

POLITECNICO DI MILANO



Laboratorio Prove Materiali - NB 1777 CPR

Notified Body 1777 – CPR

**CERTIFICATE OF CONSTANCY OF PERFORMANCE
1777 - CPR – 15.02**

In compliance with the Regulation (UE) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

Elastomeric Isolators

with trade name

LASTO®LRB – Lead Rubber Bearing

seismic isolation bearings to use in building and civil engineering works where requirements on individual devices are critical, placed on the market under the name or trade mark of

Mageba S.A.

Solistrasse 68, 8180 Bülach, Switzerland

and produced in the manufacturing plant

Factory MaIT-IL

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the Annex ZA of the standard

EN 15129:2009

under AVCP System 1 for the performance set out in this certificate are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

This certificate was first issued on 28 April 2015 and remains valid as long as neither the harmonised standard, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

The main characteristics of the product are reported in the Annex to this certificate.

Milan, 16 November 2016

Revision n. 1

Prof. Ing. Carlo Poggi
Head of Certification Body



Annex to Certificate of Constancy of Performance no. 1777 – CPR – 15.02

LASTO®LRB – Lead Rubber Bearing product family

Description of the product

LASTO®LRB – Lead Rubber Bearing is an isolation device relying on the mechanical behavior of a high damping elastomer, lead core and reinforced with steel plates. The device is classified as elastomeric isolator, type Lead Rubber Bearing (LRB) according to clause 8.2 of the standard EN 15129:2009.

The elastomeric material is high damping elastomer.

The temperature range is from 0° C to +40° C.

The intended use is in bridge, buildings and civil engineering works.

Type, identification and use

LASTO®LRB – Lead Rubber Bearing family products meet the following requirements in accordance with hEN 15129:2009:

- Mechanical and physical properties of high damping elastomers, Table 9, Table 12;
- Capacity in compression under zero lateral displacement, point 8.2.4.1.5.1, point 8.2.4.1.2;
- Compression stiffness, point 8.2.4.1.5.1, point 8.2.4.1.2;
- Horizontal characteristics under cyclic deformation, point 8.2.4.1.5.2, point 8.2.4.1.2;
- Variation of horizontal characteristics under cyclic deformation with temperature, point 8.2.4.1.5.2, point 8.2.4.1.2;
- Variation of horizontal characteristics under cyclic deformation with frequency, point 8.2.4.1.5.2, point 8.2.4.1.2;
- Variation of horizontal characteristics under cyclic deformation with repeated cycling, point 8.2.4.1.5.2, point 8.2.4.1.2;
- Variation of horizontal characteristics under cyclic deformation with ageing, point 8.2.4.1.5.2, point 8.2.4.1.2;
- Lateral capacity under maximum and minimum vertical loads, point 8.2.4.1.5.3, point 8.2.4.1.2;
- Repeated loading in compression, EN 1337-3:2005, point 4.3.4, Table 7;
- Ozone resistance, EN 1337-3:2005, point 4.3.6, Table 7.

The device is fixed to the structure by means of bolted flanges directly vulcanized to the rubber.



LASTO®LRB – Lead Rubber Bearing product family is evaluated on the basis of type testing results reported below.

LASTO®LRB – Lead Rubber Bearing C-450-132			
<i>Outer diameter 450 mm</i>		<i>total rubber thickness 132 mm</i>	
<i>Essential characteristics</i>	<i>clause</i>	<i>Design value</i>	<i>Units</i>
Load bearing capacity	EN 15129:2009 8.2.1.2.6 8.2.1.2.7 8.2.3.4.2 8.2.3.4.3 8.2.3.4.4 EN 1337-3:2005 4.3.4	Conforming	-
Resistance to seismic loads	EN 15129:2009 8.2.1.2.5	Conforming	-
Shear Stiffness	EN 15129:2009 8.2.1.2.2 8.2.1.2.4 8.2.1.2.5 8.2.2.1.5	1.50 Conforming	kN/mm -
Rotation capability	EN 15129:2009 8.2.3.4.2	Conforming	-
Energy dissipation capability	EN 15129:2009 8.2.1.2.2 8.2.1.2.3 8.2.1.2.4	19.7 Conforming	% -
Horizontal distortion capability	EN 15129:2009 8.2.1.2.7 8.2.2.1.4 8.2.3.4.1 8.2.3.4.2	Conforming	-
Durability aspects	EN 15129:2009 8.2.1.2.9 8.2.2.1.3.5 8.2.2.1.4.2 8.2.2.1.6 EN 1337-3:2005 4.3.4	Conforming	-

