

# ELASTOMERIC BEARINGS



DESIGN, BUILD, MAINTAIN



**FREYSSINET**  
SUSTAINABLE TECHNOLOGY

## ELASTOMERIC BEARING

A laminated elastomeric bearing is an elastomeric rubber block reinforced with steel plates vulcanised when built. This bearing is the connection between a structure and its support, and should make the following possible through elastic deformation:

- transmission of normal forces;
- horizontal movements;
- rotation of the structure in any direction;
- transmission of horizontal forces, within defined limits.

It may also be provided with a sliding plane for withstanding large movements of the structure and also having a one or two horizontal movement locking systems.

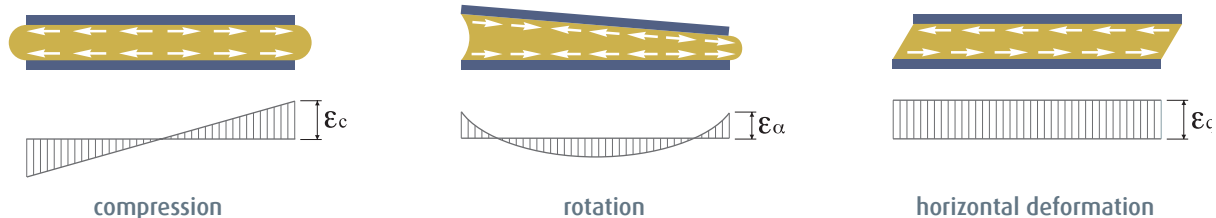
All Freyssinet bearings are CE certified.

### CONTENTS

Applications	p 3
Dimensions	p 4
Elastomeric bearing types	p 6
Production and quality	p 7



## APPLICATIONS



*Cruas Nuclear Power Plant - France.*

## Behaviour

Each elemental layer, subject to stresses and movements, deflects as shown in the three diagrams below:

Shears that occur in the elastomeric layers depend on their dimensions, stresses and also the characteristics of the elastomer used.

Sizing of bearings is based on restricting these shears in accordance with current national or international regulations.

## Use

Banded elastomeric bearings are mainly used in the structures field for which this product has many advantages: long service life, reliability, maintenance free, lightness, small overall dimensions and easy to install.

These qualities are also sought in the building field where laminated elastomeric bearings may be used for filtering vibrations (reduction of noise annoyance for example) or even earthquake proof insulators (acceleration reduction).

## Installation

Installation quality is a vital condition for efficient operation and long lasting quality. Arrangements should be made at the design stage for providing sufficient clearance around the bearings so they can be monitored and possibly replaced.



*Omnisports Palace at Paris-Bercy - France.*

# DIMENSIONS

The figures provided in this table relate to Type B and Type C bearings in accordance with EN 1337-3. The different values shown below may be changed as a function of the actual stresses on the bearing involved.

