

Arsan®

Precise Connections - since 1957



AR-EX EXPANSION JOINTS

AR-EX EXPANSION JOINTS

www.arsankaucuk.com.tr

Arsan is a leading manufacturer in Structural and Seismic Bearings, Expansion Joints and various type of Pipe Gaskets and Tunnel Segment Gaskets for infrastructure and building construction sectors.

Arsan continues to develop with its policy focused on continuous improvement since 1957. Research and development department of Arsan works on innovative projects continuously. Arsan's vision is to be worldwide reliable supplier of structural products. Currently, 60% of total production is exported and 85% of this turnover is generated from Europe. In addition to these European countries, Arsan exports to more than 50 other countries as well.

Structural bearings include all types of elastomeric bearings, guided and restraint bearings, pot bearings, spherical and cylindrical bearings. All types of structural bearings have CE Certificate.

Arsan supplies seismic isolation systems for bridges and buildings using lead rubber bearing (CE) and friction pendulum systems. Arsan test laboratory is equipped with to carry out qualification and acceptance tests on structural bearings and seismic Isolators. The factory production control tests are carried out in Arsan Factory according to the project requirements specified in the standards or client requests.

Expansion joints for bridges comprises mat expansion joints, single gap expansion joints, and modular expansion joints. Expansion joint type and design are determined as per project requirements.

Expansion joint type and design are prepared according to project needs.

Tunnel segment gaskets are designed by Arsan engineers and offer excellent water pressure resistance. Various types of pipe gaskets are also provided.

Design and drawings of all structural products are prepared by Arsan Engineers. Thus, Arsan is a reliable manufacturer for structural products with its experience, capacity in manufacturing and efficient engineering solutions.

Arsan factory operates in its facility in Ferizli, Sakarya, with a closed area of 35,000 square meters on an area of 60,000 square meters

Arsan Factory is equipped with various production methods such as extrusion, compression and injection for rubber products.

Rubber compound tests are also performed in Arsan R&D laboratory. Moreover, most tools required to produce rubber products are built in house with metal machining.

In addition, designing and producing molds, machining and assembly of structural bearings and expansion joints are completed by Arsan.





AR-EX Bridge Expansion Joints

Structure, Performance and Installation Method of Expansion Joint Devices

H5-C type, H5-Z type, H5-L type and HMD type modular pattern road and bridge expansion joint devices are the bridge expansion joint devices designed with profiled bars and integrally shaped through hot rolling.

H5-C type, H5-Z type and H5-L type expansion joint devices are applicable to bridge joints with expansion amount below 80mm. HMD expansion devices are modular pattern bridge expansion devices composed of boundary beam, middle beam, cross beam and linking mechanism and are applicable to large-span bridges with expansion amount as 80mm~1200mm.

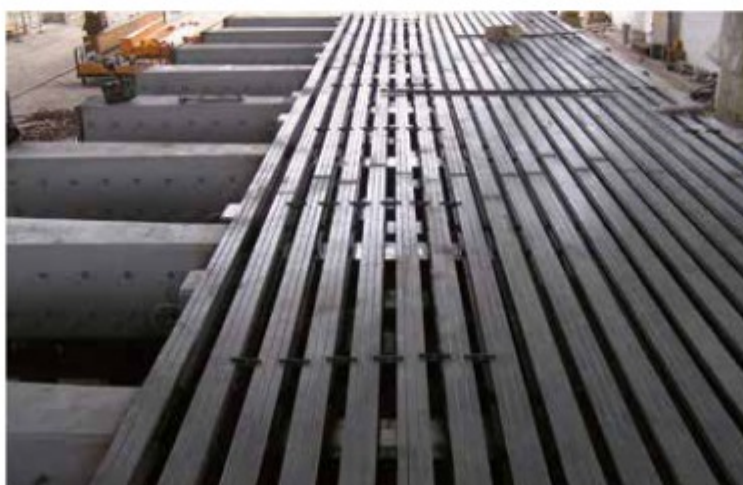


1. Technical conditions of design and manufacture

- 1) Design load: Design by adopting truck loads—according to AASHTO LRFD;
- 2) The profile bar used in this structure is S355 special steel for bridges. The tensile strength of steel is not less than 480MPa and allowable flexural stress is not less than 210MPa;
- 3) In the structure, supporting cross beam is made of S355, with allowable flexural stress not less than 210MPa;
- 4) Steel of other accessories could be made of steels with the strength not less than S235

