



Expansion joints

Infrastructure | Buildings | Industrial structures

# mageba expansion joints – for lasting driving comfort



## TENSA® FINGER Type RSFD

robust, reliable, quiet



mageba



## Expansion joints

# Product Characteristics & Benefits

### Principle

The mageba TENSA®FINGER RSFD cantilever finger joint has proven itself for use in bridges with heavy traffic loading and for movements between 2.4 inches (60 mm) and 19.7 inches (500 mm). The joint's robust steel edge profiles have strong anchor loops for concrete anchoring to the main structure, resulting in excellent fatigue resistance. The cantilevering finger plates are connected to the steel profiles by pre-tensioned friction-grip bolts. Beneath the finger plates, a watertight drainage channel, which is dimensioned to facilitate all joint movements, is connected to the edge profiles. The TENSA®FINGER expansion joint is suited to both asphalt and concrete road surfaces. For greater movements, together with high traffic loading, mageba recommends the statically better suited TENSA®FINGER GF sliding finger joint, to minimize the transfer of moment to the supporting structures.

### Properties

#### Noise-reducing Surfacing

The geometry of the cantilevering fingers avoids a straight transverse gap in the carriageway. The wheels of passing 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. TENSA®FINGER cantilever finger expansion joints are thus ideal for use on bridges near residential areas or in other noise-sensitive zones.

#### Surface Profiling

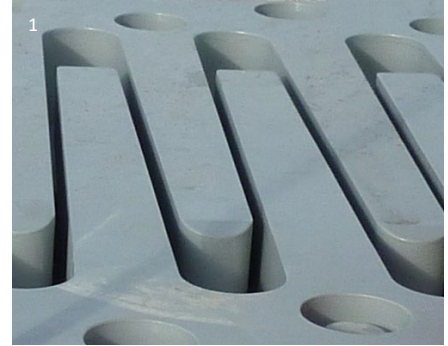
To improve the ability of vehicle wheels to grip the surface of the joint's finger plates, they can optionally be delivered with a  $\frac{1}{16}$ " (2 mm) deep surface pattern. This improves traffic safety, especially on joints with large movements and thus large surface areas.

### Drainage Channel

Beneath the expansion joint, a watertight drainage channel of flexible material 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 gathered 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.

### Shuttering Plates

Steel shuttering plates not only provide support to the fresh concrete during pouring, considerably reducing construction effort, but also serve as a connection surface for the drainage channel. They can alternatively be made from stainless steel to enhance their durability.



- 1 Interlocking of the cantilevering fingers
- 2 Expansion joint surface featuring grip-enhancing pattern
- 3 Drainage channel with shuttering plates
- 4 Hose connection point for cleaning of drainage channel

### Benefits

- Robust, durable construction with well-proven design
- Use of high-quality materials ensures a long service life
- Optimized life-cycle costs due to high product quality
- Improved noise protection due to interlocking of cantilever fingers
- 100 % water tightness due to specially developed drainage channel
- Adapts easily to suit different road surfacing thicknesses

# Material Properties & Dimensions

## Materials

The following high-quality materials are used in the manufacture of TENSA®FINGER expansion joints:

- Finger plates: ASTM A709 Grade 50 steel
- Support structure: ASTM A709 Grade 36 steel
- Drainage channel of EPDM, soft PVC or stainless steel, according to customer preference

## Corrosion Protection

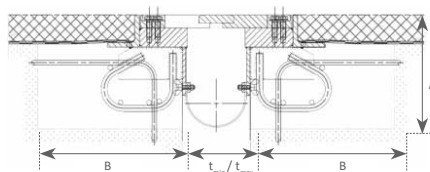
The steel edge profiles are treated with corrosion protection systems based on hot dip galvanizing ASTM A-123 / AASTHO M111, or any applicable painting systems approved by the responsible Department of Transportation (D.O.T.).

## Main Dimensions

### Type RSFD-A (for asphalt connection)

- Expansion joint for asphalted roads with surfacing thicknesses of between 2 in and 10 in (50 mm and 250 mm)
- Edge profiles feature flanges for connection of deck waterproofing membrane
- Well-proven, fatigue-tested loop anchorages

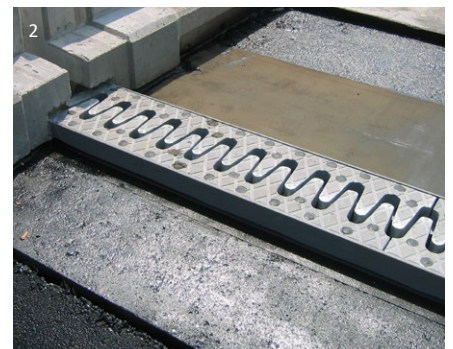
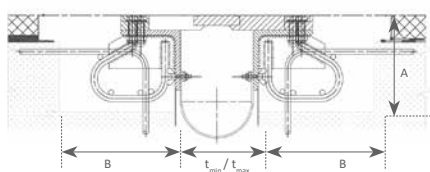
Cross-section: Type RSFD-A



### Type RSFD-B (for concrete connection)

- Expansion joint for concrete roads or sidewalks
- Well-proven, fatigue-tested loop anchorages

