

Algasism LRB



Isolatori al piombo - elastomero
Lead Rubber Bearings

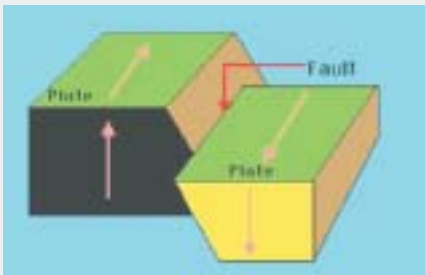




WHAT IS AN EARTHQUAKE?

Earthquakes are rapid shaking of the Earth caused by movement of rock beneath its surface.

The release of stored elastic energy caused by sudden fracture or slip on a fault makes the ground shake violently. This energy can be built up and stored for many years and then released in few seconds, causing destructive effects.



Earthquakes are natural destructive phenomena which constitute worldwide a continuous threat to life and property. The recently occurred catastrophes have shown the tremendous and ruinous effects that earthquakes have on people's lives, on their cities, buildings and infrastructures as well as on their business.



SEISMIC ISOLATION

WHAT IS SEISMIC ISOLATION?

Seismic isolation is a simple design approach to protect a structure and its content from earthquakes.

It consists substantially in a decoupling of the structure from the horizontal components of the ground motion obtained with the insertion of mechanical devices characterised by a low horizontal stiffness.

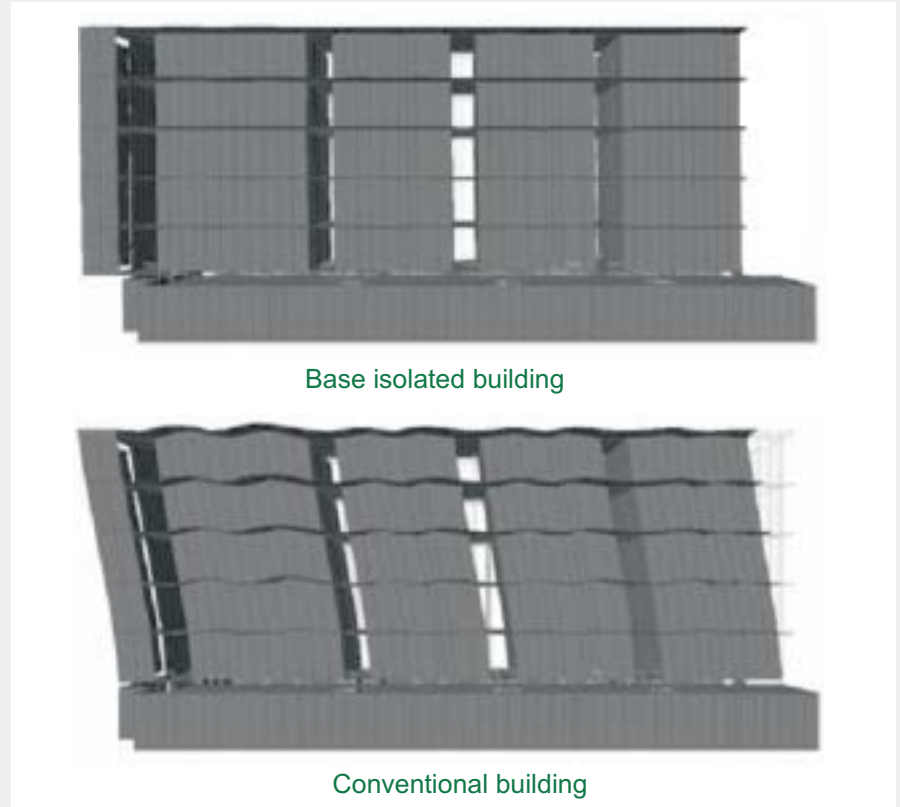
Devices, generally referred to as isolation bearings, are usually located between the structure and its foundations.

Bearings are designed to carry the weight of the structure and dissipate the destructive earthquake energy, providing an elastic restoring force and the required damping.

