Ideas, Engineering and Manufacture

AGOM®

AGOM R-Max

Spherical bearings

AGOM INTERNATIONAL SRL
Via Mesero, 12 – 20002 Ossona (MI) – Italy - www.agom.it
PH.: +39 02 9029111 – FAX: +39 02 9010201 – agom@agom.it

AGOM International: Experience and Quality

Bridges are subjected to movements and rotation caused by traffic, temperature changes, earthquakes, shrinkage, prestressing, creep, etc. Bridge construction requires carefully designed and manufactured bearings, anti-seismic devices, shock absorbers and expansion joints to ensure that such forces are properly dealt with throughout the life of the structure.

AGOM has over 50 years' experience in design and manufacturing bridge bearings, bridge expansion joints, anti-seismic devices and shock absorbers for bridge-building and construction industry. All products comply with the latest European standards and all main international standards.

The quality and durability of these products are ensured by:

- our team of skilled engineers, who can conceptualise and design the most appropriate engineering solutions
- qualified professionals, trained and continually updated in quality production techniques
- virgin raw materials that are quality assessed in our on-site testing laboratory
- ISO 9001:2015 quality standard accreditation
- strict quality control processes
- periodical external inspections by globally recognized bodies such as the TZUS of Prague and Certiquality
- independent international inspection and certification authorities.

General features of spherical bearings

AGOM R-Max spherical bearings are designed to carry combinations of vertical loads, horizontal loads, longitudinal and transversal movements and rotations and they are used in steel and concrete road and railway bridges.

The bearing is composed by steel elements coupled with low friction material (PTFE) surfaces to allow movement and rotations. One side of the internal median plate is machined as a spherical surface to allow tilting movement (rotation) whilst on the other side a flat sliding surface is obtained to allow displacements.

Depending on whether the bearing is fixed, guided sliding or a free sliding, R-Max bearings accommodate vertical loads and corresponding horizontal forces, as well as movements in longitudinal or transversal directions.

Advantages of spherical bearings

AGOM R-Max bearings fulfil the following requirements:

- ✓ Transmit the vertical loads due to permanent and accidental effects; it is possible to cover a wide range of loads about up from 500 to 100000 kN
- ✓ Transmit the horizontal loads with practically no limitation of the design load
- ✓ Allow rotation as per a spherical hinge. The standard design rotation (±0.02 rad) can be easily increased to compensate structure slopes
- ✓ No limitation for of horizontal displacement
- ✓ Suitable for all structures steel and concrete bridges and buildings
- ✓ High durability and easy maintenance

Load Combinations

R-Max spherical bearings can carry very high loads, over 100.000 kN.

The bearings are designed for combined maximum vertical and horizontal loads. The standard range of AGOM spherical bearing is designed to have and horizontal load ≤ 15% of the maximum vertical load with a maximum rotation ±0.02 rad (other load and rotation combinations are provided on request). To define the correct bearing, our engineers take into account the designed load effects, rotations, displacements and type of fixings.

Spherical bearing types

Fixed type R-Max AGSF

Due to the combination of vertical and horizontal loads, the R-Max bearings can be designed in two different arrangements: the “two steel plates” configuration and the “three steel plates” configuration.

The “two steel plates configuration” bearings are given by the combination of a convex and concave steel plates machined as a spherical surface to realize the hinge for rotation around every axis; the rotational surface is obtained coupling a curved sheet of PTFE and a spherical low roughness sliding surface (according with EN1337-2 code) to minimize friction and maximizing PTFE service life. In this “two plates configuration”, the horizontal load is transmitted through the spherical surface to the base plate, according to design codes (as EN1337-7).

The “three plates configuration” bearings are made up by adding an external steel plate to the “two plates configuration” bearings; in this arrangement the horizontal load is transmitted by the direct contact between the bearing upper steel and the base plate whilst the spherical and PTFE surfaces carry only the vertical loads allowing rotations. The “three plates configuration” bearings allow to transmit higher horizontal loads respect to the two plates bearings.

AGOM R-Max bearings enable rotation in any direction while at the same time the structure is constrained horizontally. The bearing external steel plates are designed to fix the bearing to the structure.

Free sliding R-Max AGSM

Similar in construction to the fixed bearings, these multi-directional bearings have three plates and two PTFE surfaces, one for rotation and the other for sliding.

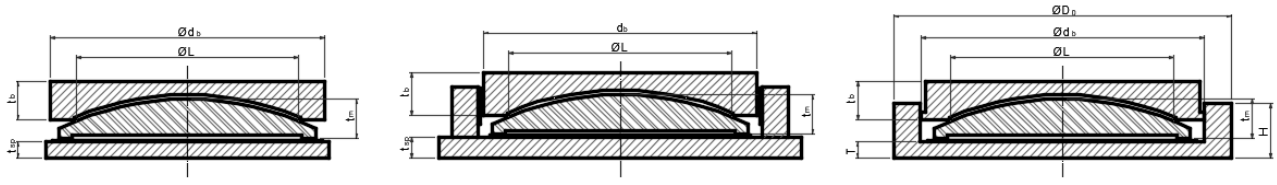
The upper PTFE sheet is in direct contact with an austenitic stainless-steel plate, enabling the bearing to slide in all directions.

