



Structural bearings

Infrastructure | Buildings | Industrial structures

# mageba structural bearings – mastering loads and movements



## RESTON® POT LIFT-CONTROL lifting and measuring bearings

cleverly developed, safe, internationally approved



mageba



# Principle and functions

## Principle

mageba RESTON®POT LIFT-CONTROL lifting and measuring bearings (with European Technical Approval ETA-11/0453) are based in their design on the RESTON®POT bearing, and have the following functions:

- support of the structure, like a conventional bearing; and
- measurement of the load carried by the bearing; and/or
- controlled lifting of the superstructure.

RESTON®POT LIFT-CONTROL can be delivered as either lifting or measuring bearings, or combined as both lifting and measuring bearings.

## Structural support

RESTON®POT LIFT-CONTROL bearings serve the primary purpose of providing structural support. Like conventional pot bearings, they can be designed as fixed, guided sliding or free sliding. They can also be designed for special applications with high horizontal loading, and for use on railway bridges.

## Lifting function

RESTON®POT LIFT-CONTROL lifting bearings feature a pre-installed needle valve in the pot. A hydraulic pump can be connected to the valve and used to inject special silicone rubber, activating the lifting function. The injected material forms a new layer beneath the bearing's elastomeric pad. This raises the pad, and thus also the piston above it and the connected superstructure. This process can be repeated several times, e.g. to adjust heights during different construction stages and under varying loading conditions.

The silicone rubber used is a special material that hardens durably in the absence of air and moisture. The hardening prevents any subsequent loss of bearing height. Following the injection procedure, the bearing exhibits the same load carrying and movement characteristics as a normal pot bearing. This has been proven by load testing at the MPA institute of the University of Karlsruhe during the course of certification evaluations, and by real use in many structures.

As an alternative to injection, the lifting can be achieved by means of hydraulics. This allows the bearing to be raised and lowered as often as desired.

## Force measurement with ROBO®CONTROL

RESTON®POT LIFT-CONTROL measuring bearings enable the load acting on the bearing to be precisely determined at any time using a ROBO®CONTROL Portable or Permanent Unit.

A measuring cell inside the bearing transmits the appropriate values to the reader, which can be connected to the bearing via a dedicated connector. The connection point is well protected against external influences, and can be located away from the bearing to improve access, if required.

ROBO®CONTROL Permanent enables bearing loads to be monitored remotely, with many features available - such as graphic presentation of data and the sending of an automatic alarm message should pre-defined boundary values be exceeded.



- 1 ROBO®CONTROL Portable Unit
- 2 RESTON®POT LIFT-CONTROL bearing
- 3 Injection process

# Applications and benefits

## Ground settlements

Structures on slopes and in areas with poor ground conditions may be at risk of ground settlements. If such a structure is supported by conventional bearings, the compensation of such settlements requires lifting of the structure to insert packing plates and a great deal of effort. RESTON®POT LIFT-CONTROL bearings are designed to themselves lift the superstructure by the required amount, without the need for additional hydraulic jacks. Their integrated load measuring capability can also be used to confirm the proper distribution of loads.

## Structural adjustment

Unwanted movements and deformations, such as those resulting from creep and shrinkage in new concrete structures, must be compensated. In high-speed railway bridges, precise adjustments are required following ground settlements. In arch bridges, loads must be distributed in accordance with the structure's design to avoid unwanted long-term stresses and resulting damage to the structure.

RESTON®POT LIFT-CONTROL bearings enable such structural adjustments to be undertaken without the need for packing plates and costly additional lifting equipment.

## Safe lifting

With RESTON®POT LIFT-CONTROL bearings, the need to stabilise and secure the structure during lifting operations does not arise. The bearings retain their full ability to support and secure the superstructure during the entire lifting process, even continuing to accommodate movements. Lifting can thus be carried out without restrictions and under service conditions.

## Replacement of bridge bearings

RESTON®POT LIFT-CONTROL bearings offer an interesting option for the rehabilitation and modernisation of bridges as may be required, for example, by capacity increases or new standards.

