

# PRODUCT DATA SHEET

## Sikadur<sup>®</sup>-31 SBA S-03

SEGMENTAL BRIDGE EPOXY JOINT ADHESIVE FOR USE AT +20 °C TO +35 °C

### DESCRIPTION

Sikadur<sup>®</sup>-31 SBA S-03 is a 2-part epoxy based moisture tolerant, thixotropic, structural adhesive especially formulated for segmental bridge construction. It has good squeezability, high initial strength gain, hardens without shrinkage and complies with many international and national standards such as FIP, ASTM etc. Application temperature range +20 °C to +35 °C.

### USES

Sikadur<sup>®</sup>-31 SBA S-03 may only be used by experienced professionals.

- Provides a watertight joint between segments
- Lubricates the surfaces
- Transfers the loading stresses between segments

### CHARACTERISTICS / ADVANTAGES

- Meets and / or exceeds International and National Standards (FIP, BS, ASTM etc.)
- Complies with both ASTM C-881 and AASHTO M-235 for Type VI
- Lubricates the surfaces and makes location of the shear keys easier
- High strength and high modulus of elasticity
- High initial and ultimate strengths
- Impermeable to liquids and water vapour
- Minimal water absorption
- Suitable for dry and damp concrete surfaces (moisture tolerant)
- Hardening is not affected by humidity
- Thixotropic: non-sag in vertical and overhead applications
- Hardens without shrinkage
- Different coloured components (for mixing control)
- No primer needed

### APPROVALS / STANDARDS

- CE Marking and Declaration of Performance to EN 1504-4 - Structural bonding

### PRODUCT INFORMATION

<b>Chemical Base</b>	Epoxy resin and selected fillers		
<b>Packaging</b>	Parts A+B: 6 kg		
<b>Colour</b>	Part A	White	(FIP 5.11)
	Part B	Black	
	Part A+B mixed	Concrete grey	
<b>Shelf Life</b>	24 months from date of production		
<b>Storage Conditions</b>	The product must be stored in original, unopened and undamaged sealed packaging in dry conditions. Protect from direct sunlight.		
<b>Density</b>	Mixed resin ~ 1.65 ±0.1 kg/l Density value at +20 °C.		

## Product Declaration

- EN 1504-4: Structural bonding
- Declaration according to FIP / fib 9/2 Proposal for a standard for acceptance tests and verification of epoxy bonding agents for segmental construction

<b>FIP Performance / Characteristics</b>	<b>Requirements and Criteria</b>
5.1 Pot Life	≥ 20 min at upper limit of temperature range
5.2 Open Time	≥ 60 min at upper limit of temperature range, concrete failure
5.3 Thixotropy	Non sagging at 3 mm thickness
5.4 Squeezability	with 15 kg load: ≥ 3 000 mm <sup>2</sup> with 200 kg load: ≥ 7 500mm <sup>2</sup> with 400 kg load: ≥ 10 000 mm <sup>2</sup>
5.5 Bond strength on concrete	100 % concrete failure
5.6 Curing rate	Compressive strength 12 hours: ≥ 20 N/mm <sup>2</sup> 24 hours: ≥ 40 N/mm <sup>2</sup> 7 days: ≥ 75 N/mm <sup>2</sup>
5.7 Shrinkage	≤ 0.4 % after 7 days
5.8 Creep	Deferred modulus in compression: after 1 hour: ≥ 6 000 N/mm <sup>2</sup> Deferred modulus in shear: after 1 hour: ≥ 1 200 N/mm <sup>2</sup>
5.9 Water absorption	Water absorption ≤ 0.5 % Solvability ≤ 0.1 %
5.10 Heat resistance	≥ 50 °C
5.11 Colour	Same as concrete
5.12 Compressive strength	At lower temperature limit after 24 hours: ≥ 60 N/mm <sup>2</sup> after 7 days: ≥ 75 N/mm <sup>2</sup>
5.13 E-Modulus Compressive	≥ 8 000 N/mm <sup>2</sup>
5.14 Tensile bending	100 % concrete failure
5.15 Shear strength	≥ 12 N/mm <sup>2</sup>
5.16 E-Modulus Shear	≥ 1 500 N/mm <sup>2</sup>

## TECHNICAL INFORMATION

<b>Compressive Strength</b>	<b>Curing time</b>	<b>Curing temperature</b>	<b>Compressive strength</b>	(EN 196) (EN 12190) (FIP 5.12)
	24 hours	+15 °C	> 60 N/mm <sup>2</sup>	
	24 hours	+20 °C	> 70 N/mm <sup>2</sup>	
	24 hours	+25 °C	> 75 N/mm <sup>2</sup>	
	24 hours	+30 °C	~ 80 N/mm <sup>2</sup>	
	7 days	+20 °C	~ 80 N/mm <sup>2</sup>	
<b>Modulus of Elasticity in Compression</b>	~ 12 400 N/mm <sup>2</sup>	(Instantaneous Modulus)		(EN 13412) (FIP 5.13)
<b>Tensile Adhesion Strength</b>	Bond strength on dry concrete	100 % concrete failure		(FIP 5.5)
	Bond strength on wet concrete	100 % concrete failure		
	Tensile bending on dry concrete	100 % concrete failure		(FIP 5.14)
	Tensile bending on wet concrete	100 % concrete failure		