WHEN TO USE SEISMIC ISOLATION?

Seismic isolation is an extraordinary earthquake-resistant design strategy that significantly improves the seismic performances of the structure and mitigate the hazards of earthquake. Seismic isolation can be used for both new and existing structures.

From the dynamic point of view, good candidate structures to be seismically isolated are those having a relatively rigid superstructure to accommodate the longer periods generated by the isolators insertion.



Base isolated building

Conventional building

WHY DOES IT WORK?

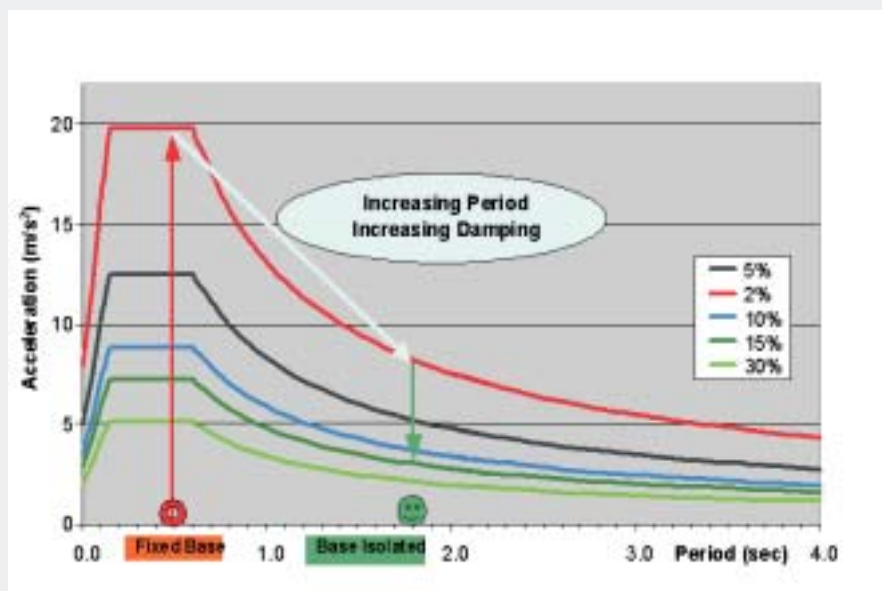
The insertion of isolation bearings gives the structures a natural frequency that is lower than both its fixed-based frequency and the predominant frequencies of the ground motion. The first dynamic mode of a base isolated structure involves deformation only in the isolation system, while the structure above the isolation system behaves as a rigid body.

The higher modes that produce deformation in the structure are orthogonal to the first mode and to the ground motion. Consequently, the high energy in the ground motion at these frequencies cannot be transmitted into the structure.

Base isolated structures response is governed by appropriate bearings design and selection.

Examples of good potential users for base isolation:

- Hospitals
- Emergency Operation Centre
- Schools
- Police and Fire Facilities
- Office buildings and Computer Centres
- Buildings that house sensitive internal equipment
- Apartment Buildings
- Museums
- Existing buildings with limited seismic capacity
- Manufacturing and Process Facilities
- Highway Bridges and Viaducts
- Stand alone components (transformers, pumps, etc.)
- Chemical and electrical plant



