

**PRODUCT DESCRIPTION**

The elastomeric expansion joint (EXJ™) of Afzir Company is composed of materials called elastomer. This type of elastomer is a type of rubber with high strength that has high temperature flexibility and high compressive strength.

EXJ™ is a suitable tool to reduce and distribute the forces due to traffic on bridges and other structures. This rubber has a high ability against vibrations, which makes it have good resistance against natural factors such as earthquakes and temperature fluctuations.

Expansion joints are essential to the life of a bridge itself and must be correctly installed and maintained in order to function properly. Bridge deck expansion joints are used to allow for movement of the bridge deck due to thermal expansion, dynamics loading, and other factors. More recently, expansion joints have also been utilized to prevent the passage of winter de-icing chemicals and other corrosives applied to bridge decks from penetrating and damaging substructure components of the bridge.

Expansion joints are often one of the first components of a bridge deck to fail and repairing or replacing expansion joints are essential to extending the life of any bridge. Oftentimes, when dirt, dust or other types of debris build-up in and around these joints (caused by traffic and environmental conditions), the joints lose their ability to expand and contract with the structure, rendering them less effective. When this happens, the reduced flexibility will result in cracking or distortion/crushing of the joint material, compromising the entire bridge's structural integrity.

Expansion joints produced by Afzir Company reduce maintenance costs and significantly increase the life of the bridge structure.

**PRODUCT FEATURES**

- High resistance to traffic impacts
- Abrasion resistant
- low weight
- High resistance to corrosion and adverse weather conditions
- Suitable insulation against water and sealing the bridge expansion joint
- Can be used in different temperature conditions
- Good deformability and good reversibility
- Increasing the resistance of the structure to temperature changes
- Useful lifespan and high durability



Expansion Joint – EXJ™

- Increasing the resistance of the structure to expansion and contraction
- Increasing the resistance of the bridge structure against seismic stresses and vibrations
- Ease of replacement
- High tensile strength

**PRODUCT USES**

EXJ™ are used to strengthen structures, especially bridges. This type of expansion joint has many applications, including usability in concrete and steel structures, bicycle paths and tracks, bridges over hospitals and parking lots, and more.

- Reinforced concrete bridges
- Prestressed bridges
- Freeway bridges and highways
- Metal bridges with load-bearing beams
- Arched metal bridges
- Metal bridges with load-bearing cables
- As a break seam in the building
- As a discontinuous joint and expansion joint in parking lots

**HOW TO USE DESIGN**

In addition to producing EXJ™, Afzir company designs bridge reinforcement in accordance with regulations and standards such as ISO9001, European Standard EN 1337-5, Euro Codes Building The Future EC0, EC1, EC8, ASSHTO M297, CNR 10018 performs with detailed analyzes. Designs are based on project needs and environmental factors and other factors. Afzir Company is one of the top companies providing technical and engineering services by considering appropriate and appropriate design factors for various projects in Iran.

**TECHNICAL DATA**

Control parameter	Test Method	Test standard	standard	Required Values
<b>Tensile strength</b>	TS 1967 ISO 37	ASTM D412	Min 15.5 MPA	≥16 MPA
<b>Elongation at break</b>	TS 1967 ISO 37	ASTM D412	Min 450%	≥450 %
<b>Compression set(70°C, 24 hours)</b>	TS 4595 ISO 815	ASTM D395/B	Max 30%	*CR≤15 % *NR≤30 %
<b>hardness</b>	TS ISO 48	ASTM D2240	60±5 Shore A	60±5 Shore A

\*The type of expansion joint rubber is determined based on the client's order.