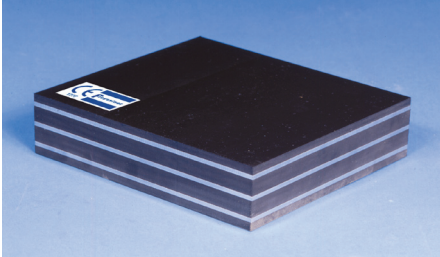
Plan dimensions of bearings	Compression load under zero displacement	Layer thickness	Number of layers	Number of reinforcing plates (TYPE B)	Reinforcing plates thickness	TYPE B			TYPE C				Allowable rotation
						Total elastomer thickness	Total thickness of bearing	Allowable displacement	Thickness of thicker steel plates	Total elastomer thickness	Total thickness of bearing	Allowable displacement	
axb, D	F	t	n	ns	ts	te	T	w	Ts	Te	T	w	$\alpha$
mm	kN	mm			mm	mm	mm	mm	mm	mm	mm	mm	m rad
100x150 100x200	120 179	8	2 3	3 4	3	21 29	30 41	21 29	15	16 24	49 60	16 24	21 31
150x200 150x250 150x300	408 558 715	8	2 3 4	3 4 5	3	21 29 37	30 41 52	21 29 37	15	16 24 32	49 60 71	16 24 32	10 15 20
200x250 200x300 200x350 200x400	803 1043 1291 1547	8	3 4 5 6	4 5 6 7	3	29 37 45 53	41 52 63 74	29 37 45 53	15	24 32 40 48	60 71 82 93	24 32 40 48	8 10 13 16
Ø200	625	8	2 3 4	3 4 5	3	21 29 37	30 41 52	21 29 37	15	16 24 32	49 60 71	16 24 32	9 14 19
Ø250	1578	8	2 3 4	3 4 5	3	21 29 37	30 41 52	21 29 37	15	16 24 32	49 60 71	16 24 32	8 12 16
250x300 250x400	1608 2425	8	3 4 5 6 7	4 5 6 7 8	3	29 37 45 53 61	41 52 63 74 85	29 37 45 53 61	15	24 32 40 48 56	60 71 82 93 104	24 32 40 48 56	6 8 10 12 14
Ø300	2230	8	4 5 6	5 6 7	3	37 45 53	52 63 74	37 45 53	15	32 40 48	71 82 93	32 40 48	9 11 14
Ø350	3598	8	3 4 5 6 7	4 5 6 7 8	3	29 37 45 53 61	41 52 63 74 85	29 37 45 53 61	15	24 32 40 48 56	60 71 82 93 104	24 32 40 48 56	5 7 9 10 12
300x400 300x500 300x600	2036 2787 3569	12	3 4 5 6	4 5 6 7	4	41 53 65 77	57 73 89 105	41 53 65 77	20	36 48 60 72	84 100 116 132	36 48 60 72	8 10 13 15
350x450	3091	12	3 4 5 6 7	4 5 6 7 8	4	41 53 65 77 89	57 73 89 105 121	41 53 65 77 89	20	36 48 60 72 84	84 100 116 132 148	36 48 60 72 84	7 9 11 13 15
Ø400	3220	12	3 4 5 6	4 5 6 7	4	41 53 65 77	57 73 89 105	41 53 65 77	20	36 48 60 72	84 100 116 132	36 48 60 72	7 10 12 15
400x500	4454	12	4 5 6 7 8	5 6 7 8 9	4	53 65 77 89 101	73 89 105 121 137	53 65 77 89 101	20	48 60 72 84 96	100 116 132 148 164	48 60 72 84 96	7 9 11 12 14
400x600	5778	12	4 5 6 7 8	5 6 7 8 9	4	53 65 77 89 101	73 89 105 121 137	53 65 77 89 101	20	48 60 72 84 96	100 116 132 148 164	48 60 72 84 96	7 8 10 12 13
Ø450	5204	12	3 4 5 6	4 5 6 7	4	41 53 65 77	57 73 89 105	41 53 65 77	20	36 48 60 72	84 100 116 132	36 48 60 72	7 9 11 13
450x600	6991	12	4 5 6 7 8 9	5 6 7 8 9 10	4	53 65 77 89 101 113	73 89 105 121 137 153	53 65 77 89 101 113	20	48 60 72 84 96 108	100 116 132 148 164 180	48 60 72 84 96 108	6 7 8 10 11 13

The loading limits given in this table correspond to the loading of a bearing device to the ULS, in accordance with the verification requirements of standard EN 1337-3-2005.

Plan dimensions of bearings	Compression load under zero displacement	Layer thickness	Number of layers	Number of reinforcing plates (TYPE B)	Reinforcing plates thickness	TYPE B			TYPE C				Allowable rotation	
						Total elastomer thickness	Total thickness of bearing	Allowable displacement	Thickness of thicker steel plates	Total elastomer thickness	Total thickness of bearing	Allowable displacement		
axb, D	F	t	n	ns	ts	te	T	w	Ts	Te	T	w	α	
mm	kN	mm			mm	mm	mm	mm	mm	mm	mm	mm	m rad	
Ø500	6848	12	3	4	4	41	57	41	20	36	84	36	5	
			4	5		53	73	53					48	7
			5	6		65	89	65					60	9
			6	7		77	105	77					72	11
			7	8		89	121	89					84	13
500x600	8262	12	4	5	4	53	73	53	20	48	100	48	5	
			5	6		65	89	65					60	6
			6	7		77	105	77					72	7
			7	8		89	121	89					84	9
			8	9		101	137	101					96	10
			9	10		113	153	113					108	11
10	11	125	169	125	120	12								
Ø550 Ø600	8825 12561	12	4	5	4	53	73	53	20	48	100	48	6	
			5	6		65	89	65					60	7
			6	7		77	105	77					72	8
			7	8		89	121	89					84	10
8	9	101	137	101	96	11								
600x600	8214	16	4	5	5	69	94	69	20	64	109	64	6	
			5	6		85	115	85					80	8
			6	7		101	136	101					96	9
			7	8		117	157	117					112	11
			8	9		133	178	133					128	12
			9	10		149	199	149					144	14
600x700	10329	16	4	5	5	69	94	69	20	64	109	64	6	
			5	6		85	115	85					80	7
			6	7		101	136	101					96	9
			7	8		117	157	117					112	10
			8	9		133	178	133					128	12
			9	10		149	199	149					144	13
700x700 Ø700 Ø750	13749 10553 13949	16	4	5	5	69	94	69	20	64	109	64	5	
			5	6		85	115	85					80	6
			6	7		101	136	101					96	7
			7	8		117	157	117					112	9
			8	9		133	178	133					128	10
			9	10		149	199	149					144	11
10	11	165	220	165	160	12								
700x800	16772	16	4	5	5	69	94	69	20	64	109	64	5	
			5	6		85	115	85					80	6
			6	7		101	136	101					96	7
			7	8		117	157	117					112	8
			8	9		133	178	133					128	10
			9	10		149	199	149					144	11
10	11	165	220	165	160	12								
800x800 Ø800 Ø850	15054 11588 14804	20	4	5	5	85	110	85	20	80	125	80	5	
			5	6		105	135	105					100	6
			6	7		125	160	125					120	7
			7	8		145	185	145					140	9
			8	9		165	210	165					160	10
			9	10		185	235	185					180	11
10	11	205	260	205	200	12								
900x900 Ø900	21971 16951	20	4	5	5	85	110	85	20	80	125	80	4	
			5	6		105	135	105					100	6
			6	7		125	160	125					120	7
			7	8		145	185	145					140	8
			8	9		165	210	165					160	9
			9	10		185	235	185					180	10
10	11	205	260	205	200	11								
11	12	225	285	225	220	12								

