

Catalogue

**ELASTOMERIC
BEARINGS**



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BEARINGS**

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ABOUT US

OZDEKAN RUBBER is one of the leading manufactures in the rubber industries since 1982. Established in Ostim Organized Industrial Zone, Ankara, and continuing engineering and manufacturing activities within the years, it has become a well-known trade mark in the Turkey and worldwide. Our company manufactures more than 2000 tons of rubber products per year and our engineers and design teams support our customers in selection of bridge bearing, providing a service beyond that of manufacturing of elastomeric bearings. Our company is capable of manufacturing different sizes of elastomeric bearings varying from 150 mm to 1500 mm in diameter with different geometrical properties. Ozdekan applies quality control tests at all phases of production process and performs required tests in conjunction with university laboratory according to different international standards. Ozdekan holds ISO 9001, ISO 14001, ISO 18001, BS OHSAS 18001 and manufacturing capacity certificate from Turkish government and trade mark. On the following pages, we provide information about elastomeric bearings. Please contact us for further information, as we are always pleased to assist our customers and consulting engineers.

Ozdekan Rubber Co.

- Elastomeric Plain Pads
- Elastomeric Bridge Bearings
- Multiflex Expansion Joint
- Lead Rubber Bearing (LRB)
- Ball Rubber Bearings (BRB)
- High Damping Rubber Bearing (HDRB)
- Vibration Lastics
- Neoprene Bands
- Earth Moving Machine Rubber Parts

Ozdekan's products are designed and tested according to the following standards;

- BS 5400
- TS-ISO-6446
- AASHTO-M251-74
- AS 5100-4
- EN 1337-3
- EN 1337-5
- DIN 4141
- EN 15129





PLAIN PAD BEARINGS

Elastomeric bearings consisting of a solid block of vulcanised elastomer without internal cavities are called plain pads. Plain pads are economical efficient support for precast and pre-stressed concrete or steel beams in bridges and buildings. These pads are designed according to EN 1337-3 and shear modulus of the manufactured elastomer may vary between 0.6-1.35 MPa to meet the customers need.



LAMINATED ELASTOMERIC BEARINGS

Elastomeric bearings reinforced internally with one or more steel plates, chemically bonded during vulcanisation are called laminated elastomeric bearings.

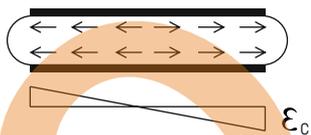
Elastomeric bearings permit a smooth and uniform transfer of loads from beams to substructure and also allow beam rotations at the point of support due to deflection of beam under loading.

They further allow lateral and longitudinal movement of beams caused by thermal forces. Elastomeric bearings have no moving parts and thermal expansion and contractions are supported by shear capacity of elastomers. There is no sliding motion between bearing and beam or between bearing and abutment.

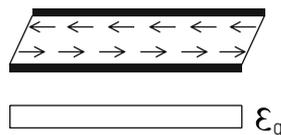


BEHAVIOR

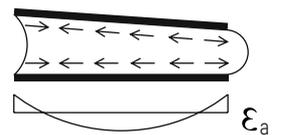
Each elemental layer, subject to stresses and movements, deflects as shown in the three diagrams below;



Elastomer in compression



Elastomer in horizontal deformation



Elastomer in rotation



The material specification for the elastomeric bearing shall meet the requirements of the current AASHTO M251 as listed under subsections named "Material" and "Test" in corresponding code. Furthermore, the physical and mechanical properties of manufactured elastomer comply with the requirements given in Table 1 of EN 1337-3. Mechanical and physical properties of elastomer are presented below.