Cross-section: Type RSFD-B



- 1 RSFD joint with asphalt connection
- 2 Waterproofing with membrane connection flange
- 3 RSFD joint with concrete connection

Type	Movement capacity		A RSFD-A*		A RSFD-B		B		t <sub>min</sub>		t <sub>max</sub>		Weight RSFD-A*		Weight RSFD-B	
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	lb/ft	kg/m	lb/ft	kg/m
RSFD 60	2.4	60	≥ 11.6	≥ 295	≥ 9.4	≥ 240	≥ 10.6	≥ 270	2.8	70	5.1	130	75.3	112	50.4	75
RSFD 80	3.1	80	≥ 11.6	≥ 295	≥ 9.4	≥ 240	≥ 10.6	≥ 270	2.8	70	5.9	150	87.4	130	55.1	82
RSFD 100	3.9	100	≥ 11.6	≥ 295	≥ 9.4	≥ 240	≥ 10.6	≥ 270	2.8	70	6.7	170	86.7	129	62.5	93
RSFD 120	4.7	120	≥ 12.8	≥ 325	≥ 9.5	≥ 242	≥ 10.6	≥ 270	3.3	84	8.0	204	120.3	179	68.5	102
RSFD 140	5.5	140	≥ 11.6	≥ 295	≥ 9.5	≥ 242	≥ 10.6	≥ 270	3.3	84	8.8	224	103.5	154	80.6	120
RSFD 160	6.3	160	≥ 11.6	≥ 295	≥ 9.8	≥ 250	≥ 10.6	≥ 270	3.5	88	9.8	248	125.7	187	96.1	143
RSFD 180	7.1	180	≥ 12.8	≥ 325	≥ 11.2	≥ 284	≥ 12.0	≥ 305	4.3	108	11.3	288	133.0	198	118.3	176
RSFD 200	7.9	200	≥ 12.8	≥ 325	≥ 11.2	≥ 284	≥ 12.0	≥ 305	4.0	102	11.9	302	143.1	213	136.4	203
RSFD 250	9.8	250	≥ 13.0	≥ 330	≥ 11.7	≥ 296	≥ 12.0	≥ 305	5.2	132	15.0	382	170.7	254	168.0	250
RSFD 300	11.8	300	≥ 13.2	≥ 335	≥ 12.0	≥ 306	≥ 12.0	≥ 305	5.6	142	17.4	442	197.6	294	194.9	290
RSFD 350	13.8	350	≥ 13.8	≥ 350	≥ 12.6	≥ 320	≥ 12.0	≥ 305	7.5	190	21.3	540	252.0	375	220.4	328
RSFD 400	15.7	400	≥ 14.2	≥ 360	≥ 13.0	≥ 330	≥ 12.0	≥ 305	9.4	240	25.2	640	288.3	429	256.7	382
RSFD 450	17.7	450	≥ 14.4	≥ 365	≥ 13.2	≥ 335	≥ 12.5	≥ 318	6.9	174	24.6	624	334.6	498	297.7	443
RSFD 500	19.7	500	≥ 14.6	≥ 370	≥ 13.8	≥ 350	≥ 14.5	≥ 368	5.7	144	25.4	644	391.8	583	338.7	504

\*) For 3.1 in (80mm) asphalt layer thickness



## 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. In addition, its quality is regularly inspected by independent testing institutes. mageba factories are AISC certified for Major Bridges (CPT, STD, SPE) and also maintain AWS certifications for D1.1 and D1.5.

### Tests and National Approvals

TENSA®FINGER cantilever finger joints have been subjected to extensive testing and analysis to verify their properties and performance. The anchorage, for example, has been thoroughly tested in dynamic fatigue tests, with  $2 \times 10^6$  load cycles at a frequency of 2.75 Hz and loads of up to 31.5 kips (140 kN). Under this loading, the anchorage fulfilled the demanding requirements of the AASHTO CRFD standard. The system has also been awarded with national approvals in numerous countries around the world.

### Installation

The expansion joint is pre-assembled in the factory and fixed at the desired pre-setting value (gap width) by cross-beams. mageba installation technicians precisely position the joint on the main structure, and fix its anchorages to the structure's reinforcement. The concrete is then poured, fully securing the joint to the bridge.

### Related Products

The following mageba products can be used in combination with TENSA®FINGER cantilever 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
- **ROBO®MUTE:** Noise-protection system, consisting of mats placed beneath the joint to reduce noise emissions
- **ROBO®GRIP:** Anti-skid coating with high coefficient of friction, preventing skidding of passing vehicles in wet conditions
- **ROBO®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

### 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.

### Reference Projects with mageba Expansion Joints



Audubon Bridge, LA (US)



Route 9G Bridge, NY (US)



Port Mann Bridge (CA)



Golden Ears Bridge (CA)



Deh Cho Bridge (CA)

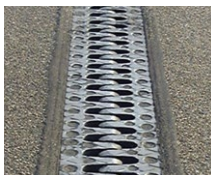


Pont de Beauharnois (CA)

### mageba Expansion Joint Types



Single Gap Joints



Cantilever Finger Joint



Sliding Finger Joints



Modular Expansion Joints

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