



FLEXIBLE RAIL FIXING EFFECTIVE NOISE AND VIBRATION REDUCTION IN URBAN ENVIRONMENTS

BUILDING TRUST



SIKA FLEXIBLE RAIL FIXING PRODUCT OVERVIEW

Sika® Icosit® KC 340 PRODUCTS are flexible two-component polyurethane, insensitive to moisture, polymer resin grout, designed as a vibration absorbing, load-bearing, flexible grout for discrete fixation, continuous undersealing or embedding rails.

The Sika® Icosit® KC range has won worldwide renown for tailor made, long lasting direct fixation of rails to solid substrates, i.e. concrete and steel. They are incorporated in a variety of trackwork designs, in discrete, continuous undersealing, embedded rail system fixations, lawn track (GT), for railway, light rail, tram and crane track installations.

Sika provides technical support in each stage of project to consultants, operators and contractors for optimum and innovative trackwork solutions under a wide variety of conditions of exposure, for max axel loads up to 25 tons.

Product	Usage	Characteristics
Sika® Icosit® KC 340/35	Elastic PU grout for continuous undersealing & embedded rail system with max product service load up to 1 MP	For axle loads less than 120 kN and high deflection
Sika® Icosit® KC 340/45	Elastic PU grout for continuous undersealing & embedded rail system with max product service load up to 2 MP	For axle loads less than 120 kN and standard deflection
Sika® Icosit® KC 340/65	Elastic PU grout for continuous undersealing & embedded rail system with max product service load up to 4 MP	For axle loads less than 250 kN and standard deflection
Sika® Icosit® KC 340/4	Elastic PU grout for discrete fixation with max product service load up to 3 MPa. Can be used with base plates different types	For axle loads less than 120 kN and high deflection
Sika® Icosit® KC 340/7	Elastic PU grout for discrete fixation with max product service load up to 4 MPa. Can be used with base plates different types	For axle loads less than 250 kN and standard deflection
Sika® Icosit® KC 330/10	Hard elastic PU grout for discrete fixation with max product service load up to 15 MPa. Can be used with base plates different types	For the construction of tracks with very high axle loads (exceeding 250 kN) of gantry and container cranes
Sika® Icosit® KC 220/60 TX	Adhering anchor bolts by pouring	For pressure and wear resistant lining of anchor bolts for base plates
Sika AnchorFix®-3030	Adhering anchor bolts applied with the application dispenser	For pressure and wear resistant lining of anchor bolts for base plates
Sikaflex®-406 KC	Elastic joint sealing between rails and adjacent surfaces (asphalt)	Booster accelerated elastic sealant used for joints between rails, adjacent surfaces and with Sika® Icosit® KC products.
Sikadur®-32+	Can be used as a primer on concrete (dry and mat damp) and steel (also as a coating it has an electrical surface resistance parameters) substrates, also for setting anchor bolts by pouring	Good adhesion on wet / green concrete and steel; electrical insulating
Sika® Icosit® KC 330 (Sika Primer-115)	Primer, for dry concrete and steel substrates	1-component ready to use
Sika® Icosit® KC 330 FK	Adhesive material for fixing filler blocks with high initial adhesion	2-comp fast setting thixotropic
SikaBond®-139 Filler Block	Adhesive material for fixing filler blocks applied with the application dispenser	1-component flexible polymer based on polyurethane material



BENEFITS OF ELASTIC POLYURETHANE GROUTS FOR TRACKWORK

ONE OF THE CENTRAL REQUIREMENTS OF TRACK CONSTRUCTION is reducing vibration and noise. Our innovative systems accomplish these reductions through flexibility, spring parameters, electrical isolation ensures long durability of trackway.



Urban planners are obliged to expand local public transport to cope with the rapid development of urban spaces. This trend requires a reduction in vibrations and noise in the rail fastening system, therefore the flexible and volume-compressible grouting materials become the effective, long lasting solution.