TABLE - 1 Mechanical and Physical Properties of Elastomer

Physical Properties	BS 5400			DIN 4141		EN 1337-3					
	CR			CR on Plate	CR on Product	NR			CR		
Hardness	50 ± 51 RHD	60 ± 51 RHD	70 ± 51 RHD	60 ± 5 ShrA	60 ± 5 ShrA	50 ± 51 RHD	60 ± 51 RHD	70 ± 51 RHD	50 ± 5 ShrA	60 ± 5 ShrA	70 ± 5 ShrA
Tensile Strenght	≥ 15.5 N/mm ²	≥ 15.5 N/mm ²	≥ 15.5 N/mm ²	≥ 19 N/mm ²	≥ 13 N/mm ²	≥ 16 MPa	≥ 16 MPa	≥ 16 MPa	≥ 16 MPa	≥ 15 MPa	≥ 15.5 MPa
Elongation at Break	≥ 400%	≥ 350%	≥ 300%	≥ 450%	≥ 400%	≥ 450%v	≥ 425%v	≥ 450%v	≥ 450%	≥ 350%	≥ 300%
Rubber-Metal Bond Strength	≥ 7 N/mm	≥ 7 N/mm	≥ 7 N/mm	-	-	-	-	-	-	-	-
Tear Strenght	-	-	-	≥ 10 N/mm	≥ 10 N/mm	≥ 5 kN/mm	≥ 8 kN/mm	≥ 5 kN/mm	≥ 7 kN/mm	≥ 10 kN/mm	≥ 12 kN/mm
Compression Set	100°C 22h			70°C 24h		70°C 24h			70°C 24h		
	≤ 35%	≤ 35%	≤ 35%	≤ 15%	≤ 20%	≤ 23%	≤ 30%	≤ 23%	≤ 15%	≤ 15%	≤ 15%
Ageing	100°C 3 days			70°C 7 days		70°C 7 days			100°C 3 days		
Increase in Hardness	+ 15	+ 15	+ 15	+ 5	+ 5	-5 +10	-5 +10	-5 +10	±5	±5	±5
Change in Tensile Strength	≤ 15%	≤ 15%	≤ 15%	≤ 15%	≤ 15%	± 15	± 15	± 15	± 15	± 15	± 15
Change in Elongation	≤ 40%	≤ 40%	≤ 40%	≤ 25%	≤ 25%	± 25	± 25	± 25	± 25	± 25	± 25
Ozone Resistance	30°C %20 elongation, 25 pphm. 96 h			40°C %20 elongation, 200 pphm. 96 h		40°C %30 elongation, 25 pphm. 96 h			40°C %30 elongation, 100 pphm. 96 h		
	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack	No Crack

FABRICATION AND TESTS

Reinforced elastomeric bearings are made up of multiple laminates of elastomeric material and are equipped with steel reinforcing plates during the vulcanisation process. The steel sheets provide the necessary stiffness in vertical direction. There are different types of reinforced elastomeric bearings and these types are classified as Type A, B, C, D, E and F in the EN 1337-3 and all types are manufactured in our factory. Table 2 and 3 present the standart sizes for bearings type B according to EN 13337-3. Vertical loading capacity, rotational capacity and horizontal displacement capacity of the bearing are calculated according to EN 1337-3. However it should be mentioned taht for a specific project, different size and shapes of elastomeric bearings can be designed and manufactured in our factory. Different tests on elastomeric bearings can be conducted such as;

- Shear modulus test (at nominal, low and very low temperature)
- Shear modulus after aging
- Shear bond strength test (at ambient and after aging condition)
- Compression test
- Resistance to ozone test



