STRUCTURAL BEARINGS

TETRON® SB
SPHERICAL BEARINGS

Data sheet n°: FT En C V 8 1 V03 – 03/25

- Very high loads and rotation capacity
- Smallest footprint
- Very low friction factors
- Certified service life above 50 years
- Multiple adaptations and accessories available
- Maintenance free

Introduction

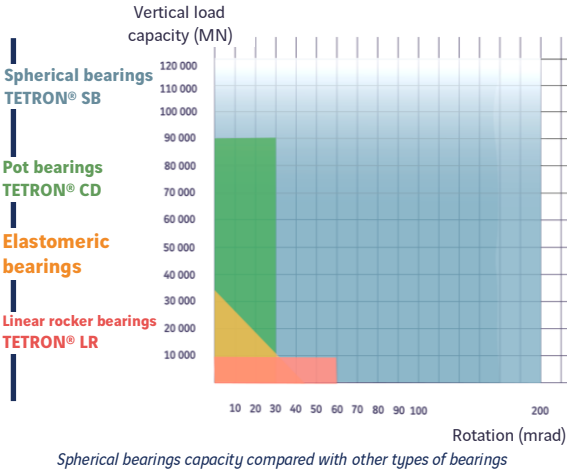
Bearings are a major component of structures, and their function means that they play a decisive role in the operation of those structures. As such, bearings must be designed, manufactured, and installed by specialists.
As a major player in the field of construction, Freyssinet has developed a wide range of bearings. Freyssinet designs and provides the right solution to meet its customers' needs for every type of structure.
Freyssinet TETRON® range has been a leading solution for bearings since the 1960's with hundreds of thousands of bearings successfully designed, manufactured and installed all around the globe.
TETRON® bearings are manufactured in-house, CE-marked, and officially approved in many countries.

Areas of use

Bearings are most commonly used to provide the connection between the piers and the deck of a bridge. Freyssinet bearings can also be used in several other areas, such as stadiums, pipelines, and all types of buildings.

Description

TETRON® SB spherical bearings consist of a base plate with a concave spherical surface and a backing plate with a convex spherical surface (rotational element) between which an ISOGLIDE® sheet and the mating material form a curved sliding surface. Spherical bearings are used in combination with flat sliding elements, guides and restraining rings to compose free, guided and fixed bearings. The specificity of the spherical bearings is that they can be used with high rotation (up to 200 mrad). Furthermore, the absence of an elastomeric pad allows a higher compression capacity compared to elastomeric or pot bearings. This characteristic is very interesting in case of steel bridges or when the structure uses concrete with a high local bearing pressure capacity. The spherical bearings can be significantly smaller than the pot bearings in these cases.



Spherical bearings capacity compared with other types of bearings

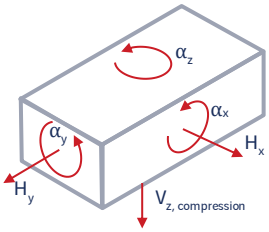
Design

TETRON® SB spherical bearings can be designed according to main bearing-design standards and additional rules which depend on projects requirements: European Standards EN 1337, American AASHTO, Australian Standards AS 5100, previous British Standard BS 5400 and many others.
The bearing schedule shall identify applicable loads/displacements and rotations in Service and Ultimate/Strength combinations.

TETRON® SB comes in the following basic types:

- FX: Fixed
- GG: Guided sliding
- GL: Free sliding

Behaviour of each type is summarized in the table below:



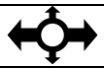
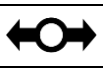
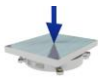
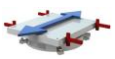
Type	Reactions			Displacements			Rotations		
	H_x	H_y	V_z	Δ_x	Δ_y	Δ_z	α_x	α_y	α_z
FX	✓	✓	✓ compression	-	-	-	✓	✓	✓
GG	-	✓		✓	-				
	✓	-		-	✓				
GL	-	-		✓	✓				

Type of bearings

TETRON® SB GL - free sliding spherical bearing is made up of a base plate with a concave spherical surface and a convex spherical cap (rotational element) between which an ISOGLIDE® sheet and the mating material form a curved sliding surface. On top, a flat sliding surface allows the upper plate to slide freely. The base plate is generally fixed to the lower support (pier, abutment, column, etc.) and the upper plate is fixed to the superstructure. It is designed to permit horizontal movements, without any constraint other than friction.

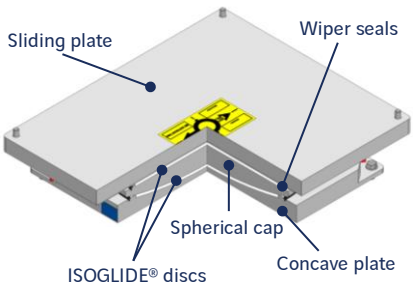
TETRON® SB GG - guided sliding spherical bearing is designed like a free sliding bearing, but with lateral guides. In some cases, guidance can be provided by a central guide secured to the spherical cap and slotted into a groove in the upper sliding plate. It accepts horizontal movement along the axis of the guide and restraints loads in the perpendicular direction.

TETRON® SB FX – spherical bearing combined with a flat sliding element can be used together with a restraining ring to form a fixed bearing. The base plate is fixed to the support and the backing plate is fixed to the superstructure. It does not allow any horizontal movement. It, therefore, transfers the loads from the superstructure to its support in all directions.