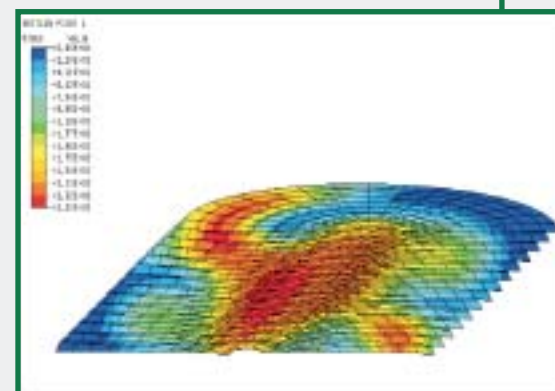
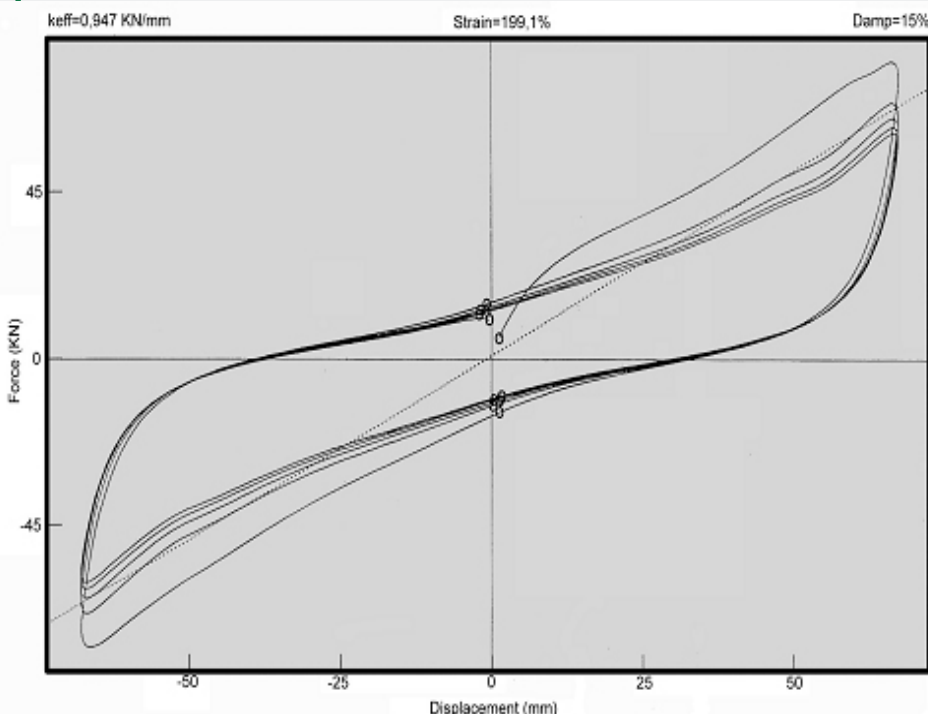
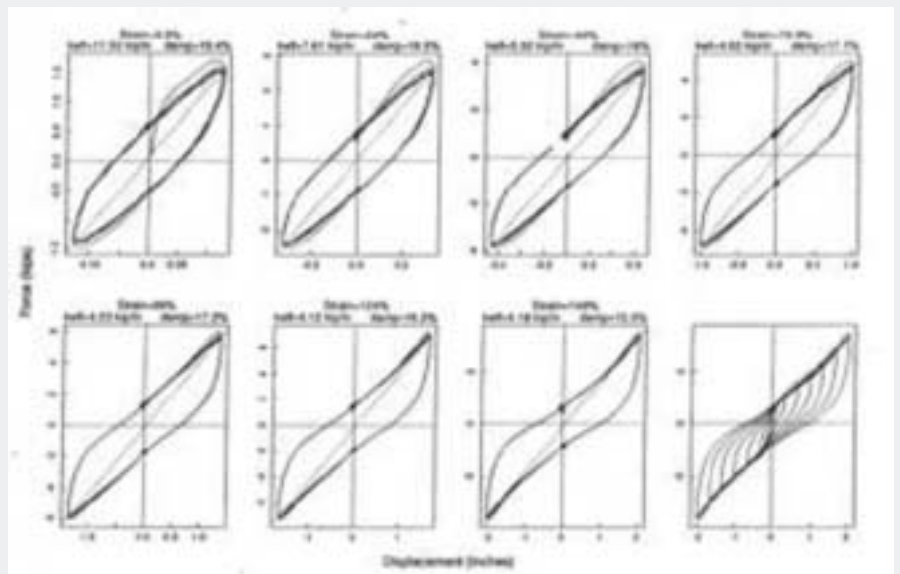
ALGA PRODUCTS FOR BASE ISOLATION

Alga started developing rubber bearings as seismic isolation devices in 1985 and since then performed researches on design, materials, manufacturing techniques and quality control technology.