2. Structural characteristics

The outstanding characteristics of HMD type expansion joint device is the bearing structure and displacement control system are separated and the load bearing of the two systems are clearly divided without any interference. In this way, both safety and uniform displacement during load can be ensured.



3. Determination of expansion amount of expansion joint devices

The calculation value of bridge expansion amount will directly influence the selection of the specification of expansion joint devices. Inappropriate selection will directly affect the use effect of expansion joint devices. Meanwhile, the amount of clearance of expansion joint device between beams and slabs shall also be taken into consideration during selection so as to ensure the anchoring between expansion joint device and both end of beam and slab is sufficient and the best use effect is achieved.

Thus, when selecting the specification of expansion joint devices, sufficient surplus must be reserved so as to ensure the use effect and durability of expansion joint devices.

4. Transportation, storage and installation of expansion joint devices

Transportation

Expansion joint devices shall be transported to construction site by the manufacturer or user after assembled according to design requirement. Fabrication in sections method could be used in case its length exceeds the allowable limit of transportation or it cannot be transported as a whole unit due to other reasons.

Storage

After transported to construction site, expansion joint devices shall be stored at the place as close as possible to the installation position, and be placed on the upholder at least 30cm from the ground.

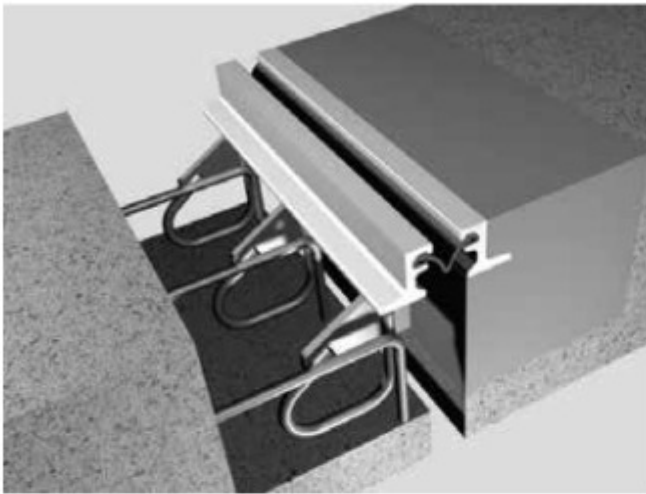
Installation

Expansion joint devices of the same quality can have obvious difference in terms of use effect and durability due to different installation quality. After investigation and research, we fully proved the construction and installation quality of expansion joint devices is the last key link to ensure the use effect of expansion joint devices.



AR-EX BRIDGE EXPANSION JOINTS

AR-EX HS – SINGLE GAP EXPANSION JOINTS



Arsan AR-EX HS single gap expansion joint consists of two steel profiles with anchor loops and a replaceable and %100 watertight seal.

AR-EX HS-80 and AR-EX HS-100 joint allows for a total movement of up to 80 mm and 100 mm.

Arsan special sealing profiles allow to arrange the maximum movement of single gap expansion joints up to 200 mm according to project requirements.

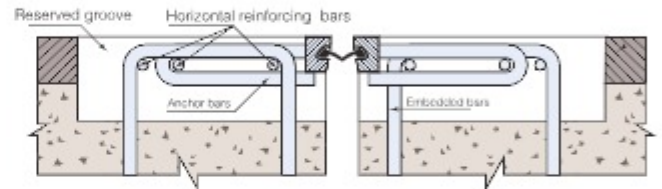
AR-EX HS Single Gap Expansion Joints are suitable both for asphalt and concrete road surfaces.