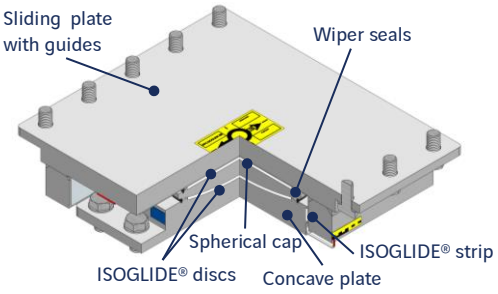
Type	Free Sliding bearing	Guided sliding bearing	Fixed bearing
	GL	GG	FX
Symbol			
Vertical load			
Rotation			
	Up to 200 mrad	Up to 200 mrad	Up to 200 mrad
Horizontal movement			
	Multidirectional	Unidirectional	Blocked

TETRON® SB SPHERICAL BEARINGS

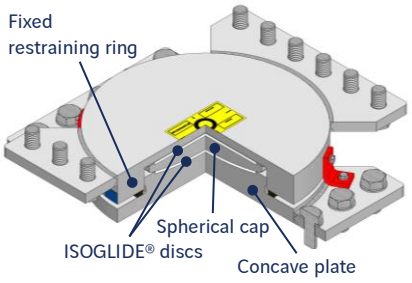
TETRON® SB general concept



TETRON® SB GL



TETRON® SB GG



TETRON® SB FX

TETRON® SB naming system

The designation of TETRON® SB bearings identify their main characteristics.

GL Free sliding bearing	**20000** Vertical load at ULS in kN	•	**250** Total acceptable longitudinal movement in mm	•	**40** Total acceptable transverse movement in mm
GG Transverse guided bearing		—	**2000** Longitudinal load at ULS in kN	•	**40** Total acceptable transverse movement in mm
GG Longitudinal guided bearing		—	**2000** Transverse load at ULS in kN	•	**250** Total acceptable longitudinal movement in mm
FX Fixed bearing		—	**3000** Horizontal load at ULS in kN (resultant of x and y)		

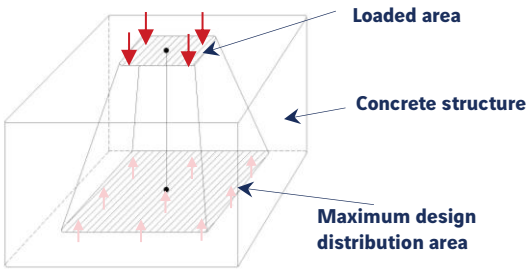
This gives the following designations, for example:

- TETRON® SB GL 20000.250.40
- TETRON® SB GG 20000-2000.40
- TETRON® SB GG 20000-2000.250
- TETRON® SB FX 20000-3000

Concrete contact pressure

The contact pressure between the bearing and the adjacent structures is designed in accordance with principle of partially loaded area as per EN 1992, AS 5100.4, AASHTO LRFD and BS 5400, considering the distribution of the loads on an area loaded to the maximum design distribution area.

By default, Freyssinet adopted the ratio between the loaded areas with a ratio of 2.



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Materials

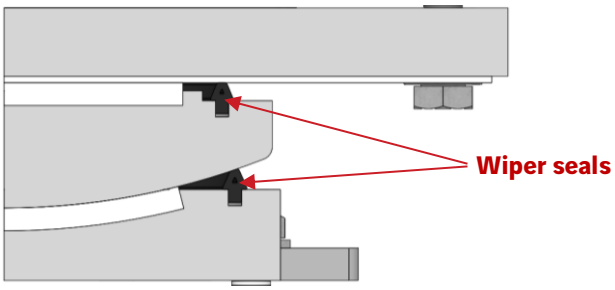
In order to provide the best mechanical performance and durability, the following materials are used:

- Structural steel components: minimum grade S355J2 as per EN 10025
- Sliding material:
  - Special sliding material ISOGLIDE® certified per European Technical Approval, with excellent wear resistance for a minimum service life of 50 years. ISOGLIDE® allows for use of spherical bearings with a very wide of temperatures from -50°C up to 90°C, while standard bearings are suitable only from -35°C to +48°C
- Sliding surfaces:
  - Austenitic steel 1.4404+2B as per EN 10088
  - Special sliding alloy ISOALLOY® (for the spherical cap)
  - Hard chromium plating as per EN 1337-2 (for the curved sliding surface of the spherical cap)
- Structural bolting: class 10.9 as per ISO 898, hot dip galvanized as per EN 10684
- Wiper seal: EPDM as per ISO 4097

Bearings in stainless steel grade 1.4301 or 1.4401 as per EN 10088 (respectively 304 and 316 per ASTM) can be supplied according to the specifications.

Wiper Seal

The sliding surfaces are fundamental to the operation of a sliding bearing. Protecting them from external aggression is a key factor in ensuring the maximum lifespan of the bearing.
All Freyssinet sliding mechanical bearings by default include a wiper seal located at the edge of the sliding material to protect bearings from debris. The material used is EPDM in accordance with ISO 4097.
Wiper seal is installed in a way that allows easy measurement of sliding material protrusion without the removal of the seals.



Additional dust & debris protection solutions, including Freyssinet Bodygarde® system are available.

