FLEXIBLE BUSHES

FLEXIBLE BUSHES

HUTCHINSON®
PAULSTRA

FLEXIBLE BUSHES

CONTENTS

Please see current price list for availability of items.
We reserve the right to modify the design and manufacture of the products and materials described in this catalogue.
The pictures of the products are supplied for information only.

The order comprises :
- the contract signed by both parties, or the purchase order and the acknoledgement of receipt,
- eventualy, special or specific additional conditions,
- sale general conditions, available upon request are part of the order.

I - GENERAL

I.1 - THE OPERATION OF A FLEXIBLE BUSH

A flexible bush has an elastomeric element enclosed between an outer sleeve and a centre axis intended to replace a greased bush.
The improvements achieved in industry due to the use of elastic bushes have been justly compared to the progress achieved in the past by the use of ball joints. In fact, the improvements achieved by the latter by reducing friction and play considerably and reducing wear an noise, have been taken even further by elastomeric rubber bushes which eliminate play completely and isolate high frequency vibrations.

I.2 - STATIC CHARACTERISTICS

I.2.1 - RADIAL CHARACTERISTICS

The application of a radial force FR causes an elastic eccentricity X by compression of the elastomer on one side and stretching of the other side.
The bush is characterised by the permissible radial static force and by the corresponding eccentricity.
In practice, the permissible radial static forces are estimated by taking the stress rate on the surface area S of the rectangle which represents the projection of part of the elastomer which is in contact with the internal tube.

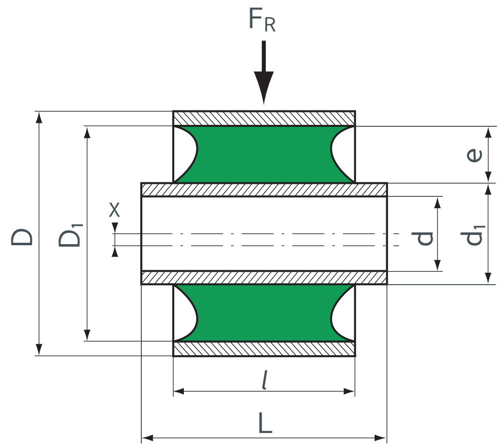
$$\text{Stress rate} = t = \frac{FR}{S} = \frac{FR}{d_1 \times l}$$

F_R in N
d_1 and l in m
t in N/m²

The permissible stress is a function $\frac{l}{D}$ of the bush and of the specific properties of the elastomer.

It is clear that the permissible deformation for a given radial force will be linked in practice to the thickness of the elastomer.

$$e = \frac{D_1 - d_1}{2}$$

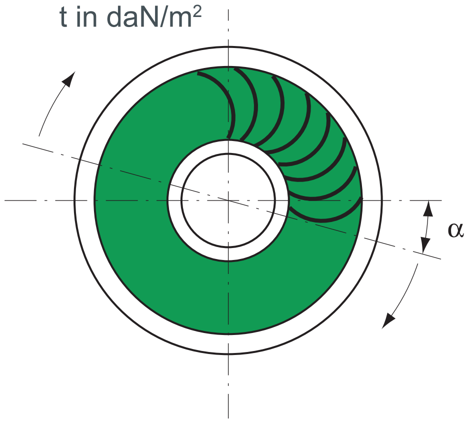


I.2.2 - TORSIONAL CHARACTERISTICS

The application of a torque to the centre axis of revolution of a bush causes an angular displacement. This displacement produces a torsional reaction expressed in N.m.
The bush is characterised by its maximum torsion angle a and by the corresponding compensating torque.
In practice, the permissible torsion angles are of the order of 20° to 30°. The maximum permissible static torque can be calculated on the basis of the stress rate at the point of contact between the internal tube and the elastomer.

$$C = t \times \pi \frac{d_1^2 \; l}{2}$$

d_1 and l in m
C in N.m
t in daN/m²

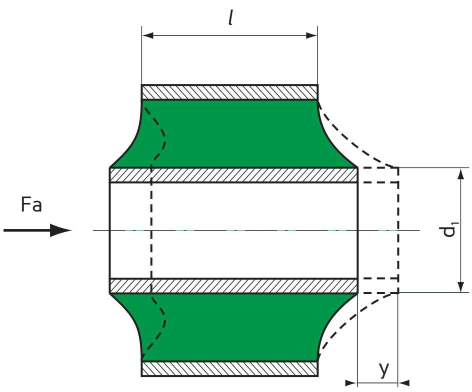


I.2.3 - AXIAL CHARACTERISTICS

When the external tube is fixed, the application of an axial force Fa on the internal tube will cause an elastic displacement “y” parallel to the axis of the bush, by shearing of the elastomer.
The bush is characterised by the permissible axial load and by the corresponding elastic displacement.
In practice, the permissible static axial loads are estimated by taking the stress rate at the internal tube.
$Fa = \pi \times d_1 \times l \times t$ where d_1 and l are in cm and Fa in daN and t is in daN/cm^2
The permissible static deflection is a function of the radial thickness of the elastomer.

$$y = k \cdot \frac{D_1 - d_1}{2}$$

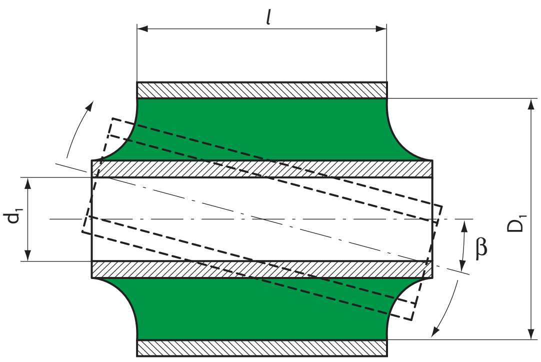
The axial breaking load of a bonded part is of the order of 10 times the permissible static load.



Note :
A Prestressed bush which is not fully bonded must not be subjected to a static axial load.

I.2.4 - CONICAL CHARACTERISTICS

The application of a torque whose axis is perpendicular to the axis of rotation of the bush will cause an angular deformation β.
This deformation will in turn produce a compensating elastic torque expressed in N.m.
The bush is characterised by the permissible conical angle and by the corresponding compensating torque.
In practice, the permissible conical angles are of the order of a few degrees. They vary greatly with the slenderness ratio $\frac{l}{D}$ of the part.

