



Expansion joints

mageba expansion joints – for lasting driving comfort



TENSA[®] FLEX Type RC

innovative, easily installed, flexible



mageba
Switzerland www.mageba.ch



Product characteristics & benefits

Principle

The mageba TENSА®FLEX Type RC sliding finger joint is suitable for use in bridges with heavy traffic loading and for movements between 100 mm and 800 mm. It consists of a steel-elastomer bonded system, and is either fixed directly to the supporting structure with chemical anchors on a prepared surface, or is bolted to a steel substructure which is concreted in place. The finger plates are pre-tensioned downwards as a result of a slight inclination at installation, and the tips of their fingers thus maintain constant contact with the sliding surface at the opposite side of the bridge gap. A watertight drainage channel beneath the joint is designed to accommodate all deck movements.

Properties

Design

The parts of the sliding finger joint together form a simply supported system. Traffic loading is efficiently transferred via the finger plates and sliding surfaces to the supporting structure, with minimal moment effect compared to a cantilever finger joint.

The sliding fingers of the TENSА®FLEX joint have a slight downwards inclination. This creates a downward pre-tensioning when the finger plates are anchored at one side of the bridge gap, and their fingers make contact with the counter pieces at the other side. This pre-tensioning prevents the sliding fingers from protruding above the driving surface due to bridge settlements or rotations, or due to longitudinal movements of a sloped bridge deck. By avoiding such protrusions, the joint design ensures a flat driving surface and maximizes driver comfort.

The finger plates are bolted to the bridge at the joint's fixed side. The sliding fingers move on a sliding surface which is securely bolted to the other side of the bridge gap. This side also features fixed fingers in the spaces between the sliding fingers.

Important: Snow ploughs without protective strips can damage the elastomeric surface of TENSА®FLEX sliding finger joints.

Noise reduction

The geometry of the sliding finger plates and their interlocking partner plates avoids a straight transverse gap in the carriageway. The wheels of over-rolling vehicles thus maintain constant contact with the expansion joint's surface, reducing the noise caused by impacts with the gap edge. This results in low noise emissions and high driver comfort. TENSА®FLEX sliding finger expansion joints are thus ideal for use on bridges near residential areas or in other noise-sensitive zones.

Drainage channel

Beneath the expansion joint, a watertight drainage channel of EPDM, soft PVC or stainless steel is attached. This features rounded end-pieces at both ends, and a flexible discharge outlet at its low point for connection to the bridge's drainage system. The channel can be easily flushed clear of any accumulated sediment during periodic bridge cleaning activities. To facilitate this, an external hose connection point can optionally be provided in the non-trafficked part of the joint.

If desired, the channel can also be delivered with a dirt-repellent surface, reducing cleaning effort to an absolute minimum.

Benefits

- Lesser loading on the supporting structure compared to a cantilever finger joint
- Use of high-quality steel-elastomer composite system ensures increased durability
- Minimal installation depth; quicker and simpler installation as compared to conventional joint types
- Minimal disruption to traffic during replacement works
- Low noise under traffic due to the design with interlocking fingers on the surface
- High driver comfort thanks to the special connection and support of the sliding finger plates
- Reliable prevention of protrusion above the driving surface



- 1 Schematic section showing build-up of joint
- 2 Drainage channel
- 3 Hose connection point to simplify cleaning of the drainage channel

Material properties & dimensions

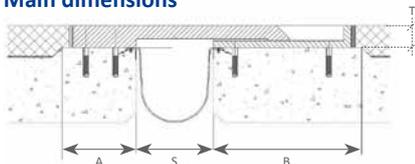
Installation of the joint as a replacement for another type

Thanks to its special connection system with chemical anchors, the TENSA®FLEX RC joint requires less installation depth than common expansion joint types. This makes the system especially suitable for expansion joint replacement works which require the impact on the supporting structure to be minimised, because the joint lies completely within the depth of the structure's surfacing layer. Furthermore, the replacement works can be carried out in phases, one traffic lane at a time, to minimise also the impact on traffic. Indeed, should it be necessary to allow traffic to use all traffic lanes during peak times, the construction area can be temporarily bridged by specially designed and properly anchored steel plates. These plates, of the so-called "Mini-Fly-Over" traffic management system, are then removed at off-peak times to allow the work to progress.