Figures provided as examples. Other sizes are available as a function of the requirements linked to a given application. Contact Freyssinet.

## ELASTOMERIC BEARING TYPES



### Standard bearings

Bearings are individually moulded and the reinforcing plates are completely buried in the elastomer with at least 4mm lateral cover and generally 2.5mm thick (type B) outside layers with the exception of bearings provided with thick external bands (type C).

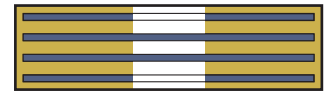
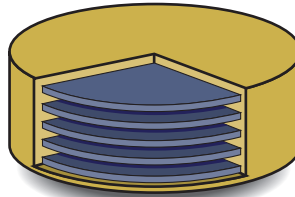


Type B



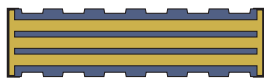
Type C

These bearings may have a rectangular, square or circular section. They may also have holes for running specific materials through (cross bar anchor), for fitting damping material or for reducing vertical stiffness.

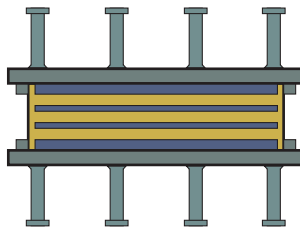


### Bearings with anchor plates

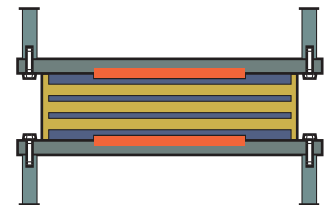
Freyssinet offers several solutions appropriate for different configurations, considering the variety of construction methods for structures and the stresses transmitted by bearings.



Bearings fitted with corrugated outer plates to guarantee thin connexion.



Bearings fitted with outer plates, anchor plates and connexion devices.



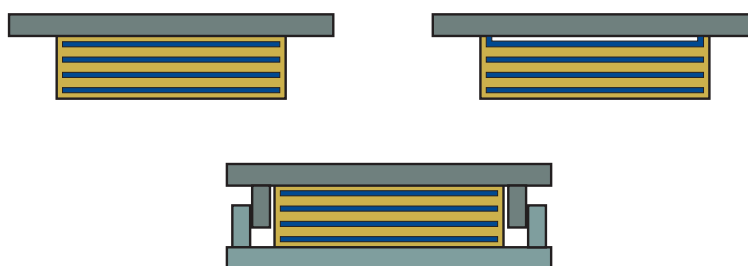
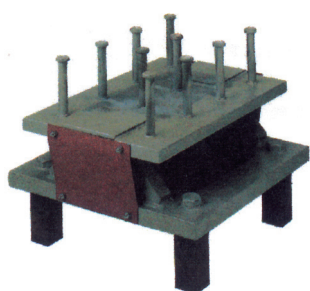
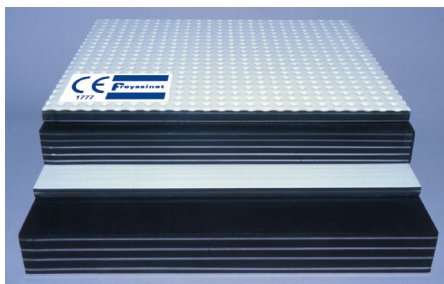
Bearings fitted with outer plates, anchor plates and shear discs.

### Bearings with sliding surface

Laminated elastomeric bearings can be fitted with a sliding surface comprising a PTFE (polytetrafluoroethylene) sheet dipped in the elastomer of the bearing or notched in the top thick outer plate and a sliding plate provided with an austenitic steel sheet for decks requiring significant movement. Therefore, the built up bearing only provides very little movement resistance (limited to PTFE/ austenitic steel friction).