Guided sliding type R-Max AGSL-AGST

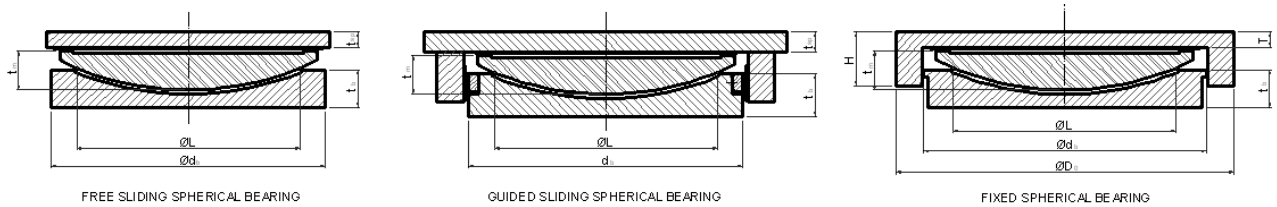
Guided sliding devices are similar in construction to free sliding bearings but are generally equipped with one or more guides to limit the bearing's movement to only one direction.

Also, in these devices the horizontal load can be transmitted either by the shape of the spherical surface or by the direct contact between upper steel plates and base steel plate.

Generally, spherical bearings for steel decks are installed with the convex plate facing upwards (as in the following pictures), to limit the eccentricity of vertical load on the above structure.



When the upper structure is made of concrete and so it's less subjected to problems due to eccentricity of vertical load, spherical bearings are generally installed with the convex plate facing downwards.



R-Max bearings with anti-lifting system

AGOM R-Max spherical bearings can be equipped with anti-lifting tool to absorb the negative tensile vertical forces. The anti-lifting tools can be applied to all the R-Max bearings (fixed, guided and free sliding) with different systems depending on the bearing type and tensile load value. It is possible to cover a very wide range of tensile loads by suitable design of anti-lifting tools.

R-Max bearings for incremental bridge launching

AGOM R-Max spherical bearings can be used also as temporary sliding supports for incremental bridge launching. Movable spherical bearings can be temporarily blocked, even maintaining their rotational capacity if requested, and the deck can be pushed above them by sliding on a mirror-polished stainless-steel surface. After launching operations, the deck can be definitely lowered upon the bearings that will be unblocked and start functioning as definitive bearings.

Materials

Structural Steel

The convex plate, the concave plate and, if present, the sliding plate are manufactured from steel material in accordance with EN 10025 standard.

Austenitic steel sheet

The austenitic steel used for sliding surfaces is X5CrNiMo17-12-2 in accordance with EN 10088-2 1.4401 with a minimum thickness of 1.5 mm.

The roughness is $R_{y5i} \leq 1$ µm. The hardness is ≥ 150 HV1 and ≤ 220 HV.

PTFE

AGOM uses only virgin PTFE without regenerated or filler materials.

The minimum thickness of recessed PTFE is 4.5 mm and varies according with the bearings size and standard. Friction force is calculated according with the current Standard Code.

Characteristic	Test method	Requirement
Tensile strength	ISO 527-1/3	≥ 29 MPa
Elongation at break	ISO 527-1/3	≥ 300%
Hardness	EN ISO 2039-1	H132/60=23 to 33 MPa

Bearing fixing

Usually, all the R-Max bearings are equipped with suitable anchor bars for anchoring purpose to lower and upper structure.

In case of pre-cast concrete beam, the bearings can be provided with upper pin and top subsidiary plate; in case of steel beams, bearings shall be provided with upper pin and/or connecting bolts.

To adjust the angle of inclination of the superstructure, the bearing's top plate may be manufactured tapered, or a wedge plate can be fixed at the top of the bearing.

In case of horizontal loads < 20% of the simultaneous vertical load, if there is sufficient friction between the bearing and the sub or superstructure, the anchor bolts can be left out and the bearing can be connected to the structure by means of cementitious or epoxy resin (if the local code allow it).

To improve the R-Max bearings replacement with minimal up-lift of the structure, suitable steel counterplates can be provided.

R-Max bearings accessories

Movement gauge

The movement indicator allows monitoring the sliding plate displacements by using a reference arrow fixed to the bearing base and a graduate indicator moving with the sliding plate. The movement gauge allows to check the initial presetting of the bearing (if required) and to verify the bearing movement during the future inspections.

Dust protection

The (removable) dust protection around the sliding plate or covering the stainless-steel surface ensures the cleaning of the sliding surfaces to minimize the friction during sliding movements and guarantees the durability of the PTFE sliding material.

Comprehensive Labelling

All the R-Max bearings are provided with a metal label detailing the proprieties of the bearings:

- bearing type
- maximum vertical and horizontal loads
- movement capacity
- design rotation
- order number
- date of manufacture
- CE Mark (if applicable)

The top face of the bearing gives information on the type of the bearing, the direction of the axis of the bridge, the presetting (if any), the position.

Corrosion protection

Steel components exposed to the elements are protected against corrosion. AGOM adapts the corrosion protection in accordance with the aggressiveness of the environment in which the bearings are to be installed and to each customer's requirements.

The standard corrosion protection according with EN 1337-9 (environment class C4H ISO 12944) is as follows:

- sandblasting grade SA2.5
- two components high thickness epoxy zinc paint (min 250 µm).

The high resistant corrosion protection (environment class CX ISO 12944) is as follows:

- sandblasting de grade SA2.5
- zinc rich epoxy primer, with minimum thickness of dry film 75 µm
- epoxy mastic intermediate, with minimum thickness of dry film 175 µm
- polyurethane topcoat, with minimum thickness of dry film 75 µm.

Standard colour of AGOM bearings is RAL 7001 (silver grey).

Quality and International Standards

AGOM R-Max bearings are designed and manufactured in accordance with the requirements of the European standard EN1337-7 and are qualified with the CE mark.

AGOM can also provide spherical bearings in accordance with other standards of a wide range of international standards (American AASHTO, British BS 5400, Canadian CSA,...).

Every single steel component is mechanically worked and assembled by fully qualified and trained workers inside the AGOM factory under strict ISO 9001:2015 accredited quality control standards.

