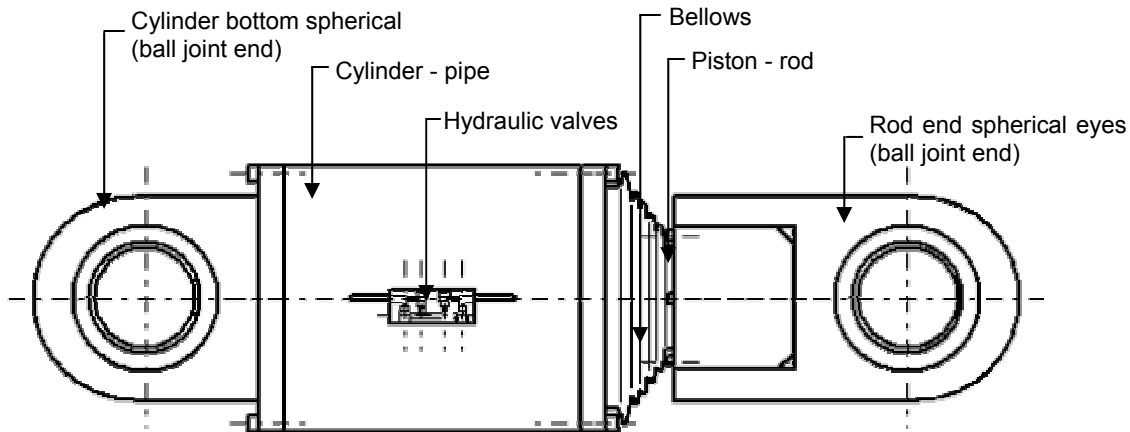


Technical Specification: mageba Hydraulic Buffers

1. GENERAL DISCRIPTION



The basic principle of a buffer is to allow free movements during normal operations and a temporarily rigid connection during a shock loading from an earthquake, traffic breaking, or a heavy wind blow, for instance.

The buffer shall be designed to cater to the most advanced specifications in respect to anti-seismic behaviour.

2. MATERIAL SPECIFICATION

	Specification	Standard
Cylinder tube	St 52-3N	EN10025 (DIN 17100)
Cylinder bottom spherical	St 52-3 N	EN10025 (DIN 17100)
Cylinder pipe	St 52-3 N	EN10025 (DIN 17100)
Hydraulic valves	Cast steel	EN10025 (DIN 17100)
Piston rod	34 CrMo 4	EN10025 (DIN 17100)

Material and components employed and the selected protective system shall be securing a service life of at least 30 years.

3. SEALS

The sealing represents a critical element of the total hydraulic system. Therefore, the sealing shall be of a quasi zero natural wear and have an absolute physical-chemic compatibility with the adopted hydraulic fluid.

The hydraulic buffers shall be equipped with, first class seals which have been subject to extensive experiments with different combinations of seals and oils.

4. CONTROL OF HYDRAULIC FLUID LEVEL

The buffers shall be equipped with appropriate aeration valves for an ideal control of the hydraulic fluid. The level shall be checked every 3 years by a simple method (aeration).

5. HYDRAULIC FLUID

The hydraulic fluid shall be based on silicon oil and shall contain special additives, protecting it against natural aging and the buffer from inner corrosion. With respect to temperature variations, the viscosity of the selected fluid shall have a nearly constant characteristic. This characteristic facilitates the mechanical system to be thermally compensated.

6. TEMPERATURE

The hydraulic buffer shall be designed for an operating temperature range from -10°C to +70°C. For short moments, the hydraulic buffer shall be constructed and designed to survive even temperatures of more than 200°C, temperatures that can be observed at the time of energy dissipation during a seismic event.

7. CORROSION PROTECTION

All visible surfaces shall be sandblasted and protected by a 100 µm zinc dust primer and two layers each of 80 µm additional top coating. The piston rod treated with a special corrosion protection.

Alternative requirements for corrosion protection can be accommodated.

The protection of the surface shall be resistant and ideal for the allocation in aggressive environment. This surface protection shall employ a long service life without the necessity of maintenance.

8. POSITION MEASURING SYSTEM

If requested by the engineer, the buffer shall have the possibility to integrate an optional measuring system that is integrated into the hydraulic cylinder, with an absolute or incremental position measuring gauge.

9. MONITORING SYSTEM

If requested by the engineer, the buffer shall have the possibility to be equipped with a monitoring system that shall include measuring units such as oil temperature gauge, distance control systems, oil pressure sensors, and so forth. The output shall be realised through an analogue output 4-20mA or 0-10V.

10. MANUFACTURING

The hydraulic buffers shall be manufactured by a specialised manufacturer, with at least 20 years experience in this field. The manufacturer shall demonstrate, that he has manufactured hydraulic buffers at least according to the given specifications and requirements. All manufacturers have to be approved by the responsible authority.

For welding the manufacturer must be qualified according to DIN 18800 Part 7 with extension for steel road bridges according to DIN 18809. All welders must be approved according to EN 287 Part 1.

11. TESTING

All tests shall be performed at an independent test institute, which has to be approved by the responsible project authority. The test reports or relevant evidence have to be submitted for approval on request.

12. INSTALLATION

The installation of the hydraulic buffer shall be simple and be installed as a single unit. The hydraulic buffers shall be delivered with a blocking bolt which is used during the construction phase therefore it is possible to shift the buffer.

The fixing from buffer to pylon shall be made by bolts and the spherical plain bearing. The counterpart of the spherical plain bearing shall be the fixing plate which has two flat links.

13. INSPECTION AND MAINTENANCE

The manufacturer shall supply together with the drawings an inspection and maintenance manual for the hydraulic buffers.

14. QUALITY CONTROL

The manufacturer shall have a QA-System according to EN ISO 9001. The QA-System must be in use for more than 6 years and must have passed successfully at least one repetition audit.

Quality requirements for welding shall be in accordance with EN 729-2 (fusion welding of metallic materials).

The production of the hydraulic buffers must be supervised at least 2 times a year by an independent test authority with knowledge in the field of hydraulic buffers production. The test authority must be approved by the responsible authority for the project. Certificates for EN ISO 9001 and EN 729-2 have to be supplied with the offer.