Expansion joint type selection depends on the bridge structure. The chosen expansion joint type must be able to facilitate all movements in all directions and rotations.

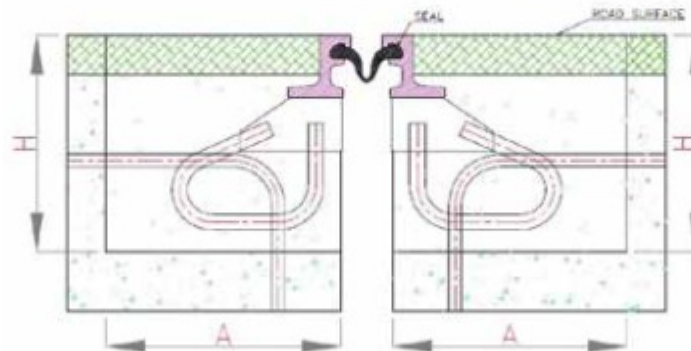
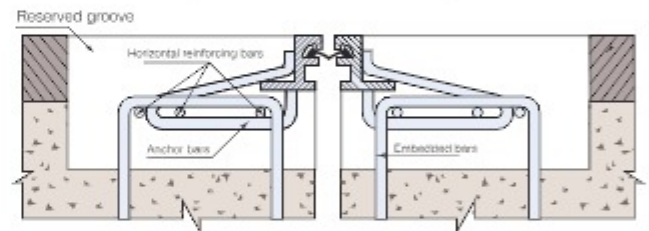
The ability of an expansion joint to prevent leakage of surface water to the structure beneath is a critical factor to avoid serious damage to the bridge support system.

Single gap expansion joints are commonly used expansion joints for movements of 100 mm or less. Short span bridge decks do not experience large changes in length due to temperature changes etc.

Elevation of C type



Elevation of Z type



Cross Section of AR-EX HS

| Type | Max. Longitudinal Movement (mm) | Max. Transverse Movement (mm) | A (mm) | H (mm) |
|--------|---------------------------------|-------------------------------|--------|--------|
| HS-80 | 80 | +/- 40 | 300 | 280 |
| HS-100 | 100 | +/- 50 | 300 | 280 |

AR-EX BRIDGE EXPANSION JOINTS

AR-EX HS — SINGLE GAP EXPANSION JOINTS

Watertightness

Arsan HS Rubber Strip Seal is effectively placed in the grooves of the edge beams without using any screwed or bolted connections.

Screwless connection of seal is for easy and quick replacement. For maintenance, it can be easily replaced and inserted from the top of the road surface with simple tools.

Arsan rubber seal design ensures %100 watertightness with tests. Sealing elements are in EPDM or CR material.

Rubber seal between steel beams consists of elastomeric sealing element with special shape.

Watertight rubber seal is protected from the heavy traffic by the edge beams and its shape maintains the joint gap free of dirt.



Fabrication of AR-EX HS—Before Painting

Considering all factors which should be taken into account when selecting and detailing a small movement joints, consisting of steel edge profiles and a durable elastomeric strip seal, single gap expansion joints offer effective solution.



Fabrication of AR-EX HS



Anchorage Welding of AR-EX HS

Fabrication—Anchorage

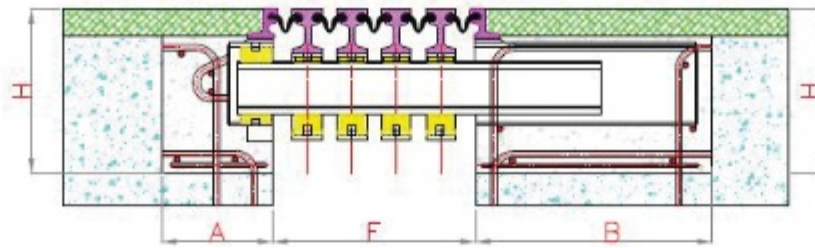
The edge beams are rigidly connected to the main structure by means of anchors directly welded to the edge beams.

