Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

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European Technical Assessment

ETA-03/0038 of 16 March 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Sikasil®SG-500
Product family to which the construction product belongs	Structural sealant for use in structural sealant glazing kits
Manufacturer	SIKA SERVICES AG Tüffenwies 16 8048 Zürich SCHWEIZ
Manufacturing plant	SIKA ENGINEERING SILICONES srl Via L. Einaudi 6 20068 Peschiera Borromeo (MI) ITALIEN
This European Technical Assessment contains	12 pages including 2 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval of "Structural sealant glazing systems", ETAG 002 Part 1: "Supported and unsupported systems", used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.
This version replaces	ETA-03/0038 issued on 16 March 2009

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Specific part

1 Technical description of the 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 structural sealant glazing kit. The kit as such is not covered by this European Technical Assessment (ETA).

2 Specification of the intended use in accordance with the applicable European assessment Document

The structural sealant Sikasil®SG-500 is to be used in structural sealant glazing kits within the scope of ETAG 002-1[1] to bond glazing products on support frames made of anodised aluminium or stainless steel. Uncoated glass, glass with an inorganic coating and enamelled glass are applicable as glazing products. The feasible adhesion surfaces of the frames as well as of the glass products are listed in Annex 1 and specified in the test reports deposited at Deutsches Institut für Bautechnik.

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 002-1 used as European Assessment Document (EAD).

The sealant Sikasil®SG-500 may be used in structural sealant glazing systems of any of the following four types referred to in ETAG 002-1 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.

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[1] ETAG-002-1:2009-08 Guideline for European technical approval for Structural Sealant Glazing Systems (SSGS), Part 1: Supported and unsupported systems

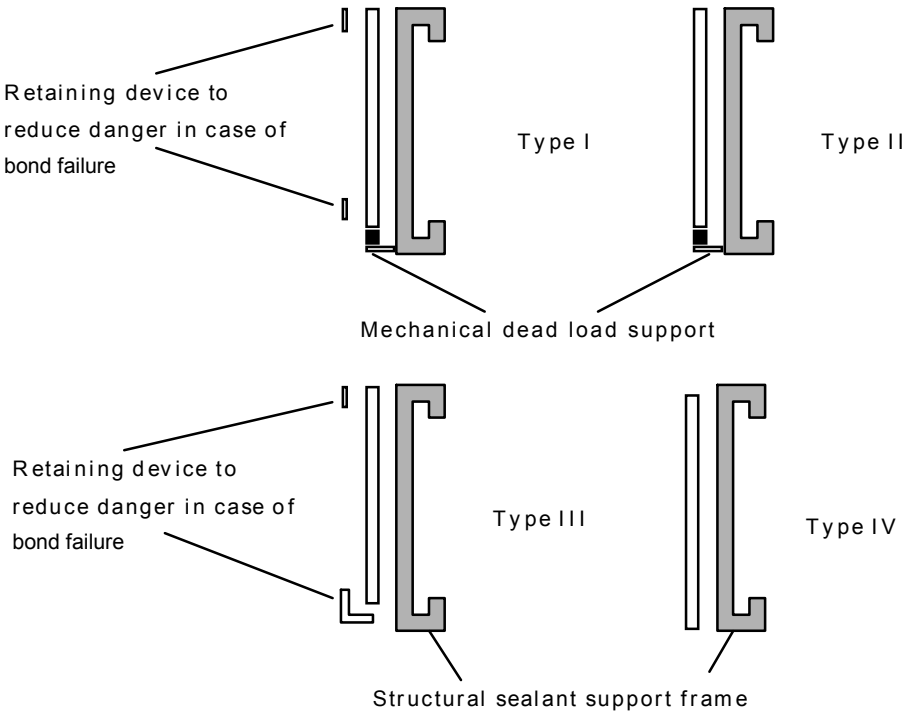

Figure 1 - Schematic examples of the different types of SSGK

The performances given in Section 3 are only valid if the structural sealant Sikasil®SG-500 is used in compliance with the specifications and conditions given in Section 3 and Annex 1.

The verifications and assessment methods on which this European Technical Assessment is based lead the assumption of working life of the structural sealant Sikasil®SG-500 of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

Indications for reaction to fire and for design calculation see Annex 2.

3.1 Mechanical resistance and stability (BWR 1)

Requirements with respect to the mechanical resistance and stability of non-load bearing parts of the works are not included in this Essential requirement but are under the Essential Requirement safety in use, Section 3.4.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class F (no performance determined)

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

3.3 Hygiene, health and the environment (BWR 3)

Contents and/or release of dangerous substances:

The chemical composition of the structural sealant has to be in compliance with the composition deposited at the Technical Assessment Body (DIBt).

The structural sealant does not contain or release dangerous substances according to EOTA TR034 (version April 2014), except VVOC, VOC, SVOC – no performance determined.

Within the scope of this European Technical Assessment there may be other requirements applicable to the product (e.g. due to national laws, regulations and administrative provisions). These requirements need also to be complied with if applicable.

