BUILDING TRUST

PRODUCT DATA SHEET

Sikadur®-31 SBA S-04

SEGMENTAL BRIDGE ADHESIVE FOR USE AT +10 °C TO +25 °C TEMPERATURES

DESCRIPTION

Sikadur®-31 SBA S-04 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 +10 °C to +25 °C. Suitable for use in hot and tropical climatic conditions.

USES

Sikadur®-31 SBA S-04 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.)
- Follows the requirements of ASTM C-881 and AASHTO M-235 for Type VI
- Lubricates the surfaces and makes positioning 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

PRODUCT INFORMATION

Composition	Epoxy resin and selected fillers		
Packaging	Parts A+B	6 kg and 12 kg	Pre-batched unit
Colour	Part A	White	(FIP 5.11)
	Part B	Black	
	Part A+B mixed	Concrete grey	
Shelf life	24 months from date of production		
Storage conditions	The product must be stored in original, unopened and undamaged sealed packaging in dry conditions at temperatures between +5 °C and +30 °C. Always refer to packaging.		
Density	Mixed resin ~1,65 ±0,1 kg/l Value at +20 °C.		

Product declaration

- Follows the main requirements of EN 1504-4: Structural bonding
- Follows the requirements of FIP / fib 9/2: Proposal for a standard for acceptance tests and verification of epoxy bonding agents for segmental construction

FIP Performance / Characteristics	Requirements and Criteria
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	Max. 30mm in 10 min at upper limit of specified temp.
5.4 Squeezability	with 15 kg load: ≥ 3000 mm² with 200 kg load: ≥ 7500 mm² with 400 kg load: ≥ 10 000 mm²
5.5 Bond strength on concrete	100 % concrete failure
5.6 Curing rate	Compressive strength 12 hours: ≥ 20 N/mm² 24 hours: ≥ 40 N/mm² 7 days: ≥ 75 N/mm²
5.7 Shrinkage	≤ 0,4 % after 7 days
5.8 Creep	Deferred modulus in compression: after 1 hour: ≥ 6000 N/mm² Deferred modulus in shear: after 1 hour: ≥ 1200 N/mm²
5.9 Water absorption	Water absorption ≤ 0,5 % Solvability ≤ 0,1 %
5.10 Heat resistance	Shear strees at failure to be ≥ 10 N/mm² at 50 °C
5.11 Colour	Same as concrete
5.12 Compressive strength	At lower temperature limit after 24 hours: ≥ 60 N/mm² after 7 days: ≥ 75 N/mm²
5.13 E-Modulus Compressive	≥ 8000 N/mm²
5.14 Tensile bending	100 % concrete failure
5.15 Shear strength	≥ 12 N/mm²
5.16 E-Modulus Shear	≥ 1500 N/mm²

TECHNICAL INFORMATION

Compressive strength

Curing time	Curing temperature	Compressive strength	(ASTM D695) (FIP 5.12)
12 hours	+10 °C	~45 N/mm²	
24 hours	+10 °C	~65 N/mm²	
7 days	+10 °C	~80 N/mm²	

Note: Higher temperatures - Faster curing

Modulus of elasticity in compression ~10 500 N/mm² (Instantaneous Modulus) (FIP 5.13)

Tensile adhesion strength

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	

Shear strength

Curing temperature[1]	Shear strength[2]	(FIP 5.15)
+10 °C	> 13 N/mm²	

[1] Higher temperatures - Faster curing
[2] Slant shear cylinder test

Modulus of elasticity in shear ~3,400 N/mm² (Instantaneous Modulus) (FIP 5.16)

Shrinkage Hardens without shrinkage
~0,01 % (after 7 days, at +25 °C) (FIP 5.7)

Creep

Deferred modulus in compression (1 hour)	~8000 N/mm²	(FIP 5.8)
Deferred modulus in shear (1 hour)	~2900 N/mm²	

Temperature resistance

Shear stress at failure	Heat Resistance	(FIP 5.10)
>15 N/mm²	+50 °C	

Water absorption

Water absorption	~0,2 %	(FIP 5.9) at +60 °C
Solvability	~0,08 %	

SYSTEMS

System structure A full range of Sikadur®-31 SBA segmental bridge epoxy adhesives covering application temperatures between +10 °C and +60 °C is available:

Application Temperature	Segmental Bridge Epoxy Adhesive
+40 °C to +60 °C	Sikadur®-31 SBA S-08
+30 °C to +50 °C	Sikadur®-31 SBA S-02 MY
+20 °C to +35 °C	Sikadur®-31 SBA S-03 (G)
+10 °C to +25 °C	Sikadur®-31 SBA S-04

APPLICATION INFORMATION

Mixing ratio Part A : Part B = 3 : 1 by weight or volume

Layer thickness 30 mm max.

Sag flow No sag at +25 °C (ASTM D2730) Daniel gauege

Up to 5 mm at +25 °C (Thixotropy) (FIP 5.3)

Squeezability

Squeeze load	Squeeze area	(FIP 5.4)
15 kg	~5800 mm²	
200 kg	~8000 mm²	
400 kg	~10900 mm²	

Product temperature Sikadur®-31 SBA S-04 must be at a temperature of between +5 °C and +30 °C for application.

Ambient air temperature +10 °C min. / +25 °C max.

Dew point Beware of condensation.
Substrate temperature during application must be at least 3 °C above dew point.

Substrate temperature +10 °C min. / +25 °C max.

Substrate moisture content When applied to matt moisture concrete, brush the adhesive well into substrate.

Pot Life

Quantity: 1 litre (~1,65 kg)

Temperature	Pot Life
+10 °C	~50 minutes
+15 °C	~40 minutes
+20 °C	~25 minutes
+25 °C	~20 minutes
+30 °C	~10 minutes

(ISO 9514)
(FIP 5.1)

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
+25 °C	≥ 60 minutes

(FIP 5.2)

Note: With lower temperatures, open time will increase.
Below indicative open time for lower temperatures.

Temperature	Open time
+10 °C	~90 minutes
+20 °C	~70 minutes
+30 °C	~30 minutes

Curing rate

Time	Compressive Strength
12 hours	≥ 40 MPa
24 hours	≥ 60 MPa
7 days	≥ 75 MPa

(FIP 5.6)

all values at +10 °C

BASIS OF PRODUCT DATA

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

ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets before using any products. For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety-related data.

FURTHER INFORMATION

- Where applicable, reference must also be made to International and National Standards such as FIP, BS, ASTM etc.
- For further instructions please refer to Sika's Method Statment: "Sikadur®-31 SBA"

IMPORTANT CONSIDERATIONS

- 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.

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY

Concrete must be at least 28 days old and have an open textured profile. Any cement laitance must 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 the mixed adhesive to the prepared surface with a spatula, trowel, notched trowel, or with hands protected by gloves.

CLEANING OF EQUIPMENT

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

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

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.

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