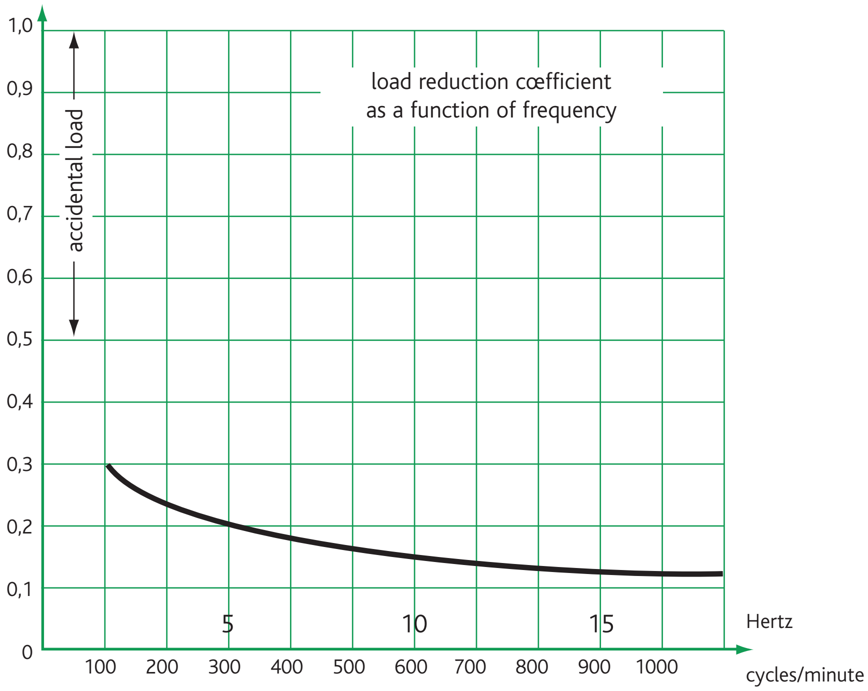


I.3 - DYNAMIC CHARACTERISTICS

I.3.1 - DYNAMIC LOADS

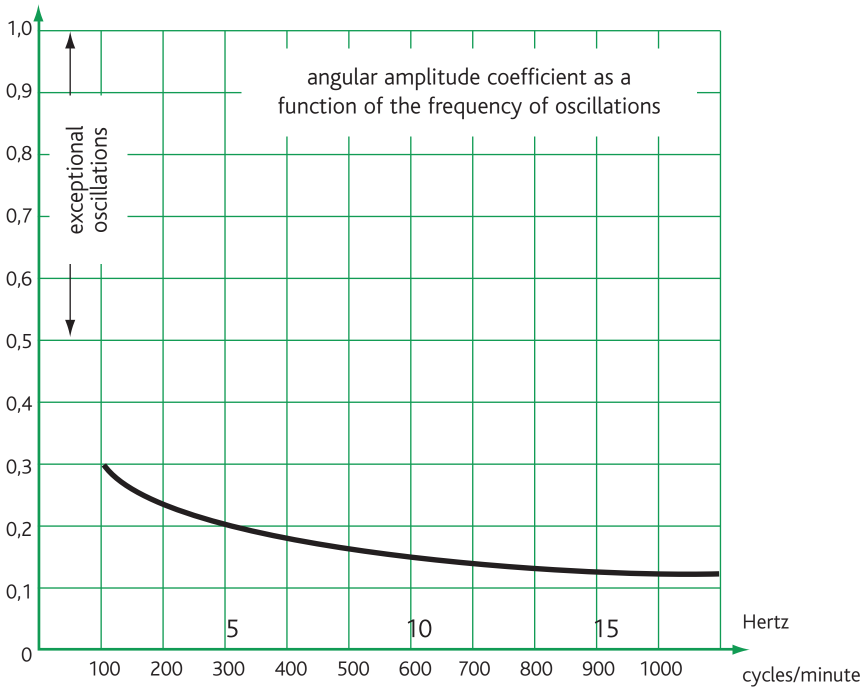
For dynamic loads, the following corrections must be added to the static loads provided in the catalogue :

- For infrequent forces of very short duration (shocks), the loads can be doubled.
- In the case of continuing periodic forces, the loads must be multiplied by a reduction coefficient λ which is a function of the frequency of the forces.



I.3.2 - TORSIONAL AMPLITUDES

The torsion amplitudes provided in the catalogue must be multiplied by a reduction coefficient μ which is a function of the frequency of the oscillations.



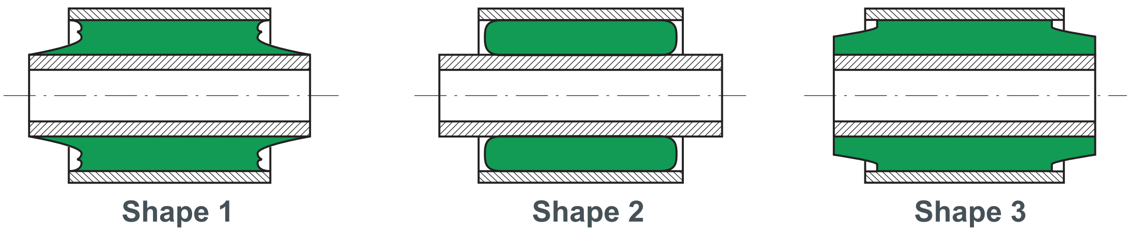
II - PRINCIPAL TYPES OF FLEXIBLE BUSHES

II.1 - SIMPLE BUSHES

FLEXIBLOC (fig. 1) - FULLY BONDED
This is a bush made up of 2 concentric tubes between which of elastomer is bonded. Under the effect of external forces or torques, the relative movement of the tubes will cause an elastic deformation of the elastomer. By consulting the service conditions, a bush should be chosen which will remain within its elastic operational limits.

SILENTBLOC (fig. 2) - PRESTRESSED
This is a bush made up of 2 concentric tubes between which a ring of “adhérite®” elastomer is inserted by force. Under the effect of external forces or torques, the relative movement of the tubes will cause an elastic deformation of the elastomer. Above a certain value the adherite will slide in the tubes.

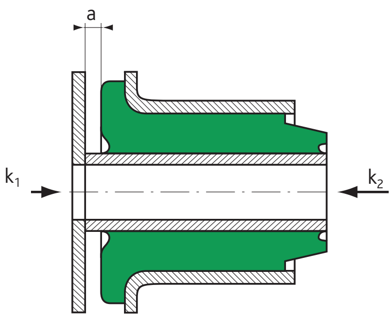
These simple bushes are considered to have lateral stops (shape. 3) when the elastomer protrudes from the external tube in the form of a support surface with various profiles.

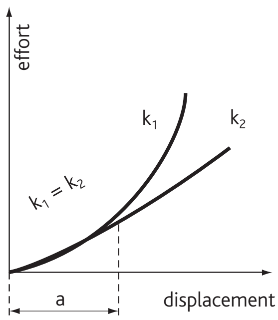


The lateral stop only comes into operation when the bush is forced off centre by a radial load. This causes the stop to protrude, thus ensuring an “anti-noise” role at the limit of axial movement.

II.2 - FLANGED BUSHES

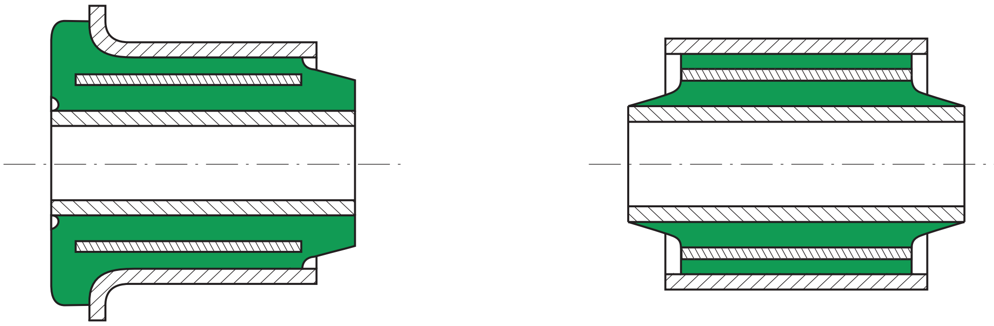
In this type of bush, one of the tubes is flanged.





