



PRODUCT DATA SHEET

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EPOXY INJECTION GROUTING

Sikadur®-673

THIXOTROPIC, MEDIUM POT LIFE, MODIFIED-EPOXY RESIN CAPABLE OF DISPLACING WATER DURING INJECTION GROUTING AND CRACK SEALING

Description	Sikadur®-673 is a two component, 100% solids, epoxy resin. It is able to displace water from cracks and similar imperfections and is of a thixotropic consistency which prevents it from draining out of cracks during cure. This allows it to structurally bond and seal blind cracks.
Where to Use	<ul style="list-style-type: none"> Injection grouting of wider cracks (0.25 - 6 mm [0.01 - 0.25 in]) to reinstate structural integrity in concrete, masonry and other suitable substrates. Grouting of wet or even water filled cracks where other resins would not be suitable owing to sensitivity to moisture. Injection of 'blind' cracks where the back of the section to be injected cannot be accessed and therefore cannot be capped at the back side.
Advantages	<ul style="list-style-type: none"> Thixotropic consistency suitable for wider cracks in horizontal, vertical or overhead applications. Medium pot life accommodates differing application methods and equipment. High moisture tolerance, achieving 2.1 MPa (304 psi) tensile adhesion strength on wet (no standing water) substrates. Capable of curing down to 0 °C (32 °F), lower than most injection resins and suitable for colder conditions. High bond characteristics, substrate failure typical before resin. Excellent damp adhesion, ensuring cracks and defects are filled, bonded and sealed.

Technical Data

Packaging	3.5 L (0.9 US gal.) unit [2.73 L (0.7 US gal.) Component A; 0.77 L (0.2 US gal.) Component B] Supplied in cartons each containing 2 x 2.73 L (0.7 US gal.) pails and 2 x 0.77 L (0.2 US gal.) cans
Colour	Component A: Light Yellow Component B: Amber Mixed (A + B): Light Amber
Yield	1 L = 1 m ² of resin at 1 mm thick (1 US gal = 231 in ³)
Shelf Life	2 years in original, unopened packaging. Store dry and condition product at above 15 °C (59 °F) for ease of mixing and application. Do not allow to freeze.
Mix Ratio	A:B = 78:22 by volume, 80:20 by weight
Properties at 23 °C (73 °F) and 50 % R.H.	
Specific Gravity	A: 1.11 kg/L B: 0.98 kg/L Mixed (A+B): 1.08 kg/L
Viscosity	Mixed (A+B): 9300 cps (Gel)
Solids by weight	100%
Pot Life	
Mixed Resin, 200 g	60 min
Tack-Free Time (10/25 °C [50/77 °F])	20/10 hrs
Through Cure (10/25 °C [50/77 °F])	7/3 days
Tensile Strength ASTM D638 14 days	44 MPa (6383 psi)
Compressive Strength ASTM D695 14 days	89 MPa (12 908 psi)
Flexural Strength ASTM D790	48 MPa (6962 psi)
Tensile Adhesion (wet concrete)	2.1 MPa (304 psi) (concrete failure)

Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods.

HOW TO USE

Surface Preparation

General: Proper preparation and a suitable substrate condition are fundamental to achieving the best results and durable performance from injection grouting and crack sealing. Foreign material in a crack may be a major factor in successful injection or grouting works. **Note:** Substrates must be clean, sound and can be dry or damp. Optimum penetration and adhesion are obtained in dry conditions.

Concrete: Where cracks are to be injected, clean the concrete surface along the length of the crack to approx 20 mm (3/4 in) on either side to remove existing coatings or surface treatments, dirt, dust, debris, loose friable material and other such contaminants which will impede penetration and impact upon adhesion. Sandblasting or other such mechanical methods are considered most suitable to remove all deleterious material and provide an open, roughened texture. Where a deeply contaminated concrete exists, ie, containing oils, grease or similar such substances, chip out the affected substrate and vacuum any preparation residue to achieve a suitable surface condition. If possible, clean the crack with a wire brush to clear the way for resin to penetrate. Blow out the crack or defect with clean, dry and filtered (oil-free) compressed air or vacuum to remove all contaminants.

Steel: Where cracks are to be injected and steel is present, clean the steel surface around the fracture to approx. 20 mm (3/4 in) to remove existing coatings or surface treatments, dirt, dust, debris, loose friable material and other such contaminants. Sandblasting or other such mechanical methods are considered most suitable to remove all deleterious material and provide a white-metal finish. Blow out the prepared crack, where possible, with clean, dry and filtered (oil-free) compressed air or vacuum to remove all contaminants.

Injection Set-Up

When using automated or manual injection equipment, set appropriate injection ports, tees etc. as required by the system being used. The intervals at which injection ports, tees or drilled ports are set will be governed by the severity and extent of the crack together with the nature of the structure. Space the injection points in accordance with the thickness of the element being injected (100 to 200 mm [4 to 8 in]). The spacing can be increased or decreased as determined by the rate of injection of the specific resin.

Where substrates are relatively flat and can accommodate them, injection tees are installed over the crack, taking care not to block the passage way for the injected resin. Where substrates are not flat or cannot be cleaned to the required standard to allow adequate adhesion of the injection tees, install drilled ports. Create drill holes approximately 10 mm (3/8 in) in diameter, 45° angle to intersect the crack at about 100 mm (4 in) from the surface. The drill holes should be drilled alternately on opposite sides of the crack and at 200 mm (8 in) centres and should be created using a vacuum drill. Ensure the passage way is not blocked and insert the injection ports. The injection ports are typically Tapered HD Packers that are hammered into the drill holes and high pressure nipples fitted into them.

