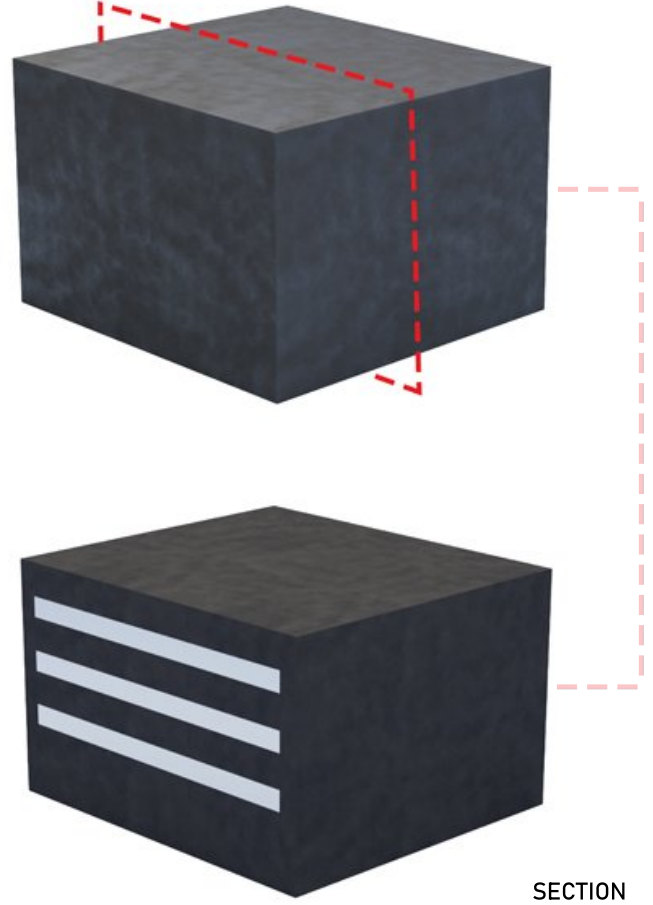




INTRODUCTION

An elastomeric bridge bearing, also known as a pot bearing or elastomeric bearing, is a commonly used modern bridge bearing. The term encompasses several different types of bearings including bearing pads, bridge bearings, laminated elastomeric bearings, and seismic isolators ... which are all generally referred to as "bridge bearing pads" in the construction industry. The purpose of the elastomeric bearings is to support a bridge or other heavy structure in a way that permits the load to shift slightly, in a horizontal direction, relative to the ground or foundation. Without such bearings, the bridge support might crack or fracture when it moves due to ground movements or thermal expansion and contraction. Elastomeric bearing pads compress on vertical load and accommodate both horizontal rotation and horizontal shear movement.

The internal structure of an elastomeric bearing consists of a three layers: a lower "pot" made of steel, which rests on the foundation or footing; a relatively thin elastomeric pad (a rectangle or disk shape) resting on the lower pot; and a steel plate loosely set on top of the elastomeric disk, on top of which the weight of the bridge rests. The bearings are often produced as a unit, ready to be installed. The elastomeric pad may be made from any of several materials, including natural rubber, elastomers, teflon, or synthetic rubber (such as neoprene).



Elastomeric bearing pads are the most economical solution used in construction of large span bridges and buildings.[1][2] Elastomeric bearings are often used in applications other than bridges, for example, supporting buildings that are built on soil that may shift slightly and cause a concrete load to crack in the absence of a elastomeric bearing. Elastomeric bearings are designed and manufactured based on standards and specifications of such organizations as British Standard, AASHTO, and European Norms En 1337.[3]

Bridge decks supported by piers are susceptible to damage due to vehicle movement and heat expansion. The primary function of Elastomeric Bearing Pads is to provide a connection to control the interactions of loading and movements between parts of a structure, usually between superstructure and substructure. Bearing pads provide a uniform transfer of load from beam to sub-structure. Bearing pads are used extensively in bridge structure - Pre-stressed and Pre-cast concrete buildings. ORF Bearings are manufactured from premium quality neoprene/natural rubber. All the bearing pads are manufactured in compliance to standards like AASHTO, BS 5400, EN-1337, DIN 4141 etc, hardness ranging from 50 Shore 'A' to 70 Shore 'A'. Upon, request, specially designed bearing pads for non-standard application can also be provided, including testing and certification.