Corrosion Protection

As structural steel components, bearings must be protected against corrosion by painting. The system is selected depending on the surroundings and reference standard applied.

Freyssinet offers reliable, extensively tested systems in accordance with EN ISO 12944 and EN 1337-9 standards.

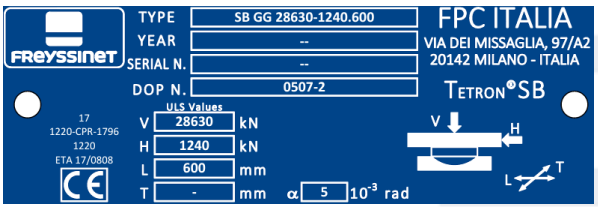
System	Environmental Use	Durability
C4-H	Highly corrosive atmosphere	High >15 years to first maintenance
C4-VH		Very high >25 years to first maintenance
C5-H	Extremely corrosive atmosphere (Marine or Industrial)	High >15 years to first maintenance
C5-VH		Very high >25 years to first maintenance

Other corrosion protection systems can be proposed upon request.

As an alternative, use of stainless steel is a particularly effective solution to minimize any corrosion problems and avoid the need for paint maintenance.

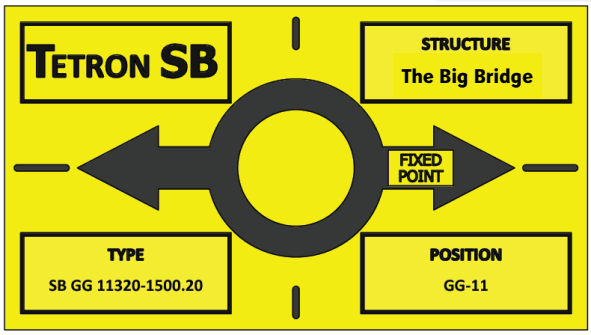
Labelling and transport

Each bearing has an individual identification label permanently fixed to its body, indicating its unique serial number and its design capacity.



Individual identification label fixed on the body of the bearing

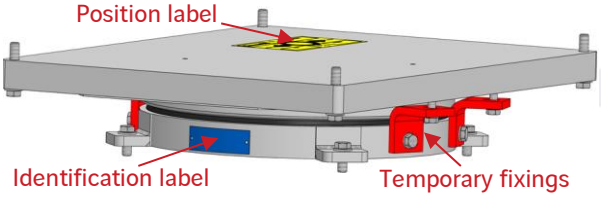
Moreover, a highly visible yellow position label is placed on top of the bearing to facilitate the correct placement of the device in the structure.



Positioning label for easy identification of bearing on site

TETRON® SB bearings before final packaging in Freyssinet factory

All Freyssinet TETRON bearings are supplied with robust temporary fixing system, painted in red for clear identification on site and designed to the highest standards to allow for safe handling operation. Those elements need to be unscrewed after load transfer to the bearing.



Labels and temporary fixation on a typical TETRON® SB bearing

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Fixing systems

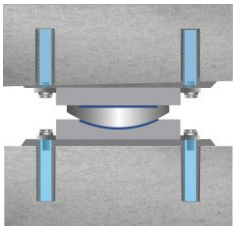
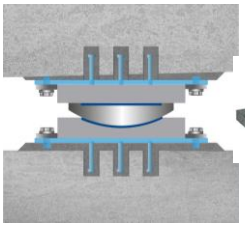
Several types of fixings can be provided, depending on the type of structure, the level of loads and the installation methods.
All fixing systems proposed by Freyssinet allow for the replacement of the bearings without demolition of adjacent structures, making eventual replacement operations as easily as possible.

Friction
Bearings can be restrained by the combination of friction due to minimum vertical load in ULS, and mechanical fasteners. The friction coefficient is considered as per the following values given in the reference standards.

Interface	EN 1337	AS 5100.4	AASHTO
Steel on concrete	0.60	0.50	0.50
Steel on steel grit blasted, metal zinc sprayed or lightly primed surfaces	0.40	0.30	0.30
Steel on steel clean mill scale surfaces	-	0.20	0.20
Hot-dip-galvanized surfaces	-	0.08	-

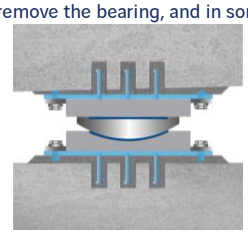
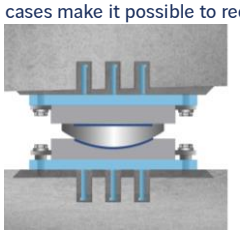
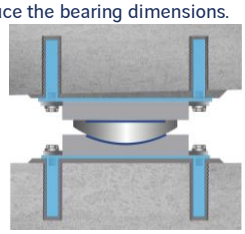
In accordance with EN 1337-1 and AS 5100.4, in the case of dynamically stressed structures where extreme load fluctuations can occur, e.g. railway bridges and earthquakes, the horizontal forces shall not be resisted by friction.