Throughout the research carried out and the experience achieved Alga can nowadays offer top quality base isolation devices.

ALGA LRB are multilayered bearings manufactured to recognised international standards, available in a wide range of load bearing capacity, shape and dimension, with specifically designed rubber formulations other than natural rubber, thus providing the designer extreme flexibility and economy.

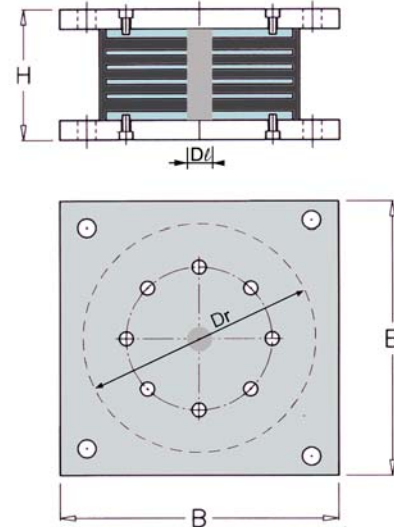
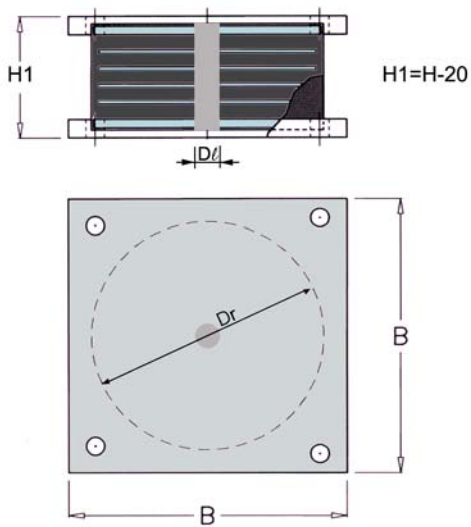
Comprehensive technical details are available from Alga



- Main features are:
- load bearing capacity up to 15000 kN
 - dimensions from 300 mm up to 1200 mm diameter
 - high protection against ageing
 - no maintenance
 - easy to install
 - constant characteristics