BEARING FUNCTION

- Permit lateral movements due to temperature change, traffic movements, wind, shrinkage and creep, foundation movement, seismic
- Actions, dynamic forces and resulting vibrations
- Transmitting load to substructure foundations
- Accommodate girder rotation
- Support vertical loads

STANDARDS AND SPECIFICATION

We follow AASHTO LRFD and AASHTO M251 standards for material specification bearing pad designs. But at the same time, we are not restricted to any standard and based on the enquiry specification, we follow all other standards like BS 5400, EN 1337 etc.

INNER REINFORCING PLATES

The inner reinforcing steel plates are steel grade ASTM A36 or steel of minimum equivalent elongation at break. The minimum thickness of the plates used is 2mm

MATERIAL

The materials used for the ORF Bridge Expansion Joints are completely in compliance with the relevant bridge standards like AASHTO/BS/DIN/EN. ORF bridge expansion joints are manufactured from a virgin polychloroprene-based elastomer. The specially formulated rubber compound helps to meet stringent requirements, such as abrasion resistance, extreme weather conditions, and longer service life.

MATERIAL PROPERTY

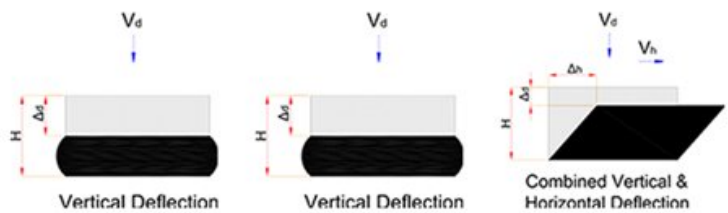
MATERIAL PROPERTY	TEST REQUIREMENTS	STANDART	UNIT	SPECIFICATION
Physical Property	Hardness	ASTM D 2240/ BS903 Part A26/ DIN 5350	Shore A	55±5
	Min Tensile Strength	ASTM D 2240/ BS903 Part A26/ DIN 5350	Mpa	16,0
	Min Ultimate Elongation		%	350
	Shear Modulus 'G' value		Mpa	0,90
Heat Resistance (7 Hours @ 100° C)	Max Change in Hardness	ASTM D 2240/ BS903 Part A19/ DIN 53508	Shore A	+5
	Max Change in Tensile Strength		%	-15
	Elongation		%	-25
Compression Set (22 hrs @ 100° C)	Max Permissible Change	ASTM D 2240/ BS903 Part A19/ DIN 53508	%	35
Resistance to Ozone (25 pphm 48hrs, 40°C, 9% Strain)	Crack Formation	ASTM D 1149/ Method B / BS 903 Part A 43/ DIN 4106	---	No Cracks
	Load Failure	ASTM D 4298/ BS 903: Part A2112/ DIN 230	N/mm	7
Oil determination test, Volume increase after immersion in ASTM #3 for 70 Hrs@100° C Max		ASTM D 471/ BS 903: Part A16/ DIN 5304	%	120

ARCHFLEX® ELASTOMERIC BEARING PADS

Elastomeric Bridge Bearing Pads is a block of vulcanized elastomers reinforced internally by one or several steel plates, chemically bonded during vulcanization.

External Forces being supported Elastomeric bearings permit the simultaneous support of the following loads

- Absorption of briefly applied external horizontal forces
- Horizontal movement in all directions through shear deformation.
- Rotation of the bearing surfaces around all axes
- Standard absorption of vertical loads.



FREQUENTLY ASKED QUESTIONS

What is elastomeric bearing pad ?

Elastomeric bearing pads compress on vertical load and accommodate horizontal rotation and provide lateral shear movement. Elastomeric bearing pads are the most economical solution used in construction of large span bridges and buildings.

How do elastomeric bearings work ?

Laminated elastomeric bearings support simultaneous loads and deformation in any direction. Steel plates are bonded to the rubber through a vulcanization process and have the main scope to increase the resistance of the bearings to vertical loads.

How do you install elastomeric bearings ?

Installation of bearing. Place bearing on top of applied epoxy resin. Care should be taken, to see that, the bearing is placed according to movements specified in main drawings.

Why are steel plates inserted inside bearings in elastomeric bearings ?