Dowels/shear studs
Anchors are used to secure the bearing to the structure for horizontal loads or uplift load if any. Different types of anchorages are available:

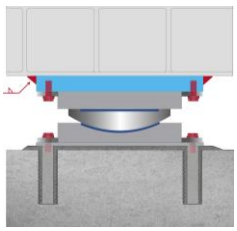
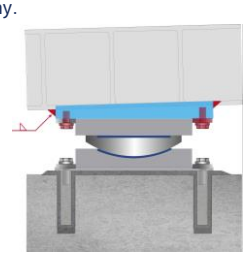
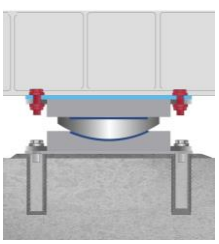


Dowels


Welded shear studs

Masonry plates
Masonry plates are installed between the bearings and the structure. They make it easier to remove the bearing, and in some cases make it possible to reduce the bearing dimensions.


Masonry plates with shear studs and bolts & nuts connection

Masonry plates with shear studs and threaded hole connection

Masonry plates with dowels

Bolts
Bolts are generally used for fastening to a steel structure; they are designed to withstand horizontal loads and uplift, if any.


Bolts threaded into flat upper attachment plate

Bolts threaded into tapered upper attachment plate

Bolts and nuts connection with a shim plate

Installation

The installation of bearings is a meticulous operation during which any mistake or lack in precision may, throughout the structures' service life, induce effects that may prove harmful to the bearings and, in the most severe cases, even jeopardize the structural integrity. The bearings' pathology is often closely associated with their installation quality.

Freyssinet, as a specialist supplier and contractor, with extensive experience from its installation teams, has developed guidelines that describe the principles to follow to guarantee a correct installation of the bearings. Those installation guidelines are available on request.

Additionally, Freyssinet can provide on-site installation services to guarantee a high-quality implementation.


Professional bearings installation by Freyssinet teams

Surveillance and enhanced maintenance

The bearings are essential elements of a bridge. Their durability depends on solicitations and environmental conditions. It is essential to apply a policy of inspection and maintenance to reduce the effects of any normal deterioration: painting, coating, wear... Freyssinet can assist with the whole life of our products by supporting service through the local entity, Freyssinet can prepare inspection & maintenance procedures, inspect and maintain during the life of the product, working with the asset owner to prolong life and deliver sustainability.

Quality & manufacturing

Freyssinet designs and produces all the bearings supplied to its customers at its plants and ensures the quality of its products by carefully managed processes from design all the way through manufacture and onwards to the site through the installation teams located worldwide. This complete service approach, embracing products and services, is unrivalled allowing us to adapt solutions to a wide range of conditions.

All Freyssinet bearings are developed and designed by an in-house technical department that ensures compliance with applicable standards and project specifications. Coordination between the design and manufacturing, and the choice of materials is critical for optimizing solutions and offering reliable, durable products.

All steps of design, production, testing and installation are covered by ISO 9001 quality system.

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Testing

Full-scale testing of finished bearings can be carried out to demonstrate the bearing's behaviour (compression test, friction test, horizontal load test, uplift load test etc) in the Freyssinet testing laboratory ISOLAB. All required tests for the project should be defined at the beginning of the project.

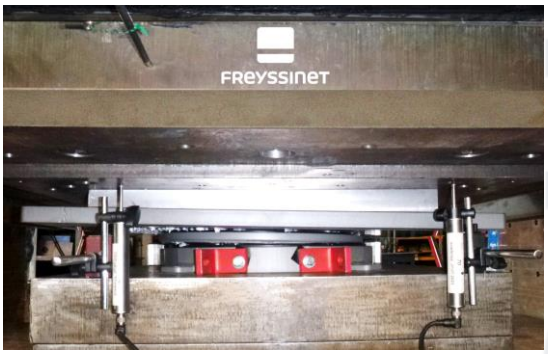
The testing laboratory ISOLAB can test the bearings in different conditions (proof load test, friction test, lateral load test etc). Other testing requirements can be proposed upon request.

Long term compression test of TETRON® SB bearing under 70MN testing bench in ISOLAB testing facility

Project Storstrøm Bridge (Denmark)

TETRON® SB guided bearing during test under combined horizontal and vertical load in ISOLAB facility (50 MN testing bench)

Project New Wear Footbridge (United Kingdom)



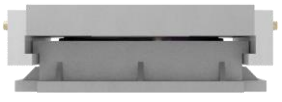
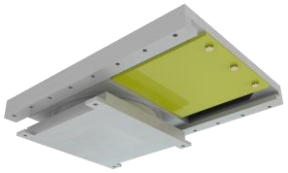
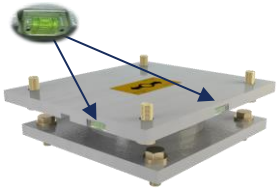
TETRON® SB bearing during combined load & rotation test at ISOLAB testing facility (50MN testing bench)

Project Bridgewater Bridge (Tasmania, Australia)

Bearings manufactured under CE marking certification have a guaranteed Constancy of Performance thanks to continuous factory production control and their full-scale testing is not mandatory.

Options & add-ons

Freyssinet offers several options on its bearings, which should be requested by the customer from the design stage to be considered in the design and added to the drawings.