Qualification, approval tests and certifications

All the qualification and approval tests are performed by independent and worldwide recognized laboratories to assure that the R-Max bearings performances comply with the project and with international standard requirements.


TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague, SOE

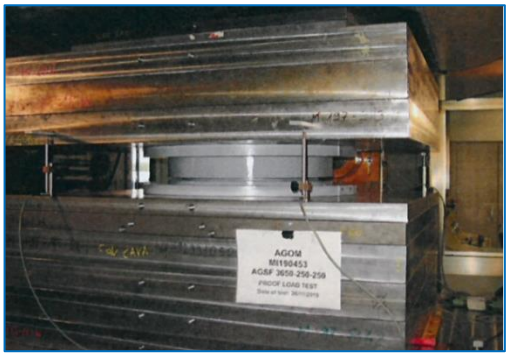
Notified Body 1020

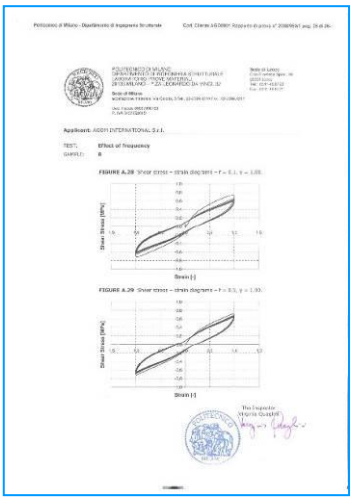
CERTIFICATE
OF CONSTANCY OF PERFORMANCE

No. 1020 – CPR – 090-040326

Structural bearings
AGOM INTERNATIONAL S.r.l.
AGOM INTERNATIONAL S.r.l.
EN 1337-5:2005
constancy of performance of the construction product.

CE MARK





FRICTION TESTS


Politecnico di Milano – Dipartimento di Ingegneria Strutturale
POLITECNICO DI MILANO
DIPARTIMENTO DI INGEGNERIA STRUTTURALE
LABORATORIO PROVE MATERIALI
PIAZZA LEONARDO DA VINCI, 32 - 20133 MILANO
Codice cliente AGOM01
Codice certificato 2007/1942/1
Spett.le
AGOM INTERNATIONAL S.R.L.
VIA MESERO, 12
20010OSSONA - MI (I)
Certificato di Prova N. 2007/1942 emesso in Milano il 11/07/2007
Richiedente: AGOM INTERNATIONAL S.R.L. - OSSONA
RAPPORTO DI PROVA
TESTING OF AGOM POT BEARINGS - CONTRUCTION OF WAFI CITY BRIDGE
I risultati contenuti si riferiscono esclusivamente agli oggetti provati.
Questo certificato di prova consta di N. 25 pagine.
Tutte le pagine sono individuate dal N. 2007/1942/1.
Il presente certificato di prova può essere riprodotto solo integralmente e deve essere assoggettato a bollo in caso d'uso ai sensi del D.P.R. 642/72.
IL DIRETTORE DEL DIPARTIMENTO
Carlo Urbano

DYNAMIC FATIGUE TESTS

Handling and storage

Care should be taken in storage to prevent contamination and damage to the working surfaces. AGOM bearings should be stored in a controlled environment where they are protected from contamination, misuse and excessive moisture.

Robust transportation devices are fitted to all bearings to ensure that the movable components are maintained in their correct relative positions before and during installation. These temporary fixing devices are normally finished in red paint and shall be removed after installation.

Unless special devices have been specified, they should not be used for slinging or suspending the bearings beneath beams.

Due to unpredictable conditions, which may occur during transportation or handling on site, the alignment and pre-setting (if applicable) of the assembled bearing should be checked against the drawing.

Do not try to rectify any discrepancies on site.

Bearing too heavy to be lifted by hand should be properly slung using lifting equipment.

Pre-setting

If bearing is required to be pre-set, e.g. where once only large movements may occur during stressing operations, this should be specified as a requirement and should only be carried out in AGOM prior to despatch. Do not attempt this operation on site.

Installation

Under control of the Engineer who designed the bridge, bearings must be installed by expert workers, with precision to meet the bridge and bearing design criteria. Inappropriate handling, storage and installation will have an adverse effect on the bearing life, usually estimated in more than 50 years providing right maintenance.

AGOM structural bearings are manufactured to close tolerances by skilled technicians working in clean conditions. To obtain the requisite performance from bearings it is imperative that they are properly handled at the work site and installed with the same care as when they were assembled in the factory.

AGOM bearings are clearly identified and marked on the top plate (if present) to ensure correct installation. The typeface on the cover or sliding plate gives information on the type, size and number of the bearing. Moreover, arrows indicate the movement axis and the pre-setting direction (if applicable).

For all the detailed information about installation procedure and maintenance, see AGOM manual “R-Max Installation & maintenance” that can be download from AGOM web site www.agom.it.

Maintenance

The service life of a spherical bearing is usually estimated in more than 50 years. The most important thing to assure such a long lifetime is a correct and careful maintenance of the bearing, that is usually installed in a severe environment.

The requested bearing inspection and maintenance program that could be adapted and improved by the Bridge Designer to the specific service conditions of the bridge is fully described in the “R-Max - Inspection and warranty manual” that can be download from AGOM web site www.agom.it.

