

STARRGleis SIL

Approval by the German Federal Railway Authority for operational testing of ballast bonding for use in track areas on earthwork structures and bridges



Properties:

STARRGleis SIL is a two-component, silicate-based injection resin developed especially for the fixation of rail ballast in railway construction.

This resin may be deployed universally in railway construction, on ballast of any type and with containing any level of moisture.

Areas of application:

- Transitions between standard open rail and fixed rail stretches
- As protection against ballast shifting
- As protection against flying ballast
- For safety during work on tracks
- Position stabilisation and/or correction
- Reduction of tamping intervals
- For easier cleaning of track ballast beds
- Reduction of dust production in operations
- Securing of escape routes in tunnels

Technical Data:

Substance data of components:

Component A

Consistency	liquid	
Colour	colourless	
Odour	characteristic	
Spec. density (23°C)	approx. 1.41 g/cm ³	DIN EN ISO 2811-1
Dyn. viscosity (23°C)	approx. 150 mPas	DIN EN ISO 2555

Component B

Consistency	liquid	
Colour	brown	
Odour	characteristic	
Spec. density (23°C)	approx. 1.11 g/cm ³	DIN EN ISO 2811-1
Dyn. viscosity (23°C)	approx. 250 mPas	DIN EN ISO 2555

Mixture of A- and B-component:

Processing temperature	15 - 30°C	substrate temperature
Mixing ratio A : B	1 : 1 (parts by volume)	

Reaction data (at 23°C):

String gel time (Pot-life)	approx. 60 s	ASTM D7487
Final curing	approx. 20 min	

Properties of silicate resin:

Compressive strength		DIN EN 12190
2 h	approx. 18 N/mm ²	
1 d	approx. 22 N/mm ²	
7 d	approx. 25 N/mm ²	
E-modulus	approx. 75 MPa	DIN EN ISO 527
Tensile strength	approx. 6.0 MPa	DIN EN ISO 527
Elongation at break	approx. 10 %	DIN EN ISO 527

Processing:

The two components are initially stored in a 1 : 1 proportion and continuously moved using a suitable injection pump.

Indicated injection pumps: *TPH INJECT PS 25-II*
 TPH INJECT PS 5-II

At the end of the the conveyor hoses the components are combined using a T or Y piece and then mixed together homogeneously in the mixing pipe using a static mixing unit.

Using an attached injection lance, the reaction mixture is applied to the prepared track ballast area in such a way as to achieve the uniform spread of the product (using a flood grouting process). For an easy and uniform distribution, we recommend the use of flat fan nozzles (e.g. 80/10).

The still liquid products quickly flows into the porous structure of the ballast, but then reaches a consistency at which it can no longer flow freely and begins to harden without any increase in volume.

The areas to be consolidated should be reviewed in sections depending on penetration behaviour until the required quantity of resin has been applied and resulted in the even consolidation of the ballast.

Alternatively, *STARRGLEIS SIL* may be injected into the ballast or under the sleepers with ram injection lance.

Criteria for ceasing will always be the following:

- Emergence of the injection resin from the ballast bed
- Formation of puddles
- Temperatures lower than the minimum for use of the material

Other notes:

The minimum temperature for use of the product is 15° C. If the product is cooled excessively it may result in problems with the suction capacity of the pump due to increased viscosity. Warm the product before use being careful to avoid local hot spots.

The mixing lines of the equipment must contain at least a 25 cm spiral or screen mixer, depending on the diameter of the mixing pipe. Operation of the piston pump requires the use of a compressor of a suitable rating.

Quantity used:

- ~ 6 - 9 kg/m² for consolidation of ballast shoulders
- ~ 1,8 - 2,8 kg/m² for bonding ballast bed of 10-15 cm thickness
- ~ 4 - 8 kg/m² for bonding ballast bed of 25 cm thickness
- ~ 8 - 16 kg/m² for bonding ballast bed of 50 cm thickness

The stated quantities are empirical values. Independently, we recommend detecting the actual quantity on-site by means of test injection.

Safety information:

STARRGleis SIL components A and B are classified as hazardous according to Regulation (EC) 1272/2008 (CLP).

It is therefore necessary, before beginning processing, to become familiar with the precautions and safety advice as indicated in the material safety data sheet.

Packaging:

Component A	28 kg metal canister
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Component B	24 kg metal canister
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Bigger packaging on request.

Storage:

Shelf life at least 12 month in original packaging when stored in dry conditions between 15-25°C, protected from heat, frost and direct sunlight.

After the expiration the use of the product is generally not recommended, unless an approval has been provided by TPH. This approval can only be obtained by the quality assurance department of TPH releasing the material after verification of main properties being within specification.

Disposal:

You can tamp the bed down with standard rail manual tamping devices or tamping machines on what are referred to in German as "Plesserzüge". Removed ballast bonded using *STARRGleis SIL* can be disposed of and sent to landfill as construction rubble. Alternatively, the material can be reused without worry, for example as a base course, in the usual process of recycling building materials.

For further information please refer to the material safety data sheets.

Test certificates:

Examination of the leaching behaviour of an injection resin based on silicate - *STARRGleis* SIL (column trial referring to DIBt Guideline "Assessments of the effects of construction products on soil and ground water"; MFPA Leipzig 2010

Fire behaviour test of building products, Inflammability at directly flames according to DIN EN ISO 11925, part 2: 2002; MFPA Leipzig 2012

Classification report about fire behaviour according to DIN EN 13501-1:2007;
MFPA Leipzig 2012

Research Report 2884-1: Fatigue test of ballast bonded using *STARRGLEIS* SIL; "Lehrstuhl und Prüfamnt für Verkehrswegebau" of TU München 2012



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Legal notice:

The correct and thus successful application of our products is not subject to our control. A guarantee can be issued for the quality of our products within the framework of our sales and supply conditions, however not for successful processing. All data and specifications in this specification sheet are based on the present state of the art and the right to changes and adaptations for the sake of development remains explicitly reserved. The consumption specifications designated by us can be only average empirical values, where deviations are possible on an individual basis and therefore cannot be excluded by us.

TPH Bausysteme GmbH
Nordportbogen 8
D-22848 Norderstedt

Tel.: +49 (0)40 / 52 90 66 78-0
Fax: +49 (0)40 / 52 90 66 78-78
e-mail info@tph-bausysteme.com
Web www.tph-bausysteme.com

TPH.
Waterproofing Systems