Anti-uplift	Temporary stoppers	Incremental launching (launch-over bearings)
		
Protective skirt Bodygarde®	**Monitoring of loads and / or displacements**	**Spirit levels**
		

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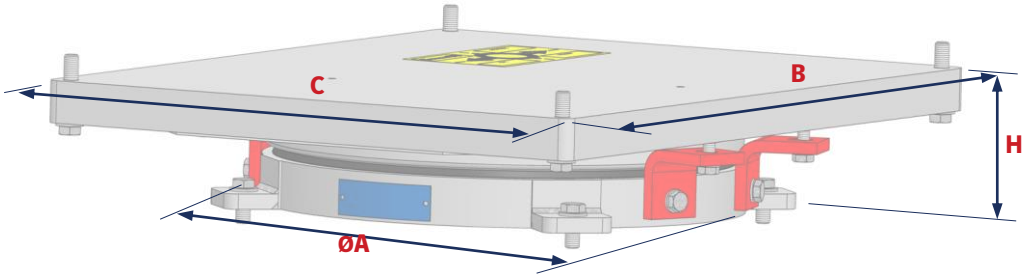
Indicative dimensions

TETRON® SB GL ISOGLIDE spherical bearings with +/-50mm longitudinal and +/-20mm transverse displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GL with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

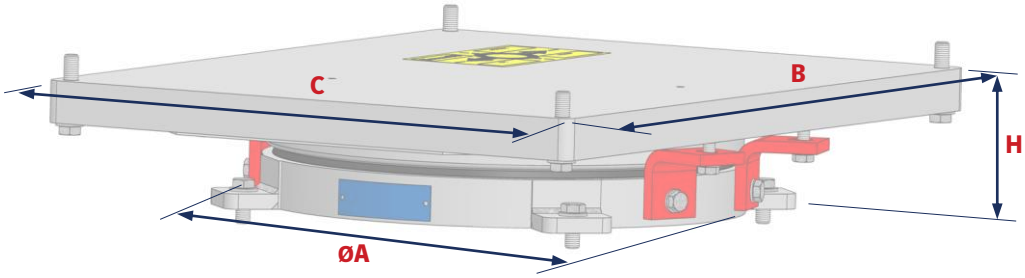
Bearing type	Design as per European Technical Assessment			
	ØA	B	C	H
GL 1 000 . 100 . 40	175	290	260	77
GL 2 000 . 100 . 40	220	340	310	79
GL 3 000 . 100 . 40	255	380	350	86
GL 4 000 . 100 . 40	295	410	380	90
GL 5 000 . 100 . 40	315	430	400	93
GL 6 000 . 100 . 40	340	460	430	96
GL 7 000 . 100 . 40	355	480	450	100
GL 8 000 . 100 . 40	385	500	470	99
GL 9 000 . 100 . 40	395	520	490	108
GL 10 000 . 100 . 40	420	540	510	106
GL 12 000 . 100 . 40	455	570	540	114
GL 14 000 . 100 . 40	480	610	580	117
GL 16 000 . 100 . 40	505	640	610	116
GL 18 000 . 100 . 40	545	670	640	124
GL 20 000 . 100 . 40	565	690	660	132
GL 25 000 . 100 . 40	625	760	730	148
GL 30 000 . 100 . 40	680	810	780	145
GL 35 000 . 100 . 40	730	860	840	162
GL 40 000 . 100 . 40	775	910	890	164
GL 45 000 . 100 . 40	815	950	930	167
GL 50 000 . 100 . 40	860	990	975	179
GL 60 000 . 100 . 40	935	1.070	1.055	188
GL 70 000 . 100 . 40	1.005	1.140	1.135	204
GL 80 000 . 100 . 40	1.085	1.220	1.230	215
GL 90 000 . 100 . 40	1.150	1.290	1.290	211
GL 100 000 . 100 . 40	1.225	1.370	1.370	236

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB GL ISOGLIDE spherical bearings with +/-200mm longitudinal and +/-20mm transverse displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GL with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

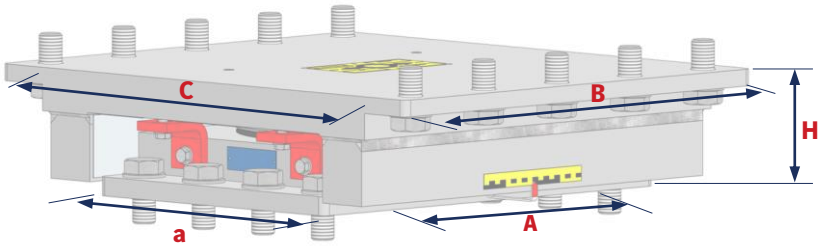
Bearing type	Design as per European Technical Assessment			
	ØA	B	C	H
GL 1 000 . 400 . 40	175	590	260	87
GL 2 000 . 400 . 40	220	640	310	89
GL 3 000 . 400 . 40	255	680	350	96
GL 4 000 . 400 . 40	295	710	380	100
GL 5 000 . 400 . 40	315	730	400	103
GL 6 000 . 400 . 40	340	760	430	106
GL 7 000 . 400 . 40	355	780	450	110
GL 8 000 . 400 . 40	385	800	470	109
GL 9 000 . 400 . 40	395	820	490	118
GL 10 000 . 400 . 40	420	840	510	116
GL 12 000 . 400 . 40	455	870	540	119
GL 14 000 . 400 . 40	480	910	580	127
GL 16 000 . 400 . 40	505	940	610	126
GL 18 000 . 400 . 40	545	970	640	134
GL 20 000 . 400 . 40	565	990	660	142
GL 25 000 . 400 . 40	625	1.060	730	151
GL 30 000 . 400 . 40	680	1.110	780	158
GL 35 000 . 400 . 40	730	1.160	840	170
GL 40 000 . 400 . 40	775	1.210	890	177
GL 45 000 . 400 . 40	815	1.250	930	175
GL 50 000 . 400 . 40	860	1.290	975	192
GL 60 000 . 400 . 40	935	1.370	1.055	198
GL 70 000 . 400 . 40	1.005	1.440	1.135	209
GL 80 000 . 400 . 40	1.085	1.510	1.220	225
GL 90 000 . 400 . 40	1.150	1.570	1.280	238
GL 100 000 . 400 . 40	1.220	1.660	1.370	246