Legend

$G = 1.1 \text{ N/mm}^2$

Technical Data

N_d : Vertical design force

V_{xy} : Maximum resultant horizontal relative displacement

Geometrical Data

a: Overall width of bearing

b: Overall length of bearing

H: Overall thickness of bearing

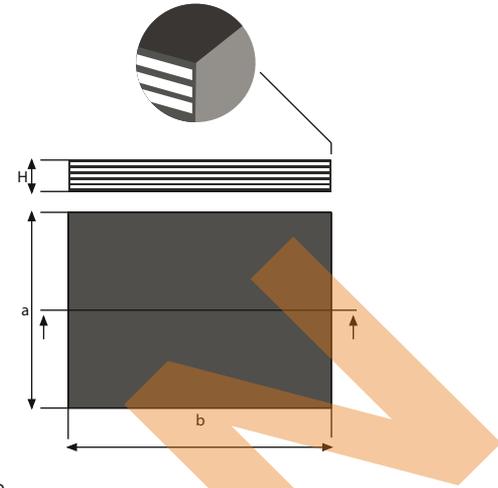


TABLE - 2 Standard Sizes for Rectangular Bearings Type B

Dimensions (mm)			N_d kN	V_{xy} mm
a	b	H		
100	150	30	92	16
100	150	41	59	24
100	200	30	139	16
100	200	41	89	24
150	200	30	426	16
150	200	41	325	24
150	200	52	236	32
150	250	30	589	16
150	250	41	449	24
150	250	52	327	32
100	300	30	759	16
100	300	41	578	24
100	300	52	421	32
200	250	41	950	24
200	250	52	781	32
200	250	63	609	40
200	250	74	489	48
200	300	41	1240	24
200	300	52	1080	32
200	300	63	795	40
200	300	74	638	48
200	350	41	1542	24
200	350	52	1268	32
200	350	63	989	40
200	350	74	794	48
200	400	41	1852	24
200	400	52	1523	32
200	400	63	1188	40
200	400	74	953	48
250	300	41	1851	24
250	300	52	1782	32
250	300	63	1535	40
250	300	74	1250	48
250	300	85	1040	56
250	400	41	2810	24
250	400	52	2705	32
250	400	63	2330	40
250	400	74	1898	48
250	400	85	1579	56

Dimensions (mm)			N_d kN	V_{xy} mm
a	b	H		
300	400	57	2469	36
300	400	73	2159	48
300	400	89	1672	60
300	400	105	1337	72
300	500	57	3394	36
300	500	73	2967	48
300	500	89	2298	60
300	500	105	1837	72
300	600	57	4358	36
300	600	73	3810	48
300	600	89	2951	60
300	600	105	2359	72
350	450	57	3847	36
350	450	73	3694	48
350	450	89	3105	60
350	450	105	2507	72
350	450	121	2071	84
400	500	73	5025	48
400	500	89	4847	60
400	500	105	4303	72
400	500	121	3581	84
400	500	137	3030	96
400	600	73	6046	48
400	600	89	5832	60
400	600	105	5597	72
400	600	121	4658	84
400	600	137	3942	96
450	600	73	6938	48
450	600	89	6724	60
450	600	105	6510	72
450	600	121	6296	84
450	600	137	5589	96
450	600	153	4819	108
500	600	73	7829	48
500	600	89	7615	60
500	600	105	7401	72
500	600	121	7178	84
500	600	137	6973	96
500	600	153	6562	108
500	600	169	5744	120

Dimensions (mm)			N_d kN	V_{xy} mm
a	b	H		
600	600	94	8745	64
600	600	115	8477	80
600	600	136	8210	96
600	600	157	7896	112
600	600	178	6712	128
600	600	199	5783	144
600	700	94	10222	64
600	700	115	9909	80
600	700	136	9596	96
600	700	157	9284	112
600	700	178	8457	128
600	700	199	7276	144
700	700	94	12176	64
700	700	115	11864	80
700	700	136	11551	96
700	700	157	11238	112
700	700	178	10926	128
700	700	199	10613	144
700	700	220	9922	160
700	800	94	13936	64
700	800	115	13578	80
700	800	136	13220	96
700	800	157	12862	112
700	800	178	12504	128
700	800	199	12147	144
700	800	220	11789	160
800	800	110	12652	80
800	800	135	12294	100
800	800	160	11936	120
800	800	185	11578	140
800	800	210	11220	160
800	800	235	10862	180
800	800	260	10505	200
900	900	110	16256	80
900	900	135	15862	100
900	900	160	15459	120
900	900	185	15056	140
900	900	210	14653	160
900	900	235	14250	180
900	900	260	13847	200
900	900	285	13443	220

Legend

$G = 1.1 \text{ N/mm}^2$

Technical Data

N_d : Vertical design force

V_{xy} : Maximum resultant horizontal relative displacement

Geometrical Data

a: Overall width of bearing

H: Overall thickness of bearing

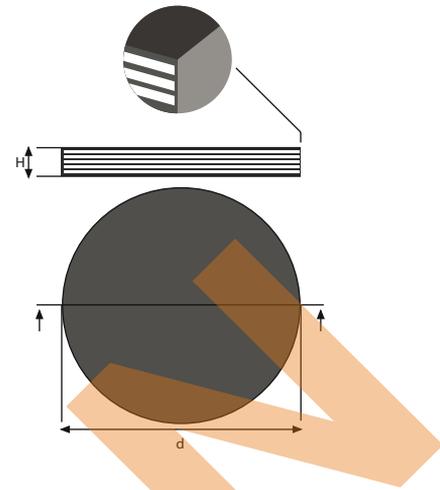


TABLE - 2 Standard Sizes for Circular Bearings Type B

Dimensions		N_d	V_{xy}
d	H		
200	30	556	16
200	41	530	24
200	52	436	32
250	30	1143	16
250	41	1102	24
250	52	1060	32
300	41	1981	24
300	52	1921	32
300	63	1860	40
300	74	1653	48
350	41	2849	24
350	52	2776	32
350	63	2703	40
350	74	2631	48
350	85	2558	56