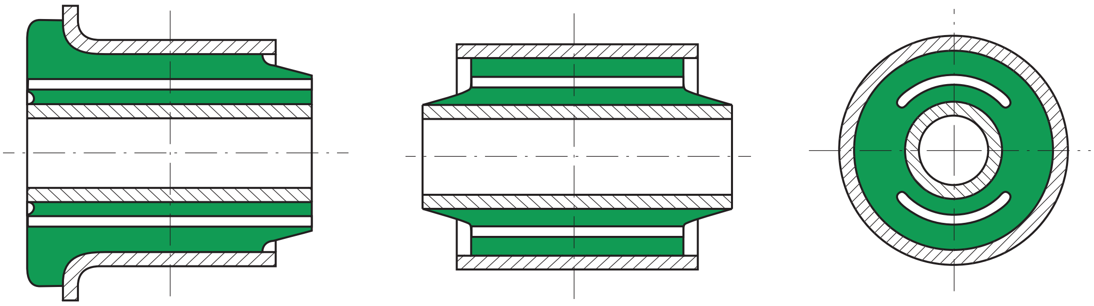
The rigidity k_1 is equal to k_2 if the travel is less than “a”, and it becomes greater than k_2 when the travel is greater than “a”.

II.3 - LAMINATED BUSHES



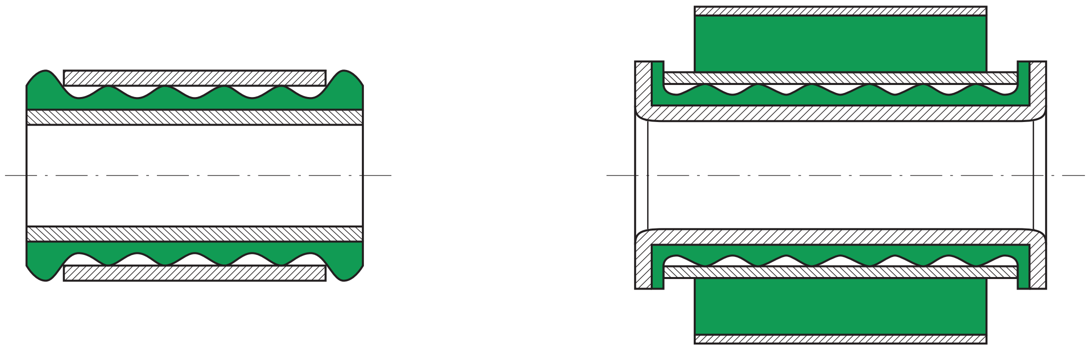
This type of bush has a thin metallic tube between the internal tube and the external tube. The object is to have a higher stiffness radially while keeping practically the same stiffness in torsion. The lamination of a bush also helps to decrease the work rate of the elastomer under high radial loads.

II.4 - VOID BUSHES



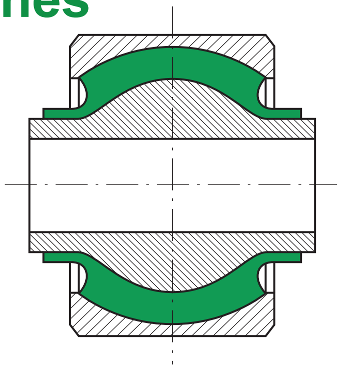
A void bush is designed to have radial stiffness which are very different at 90° to each other. The difference in rigidity is governed by the size of the voids, which may or may not run the whole length of the bush.

II.5 - PIVOT BUSHES



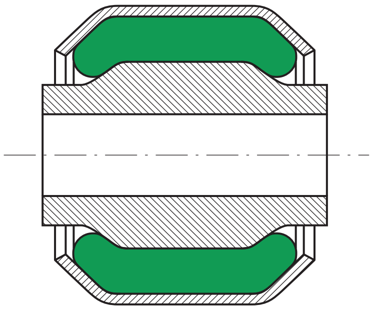
FLUIDBLOC :
This type of bush is intended to offer minimum resistance to torsion. The elastomer is bonded to only one of the armatures, and a suitable permanent lubricant ensures the lubrication between the elastomer and the second armature ensures a very low torsional resistance. Seals are provided at each end to prevent the lubricant from coming out and stop impurities from getting in. Resistance to axial force is provided by a flange in the elastomer which bears against the side of the outer sleeve, the force being transmitted by a lateral washer.

II.6 - Spherical bushes

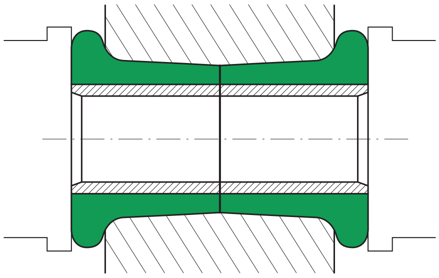


SPHERIFLEX :
In this bush, the outer sleeve and centre axis are spherical, which enables the bush to resist relatively high radial and axial loads and to obtain a circular rigidity which is independent of the axis of rotation.

II.7 - OTHER BUSHES



"PRESTRESSED BUSHES" with turned down sides :
For the same dimensions, this type of bush provides a radial load capacity which is superior to that of the classic "prestressed". In addition, versions of relatively short length permit conical movement more easily (reduced torque and increased angle).



CONICAL BUSH :
This takes the form of a rubber sleeve whose external surface is a truncated, and which surrounds a cylindrical internal part to which it adheres strongly by high radial expansion.
Assembly in pair, in a housing made up of two truncated cones placed small end to small end.
By axial pressure, a high compression is created which ensures the external adherence of the rubber and causes lateral cushions to form at each end of the housing. These cushions ensure resistance to axial forces.

III - OUTER SLEEVE AND CENTRE AXIS

III.1 - MATERIALS USED

In general, the outer sleeve and centre axis of flexible bushes are made of :

- Mild steel or polyamide for the external outer sleeve.
- Medium carbon steel for the centre axis.

The reason for the difference has to do with the method of fixation onto the internal armature, which is usually done by forcing from one end. The armature must therefore be both strong and not too thin, to avoid buckling.

III.2 - PROTECTION DURING STORAGE

To avoid corrosion of the steel parts, the parts are protected by a layer of phosphate which gives them a grey appearance, the whole being protected by a layer of oil.

To ease removal of fixing botts, the internal tubes are also protected on the interior by a layer of phosphate. This protection is good for storage, but it does not constitute a “tropicalised” protection, nor is it intended to resist saline mist.