According to Test Report 2014/2217

The elastomeric material is identified as 881100326. The appropriate certificate 2014/0410 reporting the identification characteristics of the elastomer is deposited at the Notified Body involved in the Assessment and Verification of Constancy of Performance.

The design of the product family is in accordance with document *Mageba Design Calculation Report rev 0 dated 08 October 2014*.



LASTO®LRB – Lead Rubber Bearing C-550-162			
<i>Outer diameter 550 mm</i>		<i>total rubber thickness 162 mm</i>	
<i>Essential characteristics</i>	<i>clause</i>	<i>Design value</i>	<i>Units</i>
Load bearing capacity	EN 15129:2009 8.2.1.2.6 8.2.1.2.7 8.2.3.4.2 8.2.3.4.3 8.2.3.4.4 EN 1337-3:2005 4.3.4	Conforming	–
Resistance to seismic loads	EN 15129:2009 8.2.1.2.5	Conforming	–
Shear Stiffness	EN 15129:2009 8.2.1.2.2 8.2.1.2.4 8.2.1.2.5 8.2.2.1.5	1.71 Conforming	kN/mm -
Rotation capability	EN 15129:2009 8.2.3.4.2	Conforming	-
Energy dissipation capability	EN 15129:2009 8.2.1.2.2 8.2.1.2.3 8.2.1.2.4	16.2 Conforming	% -
Horizontal distortion capability	EN 15129:2009 8.2.1.2.7 8.2.2.1.4 8.2.3.4.1 8.2.3.4.2	Conforming	-
Durability aspects	EN 15129:2009 8.2.1.2.9 8.2.2.1.3.5 8.2.2.1.4.2 8.2.2.1.6 EN 1337-3:2005 4.3.4	Conforming	–

According to Test Report 2014/2721

The elastomeric material is identified as 881100326. The appropriate certificate 2014/0410 reporting the identification characteristics of the elastomer is deposited at the Notified Body involved in the Assessment and Verification of Constancy of Performance.

The design of the product family is in accordance with *Mageba Design Calculation Report rev 1 dated 20 March 2015*.



LASTO®LRB – Lead Rubber Bearing C-850-200			
<i>Outer diameter 850 mm</i>		<i>total rubber thickness 200 mm</i>	
<i>Essential characteristics</i>	<i>clause</i>	<i>Design value</i>	<i>Units</i>
Load bearing capacity	EN 15129:2009 8.2.1.2.6 8.2.1.2.7 8.2.3.4.2 8.2.3.4.3 8.2.3.4.4 EN 1337-3:2005 4.3.4	Conforming	–
Resistance to seismic loads	EN 15129:2009 8.2.1.2.5	Conforming	–
Shear Stiffness	EN 15129:2009 8.2.1.2.2 8.2.1.2.4 8.2.1.2.5 8.2.2.1.5	3.53 Conforming	kN/mm -
Rotation capability	EN 15129:2009 8.2.3.4.2	Conforming	-
Energy dissipation capability	EN 15129:2009 8.2.1.2.2 8.2.1.2.3 8.2.1.2.4	19.6 Conforming	% -
Horizontal distortion capability	EN 15129:2009 8.2.1.2.7 8.2.2.1.4 8.2.3.4.1 8.2.3.4.2	Conforming	-
Durability aspects	EN 15129:2009 8.2.1.2.9 8.2.2.1.3.5 8.2.2.1.4.2 8.2.2.1.6 EN 1337-3:2005 4.3.4	Conforming	–

According to Test Reports 2016/0062 and 2016/0057

The elastomeric material is identified as 880035708. The appropriate certificate 2013/0684 reporting the identification characteristics of the elastomer is deposited at the Notified Body involved in the Assessment and Verification of Constancy of Performance.