EFFECTIVE NOISE AND VIBRATION REDUCTION, INCREASE OF COMFORT AND SMOOTH EXPERIENCE (“SILENT TRACKS”)

- Resilient intermediate layer for optimum reduction of noise and vibration transmission, i.e. vibration damping, cast-in-situ after alignment to eliminate voids under the rail and to ensure continuous and homogenous fixation.
- Increase comfort and smooth train operation shortly named “silent tracks”
- Appropriate selected Shore A hardness for a given type of rolling stock ensures primary noise reduction by reducing vibrations and secondary noise; increasing the comfort and smooth running of the train and allows to meet the requirements of noise standards.
- Appropriate selected Shore A hardness for a given type of rolling stock ensures right level rail deflection, increasing the comfort and smooth running of the train and allows to meet the requirements of noise standards



LONG DURABILITY (SERVICE LIFE) AND EXTREMELY LOW (CLOSE TO ZERO) MAINTENANCE COSTS

- Load bearing – resistant to dynamic loads and permanent alignment of rails ensuring track stability
- Levelling out inevitable tolerances between rail and concrete or steel substrate
- Long-term resistant against water and most detergents allows the long life service of applied solution in wash train stations
- Short-term (min 3 days) resistant against: mineral oils, diesel fuel, vegetable and animal fat allows the long life service of applied solution in the case of a track integrated with the road surface



SAFETY AND LOW RISK

- Added safety and maximum performance due to excellent parameters of Sika® Icosit® KC products.
- Highly efficient electrical resistivity for prevention of stray current leakage as a safeguarding against signalling malfunction.



VERSATILITY

- Suitable for any kind of rails (e.g. 60R1, 60R2, 49E1, etc.).
- Has selected versions of materials for concrete and steel substrates, depending on the application (tram, train, underground and overhead, etc.)



EASY APPLICATION

- Manually apply
- Machine apply – highly ecological and economical solution due to reduced wastage and less application time needed

PROVEN IN-FIELD SERVICE – CONTINUOUS BEDDING OF RAILS

STRONG ENGINES AND REGENERATIVE BRAKING SYSTEMS, modern rail vehicles are becoming more comfortable and fast. However, they also have a high return current which increases the risk of stray current corrosion and signal interference.

RAIL FIXING GROUTS

Sika® Icosit® KC 340 Products fulfil the latest regulations as per EN 50122-2 regarding insulation against electrical current leakage. Application of Sika® Icosit® KC 340 Products is largely independent of weather conditions as it can also tolerate matt damp substrates.

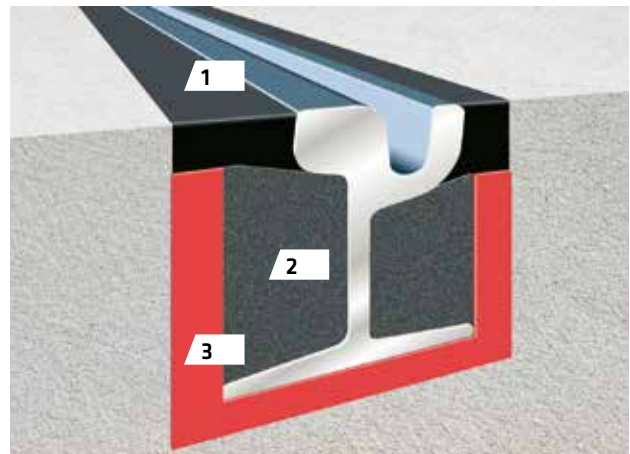
- Sika® Icosit® KC 340/35 is used for with max product service load up to 1 MPa.
- Sika® Icosit® KC 340/45 is used for continuous undersealing or embedding rails with max product service load up to 2 MPa.
- Sika® Icosit® KC 340/65 is used for continuous undersealing or embedding rails with max product service load up to 4 MPa.