III.3 - LENGTH TOLERANCES

- Length L (internal tube) : ± 0.1mm
- Length l (external tube) : JS 15, according to NF E02 100-1 and NF E02 100-2

- Longitudinal overhang : $\frac{L - l}{2}$ ± 0,4 mm

III.4 - DIAMETER TOLERANCES

On the internal diameter d : H10

d (mm)	3 to 6	6 to 10	10 to 18	18 to 30	30 to 50
H10	+ 0,048 + 0	+ 0,058 + 0	+ 0,070 + 0	+ 0,084 + 0	+ 0,1 + 0

On the external diameter D :

D ≤25 (mm)	25 < D ≤ 40 (mm)	D > 40 (mm)
+ 0,05 +0	+ 0,1 +0	+ 0,15 + 0

Recommended tolerance for fitting into a bored hole : boring D : N9

D (mm)	10 to 18	18 to 30	30 to 50	50 to 80	80 to 120
N9	- 0 - 0,043	- 0 - 0,052	- 0 - 0,062	- 0 - 0,074	- 0 - 0,087

IV - THE SELECTION OF A FLEXIBLE BUSH

In order to specify a bush correctly for a given application, the following criteria must be determined :

Basic data

For each of the 4 characteristics of the part (axial, radial, torsion or conical), the following values must be taken into account :
- The maximum static values (of force and/or of deflection) to which the part is subjected.
- The maximum dynamic values and their frequencies.

Fundamental parameters

Depending on the application, determine from the basic data the major fundamental parameter(s) which govern the choice of the bush to be used.

Dimensions

The fundamental parameters enable you to consult the catalogue for the range of dimensions of various bushes.

Stiffness

The final selection of the bush will depend on the required stiffness for the application. In particular, length, diameter and the thickness of the elastomer required for the desired bush will be determined.

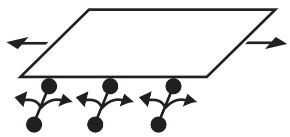
Environmental conditions

Most of our standard bushes are in natural rubber. This has been chosen because of its good dynamic qualities.
In normal conditions of use, the types of rubber used guarantee a good life and limit creep in particular.
The following conditions of use are considered abnormal :
- temperatures above 70° C,
- prolonged contact with aggressive fluids,
- aggressive environments, such as oil or petrol,
- prolonged contact with acids or alkalis,
- aggressive atmospheres (e.g. ozone, chlorine).

Use in this conditions can accelerated ageing of the bushes, and cause the degradation or even the destruction of the rubber. An abnormally aggressive environment can, in particular, increase the deformation of the bush (by creep).
Flexible bushes can be made with special elastomers which are capable of surviving the abnormal conditions mentioned above and enabling the bushes to perform well.

Our technical services are at your disposal to reply to your questions about the properties of our various elastomers.

V - AN EXAMPLE OF A SELECTION



For the bushes of a vibrating carpet.
Weight : 120 daN. Number of fixing points : 6
Angle of movement : ± 2°. Frequency: 600 cycles/mn = 10 Hz
Radial load per bush : ± 20 daN (evenly loaded).
Amplitude reduction coefficient at 10 Hz : m = 0.18. Torsion angle : $\frac{2°}{0.18} = 11°$

In this case, the axial and conical parameters are not of major importance in the selection of the bushes. Since the fixing diameter of the connecting rods is 10 mm, we would select reference 561 205 from the bush catalogue.

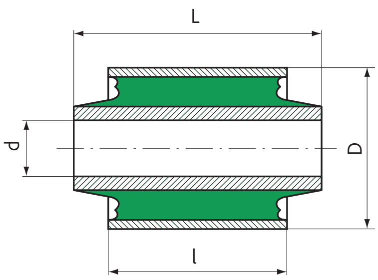
d = 10 mm   D = 22 mm   L = 17 mm   l = 15 mm   Radial load = 40 daN
Maximum torsion angle = 25°

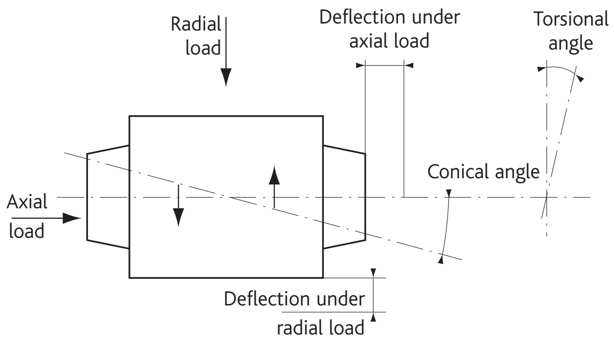
Therefore, for the given application we would use : 12 Flexibloc 561205 bushes.

VI - CATALOGUE OF FLEXIBLE BUSHES

SIMPLE BUSHES

FLEXIBLOC® AND SILENTBLOC®





FLEXIBLOC - Fully Bonded : The elastomer is bonded to the 2 concentric tubes, Parts Number 560..., 561...

SILENTBLOC - Prestressed Elastomer : The ring of “adherite” is inserted by force between the 2 concentric tubes, Parts Number 861..., 862..., 864...

BL : Bushes with a lateral stop.

d (mm)	D (mm)	L (mm)	*l* (mm)	Obs	RADIAL		TORSION	AXIAL		CONICAL	Reference
					Static Load daN	Deflection (mm)	Max angle degrees	Static Load daN	Deflection (mm)	Max angle degrees	
6	16	14	12		10	0,1	25°	10	0,6	5°	561101
	16	14	12		10	0,07	30°	5	0,3	7°	**861601**
	16	24	20		20	0,05	30°	15	0,4	3°	861602
	20	22	16		25	0,4	30°	20	2,2	6°	561239
8	16	17	15		30	0,1	15°	15	1,3	3°	**561102**
	16	24	20		50	0,1	10°	15	1	1°	561104
	16	25	22		55	0,03	20°	35	0,2	1°	861104
	16	28	25		65	0,03	20°	45	0,2	1°	**861103**
	20	17	15		15	0,1	30°	10	0,3	7°	**861603**
	20	19	15		20	0,1	30°	10	0,3	7°	**861783**
	32	23,2	18		30	0,5	35°	20	1,5	6°	**561418**
9	21	21	17	BL	40	0,2	30°	15	0,8	5°	561258
10	22	17	15		40	0,3	25°	15	0,8	6°	**561205**