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB GG ISOGLIDE spherical bearings with horizontal load = 10% of vertical load and +/-50mm displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GG with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

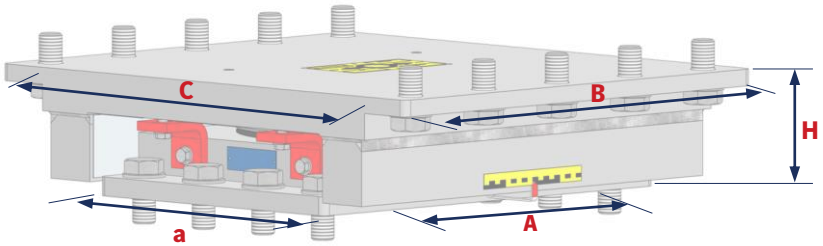
Bearing type	Design as per European Technical Assessment				
	A	a	B	C	H
GG 1 000 - 100 . 100	190	260	300	335	105
GG 2 000 - 200 . 100	240	315	350	385	107
GG 3 000 - 300 . 100	275	370	390	420	114
GG 4 000 - 400 . 100	305	420	420	450	118
GG 5 000 - 500 . 100	330	445	440	475	116
GG 6 000 - 600 . 100	355	490	500	500	119
GG 7 000 - 700 . 100	380	540	550	525	123
GG 8 000 - 800 . 100	400	610	610	545	122
GG 9 000 - 900 . 100	420	650	660	575	131
GG 10 000 - 1000 . 100	440	580	580	595	134
GG 12 000 - 1200 . 100	470	660	660	635	137
GG 14 000 - 1400 . 100	510	600	750	665	140
GG 16 000 - 1600 . 100	535	680	830	690	144
GG 18 000 - 1800 . 100	565	610	760	740	147
GG 20 000 - 2000 . 100	590	680	830	765	160
GG 25 000 - 2500 . 100	660	850	1.000	845	166
GG 30 000 - 3000 . 100	710	850	1.000	915	178
GG 35 000 - 3500 . 100	765	980	1.130	970	198
GG 40 000 - 4000 . 100	815	960	1.110	1.020	200
GG 45 000 - 4500 . 100	855	1.080	1.230	1.060	196
GG 50 000 - 5000 . 100	900	1.050	1.200	1.125	228
GG 60 000 - 6000 . 100	980	1.260	1.410	1.205	262
GG 70 000 - 7000 . 100	1.055	1.410	1.560	1.280	295
GG 80 000 - 8000 . 100	1.125	1.460	1.610	1.370	341
GG 90 000 - 9000 . 100	1.255	1.560	1.710	1.500	362
GG 100 000 - 10000 . 100	1.255	1.680	1.830	1.520	389

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB GG ISOGLIDE spherical bearings with horizontal load = 10% of vertical load and +/-200mm displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GG with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

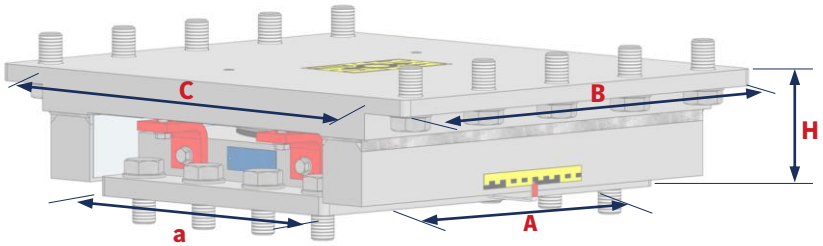
Bearing type	Design as per European Technical Assessment				
	A	a	B	C	H
GG 1 000 - 100 . 400	190	260	600	335	120
GG 2 000 - 200 . 400	240	315	650	385	122
GG 3 000 - 300 . 400	275	370	690	420	124
GG 4 000 - 400 . 400	305	420	720	450	123
GG 5 000 - 500 . 400	330	445	740	475	126
GG 6 000 - 600 . 400	355	490	800	500	129
GG 7 000 - 700 . 400	380	540	850	525	133
GG 8 000 - 800 . 400	400	610	910	545	137
GG 9 000 - 900 . 400	420	650	960	575	141
GG 10 000 - 1000 . 400	440	580	880	595	139
GG 12 000 - 1200 . 400	470	660	960	635	147
GG 14 000 - 1400 . 400	510	600	1.050	665	153
GG 16 000 - 1600 . 400	535	680	1.130	690	157
GG 18 000 - 1800 . 400	565	610	1.060	730	160
GG 20 000 - 2000 . 400	590	680	1.130	765	168
GG 25 000 - 2500 . 400	660	850	1.300	835	174
GG 30 000 - 3000 . 400	710	850	1.300	895	186
GG 35 000 - 3500 . 400	765	980	1.430	970	208
GG 40 000 - 4000 . 400	815	960	1.410	1.020	205
GG 45 000 - 4500 . 400	855	1.080	1.530	1.060	211
GG 50 000 - 5000 . 400	900	1.050	1.500	1.125	228
GG 60 000 - 6000 . 400	980	1.260	1.710	1.205	262
GG 70 000 - 7000 . 400	1.055	1.410	1.860	1.280	295
GG 80 000 - 8000 . 400	1.125	1.460	1.910	1.370	341
GG 90 000 - 9000 . 400	1.255	1.560	2.010	1.500	362
GG 100 000 - 10000 . 400	1.255	1.680	2.130	1.520	389