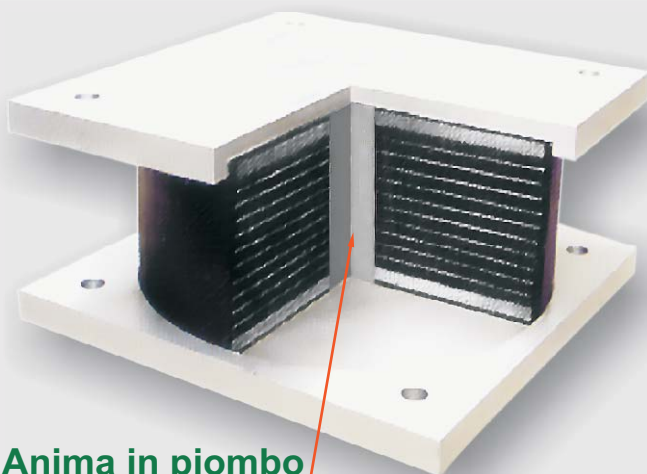
ALGASISM LRB

ISOLATORI AL PIOMBO-ELASTOMERO - LEAD RUBBER BEARINGS

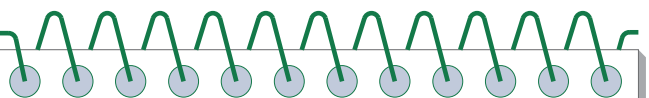


LRB	Max vert. load (kN)	Max slow displacem. (mm)	Max EQ displacem. (mm)	Total displacem. (mm)	Core lead diam. D1 (mm)	Rubber diam. Dr (mm)	Horizontal stiffness K2 (kN/mm)	Horizontal stiffness Keff (kN/mm)	Area of hysteresis loop EDC (kNm)	Side of external plates B (mm)	Overall height of bearing H (mm)
LRB 300	700	40	72	112	30	300	0,490	0,774	6,1	350	197
LRB 400	1700	52	94	146	40	400	0,670	1,059	14,1	450	230
LRB 500	2900	64	115	179	50	500	0,850	1,230	27,1	550	263
LRB 600	4000	78	140	218	60	600	1,005	1,589	47,6	650	294
LRB 700	5700	90	162	252	70	700	1,185	1,710	74,8	750	346
LRB 800	7500	102	184	286	80	800	1,366	2,160	110,7	850	394
LRB 900	9500	102	184	286	90	900	1,729	2,733	140,1	950	394
LRB 1000	11000	105	189	294	100	1000	2,073	3,278	178,1	1050	428
LRB 1100	14000	105	189	294	110	1100	2,509	3,966	215,5	1150	428
LRB 1200	16000	105	189	294	120	1200	2,986	4,720	256,4	1250	428

ALGASISM LRB



Anima in piombo
Core lead



PROPRIETA' FISICO-MECCANICHE LRB LRB PHYSICAL-MECHANICAL PROPERTIES

CARATTERISTICHE CHARACTERISTICS			NORMATIVA STANDARD
POLIMERO POLYMER	Tipo Type	Rubber compound SISMI 60	CNR 10018-87
Durezza Hardness	Shore A3	60± 5	UNI 4916
Resistenza a rottura Tensile strength	N/mm ²	20	UNI 6065
Allungamento a rottura Ultimate elongation	%	600	UNI 6065
Modulo di elasticità G G Modulus	N/mm ²	0.8	UNI 6065
ACCIAIO ARMATURA REINFORCING STEEL	Tipo Type	S275JR	UNI EN 10025-92

ANIMA IN PIOMBO PURO >99% - PURE LEAD WITH PURITY >99% IS USED



APPOGGI E GIUNTI DI DILATAZIONE -
DISPOSITIVI ANTISISMICI - POST-
TENSIONE - STRALLI - TECNOLOGIE
SPECIALI PER LE COSTRUZIONI

BRIDGE BEARINGS AND EXPANSION
JOINTS - ANTISEISMIC DEVICES - POST-
TENSION - STAY CABLES - ADVANCED
TECHNOLOGIES FOR CONSTRUCTION

ALGA SPA - VIA DEI MISSAGLIA 97/B1 - 20142 MILANO - TEL. +39 02 48569.1 - FAX +39 02 48569.245 - HTTP://WWW.ALGA.IT

ALGA SERVICES & QUALITY

Alga has pioneered seismic isolation concepts in Italy and all over the world and is nowadays a leader in the manufacturing of seismic isolators and in the use of base isolation for the protection of structures.

Alga offers high quality high damping and lead core rubber bearings.

Alga can provide complete project engineering service for both new projects and retrofit of existing buildings, including:

- Feasibility studies
- Complete dynamic non linear modelling
- Design, specifications and detailing of base isolation system
- Design and analysis support for structural engineers
- Testing facilities for qualification and homologation tests on isolation bearing
- Complete follow-through during construction and installation



Alga S.p.A. Works with quality assurance system according to ISO 9001: 94, certified since 1993 with document nr 9305 issued by CISQ/IGQ member of international network for quality system assessment and certification "IQNET".

For each supply, bearings are checked with tests. Alga technology and know-how in HDRB and LRB manufacturing are based on tests performed on more than 500 prototypes and more than 1000

rubber specimens.

Furthermore, seismic simulations on reduced scale building models and on real base isolated buildings have been performed. Such tests have been carried out in Alga laboratories and in the following external laboratories: ANSALDO RICERCHE, CERISIE, ENEA, ENEL, ISMES, MRPRA, TECHNISCHE UNIVERSITÄT KARLSRUHE, UNIVERSITY OF CALIFORNIA AT BERKLEY.



Taglio dei pilastri dell'Aeroporto di Antalya per l'isierimento di isolatori ALGASISMLRB.

LRB Base Isolators for Antalya Airport.