BENEFITS OF Sika® Icosit® KC 340 PRODUCTS

- Saves installation time due to short cure time
- Saves money due to shorter path interruption, faster installation, long-term maintenance cost reductions, etc.
- Successful in-field service for 30 years

ADVANTAGES

- Flexible, elastic, dimensions tolerance-compensating
- Dampening and vibration mitigation
- Moisture resistant, no water absorption, frost resistant which ensures watertight track structure
- Product electrical insulation ensures the protection against stray current corrosion
- Permanent fixation of rail to concrete or steel substrate



Continuous grooved rail storage with cavity filling.

1. Joint sealing by Sikaflex®-406 KC with primers
2. Filler block elements adhered by Sika® Icosit® KC 330 FK or SikaBond®-139 Filler Block
3. Two-component polyurethane material Sika® Icosit® KC 340

- A correct Shore A Hardness results in proper deflection level of the rail which ensures a reduction of mechanical wear on vehicles and rail
- Permanent rail alignment results in track geometry stability
- More uniform load distribution on the ground
- Efficient Life Cycle Costs (LCC) of the track superstructure is ensured by long durability, and a low maintenance cost





ACCESSORIES

ELASTIC JOINT SEALING BETWEEN RAILS, ADJACENT SURFACES

- Sikaflex®-406 KC is one component, self-levelling booster accelerated elastic joint sealant with high mechanical and chemical resistance, especially designed for joints between rails, adjacent surfaces (asphalt) and on Sika® Icosit® KC products.
- Sikadur®-32+ primer for concrete (dry and matt damp concrete substrates) and steel. Sikadur®-32+ is two-component, based on a combination of epoxy resins and special fillers, moisture tolerant, designed for use at temperatures between +10°C and +30°C. Important is that the surface resistance of the Sikadur®-32+ coating (4,335 GΩ) meets the requirements of the EN 50122-2 standard (0,8 – 8,8 GΩ).
- Sika® Icosit® KC 330 (Sika Primer-115), a one-component ready to use primer for dry concrete and steel substrates

ADHESIVE MATERIALS FOR FIXING FILLER BLOCKS

- Sika® Icosit® KC 330 FK, a fast setting two-component thixotropic (sag-resistant) flexible polymer based on polyurethane material
- SikaBond®-139 Filler Block applied with the application dispenser

DISCRETE/DIRECT FIXATION OF RAILS

THE VARIOUS GRADES OF the Sika® Icosit® KC 340 series are in-Field service-proven for more than 3 decades. Maximum adhesion between concrete and steel ensures a high additional safety margin.

RAIL FIXING GROUTS

Regardless of the type and size of the baseplates, the pourable, flexible grouts can be adopted to all situations of direct fixation, for all ballast less tracks types, particularly for special trackwork, in tunnels and on bridges, under certain circumstances even without anchor bolts.

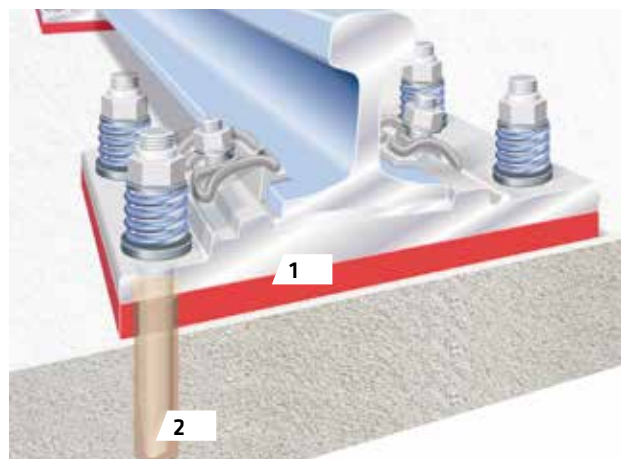
- Sika® Icosit® KC 340/4 is used for discrete fixation with max product service load up to 3 MPa.
- Sika® Icosit® KC 340/7 is used for discrete fixation with max product service load up to 4 MPa. The versatility of those products allows its use for any kind of steel baseplates, anchor bolts and rails.

