

PRODUCT DATA SHEET

Sikadur®-53

Epoxy crack injection and grouting resin for wet and underwater applications

PRODUCT DESCRIPTION

Sikadur®-53 is a two-part, moisture-resistant epoxy resin used for crack injection and grouting.

USES

Sikadur®-53 installation works to be carried out only by Sika Approved Contractors. Please observe information given by Product Data Sheets.

Sikadur®-53 is used for:

- Crack injection to seal damp and wet cracks by high pressure injection
- Filling and sealing voids and cracks in structures such as bridges, civil engineering structures, industrial and residential buildings, like in columns, beams, foundations, walls, floors and water retaining structures
- Structural bonding
- Preventing ingress of water and infiltration of substances promoting reinforcement corrosion
- Bonding concrete and steel underwater by water displacement

CHARACTERISTICS / ADVANTAGES

- Suitable for dry, damp, wet and underwater conditions
- Very low shrinkage
- Seals against moisture and oxygen
- Very good adhesion to concrete, steel and masonry
- Good adhesion to cementitious substrates immersed in saltwater
- High density ensures good water displacement
- Good mechanical strengths underwater
- Fills cracks down to a width of ≥ 0.5 mm
- Injectable with single-component pumps

ENVIRONMENTAL INFORMATION

- Contributes towards satisfying Materials and Resources (MR) Credit: Material Ingredients: Option 2 under LEED® v4.1 — 1 point
- Contributes towards satisfying Materials and Resources (MR) Credit: Environmental Product Declarations: Option 1 under LEED® v4.1 — 1 point
- Environmental Product Declaration (EPD) in accordance with EN 15804. EPD independently verified by Institut für Bauen und Umwelt e.V. (IBU)

APPROVALS / STANDARDS

- 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
- CE marking and declaration of performance based on EN 1504-5:2004 Products and systems for the protection and repair of concrete structures — Concrete injection
- CE marking and declaration of performance based on EN 1504-6:2004 Products and systems for the protection and repair of concrete structures — Anchoring reinforcing steel bar

PRODUCT INFORMATION

Chemical Base	Epoxy resin		
Packaging		20 kg pre-batched unit	6 kg pre-batched unit
	Part A	17.77 kg pail	5.33 kg pail
	Part B	2.23 kg pail	0.67 kg pail
	Part A+B	20 kg	6 kg
	Pallets	560 kg (28 × 20 kg)	432 kg (72 × 6 kg)
Refer to the current price list for available packaging variations.			
Colour	Part A	Green	
	Part B	Transparent	
	Part A+B	Green	
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	Part A	2.35 kg/L	(EN ISO 2811-1)
	Part B	1.02 kg/L	
	Part A+B	2.04 kg/L	
	Density value at +20 °C.		
Viscosity	Temperature	Part A+B	(EN ISO 3219)
	+10°C	15200 mPa·s	
	+20°C	5800 mPa·s	
Colour	Liquid		

TECHNICAL INFORMATION

Compressive Strength	Curing time	Cured at +5 °C	Cured at +20 °C	(EN 12190)		
	1 day	-	33 N/mm ²			
	3 days	39 N/mm ²	61 N/mm ²			
	14 days	70 N/mm ²	90 N/mm ²			
Product cured and tested at temperatures indicated and grouted and cured underwater.						
Specimen size: 40 mm x 40 mm x 160 mm.						
	Curing time	Cured at +23 °C	Percent compressive strain (ε _M)	(ASTM D695)		
	6 hours	10 N/mm ²	30 %			
	8 hours	20 N/mm ²	28 %			
	10 hours	30 N/mm ²	25 %			
	12 hours	40 N/mm ²	23 %			
	20 hours	60 N/mm ²	23 %			
	1 day	65 N/mm ²	22 %			
	3 days	76 N/mm ²	3 %			
	7 days	85 N/mm ²	2.2 %			
	Product cured and tested at temperatures indicated and grouted and cured in air.					
	Specimen size: 12.7 mm x 12.7 mm x 25.4 mm.					
	Modulus of Elasticity in Compression	6300 N/mm ²			(EN 13412)	

Flexural Strength	Time	Tensile strength in flexure at +5 °C	Tensile strength in flexure at +20 °C	(ISO 178)
	1 day	-	25 N/mm ²	
	2 days	28 N/mm ²	38 N/mm ²	
	14 days	38 N/mm ²	40 N/mm ²	
Product cured and tested at temperatures indicated and grouted and cured underwater.				
Flexural E-Modulus	3300 N/mm ²			(ISO 178)
Tensile Strength	Cured 14 days at +20 °C	20 N/mm ²		(EN ISO 527-2)
Product cured and tested at temperatures indicated and grouted and cured underwater.				
Tensile Modulus of Elasticity	4100 N/mm ²			(EN ISO 527-3)
Elongation at Break	0.6 %			(EN ISO 527-2)
Shrinkage	Hardens without shrinkage			(EN 12617-4)
Tensile adhesion strength	2.5–3.5 N/mm ² (concrete failure)			(EN ISO 4624; EN 1542)
Coefficient of Thermal Expansion	7.5 × 10 ⁻⁵ 1/k			(EN 1770)
Electrical Resistivity	4.12 GΩ (surface resistance within the range of 0.8 to 8.8 GΩ which corresponds to EN 50122-2)			(PN-E-05203)
Service Temperature	Maximum	+40 °C		
	Minimum	-40 °C		
Heat deflection temperature	Cured for 7 days at +23 °C	+44 °C		(ASTM D648)

APPLICATION INFORMATION

Mixing Ratio	Part A : Part B by weight	8.0 : 1
	Part A : Part B by volume	3.6 : 1
Layer Thickness	Maximum	30 mm
	Minimum	0.5 mm
Product Temperature	Maximum	+30 °C
	Minimum	+5 °C
Ambient Air Temperature	Maximum	+30 °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	+30 °C
	Minimum	+5 °C
Pot Life	Temperature	Time
	+8 °C	60 minutes
	+20 °C	30 minutes
	+30 °C	15 minutes
	+40 °C	7.5 minutes

Note: Pot life begins when the resin and hardener are mixed.

