

PRODUCT DATA SHEET

Sikadur®-31+

Low-VOC epoxy adhesive for structural bonding and concrete repair

DESCRIPTION

Sikadur®-31+ is a two-part, low-VOC, moisture-tolerant epoxy structural adhesive that bonds to many construction materials. It is also used for structural concrete repairs, joint filling, and crack sealing. It can be used in both do-it-yourself (DIY) applications and professional applications.

USES

Sikadur®-31+ is used as an adhesive for:

- Structural concrete repair (Principle 3, Method 3.1 of EN 1504-9). Repair of spalling and damaged concrete in buildings, bridges, infrastructure and superstructure works
- Structural strengthening (Principle 4, Method 4.3 of EN 1504-9). Bonding plate reinforcement
- Structural strengthening (Principle 4, Method 4.4 of EN 1504-9). Increasing the bearing capacity of the concrete structure by adding mortar

Sikadur®-31+ is used for bonding the following materials:

- Concrete
- Natural stone
- Ceramics
- Fibre cement
- Mortar
- Brick masonry
- Brick slips
- Steel
- Iron
- Wood

Sikadur®-31+ is used for repairing and reprofiling:

- Structural concrete elements such as beams, columns, and walls
- Non-structural concrete elements
- Small patches and edges

Sikadur®-31+ is used for filling and sealing:

- Joint arrises
- Crack arrises
- Non-structural static cracks

- Holes
- Voids

FEATURES

- Easy to mix and apply
- Very low VOC (GEV Ecode EC1^{PLUS})
- Very good adhesion to many construction materials
- Very good initial and final mechanical strength
- Suitable for structural concrete repair, class R4 according to EN 1504-3:2005 (Structural and non-structural repair)
- Good adhesion to dry and matt damp concrete
- Thixotropic: non-sag in vertical and overhead applications
- No primer required
- Good resistance to abrasion
- Good resistance to specific chemicals
- Differently coloured components for mixing control
- Impermeable to most liquids and water vapour
- Hardens without shrinkage
- Application up to 30 mm thickness in one layer
- Temperature application range +10 °C to +30 °C

SUSTAINABILITY

- Contributes towards satisfying Materials and Resources (MR) Credit: Environmental Product Declarations: Option 1 under LEED® v4.1 — 1 point
- Contributes towards satisfying Materials and Resources (MR) Credit: Material Ingredients: Option 2 under LEED® v4.1 — 1 point
- Contributes towards satisfying Indoor Environmental Quality (EQ) Credit: Low-Emitting Materials under LEED® v4.1 — 1-3 points
- Environmental Product Declaration (EPD) in accordance with EN 15804. EPD independently verified by Institut für Bauen und Umwelt e.V. (IBU)
- VOC emission classification GEV ECODE EC1^{plus}

CERTIFICATES AND TEST REPORTS

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020204030010000228

- CE marking and declaration of performance based on EN 1504-3:2005 Products and systems for the protection and repair of concrete structures — Structural and non-structural repair

- CE marking and declaration of performance based on EN 1504-4:2004 Products and systems for the protection and repair of concrete structures — Structural bonding

PRODUCT INFORMATION

Composition	Epoxy resin and selected fillers		
Packaging	1.2 kg (A+B) container	8 × 1.2 kg carton box	
	6 kg (A+B) container	32 boxes per pallet - 256 pieces	
	20 kg (A) container	96 containers per pallet	
	10 kg (B) container	22 containers (A) per pallet	
		44 containers (B) per pallet	
	Refer to the current price list for available packaging variations.		
Colour	Part A	White	
	Part B	Dark grey	
	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 the packaging. Refer to the current Safety Data Sheet for information on safe handling and storage.		
Density	Mixed resin (2.00 ± 0.1) kg/l Density value at +23 °C.		
Product declaration	<ul style="list-style-type: none"> ▪ Complies with the general requirements of EN 1504-3: Class R4 ▪ Complies with the general requirements of EN 1504-4: Structural bonding for bonded plate reinforcement and bonded mortar or concrete 		
Volatile organic compound (VOC) content	Compliant with VOC emission classification GEV-Emicode EC1 ^{PLUS}		