BENEFITS OF Sika® Icosit® KC 340 PRODUCTS

- Saves installation time due to short cure time
- Saves money due to shorter path interruption, faster installation, long-term maintenance cost reductions, etc.
- Successful in-field service for 30 years

ADVANTAGES

- Flexible, elastic, dimensions tolerance-compensating
- Dampening and vibration mitigation
- Moisture resistant, no water absorption, frost resistant which ensures watertight track structure
- Product electrical insulation ensures the protection against stray current corrosion
- Permanent fixation of the baseplate with the rail to the concrete or steel substrate
- A correct Shore A Hardness results in proper deflection level of the rail which ensures a reduction of mechanical wear on vehicles and rail
- Permanent rail alignment results in track geometry stability
- More uniform load distribution on the ground by water penetration
- More uniform load distribution on the ground
- Efficient Life Cycle Costs (LCC) of the track superstructure is ensured by long durability, and a low maintenance cost.



On the discrete fixation of rails the single fixations will be fixed by anchor bolts and stored on Sika® Icosit® KC.

1. Two-component polyurethane Material Sika® Icosit® KC 340
2. Sika chemical anchoring products





PRODUCTS FOR THE ANCHORS IN THE DISCRETE FIXATIONS

Since the system is based on chemical and mechanical compounds, no pre-loading stress is imparted to the substrate as it is with expansive mechanical anchors; they are ideally suited for high load applications, especially in case of discrete fixation. Sika provides three options of chemical anchoring materials:

- Pourable – Sikadur® 32+ (dry and matt damp concrete substrates)
- Sika AnchorFix®-3030 applied with the application dispenser (dry and matt damp concrete substrates)
- Pourable – Sika® Icosit® KC 220/60TX (dry concrete substrate)

LAWN TRACK (GT) DESIGNS AND CUSTOM APPLICATIONS

LAWN TRACK DESIGNS – THE “GREEN ALTERNATIVE”

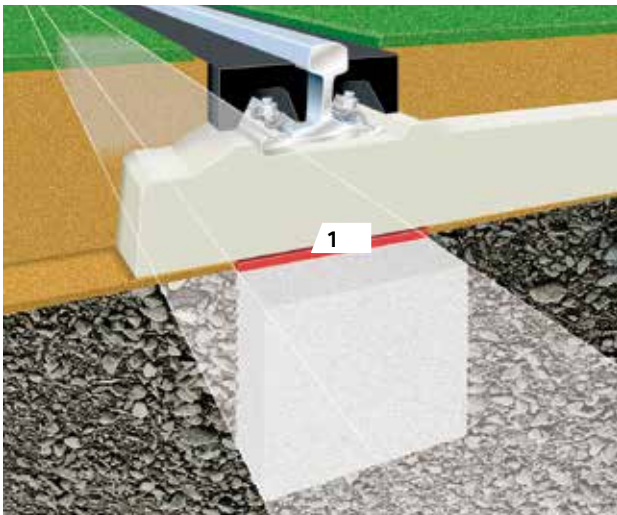
Town planners prefer to segregate rail from road traffic to shorten transit times and to reduce risk of accidents. To reduce the environmental impact of the trackwork, lawn track designs have become very popular. Ecological, lawn track designs with Sika® Icosit® KC 340 Products reduce vibration, primary and secondary noise while still maintaining efficient insulation against stray currents. These designs ensure long durability (service life) and extremely low (close to zero) maintenance costs.

BENEFITS:

The sustainable solution for ecological construction

THE LAWN TRACK ADVANTAGES:

- Less emission of airborne sound
- Aesthetically pleasing design
- Ecological and sustainable
- Protection against stray current corrosion
- Efficient Life Cycle Costs (LCC) of the track superstructure is ensured by long durability, and a low maintenance cost.



