BUILDING TRUST

PRODUCT DATA SHEET

Sikadur®-31+ Rapid

2-part rapid low VOC epoxy adhesive for structural bonding and concrete repair

DESCRIPTION

Sikadur®-31+ Rapid is a 2-part, fast-curing, epoxy-based structural adhesive. It is moisture-tolerant, bonds to many construction materials and can also be used for structural concrete repairs, joint filling, and crack sealing.

USES

The Product 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). Adding mortar

The Product is used for bonding the following materials:
- Concrete
- Natural stones
- Ceramics
- Fibre cement
- Mortar
- Brick masonry
- Brick slips
- Steel
- Iron
- Wood

The Product if used for repairing and reprofiling:
- Structural concrete elements such as beams, columns, and walls
- Non-structural concrete elements
- Small patches and edges

The Product is used for filling and sealing:
- Joint arrises
- Crack arrises
- Non-structural static cracks
- Holes
- Voids

CHARACTERISTICS / ADVANTAGES

- Easy to mix and apply
- Very low VOC (GEV Emicode EC1PLUS)
- Very good adhesion to many construction materials
- High 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 mat damp concrete
- Thixotropic: non-sag in vertical and overhead applications
- No primer required
- Good resistance to abrasion
- Good resistance to chemicals
- Different coloured components for mixing control
- Impermeable to most liquids and water vapour
- Hardens without shrinkage
- Can be applied up to 30 mm thick in one layer
- Can be applied at temperatures between +5 °C and +20 °C

SUSTAINABILITY

- Environmental Product Declaration (EPD) in accordance with EN 15804. EPD independently verified by Institut für Bauen und Umwelt e.V. (IBU)
- Contributes towards satisfying Indoor Environmental Quality (EQ) Credit: Low-Emitting Materials under LEED® v4
- Contributes towards satisfying Materials and Resources (MR) Credit: Building product disclosure and optimization — Environmental Product Declarations under LEED® v4
- Contributes towards satisfying Materials and Resources (MR) Credit: Building Product Disclosure and Optimization — Material Ingredients under LEED® v4
- VOC emission classification GEV Emicode EC1^{plus}

APPROVALS / CERTIFICATES

- 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

Product declaration

- In scope of EN 1504-3: Class R4
- In scope of EN 1504-4: Structural bonding for bonded plate reinforcement and bonded mortar or concrete

Composition

Epoxy resin and selected fillers

Packaging

1.2 kg (A+B)	8 containers per box 32 boxes per pallet - 256 pieces
6 kg (A+B) container	72 containers per pallet

Refer to the current price list for available packaging variations.

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.
Refer to the current Safety Data Sheet for information on safe handling and storage.

Colour

Part A	White
Part B	Dark grey
Part A+B mixed	Concrete grey

Density

Mixed resin at +23 °C	(1.95 ± 0.05) kg/l

TECHNICAL INFORMATION

Compressive strength

Class R4 (EN 1504-3)

62 MPa (EN 12190)

Curing time	+5 °C	+20 °C
12 hours	-	43 MPa
1 day	23 MPa	55 MPa
3 days	60 MPa	60 MPa
7 days	64 MPa	70 MPa

(EN 196-1)

Tensile strength

Curing time	+5 °C	+20 °C
1 day	-	15 MPa
3 days	14 MPa	16 MPa
7 days	15 MPa	21 MPa

(EN ISO 527-2)

Modulus of elasticity in tension

Cured 7 days at +23 °C	6.5 GPa	(EN ISO 527-2)

Tensile strain at break	Cured 7 days at +23 °C	0.4 %	(EN ISO 527-2)
Shear strength	11 MPa		(EN 12615)
	15 MPa		(EN 12188)
Tensile adhesion strength	Pass		(EN 12636)

Curing Time	Substrate	Curing Temperature	Adhesion strength	(EN 12188; EN 1542)
7 days	Concrete dry	+20 °C	> 4 MPa (100 % concrete failure)	
7 days	Concrete mat damp	+20 °C	> 3.8 MPa (100 % concrete failure)	
7 days	Steel	+20 °C	15 MPa	

