

PRODUCT DESCRIPTION

EBB™ Elastomeric bridge bearing are structural equipment or devices installed between bridge substructure that facilitate the transfer of traffic actions, permanent actions and other environmental actions from the bridge deck down to the substructure, and ultimately to the ground.

Bearing pads transfer the applied load including earthquake loads; wind loads; traffic loads; and superstructure self-weight. Bridge bearings also make rooms for relative movements between superstructure and substructure, for instance, rotation movements and translational movements in horizontal and transverse direction. They also absorb vibrations and isolate sounds.

PRODUCT FEATURES

- Simple installation
- High quality
- High flexibility
- Good stability
- Chemical resistance
- High absorption of vibrations against possible shocks
- Flexibility at the same time and in two different directions
- Ability to rotate and deform around different axes
- Good resistance to Acids and petroleum products and suitable for temperature conditions of -40°C to 70°C, which is a wide range of regions of Iran.

PRODUCT USES

In the first step, EBB™ provides the flexibility of the bridge they are made of heavy-duty industrial rubber. These pads are placed in between superstructures such as the bridge beam and substructures such as the vertical supports called piers.

Their primary function is to distribute superstructure loads to the substructure and allow the superstructure to undergo necessary movements in irregular environmental conditions without creating any harmful stresses that might compromise the structural integrity of the bridge. When the structural integrity of the bridge is compromised, the bridge could collapse. Preventing collapse is one of the function of an elastomeric bearing pad. The pads extend the life of bridges by reducing wear and tear on bridge materials. The pads help governments save money by delaying the replacement of bridges.

HOW TO USE

EBB™ features reinforced steel plates that are sandwiched between layers of rubber through vulcanization and molding manufacturing process to form a homogeneous unit. These embedded steel plates limit excessive expansions and increase transversal, longitudinal and compressive strength as well as rotation capability.

The type of reinforced elastomeric bearings to be used in a bridge can be determined by a lot of factors some of them can be considered are the strength and the stiffness of the bearings, cost, ease of installation, maintenance, cost, etc.

Rubber used in the composition of bearings can be either natural or NR for "Natural Rubber" or synthetic,

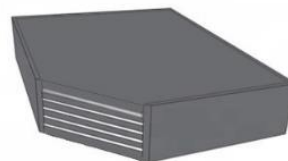


Elastomeric Bridge Bearing - EBB™

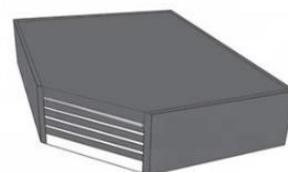
in which case the compound is generally a chloroprene polymer poly-chloroprene or CR for "Chloroprene Rubber".

The minimum thickness of a sheet, in accordance with EN 1337-3, may in no circumstance be under 5 mm, or over 25 mm. The most common types of reinforced elastomeric bearings are:

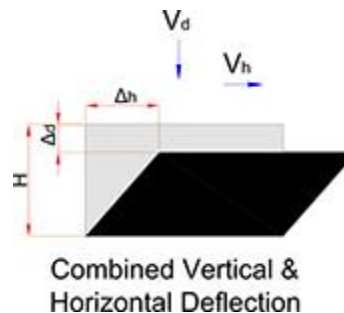
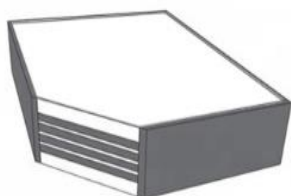
Type B (1): This kind of Neoprene is the most widely used. This type is fully covered with elastomer and containing at least two steel reinforcing plates. The permanent load has to be capable for slip prevention. For prevent of slip we recommend a minimum pressure of 3 N/mm² or 5 N/mm respectively, referring to the plan area of the bearing.



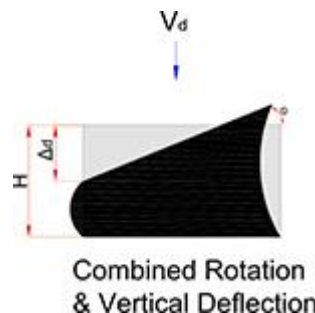
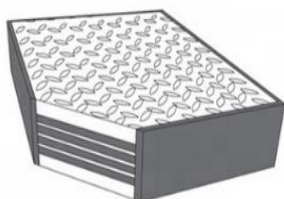
Type B/C (1/2): An outer face of this type of neoprene is reinforced with special steel plates. The steel plate allows to use almost any means against slip protection like dowels, threaded rods, bolts etc. The single sided slip protection allows an easy bearing installation and exchange. Slip protection is necessary in case of a pressure less than the minimum pressure of the bearing. Type B/C can be installed if the construction is secured in its position e.g. by a bearing that is fixed in all directions or transversely fixed. This bearing type has always to be used on railway bridges in Germany, independently of the actual load situation. An additional application for this bearing type is the usage as an anchored buffer e.g. for building constructions.



Type C (2): This type of support, at both ends, on the outermost surface, has steel plates that are connected to both sides of the structure by screws and other equipment. Reinforced bearing, both bearing surfaces are formed of steel plates to allow a slip protection. Bearing exchanges of this type are difficult to conduct without additional measures. As a floating bearing this bearing type can, depending on the stiffness, transfer horizontal loads (breaking etc.).