Bremer green track.

1. 2-component polyurethane material Sika® Icosit® KC 340



CUSTOM APPLICATIONS

Tracks for heavy gantry cranes can be exposed to extremely high wheel loads of even more than 100 tons per wheel with the maximum pressure in the product equal or lower than 15 MPa (service Load). The tough-elastic grades of the Sika® Icosit® KC Products (Sika® Icosit® KC 330/10) used for these applications has enough resistance against dynamic loads combined with such high wheel loads to avoid damage.

BENEFITS:

Safe and continuous operation

THE PRODUCT ADVANTAGES:

- For extremely heavy loads
- Insensitive to shock loads



CERTIFIED QUALITY PROVIDES SECURITY

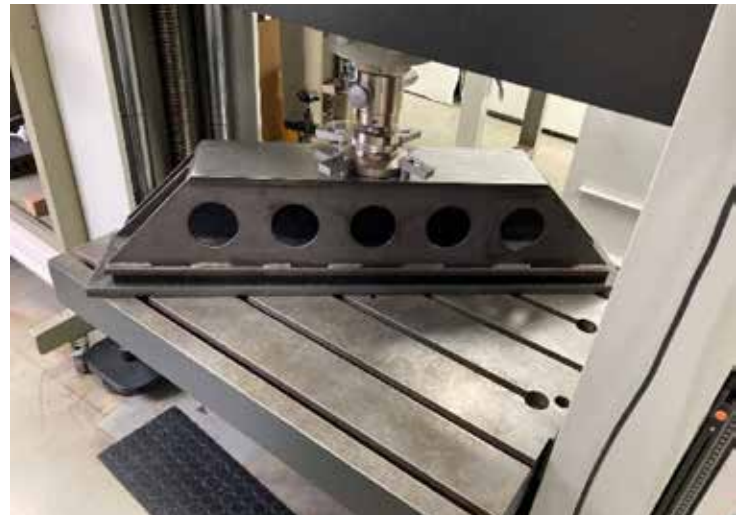
Before being released, the products of the Sika® Icosit® KC series have to undergo extensive in-house testing using sophisticated equipment under realistic conditions. In addition to that, large scale field tests are complemented by independent third party testing facilities e.g. The Technical University of Munich, The University of Calgary/Canada, Technical University of Krakow, AEA Rail Technology in the UK, the University of Louvain/Belgium, Technical University of Desden the University of Győr/Hungary and many others. German Railways (DB) ranking Sika as "Q1" = top quality supplier. Many other railway authorities also rely also on the approved track fixing designs with flexible grouts of the Sika® Icosit® KC series.

Among many other tests and references this long-term in-field experience shows the products quality particularly well: A perfectly intact 28 year old discrete/direct fixation with Sika® Icosit® KC grout was removed from Heinrichsheim bridge in Bavaria. The Technical University of Munich subsequently produced a Load deflection (spring) diagram. Comparison with the corresponding diagram from the quality control at the time of installation in 1971 only showed a loss of flexibility of 6% (+/-10% production tolerance) after 28 years – proof of outstanding longevity!



TRUSTFUL SYSTEMS CAN STAND THE TEST.

Research report of TU Munich.

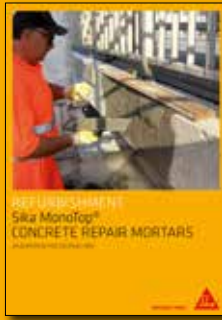


Tensile test.



Discrete/Direct fixation test.

ALSO AVAILABLE FROM SIKA



FOR MORE INFORMATION ON SIKA STREETSCAPE SYSTEMS AND SOLUTIONS:



WE ARE SIKA

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, flooring as well as roofing and waterproofing systems.

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



SIKA SERVICES AG
Tueffenwies 16
CH-8048 Zurich
Switzerland

Contact
Phone +41 58 436 40 40
www.sika.com

BUILDING TRUST

