



Bridges and Architectural Bearing

RUBBER BEARING & STEEL BEARING

SAMYOUNG & PIKASAN JV

OUR VISION

“The SAMYOUNG-PIKASAN Joint Venture was established based on the trust and friendship between the Republic of Korea and the Republic of Türkiye in 2023. SAMYOUNG M-TEK Co., Ltd. is an enterprise in Korea, which has extensive experience in manufacturing seismic-resistant/isolation systems, such as steel bearings and lead rubber bearings. SAMYOUNG M-TEK Co., Ltd. is already known worldwide for its work on global projects such as the Canakkale Bridge Project, 3rd Bosphorus Bridge Project (Türkiye), Panama Metro Line 3 (Panama), and Tao Yuan Airport (Taiwan), among others. Due to the increasing demand for seismic isolation systems in Europe and the Middle East, SAMYOUNG M-TEK found a partner in PIKASAN, one of the best rubber experts in Türkiye. Since lead rubber bearings require excellent quality rubber as raw material, PIKASAN was an ideal partner for SAMYOUNG M-TEK to produce a better quality product in terms of seismic isolation systems.

PIKASAN produces performance-oriented isolation and sealing systems adapted to your individual use case. PIKASAN helps customers maximize their efficiency by designing tailor-made products and formulating special compounds through in-house production and tracking the entire process from beginning to end. Relying on half a century of production experience, alongside a competent technical team and well-endowed manufacturing plant, we aim to produce high-performance products by merging them with top quality.

Now, as SAMYOUNG-PIKASAN JV, we are looking forward to meeting new partners worldwide who are interested in building safer structures with our world's best quality seismic isolation systems.”



Company Introduction (SAMYOUNG M-TEK)

Samyoung M-TEK Co., Ltd. was established with full assistance from Samsung Heavy Industries Co., Ltd. as an expert venture corporation in the Production of Steel Industry in October 1997.

“Our main products include steel casting and alloy steel parts and components for the marine, bridge, construction, locomotive, and heavy vehicle industries. Approximately 50% of our products are exported to Japan, the U.S.A., and Europe. The quality of our products has been recognized by Japanese industrial customers, leading to continuing orders from them. We are also engaged in research and development of technology for steel casting and bridge bearings used in a full range of suspension bridges, which require strict adherence to safety regulations in designing, manufacturing, testing, and inspection.

Our business is committed to becoming an expert parts maker and provider through trust and cooperation with our customers in the global competition of the 21st century.”



Company Introduction (PIKASAN)

“PIKASAN started its business in the early 1970s and has been serving customers for over 30 years at a facility spanning 10,000 m² in Pendik, ISTANBUL. As its production capacity, market share, and dominance in foreign markets increased, PIKASAN relocated to a new and larger plant at the European Free Zone of TEKİRDAĞ in 2014, expanding its services across various sectors for insulation and impermeability.

Our initial products were for the automotive sector, followed by construction materials and seals for infrastructure. We primarily work with EPDM Rubber, which is particularly suitable for applications requiring prolonged exposure to atmospheric conditions. Since every step from product design to formulating special compounds is completed in-house, we are capable of monitoring every process from beginning to end, allowing us to engage with customers from around the world in various sectors.

In addition to our existing wide range of products, our modern laboratory and well-equipped plant ensure the production of rubber profiles from compounds prepared in compliance with your specific needs. Our tooling division, equipped with 5-axis wire EDMs, enables us to produce rubber extrusion dies of extreme complexity with precision and efficiency.

PIKASAN A.Ş., with its institutional structure, understands that the most important investment is in our staff members. Our enterprise comprises an expert management team, engineers, chemists, quality control, and R&D teams. By combining our staff members with a qualified manufacturing plant, we are committed to remaining true to our vision of staying ahead in our sector.”





Rubber Bearing

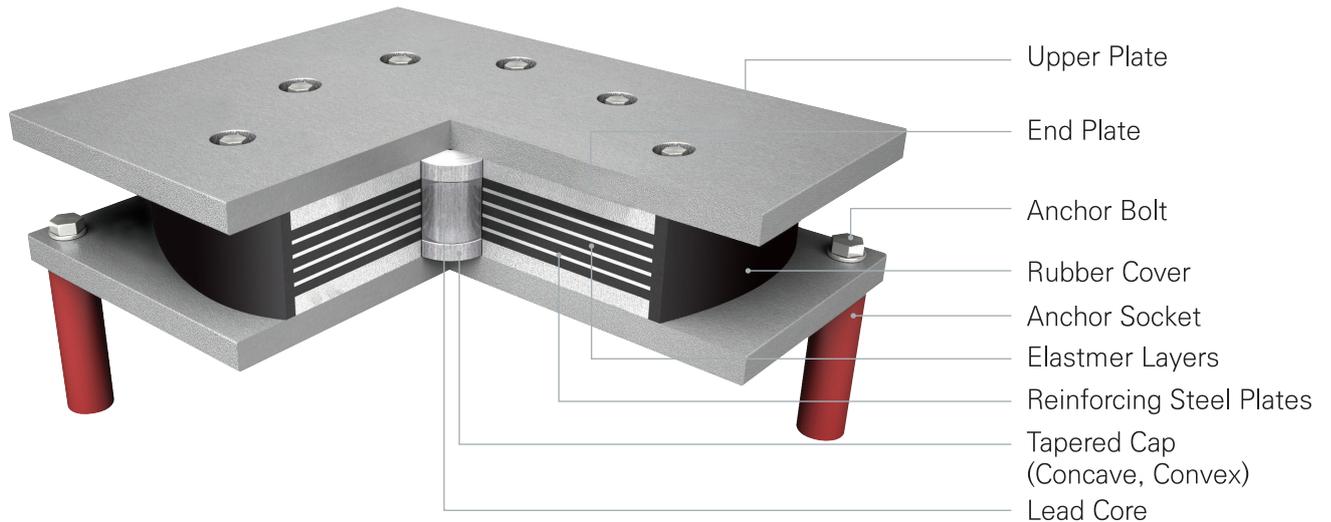
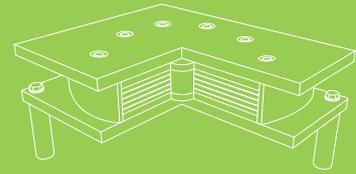
▪ LRB