Replacement of individual sliding plates

Thanks to the modular design of the system, with individual elements of 0.5m length bolted in place, single sliding plates can be easily replaced at any time. In roads with more than one lane, the service life of the TENSA®FLEX joint can be increased by swapping the finger plates of the heavy vehicles lane with those of the overtaking lane after a number of years of service, to balance out the wear and tear.

Main dimensions



Type	Movement capacity	S _{min}	A	B	T
	mm	mm	mm	mm	mm
RC 100	100	100	340	380	67
RC 200	200	100	340	580	72
RC 300	300	100	340	480	101
RC 400	400	100	340	580	101
RC 500	500	100	340	680	101
RC 600	600	50	370	800	123
RC 700	700	50	370	900	123
RC 800	800	50	370	1000	123

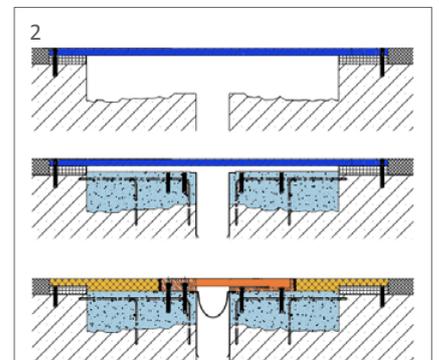
Materials

The following high-quality materials are used for manufacturing TENSA®FLEX Type RC sliding finger joint:

- Steel parts of S235 and S355 steel
- Elastomeric shell of SBR
- Drainage channel of EPDM, soft PVC or stainless steel, according to customer preference

Corrosion protection

The steel parts of TENSA®FLEX sliding finger joints are treated as standard, after sandblasting, with a multi-layer corrosion protection system based on ISO 12944.



- 1 Phased replacement of an old expansion joint (middle) with a new TENSA®FLEX joint (behind), with the help of the "Mini-Fly-Over" system (front)
- 2 Illustration of step-by-step joint replacement using the "Mini-Fly-Over" system
- 3 Preparation of the bearing surface
- 4 Placing of the finger plates





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 9001:2008. 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.

Tests and national approvals

TENSA®FLEX RC sliding finger joints have been subjected to extensive testing and analysis to confirm their properties and performance. For example, the joint has been thoroughly tested with 2 x 10⁶ load cycles at a frequency of 3.5 Hz and loads of up to 128 kN. Under this loading, the system fulfilled the demanding requirements of the Austrian RVS 15.45 standard. The system has been awarded national approvals in numerous countries around the world, such as Switzerland, Austria and Russia.

Installation

After the preparation of a suitable, flat surface, the holes for the chemical anchors are drilled with the help of a template. The drainage channel and connecting structure waterproofing are then installed. Finally, the elements of the TENSA®FLEX joint are lifted into position by hand and bolted down, and the road surfacing adjacent to the joint is completed.

Related products

The following mageba products can be used in combination with TENSA®FLEX sliding finger joints:

- **ROBO®DUR:** Strengthening ribs of special mortar, which reinforce the asphalt adjacent to the joint. These reduce rutting while increasing driver comfort and the durability of the joint
- **STATIFLEX®:** Strengthening strip of quick-hardening polymer concrete along the side of an expansion joint, which reduces rutting while increasing driver comfort and joint durability
- **ROBO®MUTE:** Noise-protection system, consisting of mats placed beneath the joint to reduce noise emissions

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, www.mageba.ch, you will find further product information, including reference lists and tender documentation.

Reference projects TENSA®FLEX Type RC



Route 9G (USA)



Viaduct Yverdon (CH)



Sihlhochstrasse (CH)



Seez-Viaduct (CH)



Dreirosen Bridge (CH)



Lautertal Bridge (DE)

mageba expansion joint types



Single gap joints



Cantilever finger joint



Sliding finger joints



Modular expansion joints



engineering connections®