Guidelines for the design of a structure with AGOM R-Max bearings

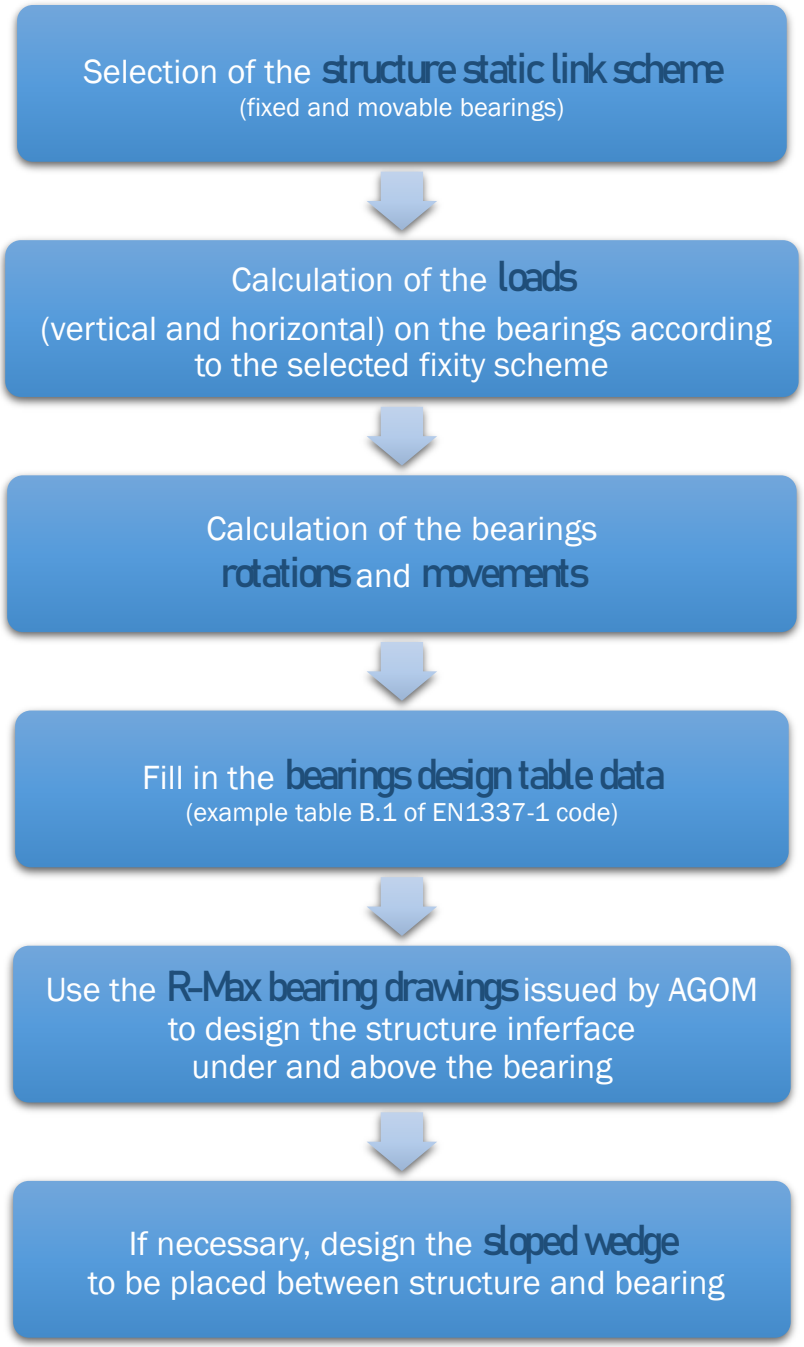
In this section a simple guideline for the design of a structure equipped with AGOM bearing is presented.

The design procedure is summarized in the following steps:

1. Selection of the structure static link scheme (fixed and movable bearings).
2. Calculation of the loads (vertical and horizontal) on the bearings according to the fixing scheme.
3. Calculation of the bearing rotations and movements.
4. Insertion of all the bearing design data into the bearing design table (example table B.1 of the EN1337-1 code attached at the end of the document).
5. Using the bearing drawings provided by AGOM, design of the interface parts between structure and bearings as: bearing lower plinth with adequate position for installing the bearing anchor bars (if required), level of the plinth to fit the vertical space between lower and upper structure, the upper structure interface where the bearing upper plate will be positioned.
6. If necessary, design of the slope compensator to be placed between the bearing and upper structure in order to adjust the permanent slope (longitudinal and transverse slopes of a bridge deck). The deck's slope must be always compensated in order to keep the sliding surface in the horizontal plane (normally the slope is compensated above the bearing between its sliding plate and the upper structure). In any case the whole bearing cannot be installed inclined.