The references kept in stock are written in bold. **1 kg ≃1 daN**

					RADIAL		TORSION	AXIAL		CONICAL	
d (mm)	D (mm)	L (mm)	*l* (mm)	Obs	Static Load daN	Deflection (mm)	Max angle degrees	Static Load daN	Deflection (mm)	Max angle degrees	Reference
10	22	19	15		40	0,3	25°	15	0,8	6°	561206
	22	23	20		55	0,03	20°	35	0,4	1°	**861112**
	22	24	18		90	0,2	20°	15	0,4	2°	561112
	22	30	25		100	0,2	20°	40	1,5	3°	**561207**
	22	33	30		110	0,03	20°	70	0,6	1°	**861114**
	22	34	30		55	0,1	30°	35	0,3	3°	**861607**
	24	22	18		50	0,4	25°	25	0,2	5°	561209
	24	24	18	BL	70	1,3	30°	25	0,8	3°	561445
	27	22	17		65	0,5	30°	25	1,5	3°	**561613**
	28	26	20	BL	80	0,6	30°	25	1,5	3°	561150
	28	27	20	BL	80	0,5	20°	30	1	5°	**561424**
	28	32	26	BL	110	0,4	30°	40	0,8	2°	561518
11,3	19,85	30,2	25,4		45	0,05	10°	35	0,3	2°	561103
12	25	23	20		55	0,04	20°	25	0,2	3°	**861118**
	25	28	25		100	0,2	20°	40	1	4°	**561212**
	25	34	30		120	0,2	20°	50	0,8	3°	**561213**
	25	38	35	BL	145	0,04	20°	95	0,4	1°	**864105**
	25	44	35		145	0,04	20°	95	0,4	1°	**861197**
	25	54	50		550	0,3	15°	45	0,6	1°	**561250**
	26	24	20		35	0,06	30°	20	0,4	7°	**861611**
	26	34	32		80	0,07	30°	50	0,4	3°	**861613**
	28	28	25		50	0,07	30°	25	0,4	7°	861614
	28	38	32		120	0,25	20°	60	1,5	3°	**561446**
	28	49	45		130	0,2	30°	60	1,6	4°	561224
	30	30	24		110	0,5	35°	40	1,5	6°	**561302**
	30	30	24	BL	110	0,5	25°	40	1,5	3°	**561341**
	30	30	24	BL	70	0,1	5°	25	0,6	4°	864801
	30	42	36	BL	210	0,55	30°	35	1,1	2°	**561395**
	32	40	24		190	0,55	20°	30	1	2°	560034
	53	46,5	34		140	1,5	50°	50	2	6°	**561122**
12,04	41,27	76,03	52		100	1	40°	50	2	4°	561677
14	27	25	17		60	0,2	20°	30	1,1	3°	561120
	27	28	25		120	0,2	20°	50	1,8	4°	**561227**
	27	28	25		90	0,04	20°	45	0,4	3°	**861128**
	27	33	25		150	0,15	20°	40	1	3°	561747
	27	45	40	BL	120	0,2	25°	80	1,5	2°	**561269**
	27	49	45		250	0,04	20°	165	0,7	1°	**861132**
	27	54	50	BL	280	0,04	20°	185	0,5	1°	**864109**
	27	58	50		350	0,1	20°	80	1	1°	561748
	28	44	40		250	0,1	15°	80	0,7	1°	**561458**
	28	54	50	BL	250	0,1	15°	70	0,7	1°	**561617**
	29	44	32		120	0,2	20°	50	2,5	2°	561594
	30	28	25		120	0,7	30°	45	1,1	5°	561303
	30	28	25		50	0,08	30°	25	0,4	7°	**861618**
	30	30	25	BL	80	0,2	25°	50	1,2	5°	561377
	30	30	25		120	0,3	25°	55	1,2	5°	561304
	30	30	25		50	0,08	30°	25	0,4	7°	**861619**
	30	42	38		150	0,2	30°	70	1,9	3°	**561305**
	30	42	38		100	0,08	30°	65	0,4	3°	**861620**
	32	33	30		130	0,4	25°	60	2	4°	**561307**
	32	46	38	BL	170	0,3	25°	80	2	2°	561492
	32	48	40	BL	250	0,1	15°	100	0,5	2°	561340
	32	54	46	BL	190	0,08	25°	125	0,6	2°	**864403**
	32	70	65		300	0,2	30°	200	1,1	1°	**561309**
14,3	30,2	69,8	63,5		370	0,1	20°	190	0,9	1°	861251
16	28,1	34	25		30	0,05	20°	15	0,4	1°	861834
	30	30	25		200	0,2	5°	35	0,5	1°	561348
	32	26	20		70	0,05	20°	35	0,3	2°	**861136**
	32	28	22		120	0,2	20°	50	2	5°	561313
	32	28	25		140	0,2	20°	50	1,6	5°	**561312**

The references kept in stock are written in bold. **1 kg ≃ 1 daN**

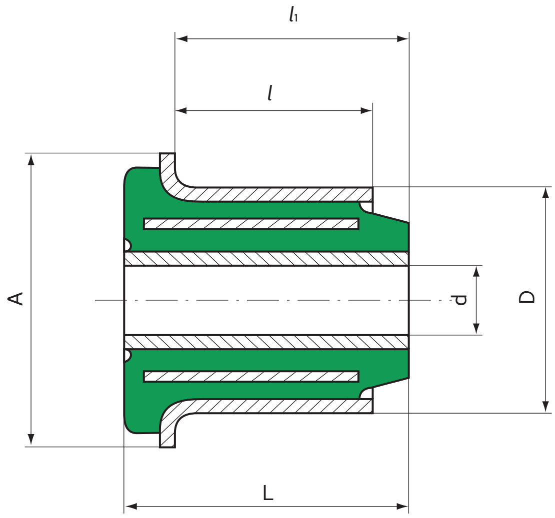
d (mm)	D (mm)	L (mm)	*l* (mm)	Obs	RADIAL Static Load daN	RADIAL Deflection (mm)	TORSION Max angle degrees	AXIAL Static Load daN	AXIAL Deflection (mm)	CONICAL Max angle degrees	Reference
16	32	32	28		130	0,05	20°	65	0,4	3°	**861141**
	32	54	50		330	0,05	20°	220	0,4	1°	**861143**
	32	54	50	BL	330	0,05	20°	220	0,4	1°	**864108**
	32	59	55		400	0,05	20°	260	0,4	1°	**861145**
	32	66	60		450	0,05	20°	300	0,4	1°	**861146**
	32	76	70		500	0,1	20°	180	1,5	1°	561358
	36	38	35		90	0,1	30°	45	0,5	7°	**861624**
	36	43	35		90	0,1	30°	45	0,5	7°	861756
	40	40	32		200	0,8	30°	45	1,5	2°	561401
	40	40	32		95	0,6	5°	-	-	4°	**861810**
	40	50	32		135	0,6	5°	-	-	4°	861931
	40	54	50		250	0,5	35°	120	3	3°	561402
	52	34	30		70	1	40°	30	3,5	7°	561511
	52	48	40		90	1	40°	50	4	7°	**561520**
18	34	33	30		120	0,1	20°	60	1,1	4°	561328
	34	33	30		150	0,05	20°	75	0,4	3°	**861151**
	34	36	32		160	0,05	20°	80	0,4	3°	**861152**
	34	54	50	BL	600	0,3	12°	100	1	1°	561455
	34	66	60		490	0,05	20°	320	1,5	1°	**861153**
	34	71	65		540	0,05	20°	360	1,5	1°	**861154**
	36	46	40		220	0,04	20°	145	0,4	1°	**861156**
	42	38	35		100	0,1	30°	50	0,5	7°	**861627**
	70	58	45	BL	225	2,5	50°	100	4	5°	561543
20	38	42	38		230	0,2	25°	75	1	3°	**561384**
	38	59	55		300	0,15	20°	50	1	2°	**561335**
	38	59	55		410	0,04	20°	270	1,5	1°	**861160**
	38	76	70		400	0,2	15°	200	1	1°	561337
	38	76	70		630	0,04	20°	420	1,5	1°	**861162**
	38	81	75		700	0,04	20°	465	1,5	1°	**861163**
	38	90	84	BL	600	0,1	15°	200	1	1°	561382
	40	45	38		70	0,15	25°	35	0,6	2°	861830
	42	42	38		300	0,3	25°	90	1,5	4°	**561404**
	42	42	38		165	0,08	20°	80	0,5	3°	861165
	44	45	38		210	0,5	25°	90	3	4°	561440
	45,15	42	38		300	0,8	25°	60	1,6	2°	561451
	48	46	33		65	0,2	5°	-	-	4°	861934
	50	50	40		155	0,5	5°	25	0,7	4°	**861817**
	52	66	60		300	1	25°	150	3	5°	561521
22	40	45	40		250	0,05	20°	130	0,4	3°	**861166**
	40	86	80		850	0,06	20°	560	1,5	1°	**861167**
24	42	50	45		340	0,06	20°	170	0,4	3°	**861169**
	42	55	50		400	0,05	20°	200	0,4	3°	**861170**
	42	96	90		1100	0,02	20°	730	1	1°	**861171**
	44	58	48		125	0,08	20°	60	0,8	3°	861831
	48	44	40		160	0,3	20°	110	1,5	2°	**561411**
	48	58	50		350	0,3	20°	120	2	2°	**561400**
	48	93	85		560	0,15	30°	370	0,7	3°	861634
	58	58	48		215	1	5°	-	-	4°	**861818**
26	44	66	60	BL	500	0,2	15°	160	1	1°	561454
28	48	36	34		315	0,05	20°	160	0,5	3°	**861173**
	48	55	50		420	0,05	20°	210	0,5	3°	861174
	48	66	60		400	0,15	20°	190	1,1	2°	**561409**
	48	66	60		540	0,06	20°	270	0,5	3°	**861175**
	48	118	110		1500	0,07	20°	900	2	1°	861177
	52	108	100		800	0,1	30°	500	0,7	3°	**861637**
	66	66	56		500	1,5	40°	140	3,5	7°	**561601**
	66	66	56		350	1	5°	100	3	4°	**861819**
	66	76	70		850	1	30°	320	3	6°	561660
30	50	128	120		1900	0,07	20°	1000	2,5	1°	**861178**
32	52	66	60		600	0,15	10°	260	2,2	1°	**561503**
	52	66	60		600	0,06	20°	300	0,3	3°	**861180**