TECHNICAL INFORMATION

Compressive strength	Class R4				(EN 1504-3)
	69 MPa				(EN 12190)
	Curing time	+10 °C	+23 °C	+30 °C	(EN 196-1)
	1 day	-	41 MPa	55 MPa	
	3 days	45 MPa	61 MPa	71 MPa	
7 days	69 MPa	75 MPa	79 MPa		
Tensile strength	Curing time	+10 °C	+23 °C		
	1 day	-	7 MPa	(EN ISO 527-2)	
	3 days	10 MPa	16 MPa		
	7 days	15 MPa	18 MPa		
Modulus of elasticity in tension	8.5 GPa (7 days at +23 °C)			(EN ISO 527-2)	
Tensile strain at break	0.37 % (7 days at +23 °C)			(EN ISO 527-2)	
Shrinkage	0.01 %			(EN 12617-1)	
	3.0 MPa (Restrained shrinkage / expansion)			(EN 12617-4)	

Tensile adhesion strength	Pass	(EN 12636)			
	Curing Time	Substrate	Curing Temperature	Adhesion strength	(EN 12188; EN 1542)
	7 days	Concrete dry	+23 °C	> 4 MPa *	
	7 days	Concrete matt damp	+23 °C	> 4 MPa *	
	7 days	Steel	+23 °C	> 20 MPa	
	* 100% concrete failure				
Thermal compatibility	Freeze and thaw	3.40 MPa	(EN 13687-1)		
	Durability	Pass	(EN 13733)		
Coefficient of thermal expansion	4.3 × 10 ⁻⁵ (±0.2 × 10 ⁻⁵) °C		(EN 1770)		
Reaction to fire	Class D-s2, d0 Class B _{fl} -s1		(EN 13501-1)		
Chemical resistance	Resistant to many chemicals. Contact Sika Technical Services for additional information.				
Resistance to moisture	Sensitivity to water	Pass	(EN 12636)		
Shear adhesion strength	50°	≥ 70 MPa	(EN 12188)		
	60°	≥ 88 MPa			
	70°	≥ 98 MPa			
Glass transition temperature	+70 °C	(EN 12614)			

APPLICATION INFORMATION

Mixing ratio	Part A : Part B = 2 : 1 by weight or volume		
Consumption	2.0 kg/m ² per mm of thickness. Note: Consumption data is theoretical and does not allow for any additional material due to surface porosity, surface profile, variations in level, wastage or any other variations. Apply the Product to a test area to calculate the exact consumption for the specific substrate conditions and proposed application equipment.		
Layer thickness	30 mm max. For non-structural adhesive or other applications, if layer thickness's of >30 mm are required, apply in successive 30 mm layers or once the previous layer has hardened. The surface of the freshly applied intermediate layers should be scratched to form a key for subsequent layers. If layer application is to be longer than 2 days, the wet applied adhesive must be blinded to excess with quartz sand immediately after application		
Sag flow	Non-sag up to 20 mm thickness on vertical surfaces		(EN 1799)
Material temperature	Maximum	+30 °C	
	Minimum	+10 °C	
Ambient air temperature	Maximum	+30 °C	
	Minimum	+10 °C	
Dew point	Beware of condensation. Steel substrate temperature during application must be at least +3 °C above dew point.		
Substrate temperature	Maximum	+30 °C	
	Minimum	+10 °C	

Substrate moisture content

Substrates must be dry or matt damp (no standing water).
Brush the adhesive well into the substrate if matt damp.

Pot Life

Temperature

+23 °C

+30 °C

Pot Life

~60 min

~45 min

(ISO 9514)

Open Time

Temperature

+23 °C

+30 °C

Open Time

~75 min

~45 min

(EN 12189)

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.

IMPORTANT

Damage due to excessive long-term load

Sikadur® resins are formulated to have low creep under long-term load. However, due to the creep behaviour of all polymer materials under load, the long-term structural design load must account for creep.