<b>Shear Strength</b>	<b>Temperature</b>	<b>Shear strength<sup>1</sup></b>	(FIP 5.15)
	+15 °C	> 15 N/mm <sup>2</sup>	
	+25 °C	> 16 N/mm <sup>2</sup>	
	+35 °C	> 16 N/mm <sup>2</sup>	
	1 Slant shear cylinder test		
<b>Modulus of Elasticity in Shear</b>	~ 3 200 N/mm <sup>2</sup>	(Instantaneous Modulus)	(FIP 5.16)
<b>Shrinkage</b>	Hardens without shrinkage ~ 0.023 % (after 7 days)		(FIP 5.7)
<b>Creep</b>	Deferred modulus in compression (1 hour)	~ 11 200 N/mm <sup>2</sup>	(FIP 5.8)
	Deferred modulus in shear (1 hour)	~ 1 800 N/mm <sup>2</sup>	
<b>Thermal Resistance</b>	Meets the requirements of FIP 5.10, DIN 53458 and ASTM D648.		
	<b>Curing Conditions</b>	<b>Heat Resistance</b>	(FIP 5.10)
	+20 °C	+57 °C	
<b>Heat Deflection Temperature</b>	<b>Curing conditions</b>	<b>HDT</b>	(ASTM D 648)
	7 days / +20 °C	+57 °C	(DIN 53458)
<b>Water Absorption</b>	Water absorption	~ 0.35 %	(FIP 5.9)
	Solvability	~ -0.1 %	

## APPLICATION INFORMATION

<b>Mixing Ratio</b>	Part A : Part B = 3 : 1 by weight or volume		
<b>Layer Thickness</b>	30 mm max.		
<b>Sag Flow</b>	Flow at 9.5 mm		(ASTM D2730) (EN 1799)
	up to 9 mm (Thixotropy)		(FIP 5.3)
<b>Squeezability</b>	<b>Squeeze load</b>	<b>Squeeze area</b>	(FIP 5.4)
	15 kg	~ 4 800 mm <sup>2</sup>	
	200 kg	~ 7 600 mm <sup>2</sup>	
	400 kg	~ 8 500 mm <sup>2</sup>	
<b>Product Temperature</b>	+5 °C min. / +30 °C max.		
<b>Ambient Air Temperature</b>	+20 °C min. / +35 °C max.		
<b>Dew Point</b>	Beware of condensation. Substrate temperature during application must be at least +3 °C above dew point.		
<b>Substrate Temperature</b>	+20 °C min. / +35 °C max.		
<b>Substrate Moisture Content</b>	When applied to matt damp concrete brush the adhesive well into substrate.		

**Pot Life**

Quantity: 1 litre (~ 1.65 kg)

Temperature	Pot Life	(ISO 9514) (FIP 5.1)
+15 °C	~ 60 minutes	
+20 °C	~ 40 minutes	
+25 °C	~ 25 minutes	
+30 °C	~ 20 minutes	
+35 °C	~ 10 minutes	

The pot life starts when the resin and hardener are mixed. It is shorter at high temperatures and longer at low temperatures. The larger the quantity mixed, the shorter the pot life.

**Open Time**

Temperature	Open time	(ISO 9514) (FIP 5.2)
+20 °C	~ 80 minutes	
+25 °C	~ 60 minutes	
+30 °C	~ 60 minutes	
+35 °C	~ 60 minutes	

**Curing Rate**

Time	Compressive Strength	(FIP 5.6)
12 hours	~ 50 MPa	
24 hours	~ 70 MPa	
7 days	~ 80 MPa	

all values at +20 °C

**APPLICATION INSTRUCTIONS****SUBSTRATE QUALITY**

Concrete must be at least 28 days old (and have an open textured profile. Any cement laitance shall be removed.

Concrete surfaces must be clean, dry or matt damp. Free from standing water, ice, dirt, oil, grease, laitance, surface treatments, all loose particles and any other surface contaminants that could affect adhesion of the adhesive.

**SUBSTRATE PREPARATION**

Concrete surfaces must be prepared mechanically using suitable abrasive blast cleaning or other suitable approved equipment to achieve an open textured, laitance free, gripping surface profile. All dust and loose material must be completely removed from surfaces before application of the adhesive.

**MIXING**

Prior to mixing all parts, mix part A (resin) briefly using a mixing spindle attached to a slow speed electric drill (max. 300 rpm). Add part B (hardener) to part A and mix parts A+B continuously for at least 3 minutes until a uniformly coloured smooth consistency mix has been achieved. To ensure thorough mixing pour materials into a clean container and mix again for approximately 1 minute. Over mixing must be avoided to minimise air entrainment. Mix full units only. Mixing time for A+B = 4.0 minutes. Mix only the quantity which can be used within its pot life.

**APPLICATION METHOD / TOOLS**

Apply mixed adhesive to the prepared surfaces with a spatula, trowel, notched trowel or by gloved hand at the required thickness.

**CLEANING OF TOOLS**

Clean all tools and application equipment with Sika® Colma Cleaner immediately after use. Hardened material can only be mechanically removed.

## LIMITATIONS

- When using multiple units during application, do not mix the following unit until the previous one has been used in order to avoid a reduction in workability and handling time.
- Sikadur® resins are formulated to have low creep under permanent loading. However due to the creep behaviour of all polymer materials under load, when using adhesive for structural applications, the long term structural design load must account for creep. Generally the long term structural design load must be lower than 20–25 % of the failure load. A structural engineer must be consulted for design calculations for specific structural applications.

## BASIS OF PRODUCT DATA

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

## LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

## ECOLOGY, HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet (MSDS) containing physical, ecological, toxicological and other safety-related data.

## LEGAL NOTES

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 accordance with Sika's recommendations. 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 user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request. It may be necessary to adapt the above disclaimer to specific local laws and regulations. Any changes to this disclaimer may only be implemented with permission of Sika® Corporate Legal in Baar.

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