3.4 Safety and accessibility (BWR 4)

3.4.1 Essential characteristics for the structural bond according ETAG 002-1

Essential characteristic	**Performance**
Characteristic stress at rupture – tension $R_{U,5}$	0.84 MPa
Characteristic stress at rupture – dynamic shear $R_{U,5}$	0.63 MPa
Modulus of elasticity in tension or compression tangential to the origin E_o	1.5 MPa
Modulus of elasticity in shear tangential to the origin G_o	0.5 MPa
Working time (at 23 °C, 50 % R.H.)	20 minutes
Tack-free time (at 23 °C, 50 % R.H.)	120 to 240 minutes
Time before transport of the bonded frame*	7 days

***** An earlier transportation on work site is possible if the following two conditions are respected (see ETAG 002-1 Table 10 Checks during the production): The tested H-samples give the following result: Rupture 100 % cohesive and breaking stress ≥ 0.7 MPa.

3.4.2 Structural sealant – identification characteristics

Test	**ETAG reference**	**Result**
Specific mass (mixed at 13/1 ratio)	5.2.1.1	V_{mean} = 1.36 ± 0.025 g/cm³
Hardness Shore A	5.2.1.2	Mean of 39 (minimum of 34)
Thermogravimetric analysis	5.2.1.3	Curve kept in the technical file of the European Technical Assessment
Colour	5.2.1.4	Black colour

This European Technical Assessment is issued for the structural sealant Sikasil®SG-500 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 Assessment and consequently the validity of the CE-marking on the basis of the European Technical Assessment and if so whether further assessment/alterations of the European Technical Assessment shall be necessary.

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3.4.3 Requirements for adhesion surfaces and materials in contact

The characteristic values according section 3.4.1 apply, provided that the adhesion surfaces for the structural bond are in accordance with ETAG 002-1, Section 2.1. The following specifications as well as Annex 1 shall be respected.

3.4.3.1 Enamelled glass as adhesion surface

The coloured pigment made of mineral material may not exceed 25 Mol-% before ceramic penetration.

The surface property after penetration should meet the following conditions and for this an inspection certificate 3.1 according EN 10204[2] is required from the glass producer:

- Minimal scratch hardness according to EN ISO 1518-1[3]: 16 N
- Porosity according to ASTM C 1048[4]: no porosity
- Minimal gloss level according to DIN 67530[5] measuring a recess of 60:20

3.4.3.2 Anodised aluminium as adhesion surface

In Annex 1 manufacturers and their procedures for anodisation are listed. In the context of issuing this European Technical Assessment these kind of anodised surfaces had been assessed. The alloys of aluminium for these types of application are alloys EN AW 6060 state T66 or EN AW 6063 state T66 according to EN 755-2[6].

3.4.3.3 Stainless steel as adhesion surface

Stainless steel material shall be austenitic alloy. Only the tested surface finish can be actually used in practice. During the process of issuing this European Technical Assessment the stainless steel materials listed in Annex 1 are assessed for bonding with Sikasil®SG-500.

3.4.3.4 Adhesion surface preparation

The following products have to be used as pretreatment of the adhesion surfaces:

Cleaning products:	Sika Cleaner G&M
	Sika Cleaner P
Activator::	Sika Aktivator 205
	Sika Aktivator
Primer:	Sika Primer-790
	Sika Primer-210

The data sheets of these products are deposited with Deutsches Institut für Bautechnik.

The pretreatment methods for the adhesion surfaces according Annex 1 should be in compliance with the deposited test reports. The structural sealant applier gets this information from SIKA Services AG. During the factory production control the applier of the structural sealant should produce and test specimen with original composition that means including pretreatment of the surfaces according the control plan[7] of the respective European Technical Assessment of the kit.

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2	EN 10204:2005-01	Metallic products – Types of inspection documents
3	EN ISO 1518-1:2011-09	Paints and varnishes - Determination of scratch resistance - Part 1: Constant-loading method
4	ASTM C 1048:2012	Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
5	DIN 67530:1982-01	Reflectometer a as a means for gloss assessment of plane surfaces of paint coatings and plastics
6	EN 755-2:2013-10	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties
7	The control plan is deposited at Deutsches Institut für Bautechnik.	

3.4.3.5 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-25of 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

3.4.3.6 Chemical Compatibility of materials in contact

The chemical compatibility is assessed for the following materials in contact with the structural sealant Sikasil®SG-500:

- NORTON spacer V2100 (spacer tape)
- Sika® Spacer Tape HD (spacer tape)
- Sika-Glaze®IG-5 PIB (Polyisobutylen, inner butyl sealing for insulation glass)

The chemical compatibility of all materials in contact with the structural sealant are to be assessed in the framework of the European Technical Assessment for the kit (system).

3.5 Protection against noise (BWR 5)

Not applicable

3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity	0.35 W/(m K)

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according the Sections 3.1 to 3.8 and Annex 1 of this ETA are taken into account.

SIKA should ensure that the essential information concerning the structural sealant Sikasil®SG-500 is circulated to the applier of the structural sealant.

The structural sealant Sikasil®SG-500 is fabricated in the manufacturing plant mentioned on page 1.

The maximum storage life of the sealant is given in the date sheet and the labelling.