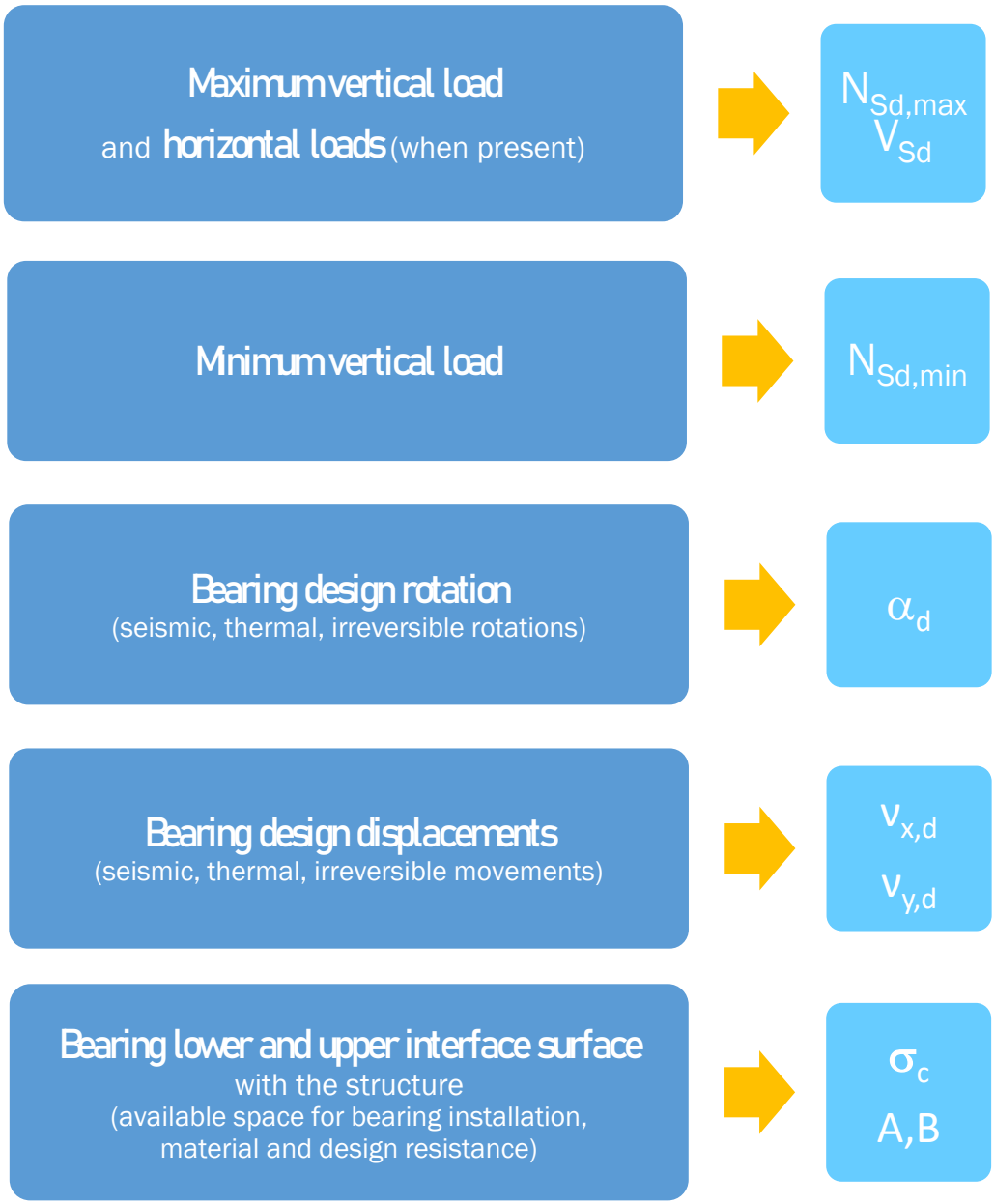
Here below we summarize the main features of the different bearing types in order to direct the choice towards the most convenient type.

	V-MAX **pot** bearing	**R-MAX** **spherical** bearing	**E-LINK** **rubber** bearings
Vertical load	High	High	Medium
Horizontal displacement	No Limits	No Limits	Medium
Rotation	Medium	High	Low-Medium
Dimension	Small-Medium	Small-Medium	High


Selection of the structure static link scheme
(fixed and movable bearings)
Calculation of the loads
(vertical and horizontal) on the bearings according to the selected fixity scheme
Calculation of the bearings rotations and movements
Fill in the bearings design table data
(example table B.1 of EN1337-1 code)
Use the R-Max bearing drawings issued by AGOM to design the structure inferface under and above the bearing
If necessary, design the sloped wedge to be placed between structure and bearing

AGOM R-Max design parameters

Normally the required input parameters that the structural Designer must provide to AGOM Engineers for device design and constructions are the ones shown for example by the table B.1 of EN1337-1 code (see following pages):



Bearing design table according to EN1337-1 code

The purpose of this bridge bearing schedule is to list the information normally required for the design of the bearings for a particular structure. This information should ensure that bearings are designed and manufactured so that, under the influence of all possible actions, unfavourable effects of the bearing on the structure are avoided. A drawing should accompany the schedule showing the layout of the bearings with identification marks, including a typical cross section of the bridge and particular of any special locating requirements. Bearing function should be indicated on the drawing by appropriate symbols.

Every item listed in the "bearing design table" should be considered, but some may not be applicable to a particular bearing. Only relevant information should be given and when an item in the schedule is not applicable this should be stated. Additional information should be added when special conditions exist.

Here above you can find a short explanation of each item listed in the "bearing design table".

BEARING IDENTIFICATION MARK	Bearing with different function or load carrying requirements should be distinguished by a unique reference mark.
NUMBER OFF	The required number for each item.
SEATING MATERIAL	The materials on which each outer bearing plate bears should be stated as it may affect the design and finish of these plates.
AVERAGE DESIGN CONTACT PRESSURE	The pressure of the effective contact area.
DESIGN LOAD AFFECTS	The structure designer should give the worst individual values of the design load effects in the schedule. The most adverse combination of these values is usually sufficient for a satisfactory design of bearing. Only in special cases would greater economy be achieved by considering the actual coexistent values of load effects, in which case these should be given in detail.
DISPLACEMENT	Displacement of the structure at a bearing should be determined and factored. Allowance should be made for any movement of the supporting structures. Transverse and longitudinal movements are normally in a direction perpendicular and parallel to the longitudinal axis of a bridge span, respectively. Where there is any likelihood of ambiguity directions of movement should be clearly indicated on the accompanying drawing.