Shear adhesion strength	50°	≥ 55 MPa	(EN 12188)
	60°	≥ 75 MPa	
	70°	≥ 80 MPa	
Shrinkage	0.01 %		(EN 12617-1)
	Restrained shrinkage / expansion	3.2 MPa	(EN 12617-4)
Coefficient of thermal expansion	$(3.9 \times 10^{-5} \pm 0.2 \times 10^{-5})$ 1/K		(EN 1770)
Glass transition temperature	+53 °C		(EN 12614)
Thermal compatibility	Freeze and thaw	3.0 MPa	(EN 13687-1)
	Durability	Pass	(EN 13733)
Chemical resistance	Resistant to many chemicals. Contact Sika Technical Services for additional information.		
Resistance to moisture	Sensitivity to water	Pass	(EN 12636)
Reaction to fire	Class C-s1, d0 Class B_{fl}-s1		(EN 13501-1)

APPLICATION INFORMATION

Mixing ratio	Part A : Part B = 2 : 1 by weight or volume	
Consumption	1.95 kg/m² 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 product to a test area to calculate the exact consumption for the specific substrate conditions and proposed application equipment.	
Layer thickness	30 mm max.	
Sag flow	Non-sag up to 25 mm thickness on vertical surfaces	(EN 1799)
Squeezability	65 mm	
Material temperature	Maximum	+20 °C
	Minimum	+5 °C
Ambient air temperature	Maximum	+20 °C
	Minimum	+5 °C

Dew point	Beware of condensation. Substrate temperature during application must be at least +3 °C above dew point.	
Substrate temperature	Maximum	+20 °C
	Minimum	+5 °C
Substrate moisture content	Substrates must be dry or matt damp (no standing water).	

Pot Life (ISO 9514)

Temperature	Open Time
+5 °C	75 min
+10 °C	60 min
+20 °C	45 min

Open Time (ISO 9514)

Temperature	Open Time
+5 °C	75 min
+10 °C	60 min
+20 °C	45 min

Waiting time to overcoating	Sikadur®-31+ Rapid may be overcoated with a Sika® compatible epoxy coating when adhesive has hardened

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 CONSIDERATIONS

Sikadur® resins are formulated to have low creep under permanent loading. However, due to the creep behavior of all polymer materials under load, 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 load calculations for the specific application.

ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains 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 with no standing water. Substrates must also be free from contamination 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 all contaminants such as dirt, oil, grease, coatings and loose friable material.
WOOD
Surfaces must be sound, clean, dry and free of all contaminants such as dirt, oil, grease, coatings and loose friable material.

SUBSTRATE PREPARATION

IMPORTANT
Reduced adhesion performance
Surface contamination such as dust and loose material, including that caused during substrate preparation can reduce the Product's performance.
1. Thoroughly clean all substrate surfaces before application of the Product by 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
Maintaining workability and handling time.
When using multiple units during application, do not mix the following unit until the previous one has been used.
PRE-BATCHED UNITS
1. Mix full units only. Note Mix only the quantity which can be used within its pot life.
2. Prior to mixing all parts, mix part A (resin) briefly using a mixing spindle attached to a slow speed electric mixer (max. 300 rpm).
3. Add part A to part B (hardener) and mix parts A+B continuously for at least 3 minutes until a uniformly coloured smooth consistency mix has been achieved.
4. IMPORTANT Do not over mix. To ensure thorough mixing pour materials into a clean container and mix again for approximately 1 minute. Mixing time for A+B = 4 minutes.

APPLICATION

IMPORTANT
Provide temporary support for heavy components positioned vertically or overhead
BONDING
Preconditions
Prior to application confirm dew point conditions before and during application.
1. IMPORTANT On damp prepared concrete substrates, always apply by brush and work the Product well into the substrate. Apply mixed adhesive to the prepared surfaces with a spatula, trowel, notched trowel or by gloved hand.
2. For optimum adhesion apply adhesive to both surfaces that require bonding.
3. For heavy components positioned vertically or overhead, provide temporary support until the Product has fully hardened. Hardening will be dependent on ambient temperatures.

REPAIR
Preconditions
Prior to application 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 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. Scratch the surface of the freshly applied intermediate layer to form a key for the subsequent layer.
2. Apply successive 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 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.

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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