Anchorage are embedded into the bridge slab reinforcement to assure the traffic force resistance. Bolted or screwed connections are not allowed in the carriageway surface directly exposed to permanent traffic loading.



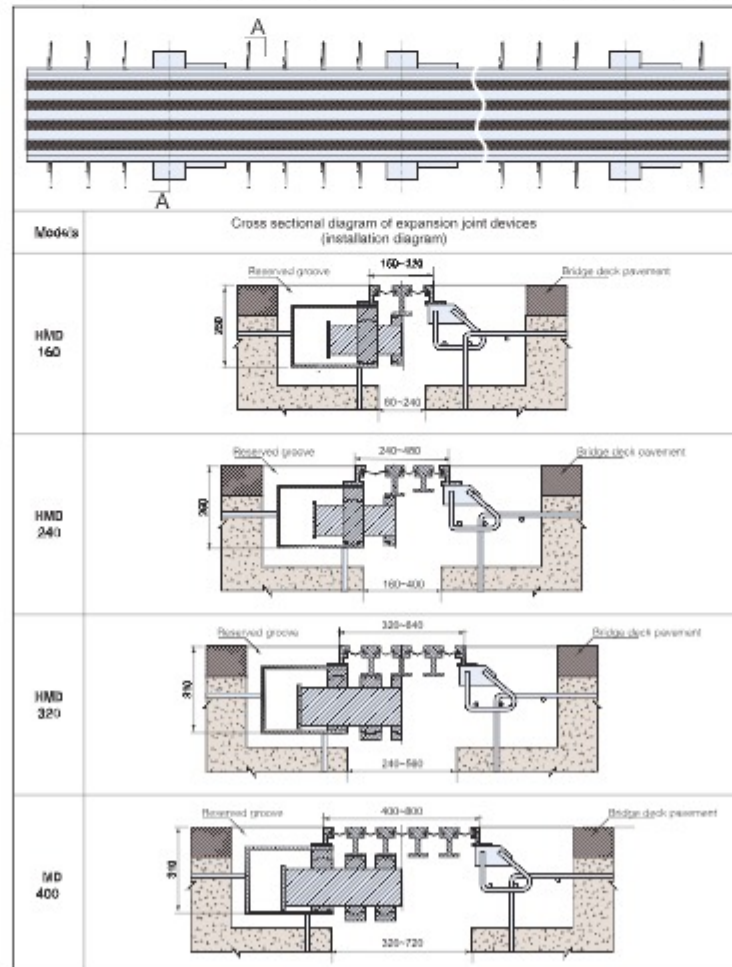
Installation of AR-EX HS

AR-EX HMD – MODULAR EXPANSION JOINTS



| Type | Max. Longitudinal Movement (mm) | Max. Transverse Movement (mm) | A _{min} (mm) | B _{min} (mm) | F _{min} (mm) | F _{max} (mm) | H _{min} (mm) |
|----------|---------------------------------|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| HMD-160 | 160 | +/- 80 | 300 | 300 | 160 | 320 | 300 |
| HMD-240 | 240 | +/- 120 | 300 | 480 | 240 | 480 | 300 |
| HMD-320 | 320 | +/- 160 | 300 | 560 | 320 | 640 | 350 |
| HMD-400 | 400 | +/- 200 | 300 | 640 | 400 | 800 | 350 |
| HMD-480 | 480 | +/- 240 | 300 | 720 | 480 | 960 | 400 |
| HMD-560 | 560 | +/- 280 | 300 | 800 | 560 | 1120 | 450 |
| HMD-640 | 640 | +/- 320 | 300 | 880 | 640 | 1280 | 500 |
| HMD-720 | 720 | +/- 360 | 300 | 960 | 720 | 1440 | 500 |
| HMD-800 | 800 | +/- 400 | 300 | 1040 | 800 | 1600 | 500 |
| HMD-880 | 880 | +/- 440 | 300 | 1120 | 880 | 1760 | 500 |
| HMD-960 | 960 | +/- 480 | 300 | 1200 | 960 | 1920 | 500 |
| HMD-1040 | 1040 | +/- 520 | 300 | 1280 | 1040 | 2080 | 500 |
| HMD-1120 | 1120 | +/- 560 | 300 | 1360 | 1120 | 2240 | 500 |
| HMD-1200 | 1200 | +/- 600 | 300 | 1440 | 1200 | 2400 | 500 |