ROTATION	The irreversible and reversible rotations at the serviceability limit state (SLS), which the bearing is required to accommodate, should be given in radians.
MAXIMUM BEARING DIMENSIONS	The maximum sizes of the bearing that can be accommodated should be stated.
TOLERABLE MOVEMENT OF BEARING UNDER TRANSIENT LOADS	The movement that can be tolerated at the bearing under transient loads, in directions in which the bearing is meant to provide restraint.
ALLOWABLE RESISTANCE TO TRASLATION UNDER SLS [kN] *(if relevant)*	In the design of the structure, reaction to displacement movements may be of significance, in which case the acceptable horizontal force generated by the bearing should be given for the serviceability limit state (SLS). The values to be given are those for slowly applied movements at normal temperatures (any necessary extra allowance for low temperatures and rapidly applied movements should be made by the designer of the structure).
ALLOWABLE RESISTANCE TO ROTATION UNDER SLS [kN*m] *(if relevant)*	In the design of the structure, reaction to rotation may be of significance in which case the acceptable moment of reaction generated by the bearing, when subjected to the critical design load effects, should be given for the serviceability design state.
TYPE OF FIXING REQUIRED	Various means of fixing the bearing to the superstructure and substructure are available, appropriate to different type of bearing. Particular requirements, such as friction, bolts, dowels, keys or other devices, should be stated.

Bearing Design Table

Reference:..... **Date:**.....

Bridge Name: ..... **Table:** ..... **of** .....

BEARING IDENTIFICATION MARK							
NUMBER OFF							
SEATING MATERIAL (e.g. cement, mortar, epoxy mortar, in situ concrete, precast concrete, steel, timber)	Upper surface						
	Lower surface						
AVERAGE DESIGN CONTACT PRESSURE [N/mm^2]	Upper face	SLS					
		ULS					
	Lower face	SLS					
		ULS					
DESIGN LOAD EFFECTS [kN]	ULS	vertical	Max				
			Perm.				
			Min.				
		Transverse					
		Longitudinal					
	SLS	Vertical					
		Transverse					
		Longitudinal					
DISPLACEMENT [mm]	ULS	Transverse					
		Longitudinal					
	SLS	Transverse					
		Longitudinal					
ROTATION [mrad]	ULS	Transverse					
		Longitudinal					
MAXIMUM BEARING DIMENSIONS [mm]		Transverse					
		Longitudinal					
		Overall Height					
TOLERABLE MOVEMENT OF BEARING UNDER TRANSIENT LOADS [mm] *(if relevant)*		Vertical					
		Transverse					
		Longitudinal					
ALLOWABLE RESISTANCE TO TRASLATION UNDER SLS [kN] *(if relevant)*		Transverse					
		Longitudinal					
ALLOWABLE RESISTANCE TO ROTATION UNDER SLS [kN·m] *(if relevant)*		Transverse					
		Longitudinal					
TYPE OF FIXING REQUIRED		Upper face					
		Lower face					

AGOM R-Max standard range

AGOM R-Max bearings can cover a very wide range of loads and displacements, they can be designed according to many international standards (European EN 1337, American AASHTO LRFD, British BS5400, etc..).

The bearings dimensions shown in the following tables have been designed according to European codes EN 1337 with the following criteria:

- EN 1337 part 1 and 7 and relevant European codes for load and displacements calculation. Note that the bearing design loads (shown in the tables) are ultimate limit state loads (ULS);
- EN 1337 part 7 and part 2 for sliding surfaces;
- Standard rotation ±0.02 rad;
- Total displacement 100 mm (±50 mm);
- Horizontal load equal to 15% of the maximum vertical one;
- Concrete stress calculated according to EC2 - EN1992-1-1 standard with concrete class C30/37, levelling mortar with minimum compression resistance f_{ck} = 60 N/mm^2 and plinth size at least 200 mm greater that bearing plate.

In any case the dimension can be adjusted to fit the available space on the structure and/or to verify the contact stress on the interface surface (example different concrete class respect to the one used for the bearing standard design, etc..).

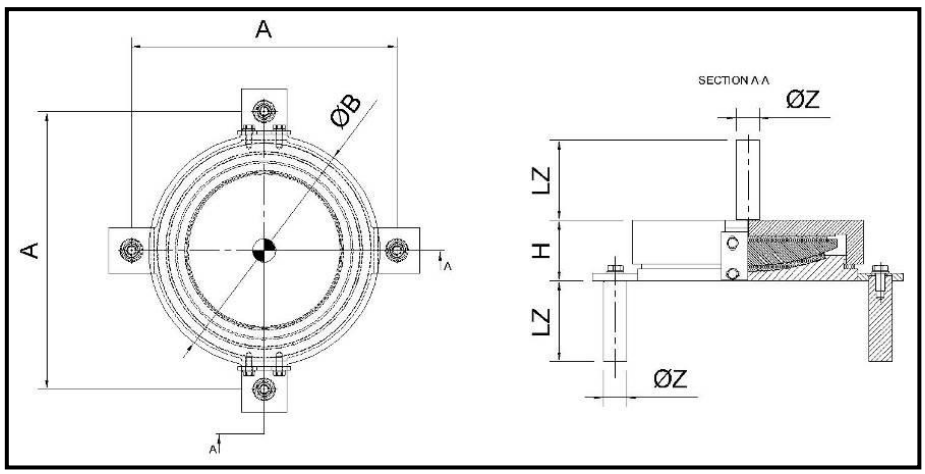
Since the bearings checks depends on the combination of multiple inputs (load, displacement and rotation), AGOM engineers can assist the structural designer for design optimisation.

Agom R-Max Fixed Bearings

Fixed bearing type AGSF (*Vertical load - Horizontal longitudinal load - Horizontal transversal load*).

For example *AGSF 500-75-75* means: Vertical load $N_{,Rd}$ = 500 kN, Horizontal longitudinal load $V_{x,Rd}$ = 75 kN, Horizontal transversal load $V_{y,Rd}$ = 75 kN.