▪ Elastomeric Bearing





Lead Rubber Bearing (LRB)



→ Features

Lead Core

- For braking and wind loads, displacement is suppressed with initial rigidity, and for temperature loads, less temperature stress is transferred with the creep characteristics of lead, and earthquake energy is reduced energy dissipation of lead during earthquake.

Tapered Cap

- Inserted lead is prevented from rising out of the hollow part and protruding.

End Plate

- A plate that connects the upper and lower plates to the rubber pads in one body.

Rubber Layers

- The load is effectively transmitted by the movement of rubber due to shear deformation and rotation, and upper structure is restored with the resilience of rubber after the earthquake.

Reinforced Steel Plate

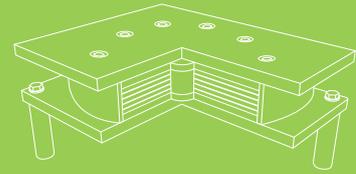
- Steel plates between rubber layers increase vertical rigidity to support vertical loads.

Rubber Cover

- Prevention of deterioration of rubber layer to ozone and ultraviolet ray



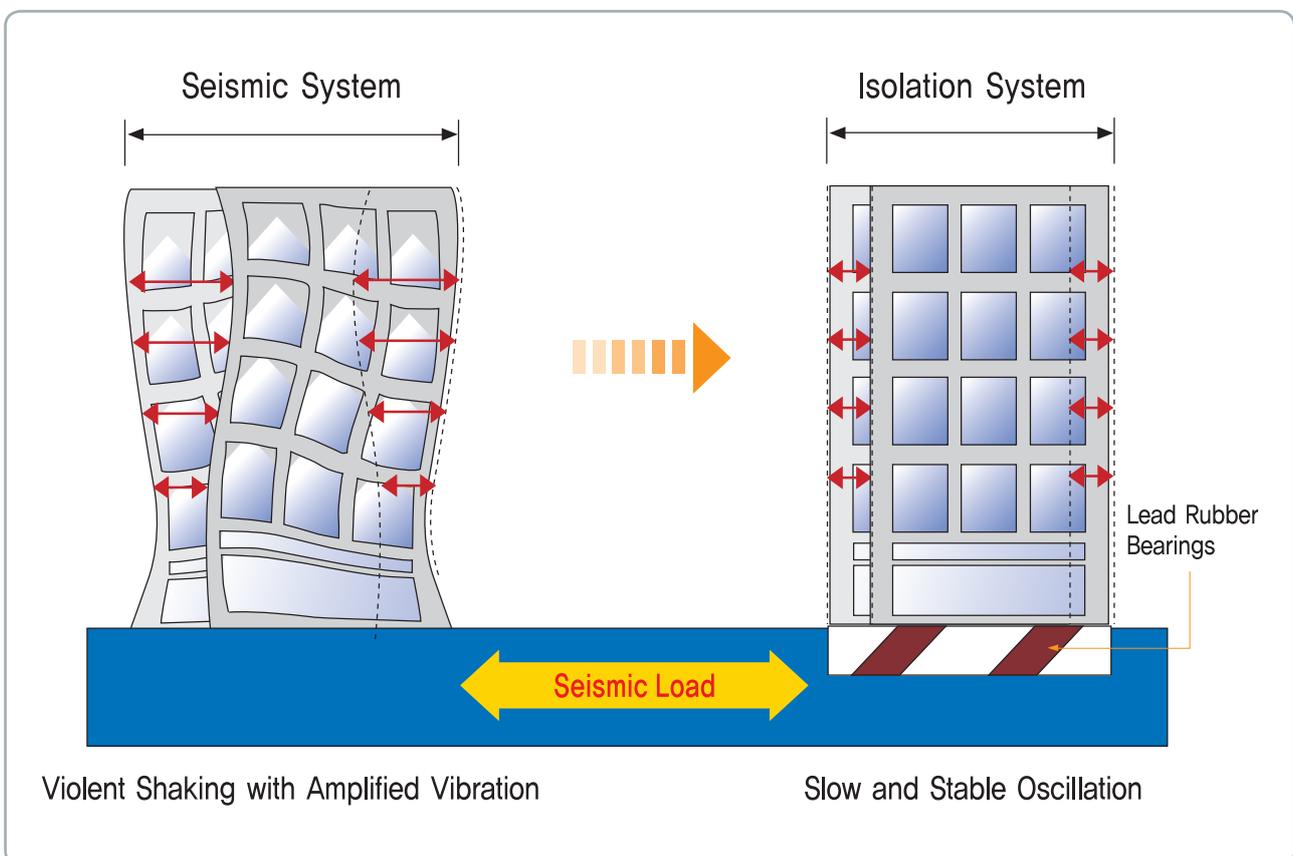
Lead Rubber Bearing (LRB)