Diagram of overall dimension and installation of various specifications ranging from 160mm to 1200mm





| Model | Sectional view of the telescopic device (Installation schematic) |
|------------|---|
| HMD 480 | <p>Reserved groove</p> <p>480-950</p> <p>350</p> <p>400-850</p> <p>Bridge deck pavement</p> |
| HMD 560 | <p>Reserved groove</p> <p>560-1120</p> <p>400</p> <p>450-1040</p> |
| HMD 640 | <p>Reserved groove</p> <p>640-1280</p> <p>450</p> <p>560-1200</p> |
| HMD 720 | <p>Reserved groove</p> <p>720-1440</p> <p>450</p> <p>640-1350</p> |
| HMD 800 | <p>Reserved groove</p> <p>800-1600</p> <p>450</p> <p>720-1520</p> |

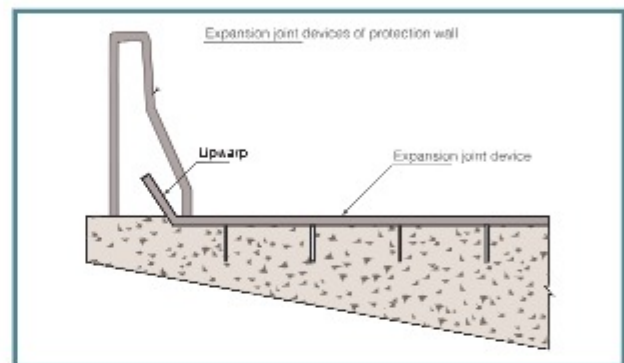
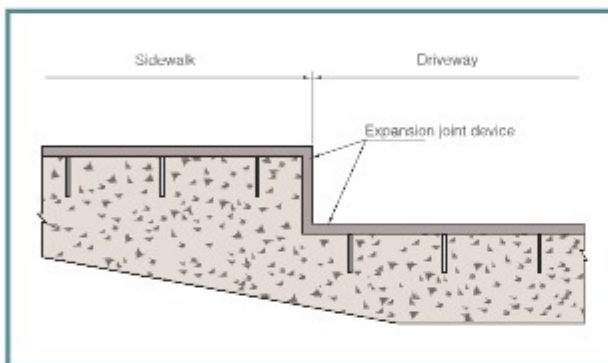


| Model | Sectional view of the telescopic device (Installation schematic) |
|----------|---|
| HMD 880 | |
| HMD 960 | |
| HMD 1040 | |
| HMD 1120 | |
| HMD 1200 | |

Waterproof Treatment of Sidewalk, Protection Wall and The End of Expansion Joint Device

In order to adapt to the transaction between sidewalk and driveway, our company could fabricate the expansion joint device conformable to the pavement in accordance with the drawing provided by the user, as shown below.

In order to prevent the accumulated water in rubber sealing strip from flowing to the abutment, upward could be set on both ends of expansion joint devices. The upward of expansion joint devices could be designed to different forms according to different pavement (upward length and angle). Generally, upward is placed the protection wall, as shown below.



Installation of AR-EX Expansion Joints



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