For elastomeric bearing to function as a soft spring, the bearing should be allowed for bulging laterally and the compression stiffness can be increased by limiting the amount of lateral bulging. To increase the compression stiffness of elastomeric bearings, metal plates are inserted.

What is the function of bearing in bridges ?

A bridge bearing carries the loads or movement in both vertical and horizontal directions from the bridge superstructure and transfers those loads to the bridge piers and abutments. The loads can be live load and dead load in vertical directions, or wind load, earthquake load, etc., in horizontal directions.



ELASTOMERIC BEARING TYPES

TYPE A

This type of bearing has only 1 steel inner plates which is covered by elastomeric layers.



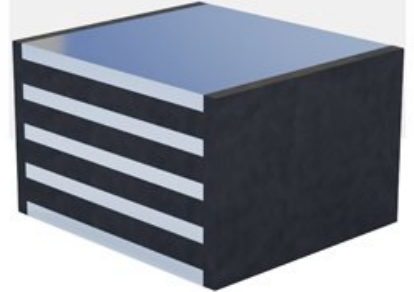
TYPE B

This type of bearing has more than 1 steel plate inside and the most common elastomeric bearing type that are used under.



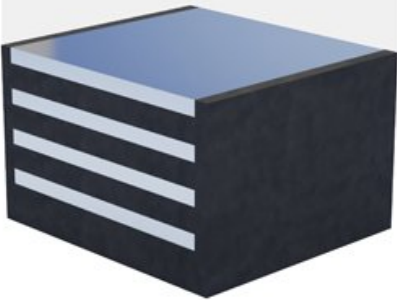
TYPE C

This type of bearing has inner steel plates like other types; additionally there are vulcanized thicker plates on upper and lower sides which help connection of bearing and structures.



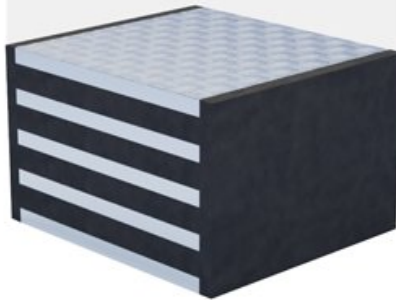
TYPE B/C

This type of bearing has inner steel plates too; additionally there is only 1 vulcanized thicker plate on upper or lower sides on order to connection.



TYPE CR

This type is same with Type C elastomeric bearings but upper and lower vulcanized plates have tear drop or different shapes. Therefore, there is no need to use additional anchor plates with.



TYPE F

This type of bearing has no steel reinforcements inside. They are used for avoiding damages on different structures if they touch to each other etc. generally.