Dimensions		N_d	V_{xy}
d	H		
400	57	3177	36
400	73	3068	48
400	89	2959	60
400	105	2419	72
450	57	4149	36
450	73	4068	48
450	89	3942	60
450	105	3817	72
500	57	5250	36
500	73	5110	48
500	89	4194	60
500	105	4194	72
500	121	4194	84
550	73	6271	48
550	89	6117	60
550	105	5963	72
550	121	5809	84
550	137	5655	96
600	73	7550	48
600	89	7383	60
600	105	7214	72
600	121	7046	84
600	137	6878	96
600	153	6709	108
650	73	8947	48
650	89	8765	60
650	105	8583	72
650	121	8400	84
650	137	8218	96
650	153	8036	108
650	169	7853	120

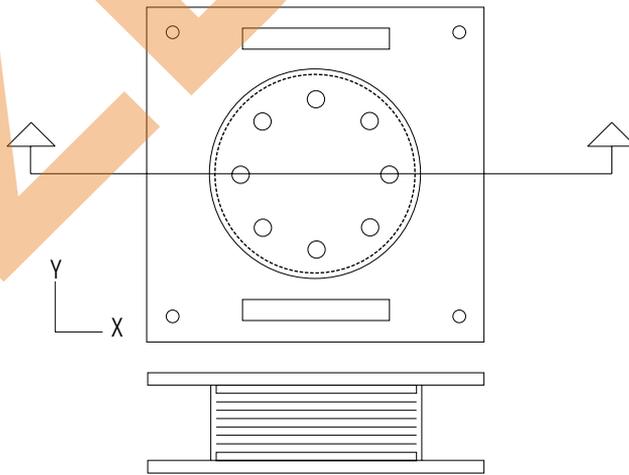
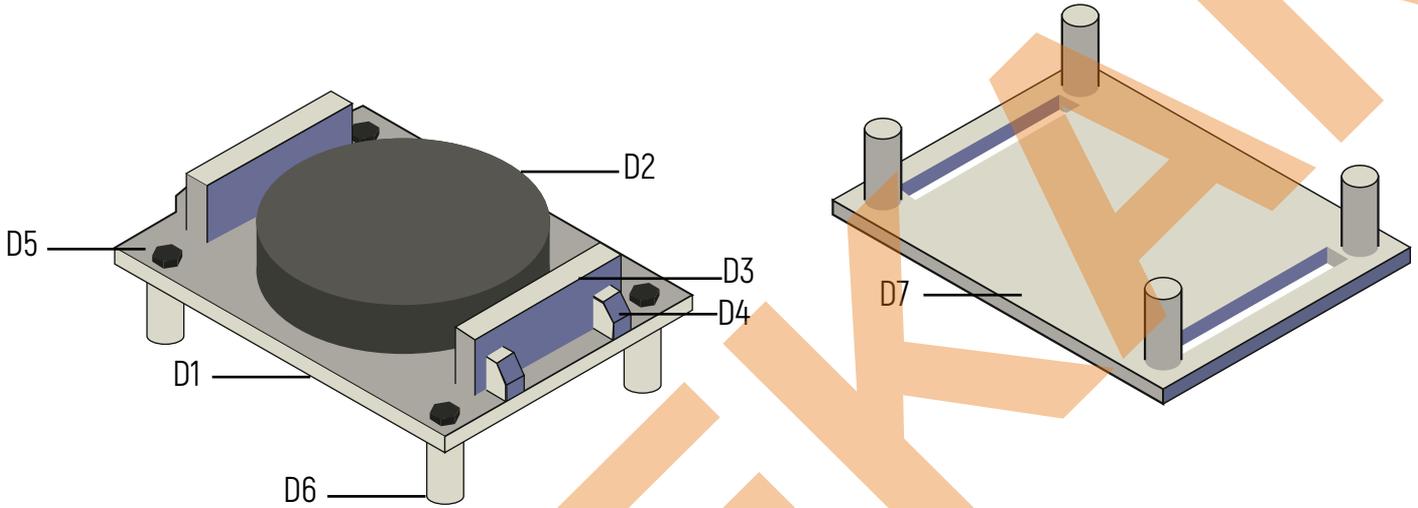
Dimensions		N_d	V_{xy}
d	H		
600	94	9563	64
600	115	9318	80
600	136	9072	96
600	157	8826	112
600	178	8581	128
600	199	8335	144
600	94	11077	64
600	115	10814	80
600	136	10551	96
600	157	10287	112
600	178	10024	128
600	199	9760	144
600	94	12702	64
600	115	12421	80
600	136	12140	96
600	157	11859	112
600	178	11578	128
600	199	11297	144
600	220	11016	160
600	94	14438	64
600	115	14139	80
600	136	13840	96
600	157	13542	112
600	178	13243	128
600	199	12944	144
600	220	12645	160
600	110	12775	80
600	135	12458	100
600	160	12141	120
600	185	11825	140
600	210	11508	160
600	235	11192	180
600	260	10875	200