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB ISOGLIDE spherical bearings with horizontal load = 30% of vertical load and +/-50mm displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GG with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

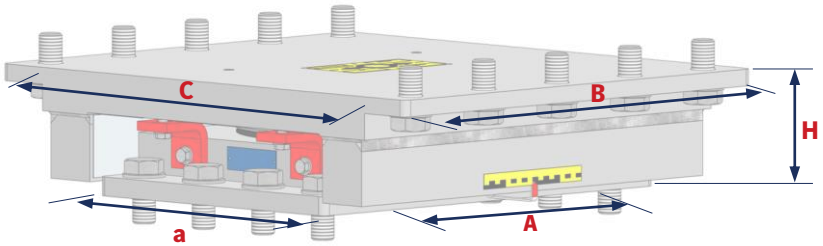
Bearing type	Design as per European Technical Assessment				
	A	a	B	C	H
GG 1 000 - 300 . 100	190	180	330	335	125
GG 2 000 - 600 . 100	240	225	360	395	152
GG 3 000 - 900 . 100	275	260	410	450	174
GG 4 000 - 1200 . 100	305	350	500	470	173
GG 5 000 - 1500 . 100	330	370	520	505	191
GG 6 000 - 1800 . 100	360	390	540	545	209
GG 7 000 - 2100 . 100	380	450	600	565	218
GG 8 000 - 2400 . 100	400	460	610	605	232
GG 9 000 - 2700 . 100	420	510	660	625	241
GG 10 000 - 3000 . 100	440	510	660	645	244
GG 12 000 - 3600 . 100	470	560	710	695	267
GG 14 000 - 4200 . 100	510	600	750	735	285
GG 16 000 - 4800 . 100	535	680	830	760	274
GG 18 000 - 5400 . 100	565	710	860	810	297
GG 20 000 - 6000 . 100	590	730	880	855	330
GG 25 000 - 7500 . 100	1.262	835	1.290	1.530	295
GG 30 000 - 9000 . 100	1.460	910	1.460	1.745	317
GG 35 000 - 10500 . 100	1.460	910	1.460	1.785	344
GG 40 000 - 12000 . 100	1.661	1.060	1.660	1.985	351
GG 45 000 - 13500 . 100	1.661	1.110	1.660	2.005	389
GG 50 000 - 15000 . 100	1.661	1.160	1.710	2.045	396
GG 60 000 - 18000 . 100	1.991	1.260	2.010	2.375	430
GG 70 000 - 21000 . 100	2.255	1.410	2.260	2.680	453
GG 80 000 - 24000 . 100	2.255	1.460	2.260	2.720	479
GG 90 000 - 27000 . 100	2.255	1.560	2.260	2.720	495
GG 100 000 - 30000 . 100	2.595	1.660	2.610	3.060	522

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB GG ISOGLIDE spherical with horizontal load = 30% of vertical load and +/-200mm displacement
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB GG with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

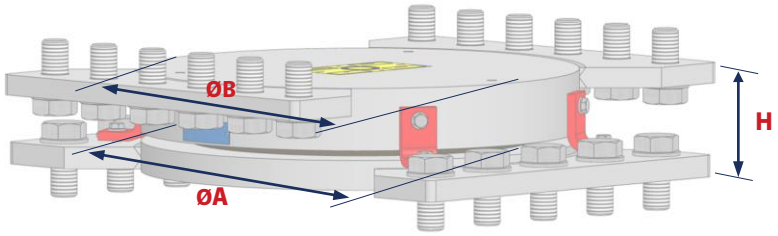
Bearing type	Design as per European Technical Assessment				
	A	a	B	C	H
GG 1 000 - 300 . 400	190	180	630	335	130
GG 2 000 - 600 . 400	240	225	660	395	152
GG 3 000 - 900 . 400	275	260	710	450	174
GG 4 000 - 1200 . 400	305	350	800	470	173
GG 5 000 - 1500 . 400	330	370	820	505	186
GG 6 000 - 1800 . 400	360	390	840	545	204
GG 7 000 - 2100 . 400	380	450	900	565	218
GG 8 000 - 2400 . 400	400	460	910	605	232
GG 9 000 - 2700 . 400	420	510	960	625	236
GG 10 000 - 3000 . 400	440	510	960	645	239
GG 12 000 - 3600 . 400	470	560	1.010	695	265
GG 14 000 - 4200 . 400	510	600	1.050	735	273
GG 16 000 - 4800 . 400	535	680	1.130	760	272
GG 18 000 - 5400 . 400	565	710	1.160	810	285
GG 20 000 - 6000 . 400	590	730	1.180	835	318
GG 25 000 - 7500 . 400	1.262	835	1.390	1.530	295
GG 30 000 - 9000 . 400	1.460	910	1.460	1.745	317
GG 35 000 - 10500 . 400	1.460	910	1.460	1.785	344
GG 40 000 - 12000 . 400	1.661	1.060	1.660	1.985	371
GG 45 000 - 13500 . 400	1.661	1.110	1.660	2.005	389
GG 50 000 - 15000 . 400	1.661	1.160	1.710	2.045	396
GG 60 000 - 18000 . 400	1.991	1.260	2.010	2.375	430
GG 70 000 - 21000 . 400	2.255	1.410	2.260	2.680	453
GG 80 000 - 24000 . 400	2.255	1.460	2.260	2.720	479
GG 90 000 - 27000 . 400	2.255	1.560	2.260	2.720	495
GG 100 000 - 30000 . 400	2.595	1.560	2.610	3.100	562