Vertical Load	Bearing Dimensions	Type B				Type C & Type CR				Type B/C				
		# Elastomer Layers	SLS Movement (+/-)	Total Thickness	Elastomer Thickness	SLS Movement (+/-)	Total Thickness / Type C	Total Thickness / Type CR	Elastomer Thickness	SLS Movement (+/-)	Total Thickness	Elastomer Thickness	Angle of Rotation	Angle of Rotation ϕ
MM	mm	ad	mm			mm				mm			rad/1000	
0,10 0,15	100x100 100x150	1	7	14	10	-	-	-	-	-	-	-	4	
		2	11	21	15	7	42	32	10	9	31,5	12,5	8	
		3	14	28	20	11	49	39	15	12	38,5	17,5	12	
		4	16	35	25	14	56	46	20	15	45,5	22,5	16	
		5	18	42	30	16	63	53	25	17	52,5	27,5	20	
		6	-	-	-	18	70	60	30	-	-	-	24	
0,30	150x200	1	7	14	10	-	-	-	-	-	-	-	3	
		2	11	21	15	7	42	32	10	9	31,5	12,5	6	
		3	14	28	20	11	49	39	15	12	38,5	17,5	9	
		4	18	35	25	14	56	46	20	16	45,5	22,5	12	
		5	21	42	30	18	63	53	25	19	52,5	27,5	15	
		6	23	49	35	21	70	60	30	22	59,5	32,5	18	
		7	25	56	40	23	77	67	35	24	66,5	37,5	21	
		8	27	63	45	25	84	74	40	26	73,5	42,5	24	
		9	28	70	50	27	91	81	45	28	80,5	47,5	27	
		10	-	-	-	28	98	88	50	-	-	-	30	
0,31 0,63 0,75 1,00	ϕ 200 200x250 200x300 200x400	1	9	19	13	-	-	-	-	-	-	-	3	4
		2	15	30	21	11	49	39	16	13	39,5	18,5	6	8
		3	20	41	29	17	60	50	24	19	50,5	26,5	9	12
		4	26	52	37	22	71	61	32	24	61,5	34,5	12	16
		5	30	63	45	28	82	72	40	29	72,5	42,5	15	20
		6	34	74	53	32	93	83	48	33	83,5	50,5	18	24
		7	36	85	61	35	104	94	56	36	94,5	58,5	21	28
		8	-	-	-	37	115	105	64	-	-	-	24	32
0,60 1,30	ϕ 250 250x400	1	9	19	13	-	-	-	-	-	-	-	3	4
		2	15	30	21	11	49	39	16	13	39,5	18,5	5	8
		3	20	41	29	17	60	50	24	19	50,5	26,5	8	12
		4	26	52	37	22	71	61	32	24	61,5	34,5	10	16
		5	32	63	45	28	82	72	40	30	72,5	42,5	13	20
		6	37	74	53	34	93	83	48	35	83,5	50,5	15	24
		7	40	85	61	38	104	94	56	39	94,5	58,5	18	28
		8	43	96	69	41	115	105	64	42	105,5	66,5	20	32
		9	46	107	77	44	126	116	72	45	116,5	74,5	23	36
		10	-	-	-	46	137	127	80	-	-	-	25	40
0,90 1,80	ϕ 300 300x400	1	9	19	13	-	-	-	-	-	-	-	2	3
		2	15	30	21	11	49	39	16	13	39,5	18,5	4	6
		3	20	41	29	17	60	50	24	19	50,5	26,5	6	9
		4	26	52	37	22	71	61	32	24	61,5	34,5	8	12
		5	32	63	45	28	82	72	40	30	72,5	42,5	10	15
		6	37	74	53	34	93	83	48	35	83,5	50,5	12	18
		7	43	85	61	39	104	94	56	41	94,5	58,5	14	21
		8	46	96	69	44	115	105	64	45	105,5	66,5	16	24
		9	50	107	77	48	126	116	72	49	116,5	74,5	18	27
		10	52	118	85	51	137	127	80	52	127,5	82,5	20	30
		11	55	129	93	53	148	138	88	54	138,5	90,5	22	33
		12	-	-	-	56	159	149	96	-	-	-	24	36