Where a crack is accessible on both faces of a structural element or the substrate is greater than 500 mm (20 in) in its cross-section, the crack can be capped and injection points may be located on both faces. Bond the injection tees or ports, using Sikadur®-31 Hi-Mod Gel^{CA} or Sika AnchorFix®-3001, depending upon prevailing conditions (refer to specific Product Data Sheet). Ensure that the injection tees or ports are securely fixed to prevent leakage or displacement but that the adhesive does not obstruct the path through which the injection resin is to pass.

Seal or 'cap' the face of the crack, defect or void using Sikadur®-31 Hi-Mod Gel^{CA} or Sika AnchorFix®-3001, depending upon prevailing conditions. The capping can be applied by a manual dispenser, trowel or with a palette knife, ensuring a consistent thickness (6 mm [1/4 in]) and complete seal over the crack (75 mm [3 in] wide).

It is sometimes possible to flush cracks or voids to remove contaminants or foreign particles prior to injection, introducing water or compressed air through the injection tees or ports in succession and subsequently inserting a plastic plug or cap into the injection port to close them off and prevent further contamination. This can ensure continuity of the crack between injection points before actually undertaking injection. A thorough study in this regard is always necessary. **Note:** If flushing the crack with water, always allow the crack to dry out sufficiently before injecting.

Mixing

Prior to mixing, pre-stir Components A and B separately to achieve an even consistency.

Pour the contents of Component B into Component A and mix the combined components thoroughly for at least two (2) minutes, or until uniform consistency and colour are produced. Use a slow-speed drill (200-300 rpm) to minimise entrapping air and an *Exomixer*® type mixing paddle (recommended model) suited to the volume of the mixing vessel. During the mixing operation, scrape down the sides and the bottom of the container with a flat or straight edge trowel at least once to ensure complete mixing.

It is advisable to mix just a part of the 4 L unit initially – 1 L would be appropriate – to determine rate of travel of the resin and to confirm that a full 4 L mix can be used well within the pot life.

Mix only that quantity that can be used within its pot life, 20 - 60 minutes, depending on quantities and prevailing temperatures. Transfer the mixed resin into suitable, injection equipment.

Injection of the mixed Sikadur®-673 is then carried out.

Application	<p>Low Pressure Injection Procedure: After the crack has been prepared for the pressure injection process, resin is injected using a modified pressure pot and is pumped from one port (or tee) to the next in sequence. On a vertical crack, one starts at the bottom. If there is water in the crack it must be expelled by the resin being injected and this phase must continue until clear, water-free resin is emerging from the next port (or tee).</p> <p>The injection process must be continued until the entire crack is filled with resin.</p> <p>On large projects Test samples of the resin being injected must be taken before, during and after the injection is complete. It is imperative that the injection process be continually monitored to ensure that the resin injected is properly mixed and will cure satisfactorily.</p> <p>Note: When using a pressure pot, pour contents of “B” into “A” and mix well with a low speed power mixer (200 - 300 rpm) to an even consistency. Pour this into pressure pot. If injecting fine cracks where productivity is slow, it is recommended to mix just 1 L of material initially. This allows a usage rate to be established and avoids wasting material if the 4 L cannot be injected within the pot life.</p> <p>High Pressure Injection Procedure: A grease gun capable of pressures up to 300 psi should be filled with water, and the water injected through the packers to check that each of the packers intersect the crack and a path is available for subsequent injection.</p> <p>Where no travel is evident then additional holes should be drilled and packers set to provide necessary access to the crack.</p> <p>Note: It should be noted that Sikadur®-673, under the pressure of injection, flows readily, even in fine cracks. Once pressure is released it then stops flowing and returns again to a gel consistency, to avoid drainage from the crack or excessive running at the crack.</p> <p>Injection of the mixed Sikadur®-673 is then carried out using another grease gun or a pump, commencing at the lowest injection packer. As the resin moves into the crack, water is displaced ahead of it. Once all the water is released then Sikadur®-673 will follow – when this is observed, injection should move on to the next packer and the same process continued along the crack until it is completed.</p> <p>Excess Sikadur®-673 appearing at the surface of the crack can be left up to 1 hour (at 25 °C [77 °F]) but can be easily scraped clear.</p>
Curing	<p>Allow Sikadur®-673 to cure sufficiently before removing injection ports and tees and grinding off the adhesive/cap seal. The time at which this can be done will be dependent upon prevailing conditions but Through Cure times should be used for guidance. Unless the site of the injection works is being overlaid or overcoated, there will be a limit to the degree to which an aesthetic appearance can be achieved. Where this is an issue, a sample installation should be undertaken and assessed.</p>
Clean Up	<p>Uncured material can be removed with Sika® Epoxy Cleaner. Cured product can only be removed mechanically. Wash soiled hands and skin thoroughly in hot soapy water or use Sika® Hand Cleaner towels.</p>
Limitations	<ul style="list-style-type: none"> ▪ Sikadur®-673 must not be thinned; solvents will prevent proper cure. ▪ Minimum age of concrete must be 21 to 28 days depending on curing and drying conditions. ▪ Minimum in place curing temperature: 0 °C (32 °F). ▪ Low temperatures will make injection slower and will considerably prolong cure times. ▪ Ensure components are correctly proportioned and mixed. ▪ Maximum resin thickness: 6 mm (1/4 in). ▪ Not for injection of cracks under hydrostatic pressure/flowing water conditions. ▪ Sikadur®-673 is a moisture vapour barrier when cured.
Health and Safety Information	<p>For information and advice on the safe handling, storage and disposal of chemical products, users should refer to the most recent SAFETY DATA SHEET containing physical, ecological, toxicological and other safety-related data.</p>

KEEP OUT OF REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY

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, within their shelflife. 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 recommendations, or from any other advice offered. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. 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 or may be downloaded from our website at: www.sika.ca

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