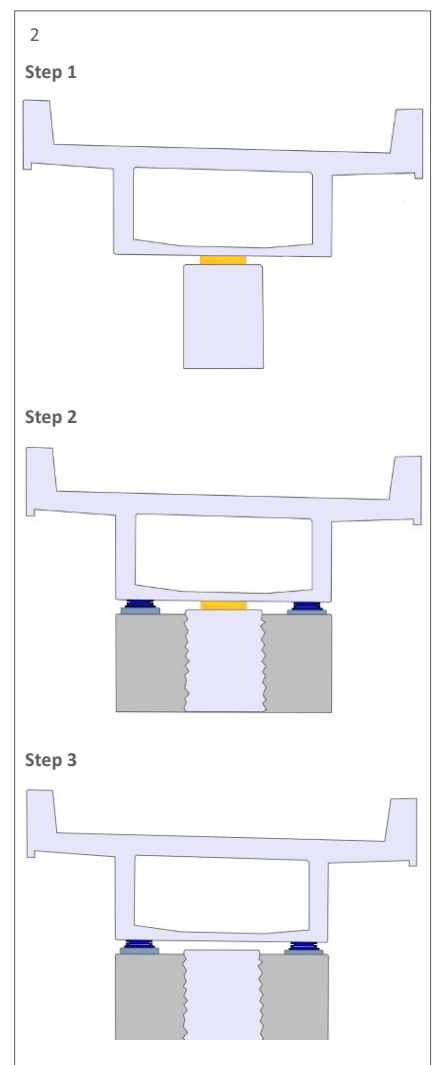
## Application example

Weyermannshaus highway viaduct, Berne, Switzerland:

After widening the viaduct's piers, the support of the deck was adapted to include two bearings on each pier instead of a single central one. The tender documentation assumed the use of hydraulic jacks to lift the superstructure. However, a proposal to use mageba RESTON®POT LIFT-CONTROL bearings as an alternative enabled the successful bidding contractor to significantly reduce construction costs, easily compensating for the additional bearing costs.

The construction method was as follows:

- Step 1:** Widening of the piers and carrying out of structural repair works
- Step 2:** Installation of the RESTON®POT LIFT-CONTROL bearings and use of these to lift the superstructure
- Step 3:** Removal of the existing bearings; the newly installed bearings take on the function of supporting the superstructure in the future



- 1 A bridge with RESTON®POT LIFT-CONTROL bearings to compensate ground settlements
- 2 Construction process at the Weyermannshaus highway viaduct



# 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

RESTON®POT LIFT-CONTROL bearings featuring the injection of a special silicone rubber, that are designed and manufactured in accordance with EN 1337, have a European approval (ETA-11/0453) and 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.

## Dimensions

The dimensions of RESTON®POT LIFT-CONTROL bearings are roughly equivalent to those of standard mageba RESTON®POT bearings, but with increased height. The lifting capacity can be specified to suit needs. In most circumstances, a capacity of +25 mm is adequate. In such a case, the bearing can be expected to be approximately 70 mm higher than a conventional pot bearing. The precise dimensions of RESTON®POT LIFT-CONTROL bearings are determined by mageba on a project by project basis.

## Materials

RESTON®POT LIFT-CONTROL bearings are manufactured using the same high-quality materials as RESTON®POT bearings. Details are provided in the RESTON®POT bearing brochure.

## Support

Our experienced product specialists are always ready to provide you with further information and to advise you in selecting the optimal solution for your project.

You can also find further product information, including data sheets with standard bearing dimensions and reference lists, at [mageba-group.com](http://mageba-group.com).

## Project references – RESTON®POT LIFT-CONTROL lifting and measuring bearings



Val da Pila (CH)



Gleisbogen Bridge (CH)



Weyermannshaus (CH)



Thaiss Power Plant (AT)



La Réunion (FR)



Maas Waalkanaal (NL)

## mageba structural bearings



Pot bearings



Spherical bearings



Elastomeric bearings



ILM bearings



engineering connections®