→ Characteristics of LRB

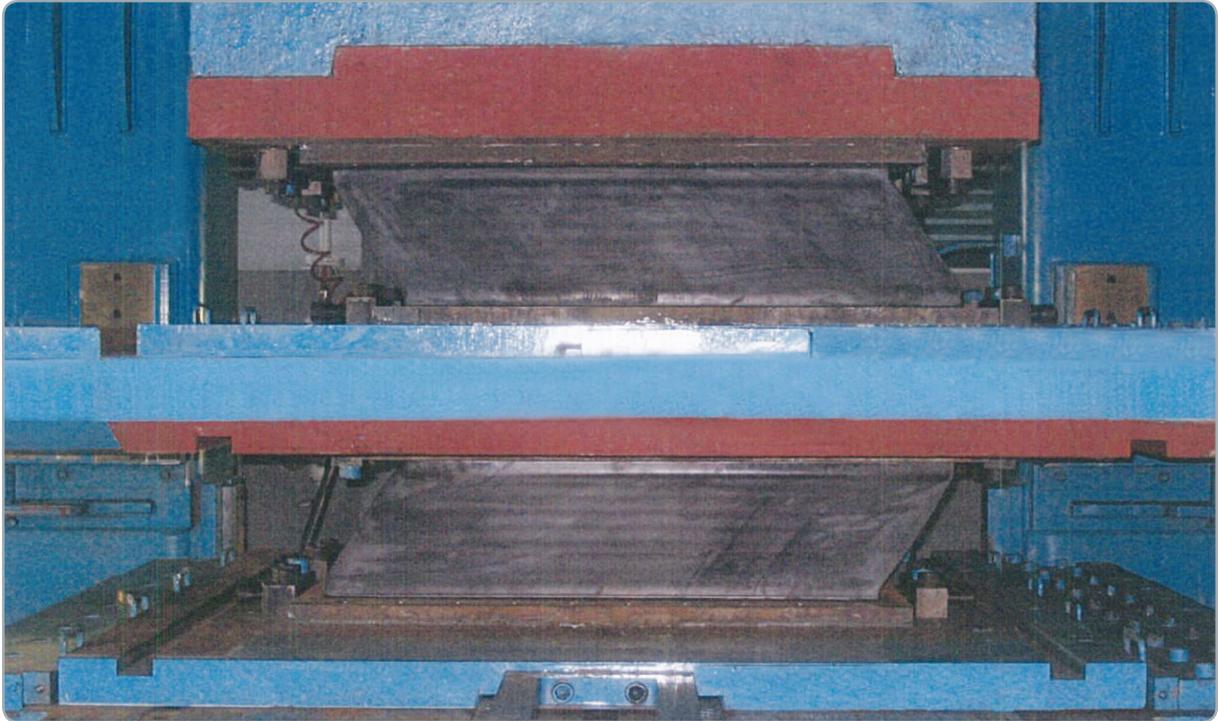
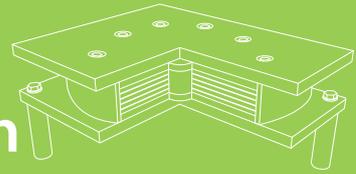
- Support the vertical load of structure
- Allow the slow movement caused by thermal displacement without any resistance.
- Isolation of the structure by increasing the oscillation period of superstructure against the earthquake the earthquake energy and quickly damps the vibration.
- As the layers of rubber are distorted, the lead plug is plastically deformed, which absorbs the earthquake the restoring force of the rubber layers returns the structure to the original position.

→ Structure movement during earthquake

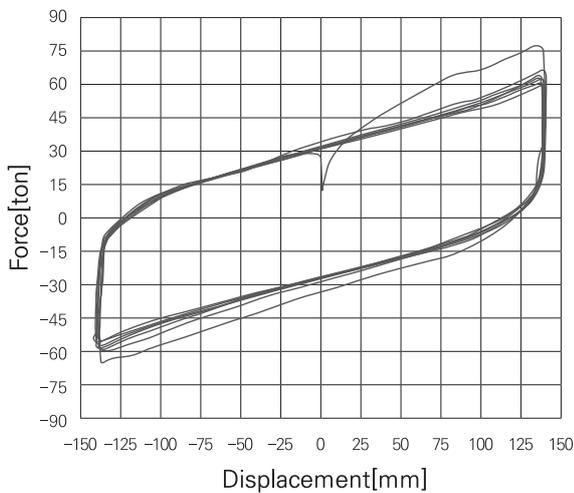




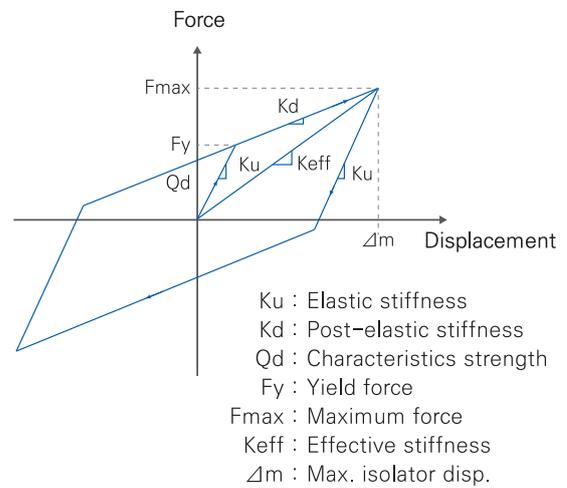
Horizontal load test of Isolation



Horizontal load test of Isolation



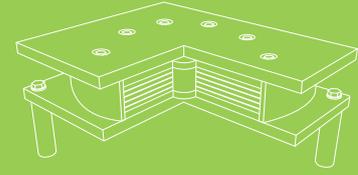
Horizontal load test result of Isolation