**MECHANICAL PROPERTIES**

Test name	Natural rubber	SBR	CR
Hardness Range	30-95°	40-95°	30-90°
colors	Full range	Full range	Full range
Heat Resistance(°c)			
Maximum Continuous	75°	85°	95°
Maximum Intermittent	105°	115°	125°
Low Temperature Resistance	-60°C	-55°C	-40°C
Resistances			
Oxidation	Fair	Fair	Very good
Ozone & Weathering	Poor	Poor	Very good
Chemical Resistance			
Acids	Fair	Fair	Good
Bases	Good	Good	Fair

**EXJ™ DIMENSIONS**

Model	Movement(mm)	Dimensions(mm)		
		W	H	L*
T30	±15	271	33	1250
T50	±25	276	43	1250
T80	±40	357	51	1250
T100	±50	388	53	2000
T140	±70	470	78	1250
T160	±80	498	84	1250
T160	±80	726	80	1250
T200	±100	802	71	1250
T250	±125	882	78	1250
T330	±165	1105	100	1250

\*Expansion joints are produced in parts with a length of 1250 mm or 2000 mm according to the client's order.

**APPLICATION**

Elastomeric expansion joints of bridges are non-structural components that are used to provide smooth passage over gaps on bridges, to compensate for thermal shrinkage and expansion of the structure, shrinkage or creep of concrete, and elastic shortening due to prestressing. Displacement due to path load in the structure, reduction of pressure due to swelling due to water freezing, foundation leakage and concrete curing are used. Expansion joint is a piece consisting of rubber and reinforced metal that is connected to the bridge structure by anchor bolts. Steel reinforcement plates are welded to elastomeric sheets by special adhesives hot during production and vulcanization. The anti-corrosion nature of these processes is of great importance in order to increase the life of the elastomeric expansion. The elastomeric compound is designed to be highly resistant to oil, grease, snow and abrasion, UV salt, sand and radiation. Anchor bolts are also made of stainless steel or hot-dip galvanized coating that is completely coated with anti-paint and anti-corrosion materials.

**Step 1:** Cutting as much as needed to install the seam, taking into account the thickness of the grout.

**Step2:** The stage of asphalt demolition and access to the required depth for the next steps.

**Step 3:** Install the mold or plastic foam for the required chat size according to technical specifications and drawings.

**Step 4:** In this step, first the heel reinforcement is done (the reinforcements are fixed by planting rebar in the structure), then the parts are temporarily stenciled and placed on the work and are ready to be grouted. In addition, the compressive strength required by the grout in the heel and under the piece is 35 MPa.

**Step 5:** The damaged concrete site and grout are impregnated with special concrete adhesive for adhesion and wetting of the previous concrete, and then the grout is poured by the mixer according to the instructions in the technical specifications and simultaneously by the vibrator to fill under the vibrating piece and after the heel.

**Step 6:** In this step, the grout is cured and then the zinc mark is made for the anchors.

**Step 7:** In this step, the parts will be collected and the marking place will be cleaned on the bolts and then drilling will be done.

**Step 8:** In this step, the holes are measured and then the bolt is implanted with implant adhesive approved by the consultant.

**Step 9:** At this stage, two-part epoxy adhesive is applied on the surface and then geomembrane insulation is spread on

it, which is finally called the sealing curtain stage. The disadvantage of all expansion joints of bridges is in this part, because when it rains, running water finds its way under the asphalt and in the most optimistic state, the water is on the curtain. The seals are flowing and they do not find a way to drain, for which case the company will transfer the collected water to the outside by offering special solutions such as adding flushing at the end of the slope.

*Step 10:* In this step, the reassembled parts are adjusted and then by the torque meter tightens the nut to 176 kN.

*Step 11:* Execution of mastic between the seams of the pieces, at the end of the mastic selected to fill the seams between the heel and the piece with mastic that is not affected by shrinkage and expansion against the conditions of severe cold weather and very high heat. The maximum temperature for this mastic is one hundred and eighty degrees celsius.

### **LIMITATIONS**

Expansion joint design calculations should be performed by reputable engineering companies or reputable and official companies. Damaged areas of concrete and corroded parts of steel should be repaired with suitable materials such as epoxy mortar before using expansion joints.

### **DISCLAIMER OF LIABILITY**

AFZIR, LLC warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within six months of the date of purchase.

AFZIR shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before committing to production.