



Structural bearings

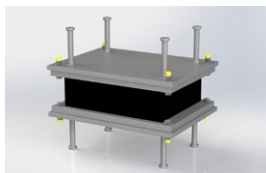
mageba structural bearings – mastering loads and movements



Puente Santa Maria, Spain

LASTO®BLOCK elastomeric bearings

versatile, flexible, durable



mageba
Switzerland www.mageba.ch



Design and types

Principle

LASTO®BLOCK elastomeric bearings act as elastic load-transferring connections between structural elements which must be able to move or rotate relative to each other. They can be designed to transmit vertical and horizontal forces from the superstructure to the substructure, without constraints. They also accommodate rotations about any axis and – where appropriate – movements of the superstructure.

Design

LASTO®BLOCK elastomeric bearings are made from high-quality elastomer, reinforced by steel plates. The two materials are chemically bonded in a vulcanisation process, forming a shear and pressure resistant connection. The steel reinforcing plates resist any arising tensile forces, and are fully enclosed in elastomer and thus permanently protected from corrosion.

Types

LASTO®BLOCK elastomeric bearings are available in the following variations as defined by EN 1337:

- Type A – Laminated bearing, fully covered with elastomer, comprising only one steel reinforcing plate; can be positioned between structural elements without anchoring
- Type B – Laminated bearing, fully covered with elastomer, comprising at least two steel reinforcing plates; can be positioned between structural elements without anchoring
- Type C – Bearing also features external steel plates, vulcanised into its upper and lower surfaces; allows external connections (e.g. to steel plates with shear dowels or bolts) should the minimum pressure acting on the bearing not be sufficient to prevent sliding
- Type C-RB – Same as Type C but with checker plate instead of flat steel plate on the surface, enabling installation directly onto a mortar bed
- Type B/C – Combination of Types B and C, with only one side featuring an external steel plate

- Type D – Same as Type B, but featuring an additional PTFE plate vulcanised onto its upper surface; in bridge construction, this type may only be used to accommodate temporary movements (e.g. creep, or the incremental launch method)
- Type E – Same as Type B, but featuring an additional steel plate vulcanised onto its upper surface into which is recessed a PTFE sheet
- Type F – Unreinforced elastomer block without any internal steel plates

The bearings are available with both rectangular and round shapes.

Types D and E are known as sliding elastomeric bearings, because of the additional sliding surface which accommodates larger displacements. They can thus also be used in bridge construction using the incremental launch method.

Movement restraints

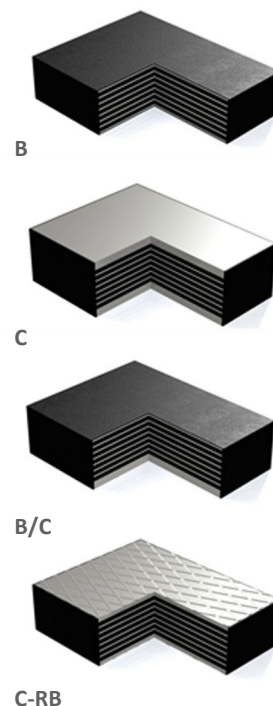
If movements between structural elements are to be prevented, in one direction or in all, then appropriate measures must be adopted. mageba offers steel movement restraints for LASTO®BLOCK elastomeric bearings, which resist horizontal forces as required. Anchorage is by means of dowels or threaded sleeves, depending on bearing type. These bearings – like the free sliding type – can also be supplied with upper and lower anchor plates featuring shear studs.

The designation of these bearings, featuring movement restraints and anchor plates as appropriate, is as follows:

- Type NBf – Non-sliding elastomeric bearing with movement restraint preventing movements in any direction (with or without anchor plates)
- Type NBe – Non-sliding elastomeric bearing with movement restraint preventing movements along all axes but one (with or without anchor plates)

- Type KGe – Sliding elastomeric bearing with movement restraint preventing movements along all axes but one (with or without anchor plates)
- Type NBa – Non-sliding elastomeric bearing (with or without anchor plates)
- Type KGa – Sliding elastomeric bearing (with or without anchor plates)

The use of anchor plates simplifies future bearing replacement and ensures proper distribution of loads.



Build-up of different bearing types

Properties and installation

Compliance with design standards

mageba LASTO®BLOCK elastomeric bearings are designed and manufactured in accordance with customer requirements and international standards such as EN 1337, AASHTO, BS 5400, AS5100.4, DIN 4141 and IRC:83.

Materials

The elastomer used in the manufacture of LASTO®BLOCK elastomeric bearings is a rubber-based macro-molecular material, which deforms when subjected to loading and regains its original size and shape after removal of the loading. LASTO®BLOCK elastomeric bearings can be manufactured from natural rubber (NR), or from synthetic chloroprene rubber (CR) which is particularly resistant to environmental and weathering influences such as ozone and ultra-violet radiation. A combination, with an NR core and a CR external shell, can also be supplied. This variation offers the individual advantages of both materials – the higher chemical resistance of CR, and the higher mechanical resistance / better deformation properties of NR.

The reinforcing plates used in the manufacture of LASTO®BLOCK elastomeric bearings are of S235 or S355 steel.

Corrosion protection

Corrosion protection of movement restraints is in general in accordance with ISO 12944 or other applicable national standards.