Ideal Hysteresis Loop of Isolation



Specification table for LRB



→ Specification table for architecture

G=0.392MPa

Diameter of Rubber(mm)	1500	1400	1300	1200	1100	1000	900	800	700	600	500
Diameter of middle(mm)	260	250	240	230	220	210	190	140	120	100	90
Thickness of Rubber(mm)	294	273	252	231	214.5	186	170.5	160	139.5	116	99
Height of LRB(mm)	578.5	544	509.5	475	458.5	401	385.5	370	302.5	274	236
1st Shapefactor	53.6	50	46.4	42.9	42.3	41.7	40.9	40	38.9	37.5	37.9
2nd Shapefactor	5.1	5.1	5.2	5.2	5.1	5.4	5.3	5.2	5.4	5.2	5.1
Vertical Stiffness(kN/mm)	9212	8372	7528	6684	6001	5665	4947	4237	3780	3045	2495
Effective Stiffness(kN/mm)	3.799	3.649	3.503	3.362	3.160	3.153	2.801	2.065	1.848	1.495	1.292
Equeivalent Damping	0.233	0.241	0.249	0.259	0.269	0.281	0.283	0.235	0.23	0.223	0.243
Post-elastic Stiffness(kN/mm)	2.359	2.215	2.072	1.928	1.748	1.669	1.475	1.273	1.157	1.495	0.779
Characteristics strength(kN)	423	391	361	331	303	276	226	123	90	63	51

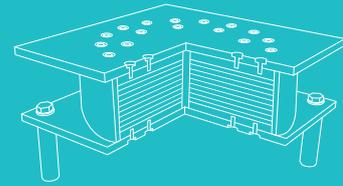
→ Specification table for bridge

G=0.7MPa

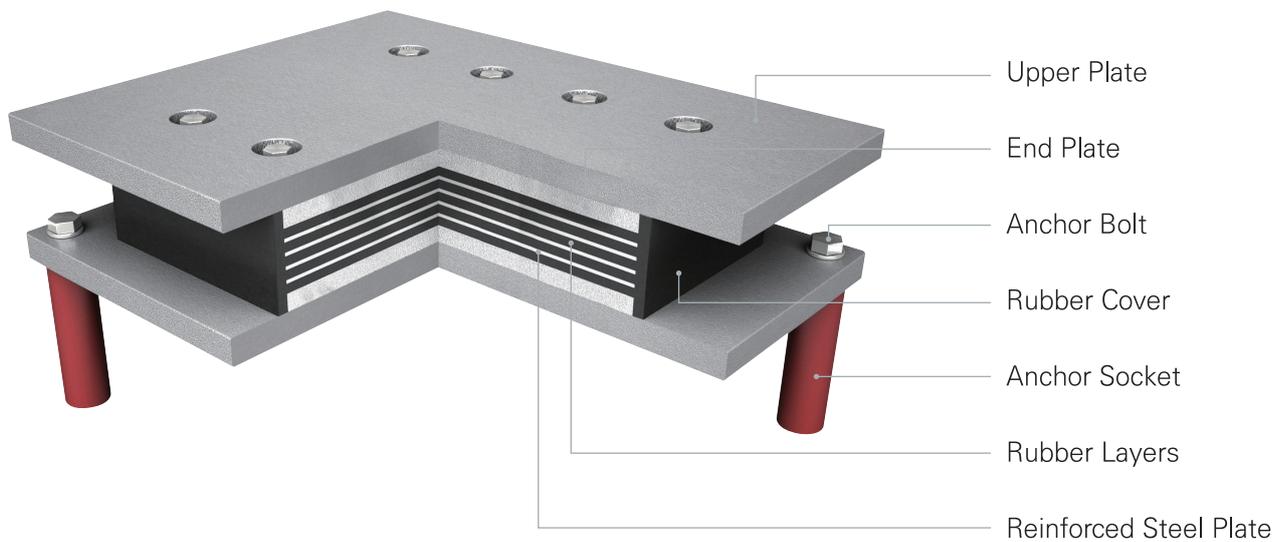
구분	LRB-10000	LRB-9000	LRB-8000	LRB-7000	LRB-6000	LRB-5000	LRB-4000	LRB-3000	LRB-2000	LRB-1000
Vertical Load (kN)	10000	9000	8000	7000	6000	5000	4000	3000	2000	1000
Rubber Bearing Size (mm)	900 x 900	900 x 800	800 x 800	800 x 700	700 x 700	700 x 600	600 x 600	600 x 450	500 x 400	400 x 300
Diameter of Middle (mm)	215	204	192	180	166	152	136	118	96	68
Height of LRB (mm)	184.5	184.5	184.5	184.5	184.5	184.5	174.5	174.5	174.5	174.5
1st Shape Factor S1	23.158	21.763	20.526	19.120	17.895	16.475	15.263	12.996	11.163	8.485
2st Shape Factor S2	13.534	13.534	12.030	12.030	10.526	10.526	9.023	9.023	7.519	6.015
Vertical Stiffness (kN/mm)	8494.8	7075.9	5915.5	4803.9	3919.5	3077.8	2432.1	1535.3	964.5	427.6
Effective Stiffness (kN/mm)	10.045	8.930	7.914	6.910	5.996	5.098	4.299	3.196	2.298	1.309
Initial Stiffness (kN/mm)	80.310	71.564	63.418	55.443	47.927	40.642	33.950	25.295	17.928	10.013
Post-Yield Stiffness (kN/mm)	7.769	6.881	6.099	5.315	4.640	3.961	3.388	2.510	1.844	1.082
Characteristics Strength (kN)	302.7	272.5	241.4	212.2	180.4	151.3	121.1	91.2	60.3	30.3



Elastomeric Bearing



→ General Type



→ Features

End Plate

- A plate that connects the upper and lower plates to the rubber pads in one body.