### Restrained bearings

Transfer of large horizontal loads in either direction can be provided using steel guides.



## PRODUCTION AND QUALITY

Freyssinet offers neoprene and natural rubber based bearings to meet different national or international standards (BS, AASHTO, DIN, EN, etc.). Production quality of these bearings is guaranteed by appropriate formulation, control of mix preparation and steel plate surface treatment quality, as well as by the care applied to construction and moulding. Internal and external inspections are made at each production stage.

Moreover, Freyssinet conducts a policy of permanently improving its products and research and development of new processes or materials. The rigorous product quality control practices Freyssinet has developed have enabled the Group to obtain CE marking to distribute its elastomeric bearings.





## More than 60 offices worldwide

### AMERICAS

- **Argentina**  
Freyssinet - Tierra Armada S.A.
- **Brazil**  
Freyssinet Brazil Ltda
- **Canada**  
Freyssinet Canada Ltée
- **Chile**  
Freyssinet Tierra Armada Chile S.A
- **Colombia**  
Freyssinet Colombie
- **El Salvador**  
Fessic S.A. De C.V.
- **Mexico**  
Freyssinet de Mexico - Tierra Armada S.A.
- **Panama**  
Freyssinet
- **United States**  
Freyssinet Inc.
- **Venezuela**  
Freyssinet - Tierra Armada CA

### EUROPE

- **Belgium**  
Freyssinet Belgium N.V.
- **Bulgaria**  
Freyssinet

### Danemark

- A/S Skandinavisk Spaendbeton
- **Estonia**  
Latvijas Tilti
- **France**  
Freyssinet France  
Freyssinet International & Cie
- **Hungary**  
Pannon Freyssinet Kft
- **Iceland**  
A/S Skandinavisk Spaendbeton
- **Ireland**  
Freyssinet Ireland
- **Latvia**  
Latvijas Tilti
- **Lithuania**  
Latvijas Tilti
- **Macedonia**  
Freyssinet Balkans
- **Netherlands**  
Freyssinet Nederland B.V.
- **Norway**  
A/S Skandinavisk Spaendbeton
- **Poland**  
Freyssinet Polska Sp. z.o.o

### Portugal

Freyssinet - Terra Armada S.A

### Romania

Freyrom

### Russia

Freyssinet

### Serbia

Freyssinet

### Slovenia

Freyssinet Adria SI d.o.o.

### Spain

Freyssinet S.A.

### Sweden

A/S Skandinavisk Spaendbeton

### Switzerland

Freyssinet S.A.

### Turkey

Freyssas

### United Kingdom

Freyssinet Ltd

### AFRICA AND MIDDLE EAST

#### Abu Dhabi

Freyssinet Middle East LLC

#### Algeria

Freyssinet Algérie

#### Dubai

Freyssinet Gulf LLC

#### Egypt

Freyssinet - Menard Egypt SAE

#### Jordan

Freyssinet Jordan LLC

#### Koweit

Freyssinet Koweit

#### Morocco

Freyssima

#### Oman

Freyssinet Arabian Sea LLC

#### Qatar

Freyssinet Menard Qatar WLL

### Saudi Arabia

Freyssinet Menard Saudi Arabia Ltd.

### Sharja

Freyssinet Menard Northern Emirates LLC

### South Africa

Freyssinet Posten (Pty) Ltd

### Tunisia

Freyssinet

### ASIA

#### Hong Kong

Freyssinet Hong Kong Ltd

Freyssinet Insight Sewer Services Ltd

#### India

Freyssinet Menard INDIA Pvt Ltd

#### Indonesia

PT Freyssinet Total Technology

#### Japan

Freyssinet KK Japon

#### Macau

Freyssinet Macau Ltd

#### Malaysia

Freyssinet PSC (M) SDN BHD

#### Pakistan

Freyypak Ltd

### Singapore

PSC Freyssinet (S) Pte. Ltd

### South Korea

Freyssinet Korea Co. Ltd

### Taiwan

Freyssinet Taiwan Engineering

### Thailand

Freyssinet Thailand Ltd

### Vietnam

Freyssinet Vietnam

### OCEANIA

#### Australia

Freyssinet Australia Pty Ltd

#### New Zealand

Freyssinet New Zealand Ltd



**FREYSSINET**  
SUSTAINABLE TECHNOLOGY

1 bis, rue du Petit Clamart 78140 Vélizy-Villacoublay - France  
Tel: +33 1 46 01 84 84 - Fax: +33 1 46 01 85 85  
[www.freyssinet.com](http://www.freyssinet.com)