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB FX ISOGLIDE spherical bearings with horizontal load = 10% of vertical load
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB FX with ISOGLIDE®



Fixing lugs and anchors are not included in the dimensions below.

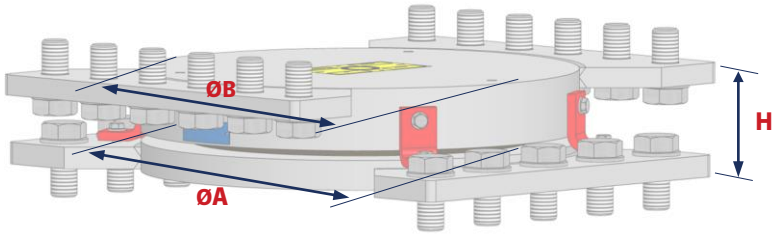
Bearing type	Design as per European Technical Assessment		
	ØA	ØB	H
FX 1 000 - 100	205	205	82
FX 2 000 - 200	260	260	82
FX 3 000 - 300	295	295	85
FX 4 000 - 400	325	325	90
FX 5 000 - 500	350	350	84
FX 6 000 - 600	385	385	88
FX 7 000 - 700	410	410	92
FX 8 000 - 800	435	435	102
FX 9 000 - 900	460	460	102
FX 10 000 - 1000	490	490	100
FX 12 000 - 1200	535	535	105
FX 14 000 - 1400	575	575	104
FX 16 000 - 1600	615	615	119
FX 18 000 - 1800	650	650	118
FX 20 000 - 2000	685	685	122
FX 25 000 - 2500	775	775	120
FX 30 000 - 3000	845	845	144
FX 35 000 - 3500	920	920	142
FX 40 000 - 4000	970	970	161
FX 45 000 - 4500	1.035	1.035	157
FX 50 000 - 5000	1.295	1.295	165
FX 60 000 - 6000	1.460	1.460	184
FX 70 000 - 7000	1.515	1.555	191
FX 80 000 - 8000	1.640	1.640	223
FX 90 000 - 9000	1.750	1.750	224
FX 100 000 - 10000	1.845	1.875	261

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet.

TETRON® SB SPHERICAL BEARINGS

TETRON® SB FX ISOGLIDE spherical bearings with horizontal load = 30% of vertical load
Plan rotation = 10 mrad
Lower concrete structure grade = **minimum C40/50**, Upper concrete structure grade = **minimum C40/50**
Maximum effective bearing temperature (for definition of allowable pressure of sliding material in ULS): **T_{max}=50°C**

TETRON® SB FX with ISOGLIDE®



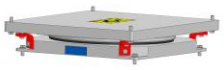
Fixing lugs and anchors are not included in the dimensions below.

Bearing type	Design as per European Technical Assessment		
	ØA	ØB	H
FX 1 000 - 300	205	205	86
FX 2 000 - 600	265	265	89
FX 3 000 - 900	320	320	96
FX 4 000 - 1200	360	360	105
FX 5 000 - 1500	405	405	103
FX 6 000 - 1800	450	450	111
FX 7 000 - 2100	625	625	110
FX 8 000 - 2400	510	510	119
FX 9 000 - 2700	545	545	133
FX 10 000 - 3000	580	580	131
FX 12 000 - 3600	825	825	140
FX 14 000 - 4200	695	695	158
FX 16 000 - 4800	750	750	157
FX 18 000 - 5400	800	800	174
FX 20 000 - 6000	855	855	172
FX 25 000 - 7500	1.175	1.215	185
FX 30 000 - 9000	1.305	1.305	202
FX 35 000 - 10500	1.400	1.400	219
FX 40 000 - 15000	1.490	1.490	230
FX 45 000 - 13500	1.610	1.610	238
FX 50 000 - 15000	1.785	1.785	272
FX 60 000 - 18000	2.150	2.150	338
FX 70 000 - 21000	2.690	2.690	483
FX 80 000 - 24000	2.830	2.830	562
FX 90 000 - 27000	3.375	3.375	638
FX 100 000 - 30000	3.770	3.770	742

The dimensions above are in millimetres and indicative only.
All bearings are designed and manufactured according to effective loads / displacements / rotations provided in the project bearing schedule.
Additional movements required by applicable standard are considered in the design by Freyssinet

TETRON Bearings

Quick notes



STRUCTURAL BEARINGS EXPERTISE ACROSS THE GLOBE

TETRON Bearings

FREYSSINET