Rubber Layers

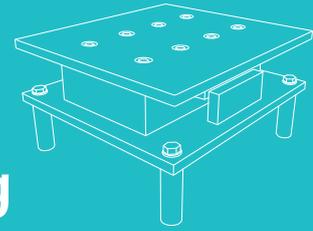
- The load is effectively transmitted by the movement of rubber due to shear deformation and rotation, and upper structure is restored with the resilience of rubber after the earthquake.

Reinforced Steel Plate

- Steel plates between rubber layers increase vertical rigidity to support vertical loads.

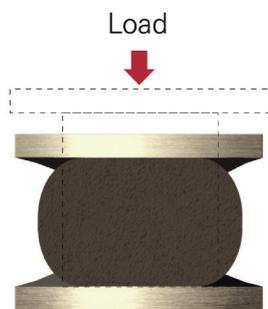
Rubber Cover

- Prevention of deterioration of rubber layer to ozone and ultraviolet ray.

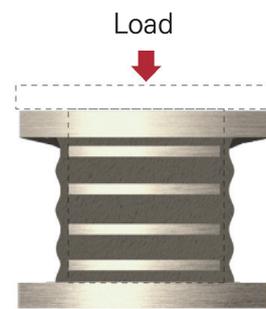


Overview of Elastomeric Bearing

Laminated elastomeric bearing pad is made of multi-layered rubber and steel plate which reinforces the strength of rubber through sulfuration and adhesion. Compared to non-reinforced rubber pad, it has sufficient vertical rigidity which can reliably transfer the concentrated vertical loads and impact loads of the superstructure to both ends of the pier of bridge. In addition, laminated elastomeric bearing pad not only has fine elasticity which can adapt the rotation of beam end but also has great shearing deformation capacity which can satisfy the horizontal displacement of the superstructure.

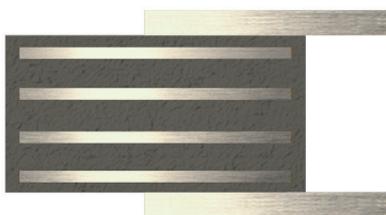


Pure-rubber Pad

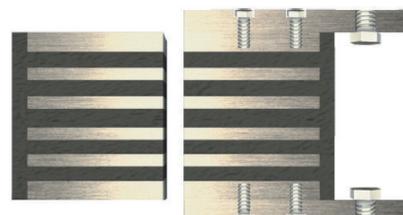


Laminated Elastomeric Pad

According to KS F 4420 (Korean Standard Specification for Elastomeric Bearings), there are 6 types of elastomeric bearings (A to F Type). Currently, most commonly used types are B Type and C Type, and these pads are both reinforced with at least 2 steel plates.



B Type – Laminated elastomeric pad with at least 2 steel plates, fully covered with rubber



C Type – Laminated elastomeric pad with steel cover plate on the surface for bolting

For B Type, elastomeric pad is simply placed between upper and lower plates, resisting horizontal forces by friction, which makes it vulnerable to slippage or lifting. In case of C Type, elastomeric pad is bolted between reinforced steel cover plate and upper/lower plates. This makes the pad to resist slip or roll-over which can be occurred in B Type.

Elastomeric Bearings C Type AASHTO

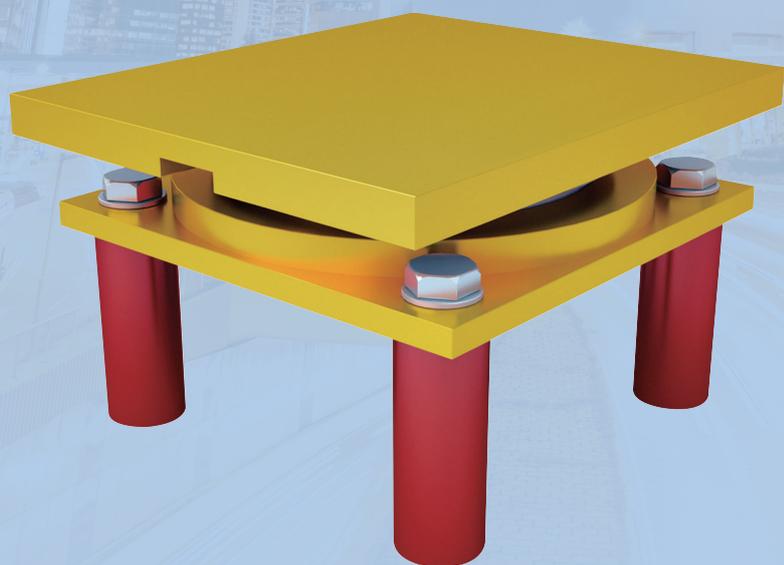
Standard Specifications (G=1.08MPa)