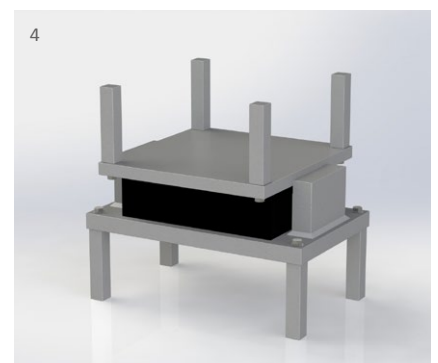
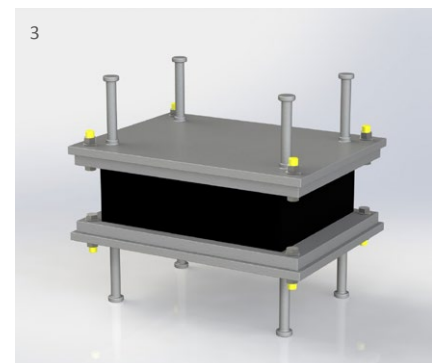
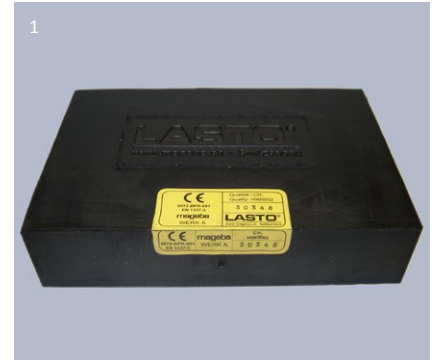
Installation

LASTO®BLOCK elastomeric bearings without movement restraints or anchorages are generally laid on a smooth mortar bed (cement mortar with appropriate strength). The mortar bed should have a thickness of 20 – 30 mm, and should be several centimetres wider than the bearing in all directions. To avoid unwanted demands on the bearing, the surface of the mortar bed must be flat and horizontal. In placing the bearing on the mortar bed, care must be taken to ensure that it is horizontal and that it will be kept in place by friction. The bearing surface of the superstructure must also be horizontal, to prevent shear deformation of the bearing under the influence of vertical loads.

The following points must be observed in relation to LASTO®BLOCK elastomeric bearings featuring movement restraints and anchorages:

- **Positioning:** The bearing location plan is the key element in the correct installation of the bearings. The structure's axes are marked on the bearings by grooves, enabling the bearings to be positioned precisely.
- **Fixing:** After positioning, the anchor recesses (if any) are concreted. The subsequently placed mortar bed should not be more than 50 mm thick; the use of mortar which can flow beneath the bearing during placing is recommended.
- **Taking into service:** If designed for movements, the bearing must be able to move freely as soon as it is connected to both superstructure and substructure. This requires any temporary transport fittings to be cut and removed.

Bearings are pre-assembled in the factory. Anchor dowels and threaded sockets are generally delivered loose to optimise volume for transport.



- 1 CE labelling of a LASTO®BLOCK type B bearing
- 2 LASTO®BLOCK type A bearing after installation
- 3 Bearing of type NBa featuring anchor plates with shear studs
- 4 Bearing of type NBe with anchor dowels



Quality and support

Quality

Over the past five decades, mageba has supplied over 50,000 structural bearings for projects all around the world. The quality and durability of mageba bearings is thus ensured not only by their well-proven product properties, but also by the extensive experience of our personnel.

mageba operates a process-oriented quality system that is certified in accordance with ISO 9001:2008. Quality is also regularly checked by independent bodies such as the materials testing institute (MPA) of the University of Stuttgart. mageba factories are approved for welding in accordance with ISO 3834-2, and certified in accordance with the current steel construction standard EN 1090.

CE conformity

LASTO®BLOCK elastomeric bearings from certified elastomer compounds, that are designed and manufactured in accordance with EN 1337, are marked with the CE label. This indicates that they fulfil all requirements of the standard and that the manufacturing facilities are systematically and regularly inspected by an independent certification body. LASTO®BLOCK bearings can also be manufactured in accordance with German standards (and marked with a Ü-label), or Austrian standards.

Offers

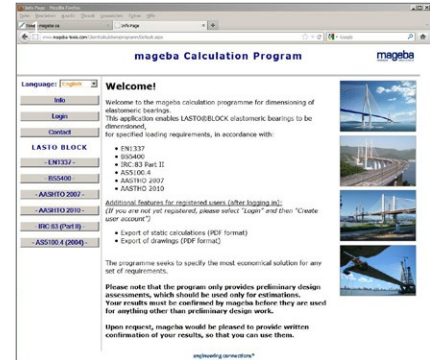
Quotations are provided on the basis of the types and numbers of bearing required. If desired, mageba can determine the types of bearing required, if provided with the following information:

- Maximum, minimum and permanent vertical loads and corresponding horizontal loads (ULS)
- Maximum horizontal loads in the structure's longitudinal and transverse directions and corresponding vertical loads (ULS)
- Displacements and rotations in the structure's longitudinal and transverse directions
- General information about the structure (concrete strength, available space for bearings, etc)

Support

Our product specialists are always ready to advise you in selecting the optimal technical solution for your project, and to provide you with quotations for supply.

You can also find further product information, including data sheets with standard bearing dimensions and reference lists, on the mageba website.



Online Dimensioning Programme

A freely accessible design programme on our website www.mageba.ch offers a simple and efficient way of dimensioning the LASTO®BLOCK bearings required for your project. The user can choose from various national / international design standards. The static design of the bearings is based on the data specified by the user, including loading and deformation data, bearing types and material quality. Registered users can also generate static design proofs and bearing drawings in PDF format, for use in their projects.

Project references – LASTO®BLOCK elastomeric bearings



Santa Maria Bridge (ES)



Krka Bridge (HR)



Seeb Corniche Road (OM)



Lali Bridge (IR)



Rreshen Kalimash (AL)



Autostrada Transilvania (RO)

mageba structural bearings



Pot bearings



Spherical bearings



Lifting/measuring bearing



ILM bearings



engineering connections®