The design of the product family is in accordance with *Mageba Design Calculation Report rev 01 dated 21 October 2016*.



LASTO®LRB – Lead Rubber Bearing C-900-276			
<i>Outer diameter 900 mm</i>		<i>total rubber thickness 276 mm</i>	
<i>Essential characteristics</i>	<i>clause</i>	<i>Design value</i>	<i>Units</i>
Load bearing capacity	EN 15129:2009 8.2.1.2.6 8.2.1.2.7 8.2.3.4.2 8.2.3.4.3 8.2.3.4.4 EN 1337-3:2005 4.3.4	Conforming	-
Resistance to seismic loads	EN 15129:2009 8.2.1.2.5	Conforming	-
Shear Stiffness	EN 15129:2009 8.2.1.2.2 8.2.1.2.4 8.2.1.2.5 8.2.2.1.5	2.05 Conforming	kN/mm -
Rotation capability	EN 15129:2009 8.2.3.4.2	Conforming	-
Energy dissipation capability	EN 15129:2009 8.2.1.2.2 8.2.1.2.3 8.2.1.2.4	29.2 Conforming	% -
Horizontal distortion capability	EN 15129:2009 8.2.1.2.7 8.2.2.1.4 8.2.3.4.1 8.2.3.4.2	Conforming	-
Durability aspects	EN 15129:2009 8.2.1.2.9 8.2.2.1.3.5 8.2.2.1.4.2 8.2.2.1.6 EN 1337-3:2005 4.3.4	Conforming	-

According to Test Reports 2019/0844

The elastomeric material is identified as 880034880. The appropriate certificate 2015/1770 reporting the identification characteristics of the elastomer is deposited at the Notified Body involved in the Assessment and Verification of Constancy of Performance.

The design of the product family is in accordance with *Mageba Design Calculation Report rev 01 dated 10 December 2019*.



LASTO®LRB – Lead Rubber Bearing products (types and sizes) covered by the Certificate of Constancy of Performance are manufactured in accordance with this design and with the same parametric technical solutions. The characteristics of the products can vary in the range defined below in accordance with clause 8.2.4.1.2 of EN 15129:2009

	LASTO®LRB C-450-132	LASTO®LRB C-550-162	LASTO®LRB C-850-200	LASTO®LRB C-900-276
Elastomer compound	881100326	881100326	880035708	880034880
shape factor of the elastomer layers	16.5 to 20.16	20.25 to 24.75	18.9 to 23.1	16.47 to 20.13
external dimension of the isolator (diameter) [mm]	225 to 495	275 to 605	425 to 935	450 to 990
external dimension of the isolator (height) [mm]	102 to 224.4	122 to 268.4	148.5 to 326.7	247.5 to 544.5
plan dimension of the internal reinforcing plates [mm]	220 to 484	270 to 594	420 to 924	440 to 968
type of attachment system	bolted	bolted	bolted	bolted
$\epsilon_{q,E}$ [%]	up to 150	up to 150	up to 150	up to 150
service temperature [° C]	-3 to 45	-3 to 45	-3 to 45	-3 to 45
N_{Sd} [kN]	up to 2990	up to 2990	up to 12033	up to 5119
$\gamma_b d_{Ed}$ [mm]	up to 289.8	up to 342.3	up to 551.3	up to 1147
$N_{Ed,max}$ [kN]	up to 935	up to 935	up to 5555	up to 3033
$N_{Ed,min}$ [kN]	down to 280	down to 280	down to 2104	down to 1260

Milan, 16 June 2020

Prof. Ing. Carlo Poggi
Head of Certification Body

**The present Annex is only valid together with the
Certificate of Constancy of Performance no. 1777 – CPR – 15.02
rev. 1 dated 16 November 2016**