The references kept in stock are written in bold. **1 kg ≃ 1 daN**

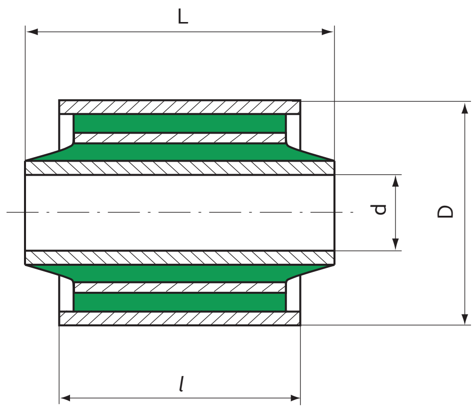
					RADIAL		TORSION	AXIAL		CONICAL	
d (mm)	D (mm)	L (mm)	*l* (mm)	Obs	Static Load daN	Deflection (mm)	Max angle degrees	Static Load daN	Deflection (mm)	Max angle degrees	Reference
32	56	55	50		310	0,08	30°	150	0,7	7°	**861638**
	56	116	108		1000	0,1	30°	650	0,7	3°	**861639**
	70	76	70		1100	1,1	25°	190	2,3	2°	561703
34	50	45	39,5	SP	200	0,2	6°	100	2,5	1°	561141
36	58	130	120		1900	0,08	20°	1000	1	1°	**861182**
	60	60	55		400	0,15	30°	200	0,7	7°	861640
38	64	76	70		900	0,07	20°	450	0,5	3°	**861183**
	64	135	125		2400	0,1	20°	1300	1,5	1°	**861184**
	66	60	55		450	0,1	30°	220	0,7	7°	**861642**
42	78	66	60		680	0,07	30°	340	1	7°	**862601**
	78	86	80		1000	0,5	10°	200	1,6	1°	**561701**
	78	86	80		1270	0,08	20°	630	0,8	3°	**862101**
	78	140	130		2000	0,6	20°	400	2	1°	**561702**
	78	140	130		2800	0,1	20°	1500	2	1°	862102
	80	85	79		1400	0,1	15°	-	-	3°	862111
44,45	76,2	63	60		700	0,1	30°	100	0,2	3°	862140
46	80	86	80		1500	0,1	15°	-	-	3°	862137
	86	110	100		1400	0,15	20°	700	1,5	1°	862422
50	80	83	79		1500	0,2	15°	150	0,7	1°	862614
56	93	250	170		2600	0,6	15°	1400	2	0,3°	561901
58	93	132	117		2000	0,2	15°	200	1,2	2°	862444
	95	90	83		1600	0,3	15°	-	-	3°	862646
60	105	87	90		2000	0,2	15°	200	1,2	2°	862435
	110	182	170		4000	0,2	15°	400	0,8	1°	862510
	140	182	170		5400	0,3	15°	360	2	1°	862512
62	105	120	110		2500	0,2	15°	250	0,8	1°	862421
68	105	120	110		2500	0,2	15°	250	0,8	1°	561657
70	120	120	115		3000	0,3	15°	300	0,9	1°	862434
	120	182	170		4500	0,2	15°	450	0,8	1°	862480
80	120	120	110		3000	0,2	15°	300	0,8	1°	561658
	140	98	98		3000	0,6	10°	1800	2	2°	561009
	140	98	98		3000	0,3	8°	-	-	2°	561043
	140	98	98		2300	0,2	10°	-	-	1°	862481
	140	182	170		5400	0,1	15°	540	0,8	1°	862414
90	145	170	145		5500	0,25	15°	550	0,8	1°	862627
	170	105	105		1500	2,3	10°	-	-	5°	561956
110	175	205	190		7500	0,15	12°	750	0,9	1°	862513
	160	190	170		6000	0,1	12°	600	0,7	1°	561928
120	160	190	170		4000	0,1	12°	400	0,6	1°	561938
125	160	185	184		4300	0,1	12°	430	0,4	1°	561913
138	192	130	124		5500	1	10°	-	-	3°	862810
150	185	210	209		5500	0,1	10°	550	0,4	1°	561916
	185	240	239		6500	0,1	10°	650	0,5	1°	561925
170	210	270	269		8000	0,1	10°	800	0,4	1°	561184
190	230	270	258		8500	0,1	10°	850	0,4	1°	561003
210	260	300	290		10500	0,1	10°	1000	0,4	1°	561989