Load(kN)	Elastomeric Size(mm)			Elastomeric Rubber Layer		Horizontal Force		compression spring coefficient	Shear spring coefficient	±Movement(mm)		Top & Bottom Plate						Anchor Bolt
	Width X Length		Height	Rubber Layer	Effective Layer thickness(mm)	Service	Earthquake			Service	Earthquake	Fixed		Transverse Longitudinal		Multi-Directional		
	W X L	H	h _r			50%	150%	K _v (kN/m)	K _h (kN/m)	50%	150%	Wp	Lp	Wp	Lp	Wp	Lp	Ø(mm)
500	210X300	104	154	7	56	34	102	308,100	1,220	28	84	460	400	460	400	310	400	Ø35X120
		115	165	8	64			269,580	1,060	32	96							
		126	176	9	72			239,630	950	36	108							
		137	187	10	80			215,670	850	40	120							
		148	198	11	88			196,060	770	44	132							
		159	209	12	96			179,720	710	48	144							
		170	220	13	104			165,900	650	52	156							
		181	231	14	112			154,050	610	56	168							
750	220X400	104	154	7	56	48	143	589,840	1,700	28	84	520	500	520	500	320	500	Ø40X120
		115	165	8	64			516,110	1,490	32	96							
		126	176	9	72			458,760	1,320	36	108							
		137	187	10	80			412,890	1,190	40	120							
		148	198	11	88			375,350	1,080	44	132							
		159	209	12	96			344,070	990	48	144							
		170	220	13	104			317,600	910	52	156							
		181	231	14	112			294,920	850	56	168							
1,000	290X400	100	150	4	48	63	188	599,140	2,610	24	72	540	500	540	500	390	500	Ø40X120
		116	166	5	60			479,310	2,090	30	90							
		132	182	6	72			399,420	1,740	36	108							
		148	198	7	84			342,360	1,490	42	126							
		164	214	8	96			299,570	1,310	48	144							
		180	230	9	108			266,280	1,160	54	162							
		196	246	10	120			239,650	1,040	60	180							
1,350	330X450	100	150	4	48	80	241	1,013,770	3,340	24	72	580	550	580	550	430	550	Ø40X150
		116	166	5	60			811,010	2,670	30	90							
		132	182	6	72			675,840	2,230	36	108							
		148	198	7	84			579,300	1,910	42	126							
		164	214	8	96			506,880	1,670	48	144							
		180	230	9	108			450,560	1,490	54	162							
1,750	350X550	116	166	5	60	104	312	1,356,360	3,470	30	90	450	800	600	650	450	650	Ø50X150
		132	182	6	72			1,130,300	2,890	36	108							
		148	198	7	84			968,830	2,480	42	126							
		164	214	8	96			847,720	2,170	48	144							
		180	230	9	108			753,530	1,930	54	162							
		196	246	10	120			678,180	1,730	60	180							
		212	262	11	132			616,530	1,580	66	198							
		228	278	12	144			565,150	1,440	72	216							
2,000	400X550	116	166	5	60	119	356	1,849,680	3,960	30	90	500	800	650	650	500	650	Ø55X150
		132	182	6	72			1,541,400	3,300	36	108							
		148	198	7	84			1,321,200	2,830	42	126							
		164	214	8	96			1,156,050	2,480	48	144							
		180	230	9	108			1,027,600	2,200	54	162							
		196	246	10	120			924,840	1,980	60	180							
		212	262	11	132			840,760	1,800	66	198							
2,250	450X550	116	166	5	60	134	401	2,408,190	4,460	30	90	550	800	700	650	550	650	Ø55X150
		132	182	6	72			2,006,830	3,710	36	108							
		148	198	7	84			1,720,140	3,180	42	126							
		164	214	8	96			1,505,120	2,780	48	144							
		180	230	9	108			1,337,890	2,480	54	162							
		196	246	10	120			1,204,100	2,230	60	180							
		212	262	11	132			1,094,630	2,030	66	198							
3,000	540X600	98	148	3	48	175	525	2,989,110	7,300	24	72	640	850	790	700	640	700	Ø70X150
		119	169	4	64			2,241,830	5,470	32	96							
		140	190	5	80			1,793,470	4,370	40	120							
		161	211	6	96			1,494,560	3,650	48	144							
		182	232	7	112			1,281,050	3,120	56	168							
		203	253	8	128			1,120,920	2,730	64	192							
		224	274	9	144			996,370	2,430	72	216							

* The shear modulus cannot exceed more than 50% of effective thickness of Elastomeric Bearing.

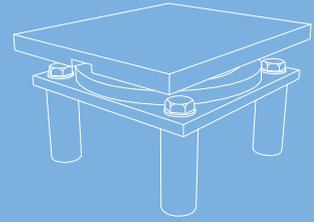
* Above measuring table can be charged based on the bridge design. (The size which not included in this table. Please contact our design team.)