1. Ensure that the long-term structural design load is lower than $\frac{1}{4}$ to $\frac{1}{5}$ of the short-term failure load.
2. Consult a structural engineer for calculating the admissible load for the specific application.

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 Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

SUBSTRATE QUALITY

CONCRETE, MASONRY, MORTAR, STONE

Concrete and mortar must be at least 28 days old. Substrates must be sound, clean, dry or matt damp but free of standing water. Substrates must be free of contaminants such as ice, dirt, oil, grease, coatings, laitance, efflorescence, surface treatments and loose friable material.

STEEL

Surfaces must be sound, clean, dry and free of contaminants such as dirt, oil, grease, coatings and loose friable material.

WOOD

Surfaces must be sound, clean, dry and free of contaminants such as dirt, oil, grease, coatings and loose friable material.

SUBSTRATE PREPARATION

IMPORTANT

Reduced adhesion due to surface contamination

Surface contaminants such as dust and loose material, including the contaminants generated during substrate preparation, can reduce the Product's performance.

1. Before applying the Product, thoroughly clean all substrate surfaces using vacuum or dust removal equipment.

CONCRETE, MASONRY, MORTAR OR STONE

Suitable techniques for substrate preparation include the following:

- Abrasive blast cleaning
- Needle gunning
- Light scabbling
- Bush hammering
- Grinding

1. Prepare the substrate mechanically using a suitable technique.

The substrate has an open-textured, gripping surface profile.

STEEL

Suitable techniques for substrate preparation include the following:

- Abrasive blast cleaning
- Rotating wire brush
- Grinding

1. Prepare the substrate mechanically using a suitable technique.

The substrate has a bright metal finish with a surface profile to satisfy the necessary tensile adhesion strength requirement.

WOOD

1. Prepare the substrate by planing, sanding or using other suitable equipment.

MIXING

IMPORTANT

Poor workability and unfavourable handling time due to wrong mixing

1. When using multiple units during application, do not mix the following unit until the previous unit has been used.

PRE-BATCHED UNITS

1. Mix part A (resin) briefly using a mixing spindle attached to a slow speed electric mixer (max. 300 rpm).
2. IMPORTANT Mix full units only. Add part B (hardener) to part A.
3. Mix parts A+B continuously for at least 3 minutes until a uniformly coloured smooth consistency mix has been achieved.
4. IMPORTANT Avoid entraining air into the mix by over-mixing. To ensure thorough mixing, transfer the mixture into a clean container and mix again for 1 additional minute.

APPLICATION

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IMPORTANT

Damage due to unsupported heavy items applied on a vertical surface or overhead

Full adhesion strength is not achieved before the Product has fully cured. Light objects may be bonded without using temporary support during curing. This is dependant on the weight of the object in relation to its size and texture of the surface in contact with the material. If the object is too heavy, it may slip or fall off.

1. Provide temporary support for heavy items until the Product has fully hardened.

BONDING

Preconditions

Confirm dew point conditions before and during application.

1. **IMPORTANT** On damp prepared concrete substrates, always apply the Product by brush and work the Product well into the substrate. Apply the mixed adhesive to the prepared surfaces with a spatula, trowel, notched trowel or by gloved hand.
2. For optimum adhesion apply the adhesive to both surfaces that require bonding.
3. For heavy components positioned vertically or overhead, provide temporary support until the Product has fully hardened.

REPAIR

Preconditions

Confirm dew point conditions before and during application.

1. Place temporary formwork as required.
2. **IMPORTANT** On damp prepared concrete substrates, always apply by brush and work the Product well into the substrate. Apply the mixed adhesive to the prepared surfaces with a spatula, trowel or by gloved hand.

For repairs greater than 30 mm deep the Product must be applied in layers.

1. Roughen the surface of the freshly applied intermediate layer by scratching it to enable better adhesion of the subsequent layer.
2. Apply subsequent layers once the previous layer has hardened.
3. If the time between layers is going to be more than 2 days, blind the wet adhesive to excess with quartz sand immediately after application.

JOINT FILLING AND CRACK SEALING

1. Apply the mixed adhesive to the prepared surfaces with a spatula or trowel.

CLEANING OF EQUIPMENT

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

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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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