The references kept in stock are written in bold. **1 kg ≃ 1 daN**

LAMINATED BUSHES



Shape 1



Shape 2

DIMENSIONS

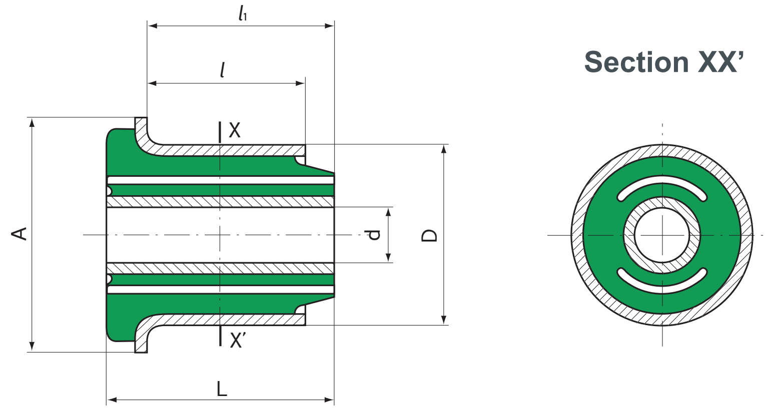
d (mm)	D (mm)	A (mm)	L (mm)	l (mm)	l1 (mm)	fig.	Reference
12	34	-	48	30	-	2	560033
14	35	-	58,3	43	-	2	561040
14	40	55	27,4	16,3	17	1	531427
16	40	-	46	32	-	2	560062
20	38	-	60	59	-	2	579071

OPERATING CHARACTERISTICS

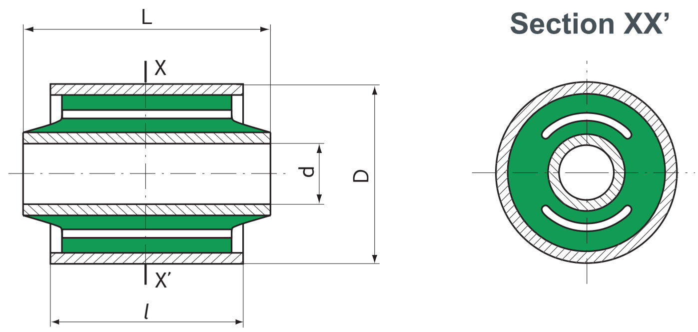
Reference	Maximum Radial Load		Axial Static Load daN	Torsion	
	Statique daN	Dynamique daN		Max Angle	Approx torque N.m.
531427*	400	-	130	20°	80
560062	900	-	40	15°	20
560033	750	-	40	20°	10
561040	850	-	50	20°	50
579071	10500	15000	-	6°	54

*** The axial load is measured on the side of the lateral stop.** **1 kg ≃ 1 daN**

VOID BUSHES



Shape 1

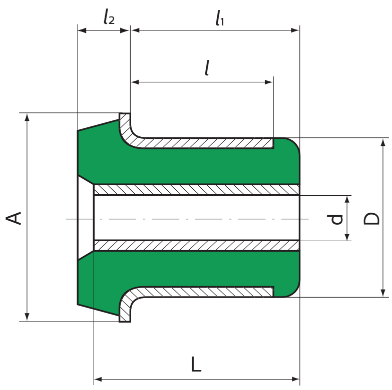


Shape 2

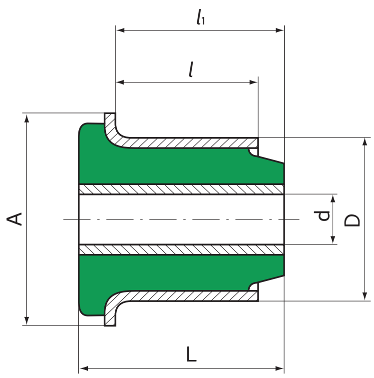
DIMENSIONS

d (mm)	D (mm)	A (mm)	L (mm)	l (mm)	l_1 (mm)	fig.	Reference
10,2	37	-	44,8	36	-	2	560218
10,2	37	-	54,3	36	-	2	560217
12	40	-	60	40	-	2	560065
12	43	60	41	26,5	32,5	1	531413
12,25	30	41	34,1	25,2	26,6	1	531363
12,25	30	41	34,1	25,2	26,6	1	531431

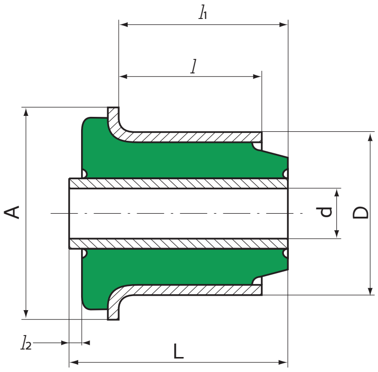
FLANGED BUSHES



Shape 1



Shape 2



Shape 3

FLANBLOC®

d (mm)	D (mm)	A (mm)	L (mm)	l (mm)	l_1 (mm)	l_2 (mm)	Maximum Radial Load		Dynamic axial load	Torsion		fig.	Ref.
							Static daN	Dynamic daN		Max angle	Approx torque N.m.		
16	32	47	62	48	56,5	-	250	Overload coefficient : 3	430	30°	45	2	866016
-	32	47	89	48	83,5	-	250		430	30°	45	2	866012
-	36	46	41	28,8	34,7	9,5	60		56	30°	90	1	867001

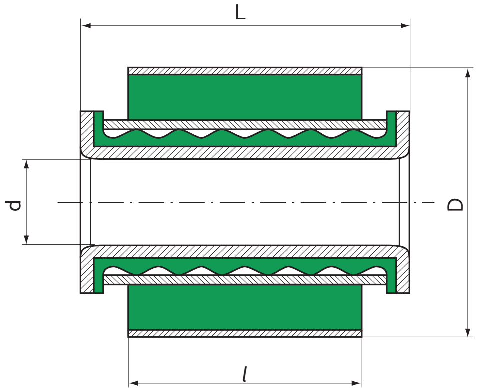
1 kg ≃ 1 daN

SPECIAL S.C.

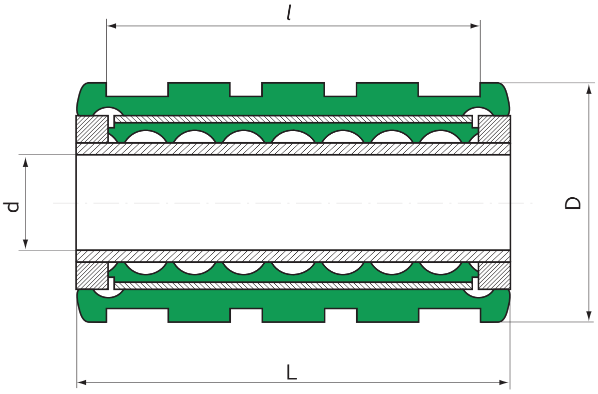
d (mm)	D (mm)	A (mm)	L (mm)	l (mm)	l_1 (mm)	l_2 (mm)	Maximum Radial Load		Dynamic axial load	Torsion		fig.	Ref.
							Static daN	Dynamic daN		Max angle	Approx torque N.m.		
12	32	43	50	34	40	3	50	Coefficient de surcharge : 3	160	35°	16	3	531300
16	40	50	50	32	40	-	150		120	20°	-	2	531411
-	40	51	83	52	76	1	200		-	20°	-	3	531417