Vertical Load	Bearing Dimensions	# Elastomer Layers	Type B			Type C & Type CR				Type B/C			Angle of Rotation	Angle of Rotation ϕ
			SLS Movement (+/-)	Total Thickness	Elastomer Thickness	SLS Movement (+/-)	Total Thickness / Type C	Total Thickness / Type CR	Elastomer Thickness	SLS Movement (+/-)	Total Thickness	Elastomer Thickness		
MN	mm	ad	mm			mm				mm			rad/1000	
1,20	$\phi 350$	1	11	24	16	-	-	-	-	-	-	-		4
		2	19	39	27	15	56	46	22	17	47,5	24,5		8
		3	27	54	38	23	71	61	33	25	62,5	33,5		12
		4	34	69	49	31	86	76	44	33	77,5	46,5		16
		5	42	84	60	39	101	91	55	40	92,5	57,5		20
		6	50	99	71	46	116	106	66	48	107,5	68,5		24
		7	55	114	82	52	131	121	77	53	122,5	79,5		28
		8	59	129	93	57	146	136	88	58	137,5	90,5		32
		9	63	144	104	61	161	151	99	62	152,5	101,5		36
		10	66	159	115	64	176	166	110	65	167,5	112,5		40
2,40	350x450	3	27	54	38	23	81	61	33	25	67,5	33,5	8	
		4	34	69	49	31	96	76	44	33	82,5	46,5	10	
		5	42	84	60	39	111	91	55	40	97,5	57,5	13	
		6	50	99	71	46	126	106	66	48	112,5	68,5	15	
		7	55	114	82	52	141	121	77	53	127,5	79,5	18	
		8	59	129	93	57	156	136	88	58	142,5	90,5	20	
		9	63	144	104	61	171	151	99	62	157,5	101,5	23	
		10	66	159	115	64	186	166	110	65	172,5	112,5	25	
		3	27	54	38	23	81	61	33	25	67,5	33,5	6	9
		4	34	69	49	31	96	76	44	33	82,5	46,5	8	12
1,90 3,00	$\phi 400$ 400x500	5	42	84	60	39	111	91	55	40	97,5	57,5	10	15
		6	50	99	71	46	126	106	66	48	112,5	68,5	12	18
		7	57	114	82	54	141	121	77	56	127,5	79,5	14	21
		8	62	129	93	60	156	136	88	61	142,5	90,5	16	24
		9	67	144	104	65	171	151	99	66	157,5	101,5	18	27
		10	70	159	115	69	186	166	110	70	172,5	112,5	20	30
		11	74	174	126	72	201	181	121	73	187,5	123,5	22	33
		12	-	-	-	75	216	196	132	-	-	-	24	36
		3	27	54	38	23	81	61	33	25	67,5	33,5	6	9
		4	34	69	49	31	96	76	44	33	82,5	46,5	8	12
		5	42	84	60	39	111	91	55	40	97,5	57,5	10	15
		6	50	99	71	46	126	106	66	48	112,5	68,5	12	18
2,40 4,21	$\phi 450$ 450x600	7	57	114	82	54	141	121	77	56	127,5	79,5	14	21
		8	65	129	93	62	156	136	88	63	142,5	90,5	16	24
		9	70	144	104	67	171	151	99	68	157,5	101,5	18	27
		10	74	159	115	72	186	166	110	73	172,5	112,5	20	30
		11	78	174	126	76	201	181	121	77	187,5	123,5	22	33
		12	82	189	137	80	216	196	132	81	202,5	134,5	24	36
		13	85	204	148	83	231	211	143	84	217,5	145,5	26	39
		3	27	54	38	23	81	61	33	25	67,5	33,5	6	9
		4	34	69	49	31	96	76	44	33	82,5	46,5	8	12
		5	42	84	60	39	111	91	55	40	97,5	57,5	10	15
		6	50	99	71	46	126	106	66	48	112,5	68,5	12	18
		7	57	114	82	54	141	121	77	56	127,5	79,5	14	21
		8	65	129	93	62	156	136	88	63	142,5	90,5	16	24
2,90 3,60 4,50	$\phi 500$ $\phi 550$ 500x600	9	72	144	104	69	171	151	99	71	157,5	101,5	18	27
		10	77	159	115	75	186	166	110	76	172,5	112,5	20	30
		11	82	174	126	80	201	181	121	81	187,5	123,5	22	33
		12	86	189	137	84	216	196	132	85	202,5	134,5	24	36
		13	89	204	148	88	231	211	143	89	217,5	145,5	26	39
		14	93	219	159	91	246	226	154	92	232,5	156,5	28	42
		15	-	-	-	94	261	241	165	-	-	-	30	45
		3	27	54	38	23	81	61	33	25	67,5	33,5	6	9
		4	34	69	49	31	96	76	44	33	82,5	46,5	8	12
		5	42	84	60	39	111	91	55	40	97,5	57,5	10	15
		6	50	99	71	46	126	106	66	48	112,5	68,5	12	18
		7	57	114	82	54	141	121	77	56	127,5	79,5	14	21
		8	65	129	93	62	156	136	88	63	142,5	90,5	16	24
		9	72	144	104	69	171	151	99	71	157,5	101,5	18	27
		10	77	159	115	75	186	166	110	76	172,5	112,5	20	30
		11	82	174	126	80	201	181	121	81	187,5	123,5	22	33
		12	86	189	137	84	216	196	132	85	202,5	134,5	24	36
		13	89	204	148	88	231	211	143	89	217,5	145,5	26	39
		14	93	219	159	91	246	226	154	92	232,5	156,5	28	42
		15	-	-	-	94	261	241	165	-	-	-	30	45



