



Expansion joints

# mageba expansion joints – for lasting driving comfort



## TENSA<sup>®</sup> CRETE Type RE and RE-LS

easy to install, noise-reducing, durable



mageba



# Features & Benefits

## Introduction

The TENSACRETE type RE and RE-LS single-gap joint systems are expansion joints for gap widths up to 80 mm for the RE type and 100 mm for the RE-LS type (these values can vary depending on the construction standard).

Type RE-LS is also equipped with a noise-reducing surface in the form of "sinus plates". This results in noise reduction of up to 80 %.

The steel edge profiles of the TENSACRETE expansion joints are anchored in ROBOFLEX waterproof polymer concrete. The joints are suitable for new constructions as well as for refurbishment projects. A major advantage is the fast and cost-effective installation of the system, because the joint is only installed in the cross-sectional area of the wearing surface and no further interference with the underlying carrying construction takes place.

## Area of application

The TENSACRETE expansion joint is mainly used for asphalt and concrete connections and can be installed on virtually all new and existing bridges. Thanks to its low installation depth, it is particularly suitable for retrofitting in cases where bituminous expansion joints are rolled out or are fissured as a result of intensive use. The same applies to the replacement of worn mat joints (e.g. those damaged by heavy snow clearing equipment). The fast installation time of TENSACRETE expansion joints and the additional possibility of phased assembly combine to reduce traffic congestion.

## Product characteristics

- Movements in all three axes and rotations of the bridge are possible without constraints
- Gap widths, depending on the standard, up to 80 mm for RE type and 100 mm for RE-LS type
- Short setting time of concrete, with traffic able to pass over again in just 4 or 6 hours after installation
- Lane-by-lane installation is possible – resulting in reduced traffic congestion
- Easy adaptation to various materials and thicknesses of adjoining structures
- Joints are 100 % water-tight

- Resistant to wear and chemicals
- Up to 80% noise reduction with the noise-reducing sinus plates for the RE-LS type

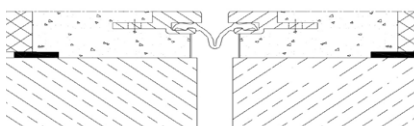
## Anchoring

No additional reinforcement or anchoring is necessary with the TENSACRETE expansion joints. All loads are transmitted directly through the bond between the polymer concrete and the substructure. To allow the transmission of forces into the adjacent structural elements, the surface of the recess must have a minimum tensile bond strength of 1.5 N/mm<sup>2</sup> (concrete) or 3.0 N/mm<sup>2</sup> (steel). ROBOFLEX should not be applied to new concrete within 14 days of pouring.

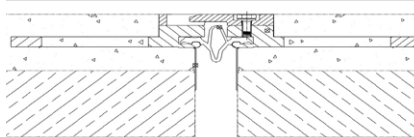
## Installation

The installation of the TENSACRETE expansion joints and the insertion of the ROBOFLEX polymer concrete must be carried out by qualified and certified personnel. The on-site coordination of these activities is carried out by our experienced project managers.

### Cross section Typ RE



### Cross section RE-LS



## Customer benefits

- Ideal replacement for bituminous expansion joints and mat joints
- Minimal traffic impacts for refurbishment projects
- Shorter and easier installation than for conventional joints
- No impact on the main structure
- Improved noise protection through noise-reducing surface
- Work can be carried out by own qualified personnel



- 1 TENSACRETE expansion joint RE type
- 2 TENSACRETE expansion joint RE-LS type
- 3 Damaged bituminous expansion joint
- 4 Damaged mat expansion joint

# Material properties & Installation

## Materials

The following high-quality materials are used for the production of the TENSA®CRETE expansion joints:

- Steel profile made of S 235 grade
- EPDM sealing profile
- Polymer concrete consisting of epoxy resin, hardener and special mineral filler

## Corrosion protection

The steel profiles are primed with anti-corrosion coating in accordance with ISO 12944 or the relevant national guidelines, such as ZTV-ING, ASTRA, RVS, ACQPA.

## Water-tightness

The TENSA®CRETE expansion joint is 100 % water-tight thanks to mageba's proven sealing profile. This sealing profile has been in use for decades, and is continuously enhanced and optimized. The profile has special sealing points to prevent the ingress of water. Should the sealing profile become damaged by external mechanical impact, it can be replaced in a fast and cost-effective manner.

## ROBO®FLEX polymer concrete

The measured material properties of the ROBO®FLEX polymer concrete are as follows:

Compressive strength (Prism 40x40x160 mm, 28 d)	at least 22.3 N/mm <sup>2</sup>
Tensile strength (Prism 40x40x160 mm, 28 d)	at least 7.4 N/mm <sup>2</sup>
E modulus (Prism 40x40x160 mm, 28 d)	at least 55 N/mm <sup>2</sup>
Bond to sand-blasted steel	at least 3.0 N/mm <sup>2</sup>
Bond to sand-blasted concrete	at least 1.5 N/mm <sup>2</sup>
Pot life	at least 10 minutes

The application surface temperature and air temperature for the installation of the ROBO®FLEX polymer concrete must be between 8 °C and 30 °C.