GUIDED ELASTOMERIC BEARINGS

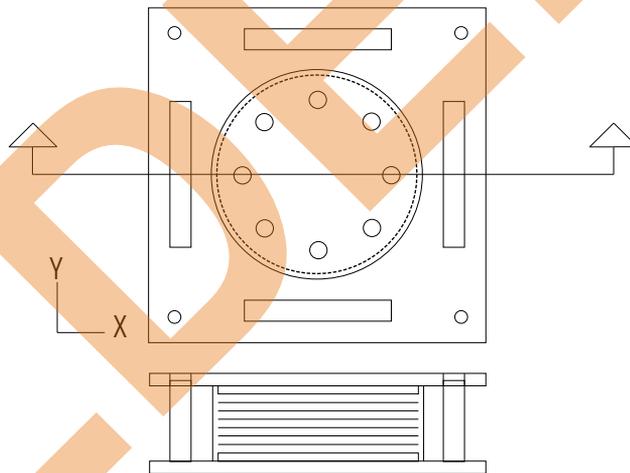
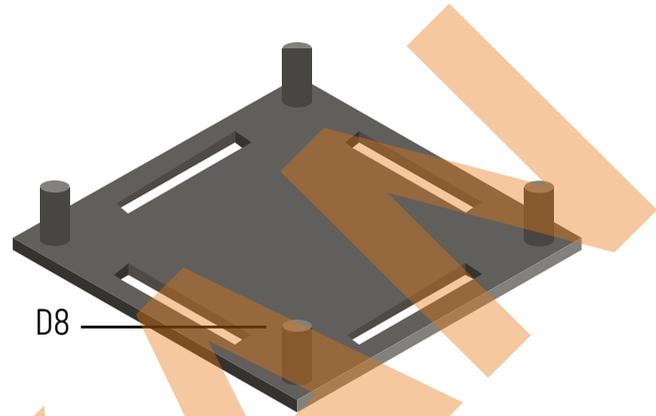
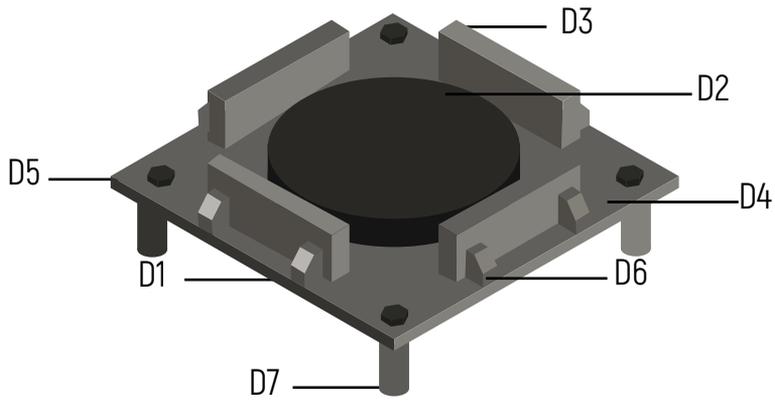
The bearings we have defined so far are the basic types, which constant feature is the fact that they allow all-ways movements and rotation. However, movements can be limited in one or all ways, thus obtaining guided or fixed bearings, respectively. In the first case -guided bearings- the restriction is obtained by means of guides parallel to the supporting axe that allows movement. To make friction as low as possible, DU and stainless steel sheets are welded to the guides.

