



Expansion joints –
optional extras

mageba optional expansion joint features – optimising benefits



ROBO® MUTE noise protection

efficient, durable, cost-effective



mageba
Switzerland www.mageba.ch



Principle and technical information

Working principle

The ROBO®MUTE system reduces the noise generated by traffic in crossing an expansion joint and transmitted from beneath the joint. A mat of layered membranes forms a channel beneath the joint, trapping noise and directing it towards the channel's ends, where it is reduced by a noise-absorbing element.

ROBO®MUTE's characteristics

- All components are frost-proof and salt water-resistant, and continue to function effectively even in extreme weather conditions
- The flexibility of use of the system's individual components make it precisely adaptable to the design and requirements of any particular structure
- All metallic components are made from high-quality stainless steel and are thus corrosion-resistant
- The materials used ensure a long service life for the noise protection system
- To facilitate inspection and maintenance work, the system can be quickly and easily dismantled

Highlights – ROBO®MUTE

- Trained, certified installation personnel
- Pre-installation on the expansion joint is possible in the case of new joints
- The system can also be installed on site, even under the expansion joints of other manufacturers
- Flexible, robust, durable design
- Low-weight system can be dismantled with little manual effort to facilitate inspection and maintenance work
- The system's high flexibility facilitates special solutions where pipes etc. pass through its components

System components

- Noise-absorbing ROBO®MUTE end elements
- Noise-reflecting ROBO®MUTE channel with drainage outlet points for controlled removal of condensation water from the enclosed area beneath the expansion joint
- Longitudinally orientated fixing elements, which can be directly connected to the joint in the factory and can later be connected to the concrete structure on site

Technical data

- Core: High-strength polyester
- Surface: Soft-PVC (both sides), in various colours
- Weight: Approx. 8.5 kg/m² (1.75 lb/ft²)
- Fire protection: Low flammability in accordance with DIN 4102, B1
- Chemical resistance: Resistant to salts, oils, solvents, water
- Noise reduction value: Up to 17 dB (proven on various structures)
- Temperature resistance: –40 °C to +100 °C (–40 °F to +212 °F)



- 1 Internal view of ROBO®MUTE system, connected to the bridge concrete at each side and with an end element
- 2 A loose end element of the ROBO®MUTE system
- 3 ROBO®MUTE connected to an expansion joint in the factory



Expansion joints – optional extras

Testing and installation

Testing of noise reduction value

To prove the effectiveness of the ROBO®MUTE noise protection system, it was subjected to noise reduction value testing at the Fraunhofer Institute.

The result of the testing was an impressive noise reduction value of 19 dB.

The relevant standards for the testing:

- DIN EN ISO 140-3
- DIN EN ISO 717-1
- ZTV-Lsw88: 1988

Installation of the end elements

The ROBO®MUTE end elements are connected to the structure at each end of the movement gap using stainless steel fixing rails, forming an effective absorption surface.

Closing of gaps between end of expansion joint and edge of structure

Additional elements are used to close any gaps between the ends of the expansion joint and the edges of the structure. These are fixed in a way that accommodates deck movements, ensuring a continuous absorption surface in all positions of the bridge deck. This step does not apply in the case of factory installation on an expansion joint, because the noise protection channel beneath the joint then generally extends to the edge of the structure.

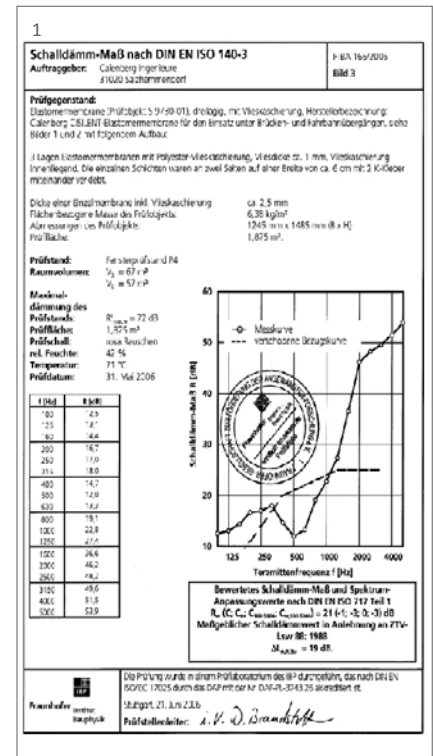
Installation of the noise protection channel

The noise protection channel is then connected to the structure or expansion joint, along the joint's full length. The channel features an edge strip at each side which enables it to be attached at the foreseen connection points using wing nuts. The channel sections have an individual length of 2 to 4 m (6.5 to 13 ft) and overlap by 300 mm (1 ft). In hanging the channel, it is important to ensure that the end of the channel is placed right up against the end element at each end. Only in this way can it be ensured that noise will be absorbed by the end elements. It is also important to ensure that the channel hangs loose, enabling it to accommodate all expansion joint movements without becoming tensioned.

Drainage

The enclosing of the area beneath the expansion joint by the ROBO®MUTE system can lead to light condensation as a result of temperature fluctuations. To facilitate controlled drainage of the water that gathers, a flexible drainage outlet is generally provided beneath the expansion joint's low point, for connection to the bridge's drainage system.

An alternative possibility for drainage is to arrange the overlap joints between adjacent sections of channel in such a way that they allow small amounts of water to escape.



- 1 Test results from the Fraunhofer Institute
- 2 End pieces that accommodate structure movements
- 3 Connection by means of wing nuts



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Possible text for bid documentation

Supply and installation

Supply and installation of a noise protection system beneath the expansion joint, consisting of flexible noise protection channels and noise-absorbing elastomer-based, fabric-enclosed end elements.

Connection of the noise protection channels to the structure at both sides of its movement gap, and connection of the noise-absorbing end elements to the structure at both ends.

The design of the noise protection channels shall allow them to be dismantled to facilitate inspection and maintenance work on the expansion joint above.

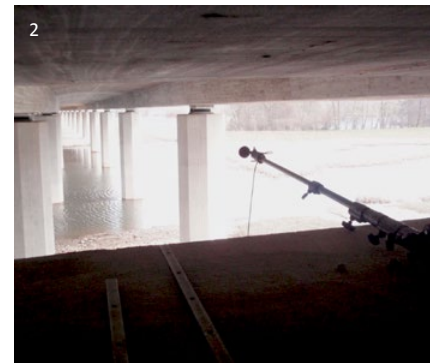
The system shall accommodate all superstructure movements without becoming tensioned or enabling sound bridges to form.

All connection aids and fasteners shall be of stainless steel.

A drainage outlet shall be provided at the lowest point of the noise protection channel, for connection to the bridge drainage system.

Manufacturer mageba, type ROBO®MUTE or approved equivalent.

Price per metre (foot) length of expansion joint including end elements, drainage outlets and complete installation.



- 1 Noise measurement in the abutment
- 2 Noise measurement outside the abutment

Reference projects – ROBO®MUTE



Liesertal Bridge (DE)



Maintal Bridge (DE)



Wasserbachtal Bridge (DE)



Hollledau Bridge (DE)



Nestelgraben Bridge (DE)



Mönchröden Bridge (DE)

mageba expansion joints – Supplemental products



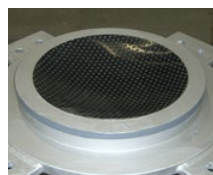
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