Type C (5): Reinforced bearing, both bearing surfaces are slip protected by ribbed steel plates (non-slip steel plates). Due to the fact that the required load cannot be defined exactly it should only be used for structures with minor loads or for building constructions. surfaces it cannot be employed between restraining structures. For prevent of slip requires a minimum pressure of 31 N/mm².



BEARING FUNCTION

- Permit lateral movements due to temperature change, traffic movements, wind, shrinkage and creep, foundation movement, seismic actions, dynamic forces and resulting vibrations
- Transmitting load to substructure foundations
- Accommodate girder rotation
- Support vertical loads

MODES OF FAILURE

Failure of the rubber is an important aspect to be considered in the design of elastomeric bearings. It is generally recognized that elastomers fail with the development of tensile stresses in the body. A rubber specimen tested under uniaxial tensile stress will fail only after sustaining large elongations. The extent of this elongation at rupture depends on the compounding and stiffness of the rubber. NR compounds usually produce larger elongations than CR of the same hardness: however, minimum values of 300 percent to 400 percent are common for both materials, and elongations approaching 600 percent are not unusual. Bridge bearings are not loaded in uniaxial tension, so the results of the elongation test are not directly applicable but elongation at break is almost universally specified as a quality control test for the material.

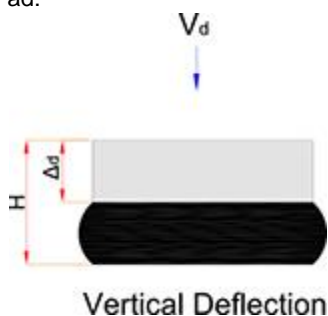
SPECIFICATIONS

Afzir Bearing Pads are manufactured to international standards such as European EN1337-3, British BS 5400, German DIN 4141, American AASHTO, etc. Following table shows the specifications that Afzir Bearing Pads are manufactured.

DESIGN FEATURES

DESIGN

The design rule of bearing pads is based on the assumption that rubber is a viscoelastic material, the deflection of which, under compressive loads, is influenced by its shape. Reinforcing plates in the bearings are chemically bonded to the elastomer to prevent any relative movement. Design of the bearing pads results in achieving the sizes, which would be stable under the specified loads, translation, and rotations of the given axis. Loads and Deflections on a Bearing Pad:



TECHNICAL DATA		
Property	Test result	Test method
Hardness	60 ± 5 Shore A	ASTM D2240
Tensile Strength	>16 Mpa	ASTMD412-06a
Elongation at Break	>425 %	ASTM D412-06a
Tear Resistance	>10 Kgr/cm	ASTM D624
Abrasion	>165 Mm ³	ASTM D2228
G Modulus	0/9±%15 N/mm ²	ASTM D4014
Compression Set	<27 %	ASTM D395-03 Method B 70°C, 70h, 24%
Bonding Test	>6 N/mm	ASTM D429B
Ozone Test	No cracks Visual Examination	ATM D1149-99 70h, 38°C 20% Elongation
Heat Aging Results with the following conditions (70h, 100° C)		
Elongation at Break Mean Variation	≤20 %	ASTM D573-04
Tensile Strength Mean Variation	≤20 %	ASTM D573-04

How to use

SURFACE PREPARATION

The surfaces should be flat. Free from cavities or protrusions professional installation is needed for optimum use and service life. It is preferable for the structure surfaces to have rough texture without lubrication, oil and hydro carbons. We coordinate the supervision. Afzir technician are ready to advise and assist the customer in every project. We coordinate the supervision.

CUTTING

EBB™ can be made in different types, dimensions according to existing standards, according to the customer's order.

APPLICATION

At all times prior to and during the installation operation, maintain every bridge member in a stable and safe condition. Bearing installation must be supervised by an Engineer. Carry out installation of bearings without any damage to the bridge member, the bearings, or any other element of the structure.

For all bearings and temporary supports, make provisions for final adjustments in order to achieve the required position and level shown on the Design Documentation drawings. Until the time of installation, store the bearings such that they are protected from direct sunlight, dirt, dust, wind, rain, running water and any other effects likely to cause damage. Do not dismantle pre-assembled bearings without the prior approval of the Principal. If so approved by the Principal, carry out the dismantling of a bearing only under the supervision of the bearing manufacturer.

To install the neoprene, first the bases of the supports are drilled, then they are filled with grout for these holes and placed in place by a crane. One of the important points in installing neoprene pieces is their alignment. However, in places where the deck

has a transverse slope, the distance between the deck and the support is filled with high-strength mortar, which in the workshop term is called massage. Usually, according to environmental conditions and catalog specifications, after a certain time, the above parts must be replaced. How to replace these parts is that first the jacks are placed next to these parts. These jacks then raise the deck to such an extent that the weight of the deck is removed from the neoprene and then the old part is replaced with a new part.

LIMITATIONS

Design calculations must be archived by a professional company. Elastomers and steel plates must be prepared according to existing standards.

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.