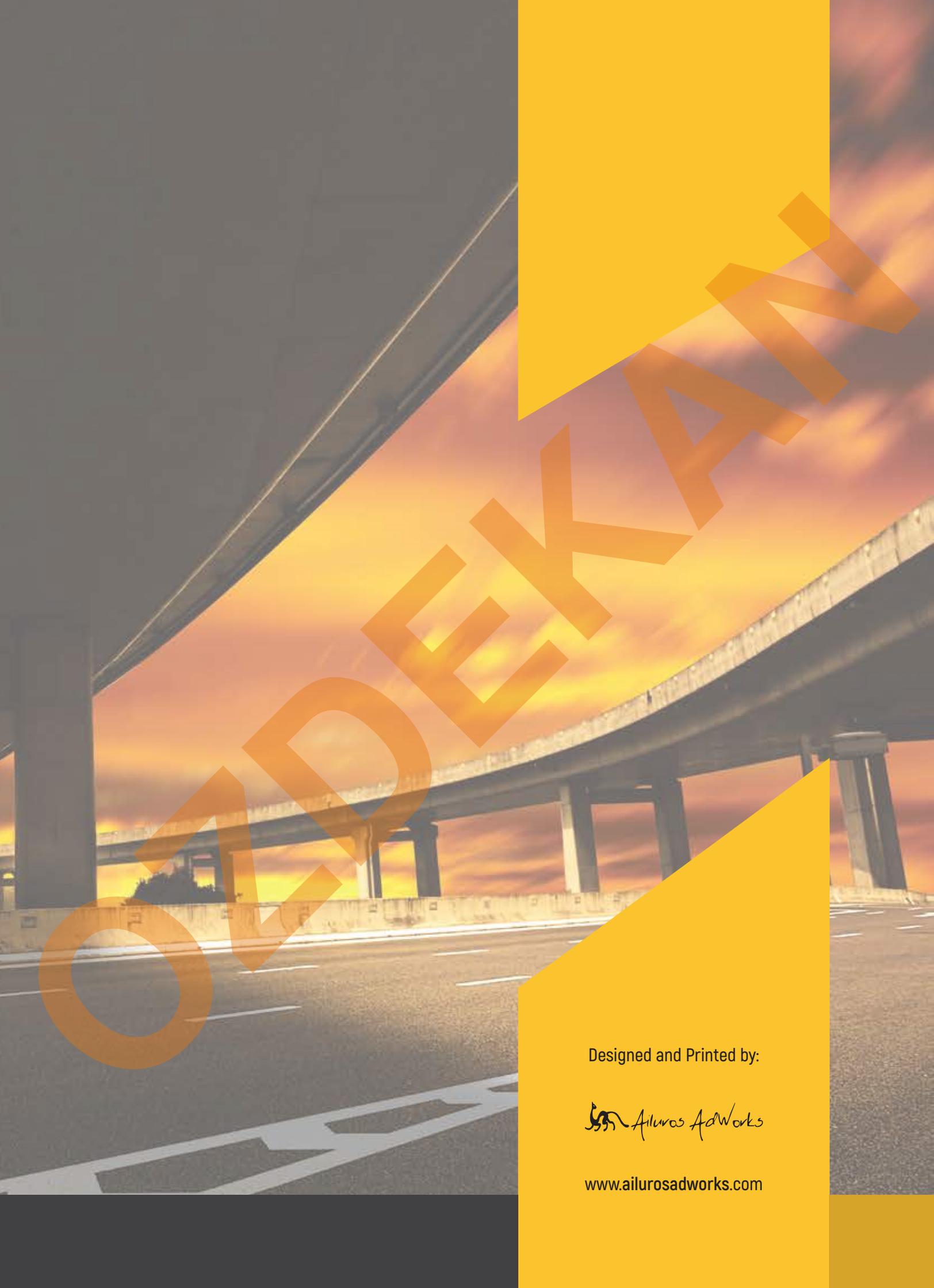




FIXED ELASTOMERIC BEARINGS

If, on the contrary, a fixed bearing is desired, guides are added parallel to both axes, so that movement is completely blocked.





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