Vertical Load	Bearing Dimensions	# Elastomer Layers	Type B			Type C & Type CR				Type B/C			Angle of Rotation	Angle of Rotation ϕ
			SLS Movement (+/-)	Total Thickness	Elastomer Thickness	SLS Movement (+/-)	Total Thickness / Type C	Total Thickness / Type CR	Elastomer Thickness	SLS Movement (+/-)	Total Thickness	Elastomer Thickness		
MN	mm	ad	mm			mm				mm			rad/1000	
4,10 5,00 6,30	$\phi 600$ $\phi 650$ 600x700	3	35	70	50	32	95	75	45	33	82,5	47,5	6	6
		4	46	90	65	42	115	95	60	44	102,5	62,5	8	8
		5	56	110	80	53	135	115	75	54	122,5	77,5	10	10
		6	67	130	95	63	155	135	90	65	142,5	92,5	12	12
		7	77	150	110	74	175	155	105	75	162,5	107,5	14	14
		8	86	170	125	84	195	175	120	85	182,5	122,5	16	16
		9	93	190	140	91	215	195	135	92	202,5	137,5	18	18
		10	99	210	155	98	235	215	150	98	222,5	152,5	20	20
		11	105	230	170	103	255	235	165	104	242,5	167,5	22	22
		12	109	250	185	108	275	255	180	109	262,5	182,5	24	24
		13	113	270	200	112	295	275	195	113	282,5	197,5	26	26
5,80 6,60 8,40	$\phi 700$ $\phi 750$ 700x800	3	35	70	50	32	95	75	45	33	82,5	47,5	6	6
		4	46	90	65	42	115	95	60	44	102,5	62,5	8	8
		5	56	110	80	53	135	115	75	54	122,5	77,5	10	10
		6	67	130	95	63	155	135	90	65	142,5	92,5	12	12
		7	77	150	110	74	175	155	105	75	162,5	107,5	14	14
		8	88	170	125	84	195	175	120	86	182,5	122,5	16	16
		9	98	190	140	95	215	195	135	96	202,5	137,5	18	18
		10	105	210	155	103	235	215	150	104	222,5	152,5	20	20
		11	112	230	170	110	255	235	165	111	242,5	167,5	22	22
		12	118	250	185	116	275	255	180	117	262,5	182,5	24	24
		13	123	270	200	121	295	275	195	122	282,5	197,5	26	26
		14	127	290	215	126	315	295	210	127	302,5	212,5	28	28
		15	131	310	230	130	335	315	225	131	322,5	227,5	30	30
7,50 8,50 9,60	$\phi 800$ $\phi 850$ 800x800	3	41	79	59	38	104	84	54	40	91,5	56,5	6	6
		4	54	102	77	50	127	107	72	52	114,5	74,5	8	8
		5	67	125	95	63	150	130	90	65	137,5	92,5	10	10
		6	79	148	113	76	173	153	108	77	160,5	110,5	12	12
		7	92	171	131	88	196	176	126	90	183,5	128,5	14	14
		8	104	194	149	101	219	199	144	103	206,5	146,5	16	16
		9	115	217	167	113	242	222	162	114	229,5	164,5	18	18
		10	124	240	185	122	265	245	180	123	252,5	182,5	20	20
		11	131	263	203	129	288	268	198	130	275,5	200,5	22	22
		12	138	286	221	136	311	291	216	137	298,5	218,5	24	24
		13	144	309	239	142	334	314	234	143	321,5	236,5	26	26
		14	149	332	257	147	357	337	252	148	344,5	254,5	28	28
9,50 12,00	$\phi 900$ 900x900	3	41	79	59	38	104	84	54	40	91,5	56,5	5	5
		4	54	102	77	50	127	107	72	52	114,5	74,5	6	6
		5	67	125	95	63	150	130	90	65	137,5	92,5	8	8
		6	79	148	113	76	173	153	108	77	160,5	110,5	9	9
		7	92	171	131	88	196	176	126	90	183,5	128,5	11	11
		8	104	194	149	101	219	199	144	103	206,5	146,5	12	12
		9	117	217	167	113	242	222	162	115	229,5	164,5	14	14
		10	128	240	185	126	265	245	180	127	252,5	182,5	15	15
		11	137	263	203	135	288	268	198	136	275,5	200,5	17	17
		12	145	286	221	143	311	291	216	144	298,5	218,5	18	18
		13	152	309	239	150	334	314	234	151	321,5	236,5	20	20
		14	158	332	257	156	357	337	252	157	344,5	254,5	21	21
		15	163	355	275	162	380	360	270	163	367,5	272,5	23	23
		16	168	378	293	167	403	383	288	168	390,5	290,5	24	24