Note: Pot life is shorter at high temperatures and longer at low temperatures.

Note: The greater the quantity of product mixed, the shorter the pot life.

Note: Apply the following methods for obtaining a longer pot life at high temperatures:

1. Divide the mixed product into smaller quantities.
2. Cool down parts A and B before mixing. Do not cool below +5 °C.

VALUE BASE

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

Local safety regulations must be observed and it advisable to wear PPI when working with this product with particular attention paid to cutting and handling.

Transportation Class: The product is not classified as hazardous good for transport. Disposal: The material is recyclable. Disposal must be according to local regulations. Please contact your local Sika sales organisation for more information.

APPLICATION INSTRUCTIONS

SUBSTRATE PREPARATION

Verify the substrate strength to ensure design strengths are achieved.

CONCRETE

Substrate surfaces can be dry, damp, wet or underwater. They must be stable, clean, free from ice, dirt, oil, grease, coatings, laitance, efflorescence, old surface treatment, all loose particles and any other surface contaminants that could affect adhesion.

Concrete must be at least 28 days old.

Suitable techniques for substrate preparation include the following:

- Hand-chiselling
 - Abrasive blast cleaning
 - Grinding
 - Light scabbling
 - Needle gunning
 - Bush hammering
 - High-pressure water blasting
1. Prepare the substrate mechanically using a suitable technique.
 2. Remove any debris from pockets or holes for structural fixings.
 3. Clean all substrate surfaces using industrial vacuuming equipment to remove dust and contaminants that may reduce adhesion.

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

STEEL

Surfaces must be cleaned and prepared thoroughly to a quality standard equivalent to SA 2.5 (bright metal) with a surface profile to satisfy the necessary tensile adhesion strength requirement.

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

Avoid dew point conditions.

For best results, the substrate must be dry.

1. Prepare the substrate mechanically using a suitable technique such as blast-cleaning or grinding.
2. Clean all substrate surfaces using industrial vacuuming equipment to remove dust and contaminants that may reduce adhesion.
3. Apply Sikadur®-53 as soon as possible to prevent re-oxidizing and rust formation.

CRACK INJECTION

Cracks must be clean. They can be dry, damp, wet or underwater.

MIXING

Observe the following guidance:

- When using multiple units during application, do not mix the following unit until the previous unit has been used. This could otherwise lead to poor workability and an unfavourable handling time.
 - Mix full units only.
 - Do not thin with solvents.
1. IMPORTANT Mix full units only. Prior to mixing all parts, mix Part A (resin) briefly using a mixing spindle attached to a slow speed electric mixer (max. 400 rpm).
 2. Add Part B (hardener) to Part A.
 3. Mix Parts A + B continuously for at least 3 minutes until a uniformly coloured mix with a smooth consistency has been achieved.
 4. Pour the materials into a clean container and mix again for at least 1 minute to achieve a consistent mix and to ensure thorough mixing. Avoid over-mixing to minimise air entrainment. Note Total mixing time is 4 minutes.
 5. IMPORTANT For underwater applications, after final mixing, wait 15 minutes at +20 °C to allow the mixture to pre-react for optimal adhesion.

APPLICATION

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 ¼ to ⅓ of the short-term failure load.
2. Consult a structural engineer for calculating the admissible load for the specific application.

ADHESIVE

1. Apply the mixed Sikadur®-53 to the prepared surface with a spatula, trowel, notched trowel, or with hands protected by gloves. If applying to matt damp concrete, brush Sikadur®-53 well into the substrate.

GROUTING RESIN

1. Select suitable formwork (permanent or temporary) of sufficient strength to contain the grout around areas such as base plates.
2. Ensure all edges and joints of the formwork are sealed tightly to prevent leakage or seepage of the grout.

3. Coat all surfaces of the formwork that will come into contact with the grout with polyethylene film or release agent to prevent adhesion.
4. Pour the mixed Sikadur®-53 into the formwork from one or two sides only. Ensure continuous grout flow during the complete grouting operation. Allow air release on the opposite side and minimise air encapsulation.
5. Where the void beneath the base plate is greater than the maximum allowable grout thickness (see Layer thickness), place the grout in successive lifts once the preceding lift has hardened and cooled.
6. Note For underwater applications, use a funnel or a feed hopper system connected with flexible tubes to provide enough hydrostatic height and pressure. Sikadur®-53 is poured underwater through the funnel or feed hopper system.

CRACK INJECTION

Preconditions

Preliminary trials have been carried out by a competent applicator experienced in crack injection, using injection equipment and appropriate injection pressures.

1. Insert or bond injection ports.
2. Cap the crack with a surface crack sealer.
3. Allow to cure.
4. Purge cracks with Sikadur®-53 until the Sikadur®-53 runs clean and contaminant-free.
5. Take cores at locations of cracks to clarify penetration of Sikadur®-53.

CLEANING OF TOOLS

Sweep excess material into appropriate containers for disposal before it has hardened. Dispose of in accordance with applicable local regulations.

Clean all tools and application equipment with Sika® Colma Cleaner at regular intervals and 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 the 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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Product Data Sheet

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