1 kg ≃ 1 daN

PIVOT BUSHES



Shape 1



Shape 2

FLUIDBLOC® AND TOURIFLEX®

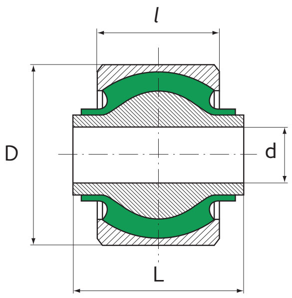
These are high precision bushes; they are made of injected polyurethane and can resist oil, water, ozone, etc.
These "PIVOTING" bushes are characterised by their very low torsional resistance (0.1 to 0.2 N.m).
They can ensure a complete rotation (360°), and have no requirements for maintenance because they have a permanent lubricant.
They don't need a high precision housing, and the load to remove the bushes is between 1500 and 1800 daN.
There are many applications, such as :
Leaf spring bushes for vehicles not exceeding 5 tons.

d (mm)	D (mm)	*l* (mm)	L (mm)	Maximum radial load static daN	fig.	Reference
16	36	60	70	900	2	566050
16	45	60	70	1100	2	566051
SQUARE AXIS	140	214	304	7000	-	568256
27	70	60	76	1000	1	568247
36	88	70	86	1000	1	568248

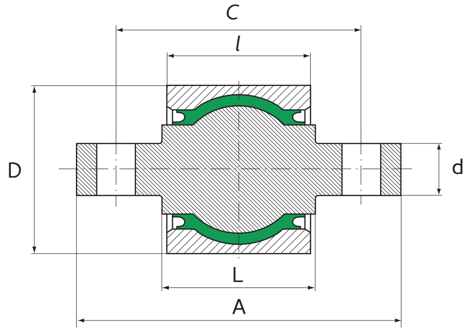
1 kg ≃ 1 daN

SPHERICAL BUSHES

SPHERIFLEX®



Shape 1

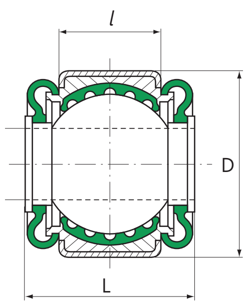


Shape 2

d (mm)	D (mm)	A (mm)	L (mm)	l (mm)	C (mm)	Radial Load Max daN	Radial Load Stiffness daN/mm	Torsion Max degrees	Torsion Stiffness daN/mm	Conical Max degrees	Conical Stiffness daN/mm	Ref.
35	62	36	-	36	-	1000	16000	12	1000	8	680	563075
24	64	58	-	30	-	800	22000	12	220	10	220	563489
35	67	35(b)	-	36	-	1000	16000	12	1000	8	680	563559
26	80	72(b)	-	56	-	3800	55000	10	2200	8	1900	563353
26	80	78(b)	-	56	-	3800	55000	10	2200	8	1900	563343
40(a)	80	49(b)	-	56	-	3800	55000	10	2200	8	1900	563354
36	85	80	-	66,5	-	3800	30000	12	2150	6	1650	563317
Axe	85	100	180	71	140	3800	30000	12	2150	6	1650	563425
Axe	88	75	144	66	-	3800	30000	12	2150	6	1650	563253
36,5	90	80	-	68	-	4400	53800	12	2300	8	3050	563316/13
Axe	90	90	170	68	130	4000	50000	12	2150	10	2800	563345
Axe	90	80	172	77	130	4400	53800	12	2300	8	3050	563300
Axe	90	90	170	77	130	4400	53800	12	2300	8	3050	563555
Axe	90	100	180	77	140	4400	53800	12	2300	8	3050	563426
44	100	114	-	87,5	-	7000	60000	12	1500	8	2000	563571
44	100,2	116	-	72,5	-	7000	60000	12	1500	8	2000	563605

(a) The internal diameter is shouldered (b) Length L not centered **1 kg ≃ 1 daN**

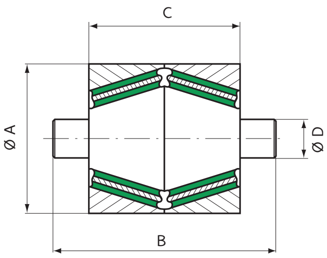
FLUIDBLOC®



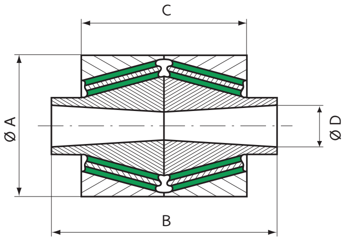
d (mm)	D (mm)	L (mm)	l (mm)	Radial static load daN	Axial static load daN	Sliding torque N.m.	Reference
24	64	58	36	850	100	10	568184

1 kg ≃ 1 daN

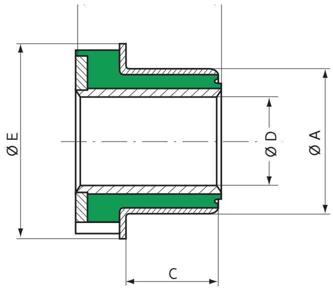
SPECIAL BUSHES



Shape 1



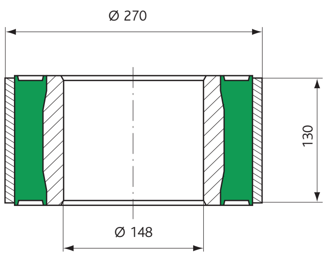
Shape 2



Shape 3

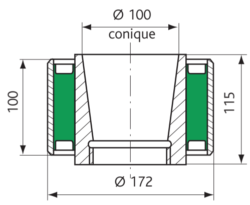
Reference	Fig.	ø A (mm)	B (mm)	C (mm)	ø D (mm)	ø E (mm)	Radial Stiffness KN/mm	Axial Stiffness KN/mm
563468	2	180	200	140	Ø 68 cône	-	85	10
562908	1	140	254	160	50 x 56	-	85	17
562912	1	140	273	145	Ø 63	-	20	5
563533	2	185	190	150	Ø 70 cône	-	57,5	16,75
563550	2	185	190	150	Ø 68	-	57,5	16,75
563443	2	132	154	136	Ø 70	-	140	5
531293	3	110	55	42	Ø 50	86	17	8
531367	3	110	95	33	Ø 52	150	10	50
531330	3	122	72	54	Ø 70	162	40	30
563352	1	122	254	120	Ø 50	-	4	5

563264

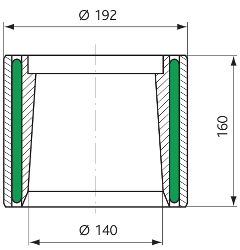


Charge radiale maxi : 100 kN

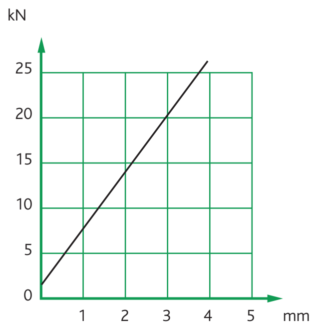
561958



862624



Charge radiale maxi : 70 kN



Charge radiale/Déplacement