The structural sealant Sikasil®SG-500 shall be mixed at a ratio base (A) / catalyst (B) by weight of 13/1. It shall be applied between 5 and 35 °C under workshop conditions. The bonding 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. For consulting the technical service of SIKA should be contacted.

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.

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

For facade cleaning it is recommended to use a 1 % (approx.) solution in water of a neutral detergent with pH-value of 7 approximately.

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

The whole kit, respectively the façade system, in which the structural sealant is used, will have to be verified. For this purpose a complementary European Technical Assessment for the kit according ETAG 002 and an associated control plan are required. In the European Technical Assessment of the kit additional adhesion surfaces to the list in Annex 1 as well as additional components of the kit, such as mechanical devices, should be assessed and the essential controls should be defined.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to Decision of the Commission 96/582/EC of 24 June 1996 (Official Journal of the European Communities L 254 of 08.10.1996) the system of assessment and verification of constancy of performance (AVCP) (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use(s)	Level or class	System
Structural sealant glazing kits	Type II and Type IV	-	1
	Type I and Type III	-	2+

System 1 applies due to the reason that the intended use of the structural sealant is not known at the time the sealant is put on the market.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 14 July 2014 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
Herr

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Sikasil®SG-500 **Annex 1**

List of suitable substrates for structural adhesion surfaces

1 Glass products

Float glass according to EN 572-2

2 Glass with inorganic coatings according to ETAG 002-1, Section 5.2.3.3 and according to EN 1096 (class A, B and S)

Glas Trösch
Float glass with coating Sunstop Silber 20
Sunstop Silber 12
Sunstop ESG neutral 50

AGC Glass Europe
Stopsol SS clear

Pilkington, Germany
K-Glass

Saint-Gobain Glass
COOL-Lite TS 120
COOL-Lite TB 140
COOL-Lite SS 108
COOL-Lite SN 150
COOL-Lite SC 114

Guardian Europe
SunGuard® Solar Silver Grey 32
SunGuard® Solar Light Blue 52

3 Enamelled Glass

For the glass matrix (Fritte) the products and the colours of the following manufacturers are suitable.

Ferro AG, Frankfurt a. M., Germany
Glass ceramic with glass matrix (Fritte) collection 140 (Group zinc-boron-silicate), all various colours

Johnson-Matthey, Maastricht, Netherlands
Glass ceramic, white colour Nr. 75079

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4 Enamelled glass with inorganic coating

Guardian Europe

SunGuard® Solar Silver Grey 32 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Light Blue 52 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Neutral 67 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Neutral 60 with ceramic coating collection 140, Ferro AG

SunGuard® Solar RD 60 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Pewter 30 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Royal Blue 20 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Silver 20 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Silver 10 with ceramic coating collection 140, Ferro AG

SunGuard® Solar Silver 08 with ceramic coating collection 140, Ferro AG

5 Anodised aluminium

Adhesion surfaces which are anodised in one of the following workshops are suitable for bonding with Sikasil®SG-500. The anodising process has to be specified and in conformity with the process deposited with Deutsches Institut für Bautechnik.

Anodising by Königsdorf Oberflächentechnik GmbH, Wolfhagen, Germany
Process Königsdorf-HL1, all colours between E6/CO and E6/C35

Anodising by HD Wahl GmbH, Jettingen-Scheppach, Germany
Process HD-Wahl-HL2, all colours between E6/CO and E6/C35

Anodising by BWB-Bürox AG, Büren a.A., Switzerland
Process BWB-HL3, colour: E6/C0

Anodising by BWB-Altenrhein AG, Altenrhein, Switzerland
Process BWB-HL4, colour: E6/C0

Anodising by Gerhard Gotta GmbH & Co. KG, Rödermark, Germany
Process Gotta-HL5, colour: E6/CO

Anodising by König Metallveredelung GmbH, Lauchringen, Germany
Process König-HL6, all colours between E6/CO and E6/C35

Anodising by Gartner Extrusion GmbH, Gundelfingen, Germany
Process Gartner-HL7, colour: E6/C0

Anodising by Alural Lummen NV, Lummen, Belgium
Process Alural-HL8, E6/C0

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6 Stainless steel

High-grade steel, material N° 1.4571, ground, grain 180
High-grade steel, material N° 1.4301 2B, silk-mat
High-grade steel, material N° 1.4301 2R, mirror-bright

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Sikasil®SG-500 **Annex 2**

Indications for reaction to fire and for design calculation

1 Reaction to fire

Reaction to fire for Germany: not easily flammable (B1) according DIN 4102.

2 Design calculation

The calculation of the structural bond should be in compliance with the additional provisions of the European Technical Assessment of the structural sealant glazing kit according ETAG 002, of which the structural sealant is one part.

For the calculation of the structural bond the total safety factor y_{tot} = 6.0 is recommended and for permanent loads a creep factor of 10. The following values for calculation result from this:

- Design stress in tension: σ_{des} = 0.14 MPa
- Design stress in dynamic shear: τ_{des}. = 0.105 MPa
- Design stress in static shear: τ_{∞}= 0.0105 MPa

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