Steel Bearing





Pot Bearing

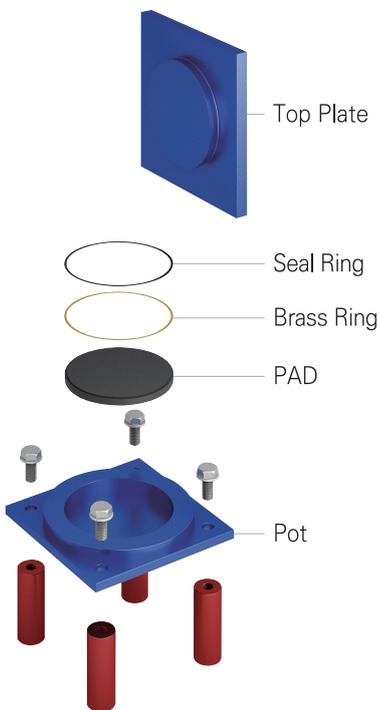


Characteristics

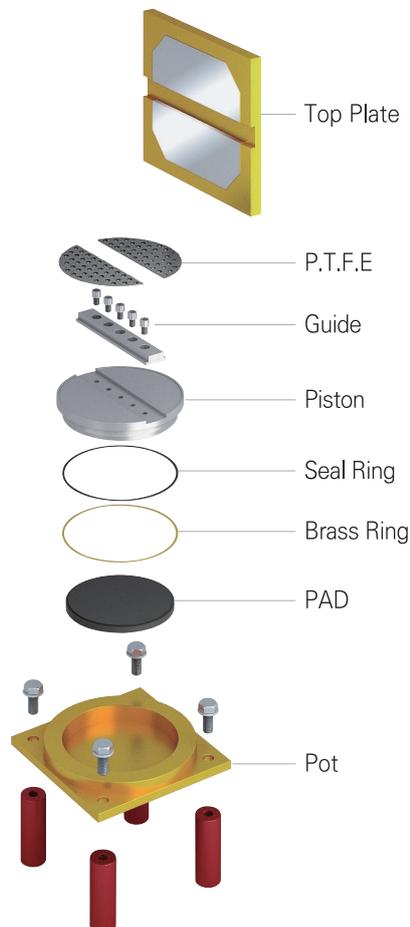
- Uniformly transfer vertical load through PAD or DISC, sealed by upper and lower plates
- PAD or DISC, enclosed in steel POT absorbs the impact load by accepting rotational energy
- Has sliding function between steel plate and PTFE plate
- Depends on the purpose, this type of bearing can be categorized into Fixed, One-Directional and Multi-Directional

