity with the European Technical Approval and any basic information. This assessment is based on an initial inspection of the factory.

Subsequently continuous surveillance of factory production control is necessary to ensure continuing conformity with the European Technical Approval. This continuous surveillance is performed as per ETAG 002 SSGS chapter 8.3.

It is necessary that surveillance inspections are conducted at least twice a year.

3.2.2.3 Certification

The approved body has to issue a Certification of Conformity of the product (for System 1).

3.3 CE Marking

The CE marking shall be affixed on each cartridge or packaging (see example, figure 2). The initial "CE" shall be accompanied by the following information:

- Identification number of the certification body;
- Name or identifying mark of the producer and manufacturing plant;
- The last two digits of the year in which the CE marking was affixed;
- Number of the European technical approval;
- Number of the EC certificate of conformity.

4 Condition precedent to the fitness of the product for the intended use

4.1 Manufacturing Conditions

The structural sealant SIKASIL SG 500 is fabricated by one of the manufacturing plant mentioned on page 1.

The maximum storage duration of the sealant is 14 months after the fabrication date in its original unopened packaging, when stored at a temperature below 30 °C.

4.2 Design Rules and Application of the structural Sealant

4.2.1 Design rules

4.2.1.1 Structural seal design

The structural seal shall be designed in accordance with the rules given in the complementary European Technical Approval of the related structural sealant glazing kit.

4.2.1.2 Suitable substrates for structural adhesion surface

Annexe 1 gives the list of substrates which have been proved as suitable for structural adhesion.

4.2.1.3 Drainage and ventilation

Water stagnation in the vicinity of structural seal shall be eliminated constructively.

4.2.1.4 Transfer of the infill loading on the building structure via the structural sealant

The structural sealant SIKASIL SG 500 is suitable to be used in SSGK types I to IV (see figure). This means that the infill bonded may or may not be equipped with mechanical dead load devices.

4.2.2 Application of the structural sealant

4.2.2.1 Description of the structural sealant application

The complementary European Technical Approval for structural sealant glazing kit describes the sealant application, in particular, the related European Technical Approval states the cleaning product to be used as well as the primer, if needed, and the method of application.

4.2.2.2 General technical conditions

The structural sealant SIKASIL SG 500 shall be mixed at a ratio base/ catalyst by weight of 13/1. It shall be applied between 5 and 35 °C in a workshop. The joint needs shall be tooled before the snap time has been reached, preferably within 10 minutes after the extrusion. It is important to realise that the snap time can vary in temperature and relative humidity.

After the snap time has been reached, no relative movement shall be induced anymore between the glass and the metal frame.

In all cases, it should be checked that there is no condensation on the substrates prior to the sealant application.

The minimum time before transport is normally seven days (see 2.1.1).

4.2.3 Recommendation for facade cleaning

It is recommended to use a 1 % solution in water of a neutral detergent with pH approximately 7.

Nevertheless, the assessment of the facade cleaning product shall be done within the framework of the European Technical Approval for the kit in order to check that those cleaning agents do not affect other kit products (gaskets, weather sealant, etc).

4.2.4 Responsibility of the manufacturer

It is the responsibility of the European Technical Approval holder to ensure that the information on the related component requirements and their fabrication and setting is given to the person concerned.

This information may be made by reproduction of the relevant parts of the European Technical Approval.

<p>CE xxxx</p>	<p>initial "CE"</p>
<p>SIKA SERVICES AG Tüffenwies 16 8048 Zürich SWITZERLAND</p>	<p>Number of Notified Body</p>
<p>SIKA ENGINEERING SILICONES srl Via L. Einaudi 6 20068 Peschiera Borromeo (MI) ITALIA</p>	<p>Name and address of the manufacturer or his representative established in the EEA and of the plant where the product was manufactured</p>
<p>xx</p>	<p>Last two digits of year of affixing CE marking</p>
<p>xxxx-CPD-xxxx</p>	<p>Number of EC certificate of conformity (where relevant)</p>
<p>ETA N° 03/0038 ETAG 002 Structural Sealant (only applicable with a complementary ETA of the kit)</p>	<p>European Technical Approval Numer</p>
<p>SIKASIL SG 500: Types I, II, III & IV</p>	<p>ETAG Reference</p>
	<p>Relevant performance characteristics and/or designation code</p>

Figure 2 – Example of CE marking

Dipl.-Ing. E. Jasch
 President of Deutsches Institut für Bautechnik
 Berlin, 16 March 2009

beglaubigt:
 Herr

List of suitable substrates for structural adhesion surface

a.) Glass products

Float glass according to EN 572-1

Messrs. Cerdec, Germany

Thermally Toughened Safety Glass Emalit Planilux, Enamel colour 14710 (black)

Thermally Toughened Safety Glass Emalit Planilux, Enamel colour 144001 (black)

Thermally Toughened Safety Glass ESG BI-COLOR B1661.91, Enamel colour D14202 (black)

Messrs. Glas Trösch, Germany

Float glass with coating Sunstop Silber 20

Sunstop Silber 12

Sunstop ESG neutral 50 (Thermally Toughened Safety Glass)

Messrs. Glaverbel, Germany

Float glass with coating Stopsol SS klar

Messrs. Johnson-Matthey

Ceramic-coated glass (Thermally Toughened Safety Glass), white colour N° 75079

Messrs. Luxgard, Luxembourg

SUN-GUARD Solar Silver Grey 32

SUN-GUARD Solar Light Blue 52

Messrs. Pilkington, Germany

INFRACLAD E010 and/or DELODUR DESIGN RAL 5008 (grey-blue)

INFRACLAD E020 and/or DELODUR DESIGN RAL 9005 (dark black)

K-Glas

Messrs. Saint-Gobain, Germany

COOL-Lite TB 140

COOL-Lite TS 120

COOL-Lite SN 108

COOL-Lite SN 150

COOL-LITE SC 114

b.) Aluminium products

Messrs. Alcolors, Germany

aluminium with hard anodised oxidation (City Point)

aluminium with standard anodised oxidation

aluminium with polyester powder coating, type Interpon D94

Messrs. Bürox, Germany

aluminium AlMgSi 0,5 F22, hard anodised oxidation

Messrs. Gartner, Germany

Al AlMgSi 0,5 F22, anodic oxidation E6/C0

Messrs. Schüco, Germany

ALMgSi 0,5 anodic oxidation E6 (dark bronze)

Messrs. Reynaers, Belgium

anodic oxidized aluminium (dark brown)

Messrs. Rinaldi Structal, France

anodic oxidized aluminium (natural colour)

c.) Stainless steel products

High-grade steel, material N° 1.4301 2B, satin etched

High-grade steel, material N° 1.4571 2B, grounded, grain 180