Bearing type	Bearing Dimensions						Weight
	ØB	H	nZ	ØZ	LZ	A	W
	[mm]	[mm]		[mm]	[mm]	[mm]	[kg]
R-Max AGSF 1000-150-150	260	83	2	30	122	340	38
R-Max AGSF 2000-300-300	335	87	2	40	140	435	67
R-Max AGSF 3000-450-450	390	90	4	40	140	346	100
R-Max AGSF 4000-600-600	450	88	4	40	140	389	125
R-Max AGSF 5000-750-750	500	106	4	50	188	438	200
R-Max AGSF 6000-900-900	550	95	4	50	188	474	214
R-Max AGSF 7000-1050-1050	600	93	4	60	235	523	273
R-Max AGSF 8000-1200-1200	630	111	4	60	235	537	329
R-Max AGSF 9000-1350-1350	670	110	4	60	235	573	369
R-Max AGSF 10000-1500-1500	720	109	4	60	235	608	418
R-Max AGSF 12000-1800-1800	770	126	4	70	282	658	569
R-Max AGSF 15000-2250-2250	880	133	4	80	330	930	780
R-Max AGSF 18000-2700-2700	940	146	4	80	330	990	966
R-Max AGSF 20000-3000-3000	990	154	4	90	375	1040	1173
R-Max AGSF 25000-3750-3750	1120	167	4	100	420	1170	1622
R-Max AGSF 30000-4500-4500	1230	173	6	90	375	1280	2045
R-Max AGSF 35000-5250-5250	1330	188	6	100	420	1380	2655
R-Max AGSF 40000-6000-6000	1410	203	6	100	420	1460	3084
R-Max AGSF 45000-6750-6750	1490	201	8	100	420	1540	3713
R-Max AGSF 50000-7500-7500	1570	215	8	100	420	1627	4208

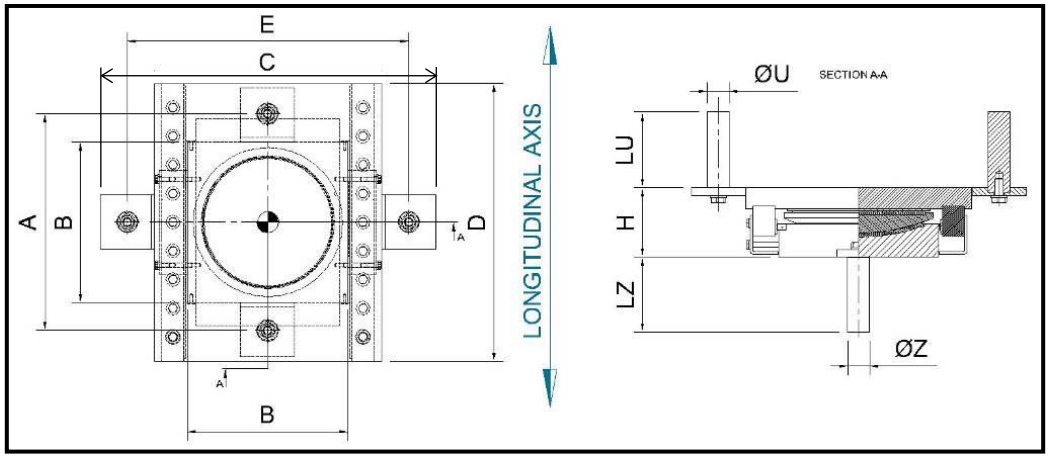


Agom R-Max Guided Bearings

Guided bearing type AGSL (*Vertical load / Horizontal longitudinal movement - Horizontal transversal load*).

For example: *AGSL 500/100-75* means: Vertical load $N_{,Rd}$ = 500 kN, horizontal longitudinal movement $v_{x,d}$ = 100 (±50) mm, horizontal transversal load $V_{y,Rd}$ = 75 kN. In case of AGST bearings, the movement is along transversal axis and the horizontal load along the longitudinal one.

Bearing type	Bearing dimensions												Weight
	B	H	nZ	ØZ	LZ	A	C	D	nU	ØU	LU	E	W
	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg]
R-Max AGSL 1000/100-150	220	97	2	30	122	300	430	360	2	30	122	370	67
R-Max AGSL 2000/100-300	280	112	2	40	140	380	520	420	2	40	140	440	117
R-Max AGSL 3000/100-450	340	115	4	40	140	440	580	490	4	40	140	500	171
R-Max AGSL 4000/100-600	380	127	4	40	140	480	630	530	4	40	140	550	226
R-Max AGSL 5000/100-750	420	138	4	50	188	540	700	570	4	50	188	600	312
R-Max AGSL 6000/100-900	460	135	4	50	188	580	740	610	4	50	188	640	349
R-Max AGSL 7000/100-1050	500	138	4	60	235	640	800	660	4	60	235	680	443
R-Max AGSL 8000/100-1200	530	164	4	60	235	670	850	690	4	60	235	730	575
R-Max AGSL 9000/100-1350	560	162	4	60	235	700	880	720	4	60	235	760	617
R-Max AGSL 10000/100-1500	580	158	4	60	235	720	910	740	4	60	235	790	649
R-Max AGSL 12000/100-1800	630	184	4	70	282	790	990	790	4	70	282	850	892
R-Max AGSL 15000/100-2250	710	179	4	80	330	760	1090	880	4	80	330	930	1067
R-Max AGSL 18000/100-2700	770	202	4	80	330	820	1170	940	4	80	330	1010	1360
R-Max AGSL 20000/100-3000	810	199	4	90	375	860	1230	990	4	90	375	1050	1535
R-Max AGSL 25000/100-3750	910	221	4	100	420	960	1370	1090	4	100	420	1170	2114
R-Max AGSL 30000/100-4500	990	243	6	90	375	1040	1440	1180	6	90	375	1260	2701
R-Max AGSL 35000/100-5250	1070	256	6	100	420	1120	1570	1260	6	100	420	1370	3403
R-Max AGSL 40000/100-6000	1140	280	6	100	420	1197	1640	1340	6	100	420	1440	4053
R-Max AGSL 45000/100-6750	1210	305	8	100	420	1267	1730	1410	8	100	420	1530	5097
R-Max AGSL 50000/100-7500	1280	329	8	100	420	1337	1820	1490	8	100	420	1620	5977