Depending on the temperature, the polymer concrete is sufficiently hard within 4 to 6 hours curing time to withstand the traffic loads.

## Installation process

After uncovering the recess – by removing the previously laid asphalt layer or the old joint - the further steps for the installation of TENSA®CRETE expansion joint are as follows:

### 1. Surface preparation

Pre-treatment (e.g. sand blasting) of concrete or steel surface in the recess, so that it reaches the tensile bond strength of 1.5 N/mm<sup>2</sup> (concrete) or 3.0 N/mm<sup>2</sup> (steel).

### 2. Setting up the profiles

Lining and levelling of the edge profiles.

### 3. Laying the polymer concrete

The ROBO®FLEX polymer concrete is mixed, poured and cured to form a smooth carriageway surface. Thanks to its excellent distribution properties no cavities are left and no additional compaction is necessary. The polymer concrete reaches the compressive strength required to withstand the traffic loads within 4 to 6 hours (depending on temperature).

### 4. Sealing profile

Insertion of the mageba sealing profile over the entire length of the joint if the latter has been installed in stages (e.g. lane-by-lane). Otherwise, the sealing profile is previously installed in the factory.



- 1 Exposed recess
- 2 Positioned RE-LS type expansion joint
- 3 Mixing of the ROBO®FLEX polymer concrete
- 4 Laying of the ROBO®FLEX polymer concrete



## Expansion joints

# Quality & support

### Quality

For five decades, mageba expansion joints have proven their worth in thousands of structures under the most demanding conditions. In addition to the product properties, the extensive experience of our well-qualified manufacturing and installation staff also contributes to the high quality and durability of the products.

mageba has a process-orientated quality system that is certified in accordance with ISO 9001. Quality is also regularly inspected by independent institutes, such as the materials testing body (MPA) of the University of Stuttgart. mageba factories are certified for welding in accordance with ISO 3834-2, and according to the current steel construction standard EN 1090.

### Testing

The ROBO®FLEX polymer concrete has been specially developed for the TENSA®CRETE expansion joints. The ROBO®FLEX polymer concrete has undergone extensive testing conducted in collaboration with the University of Innsbruck (Austria) with regard to wear and tear, loading and durability. The tests showed that ROBO®FLEX is capable of withstanding 2 million load cycles at loads of up to 160 kN without failure. The failure occurred in each case in the underlying support structure, rather than at the interface between ROBO®FLEX and concrete, or steel surface respectively.

The durability of the TENSA®CRETE expansion joints has been proven on numerous bridges worldwide for over 10 years now, which is the best reference for quality and durability.

### Tenders

The following text elements can be used for the preparation of tender documents with RE type TENSA®CRETE expansion joints:

- Delivery and installation of a water-tight expansion joint structure made of steel with polymer concrete anchoring in accordance with the static and constructive requirements
- Installation over the entire superstructure width
- Overall dilatation: 80 mm
- All steel surfaces should be prepared at the factory with SA 3 sandblasting quality grade
- Fatigue strength verification by an independent testing authority (at least  $2 \times 10^6$  cycles under traffic-related loads)
- Type designation: mageba TENSA®CRETE RE type or equivalent
- Polymer concrete: mageba ROBO®FLEX or equivalent
- Bill of quantities based on the construction length in the horizontal axis profile

Additional / alternative for the RE-LS type:

- Design of the joint using a noise-reducing surface
- Overall dilatation: 100 mm
- Type designation: mageba TENSA®CRETE RE-LS type or equivalent

### Quotations

In order to be able to provide a quotation we require the following data:

- A detailed drawing of the adjoining areas (cross and longitudinal sections of the bridge)
- Expansion joint movement range, including the direction of movements
- Noise reduction requirements

### Execution planning

In addition to the previously provided information, we need the following documentation when an order is confirmed:

- Layout plan of the construction
- Pre-setting values
- Drawings showing services
- Other particulars

### Customer support

Our product specialists will be pleased to advise you in the selection of the optimal solution for your project, and to provide you with a quotation.

On our website, [mageba-group.com](http://mageba-group.com), you will find further product information, including reference lists and tender documentation.

### RE and RE-LS types TENSA®CRETE project references



Fanja Bridge (Oman)



Brüttiseller Kreuz (CH)



Hang Bridge (DE)



Kasseler Kreuz (DE)



Fürstenland Viaduct (CH)



Simplonpass (CH)

### mageba expansion joint types



Single gap joints



Cantilever finger joints



Sliding finger joints



Modular expansion joints

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