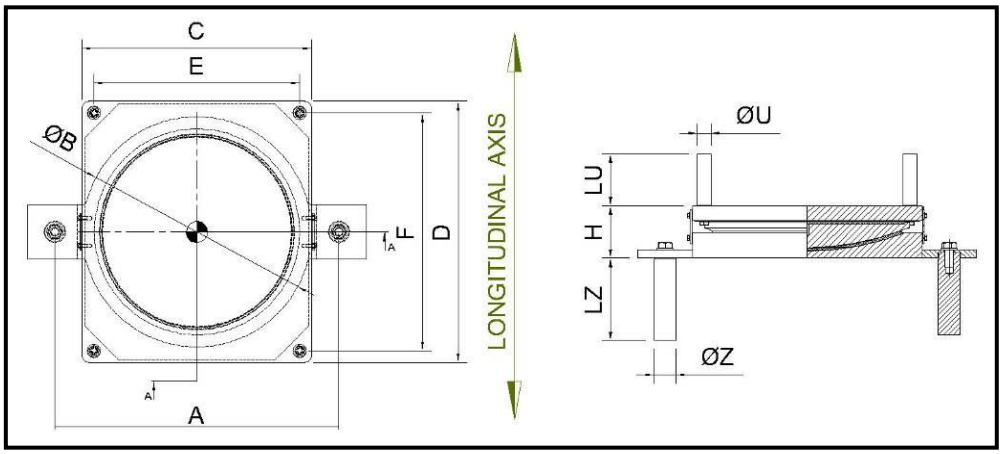


Agom R-Max Free Sliding Bearings

Free sliding bearing type AGSM (*Vertical load / Horizontal longitudinal movement / Horizontal transversal movement*).

For example: AGSM 500/100/20 means: Vertical load $N_{,Rd}$ = 500 kN, Horizontal longitudinal movement $v_{x,d}$ = 100 (±50) mm , Horizontal transversal movement $v_{y,d}$ = 50 (±25) mm.

Bearing type	Bearing Dimensions													Weight
	ØB	H	nZ	ØZ	LZ	A	C	D	nU	ØU	LU	E	F	W
	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[mm]	[kg]
R-Max AGSM 1000/100/50	240	78	2	30	122	320	240	310	4	30	122	180	250	33
R-Max AGSM 2000/100/50	310	82	2	30	122	390	310	380	4	30	122	250	320	54
R-Max AGSM 3000/100/50	360	90	2	30	122	440	360	440	4	30	122	300	380	80
R-Max AGSM 4000/100/50	410	96	2	30	122	490	410	490	4	30	122	350	430	109
R-Max AGSM 5000/100/50	450	104	2	30	122	530	450	530	4	30	122	390	470	140
R-Max AGSM 6000/100/50	480	112	2	40	140	580	480	570	4	30	122	420	510	175
R-Max AGSM 7000/100/50	520	112	2	40	140	620	520	600	4	30	122	460	540	204
R-Max AGSM 8000/100/50	550	130	2	40	140	650	550	630	4	30	122	490	570	259
R-Max AGSM 9000/100/50	580	129	2	40	140	680	580	660	4	30	122	520	600	289
R-Max AGSM 10000/100/50	610	128	2	40	140	710	610	690	4	30	122	550	630	318
R-Max AGSM 12000/100/50	660	147	2	50	188	780	660	750	4	40	140	580	670	428
R-Max AGSM 15000/100/50	730	146	2	50	188	850	730	820	4	40	140	650	740	525
R-Max AGSM 18000/100/50	790	163	4	40	140	629	790	890	4	40	140	710	810	681
R-Max AGSM 20000/100/50	830	162	4	40	140	658	830	930	4	40	140	750	850	753
R-Max AGSM 25000/100/50	910	178	4	50	188	728	920	1020	4	50	188	820	920	1023
R-Max AGSM 30000/100/50	1000	197	4	50	188	792	1000	1110	4	50	188	900	1010	1334
R-Max AGSM 35000/100/50	1070	217	4	60	235	856	1070	1190	4	60	235	950	1070	1715
R-Max AGSM 40000/100/50	1140	222	4	60	235	905	1140	1260	4	60	235	1020	1140	1971
R-Max AGSM 45000/100/50	1210	255	4	60	235	955	1210	1330	4	60	235	1090	1210	2534
R-Max AGSM 50000/100/50	1280	269	4	60	235	1004	1280	1390	4	60	235	1160	1270	2944



AGOM R-Max – Spherical bearings

MORE THAN 50 YEARS EXPERIENCE DESIGNING AND MANUFACTURING DEVICES FOR CONSTRUCTION, OFFSHORE AND INDUSTRIAL MARKETS

Expansion joints

Elastomeric joints
Joints for high movements
Finger joints
Buried joints
Railway joints

Bridge bearings

Elastomeric Bridge bearings
Pot bearings
Spherical bearings
Incremental launching bearings
Horizontal load bearings
Special bearings

Seismic Protection

Seismic Isolators
High damping rubber bearings
Lead core rubber bearings
Multilayer rubber bearings
Shock transmitters
Viscous dampers
Rubber dampers

Services

Design
Consulting
On site assistance
Installations
Tests
Inspection