Bearing Parts

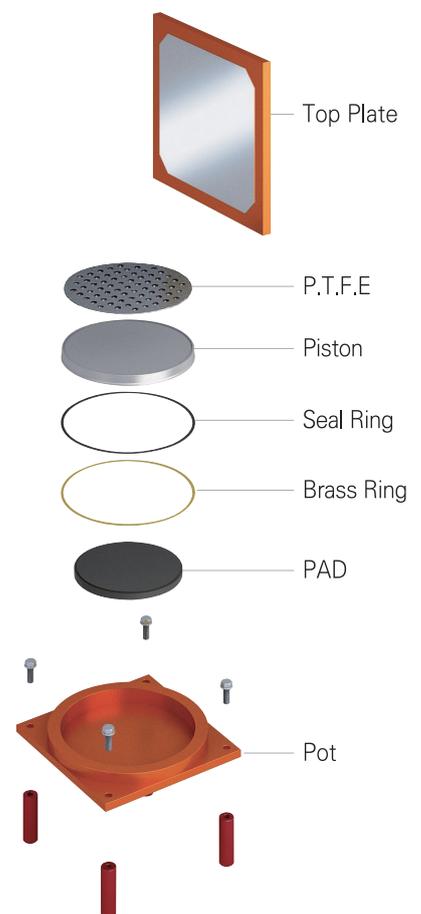
Fixed



One-Directional

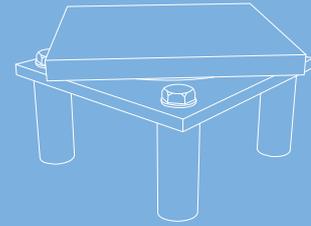


Multi-Directional

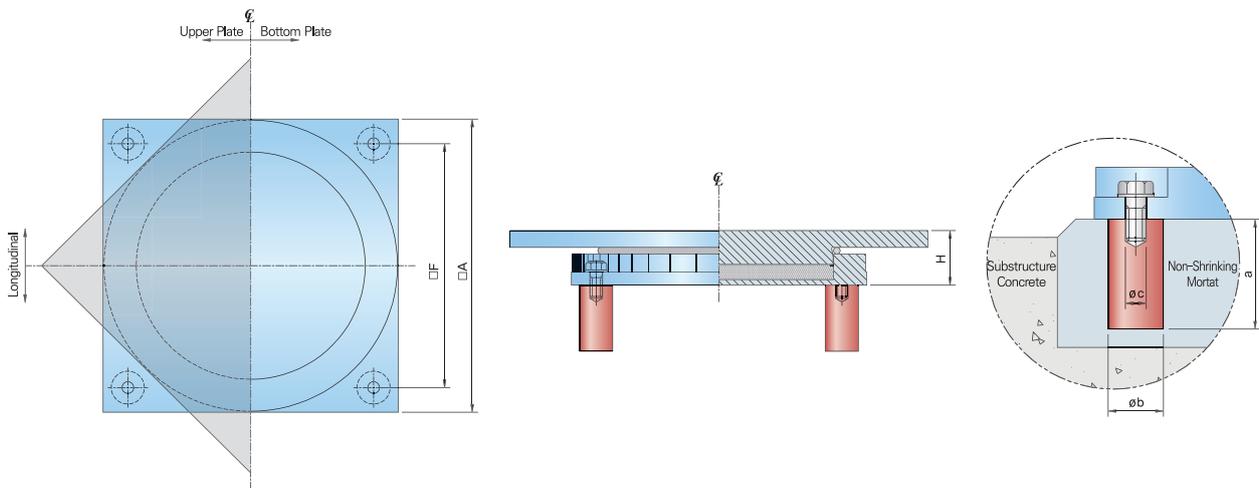




Pot Bearing



Fixed

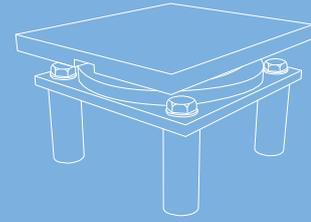


Vertical (kN)	Horizontal		Bottom Plate	Top Plate	Anchor Spacing	Bearing Height	Anchor Bolt	Anchor Socket	
	Service(kN)	Earthquake(kN)	□A(mm)	□A(mm)	□F(mm)	H(mm)	Øc(mm)	Diameter Øb(mm)	Length a(mm)
1000	300	390	290	260	230	75	20	50	220
1300	390	510	360	330	280	74	24	60	230
1500	450	590	370	320	280	88	27	70	240
2000	600	780	420	390	330	97	30	75	270
2500	750	980	460	430	360	104	33	85	290
3000	900	1170	510	470	400	120	36	90	330
4000	1200	1570	570	530	450	132	39	100	380
5000	1500	1960	640	590	500	154	45	115	410
6000	1800	2350	690	630	540	169	48	120	460
7000	2100	2740	750	710	590	176	52	130	490
8000	2400	3130	800	720	630	198	56	140	520
9000	2700	3520	830	770	650	207	60	150	540
10000	3000	3910	890	830	690	209	64	160	560

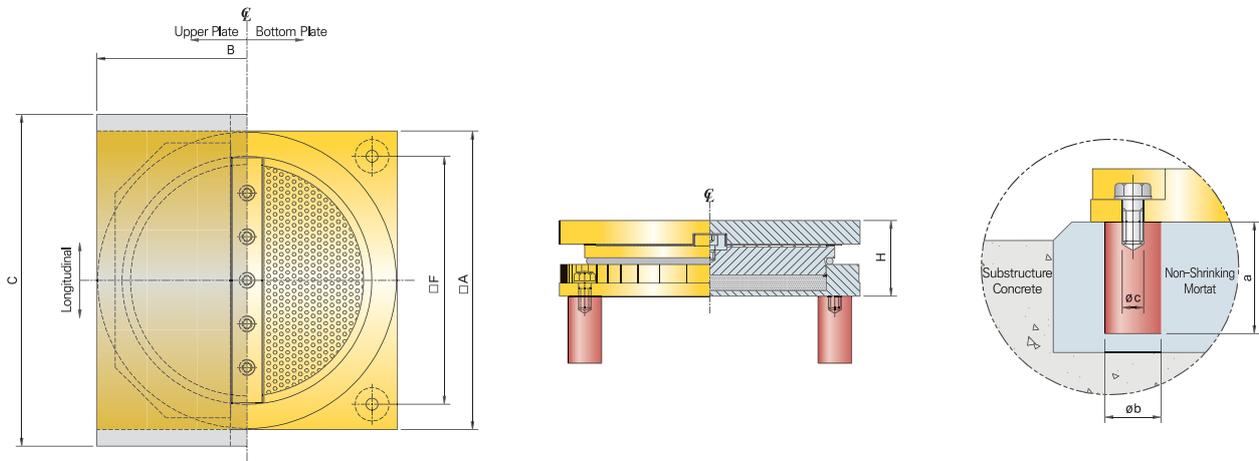
* Sleeve diameter is based on 100mm Anchor diameter.
 * The above dimensions can be changed.



Pot Bearing



One-Directional

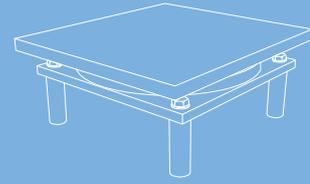


Vertical (kN)	Horizontal		Movement (mm)	Bottom Plate □A(mm)	Anchor Spacing □F(mm)	Top Plate		Bearing Height H(mm)	Anchor Bolt Øc(mm)	Anchor Socket	
	Service(kN)	Earthquake(kN)				Transverse (mm)	Longitudinal (mm)			Diameter Øb(mm)	Length a(mm)
1000	300	390	±50	310	250	310	410	117	20	50	220
1300	390	507	±50	350	270	350	450	121	24	60	230
1600	480	624	±50	400	310	400	500	130	27	70	240
2000	600	780	±50	440	350	440	540	134	30	75	270
2500	750	975	±50	480	380	480	580	144	33	85	290
3000	900	1170	±50	530	420	530	630	156	36	90	330
4000	1200	1560	±50	600	480	600	700	170	39	100	380
5000	1500	1950	±50	680	540	680	780	195	45	115	410
6000	1800	2340	±50	730	580	730	830	211	48	120	460
7000	2100	2730	±50	790	630	790	890	211	52	130	490
8000	2400	3120	±50	840	670	840	940	235	56	140	520
9000	2700	3510	±50	890	710	890	990	252	60	150	540
10000	3000	3900	±50	950	750	950	1050	250	64	160	560

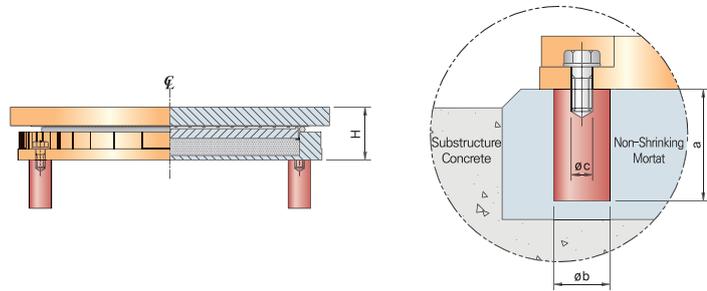
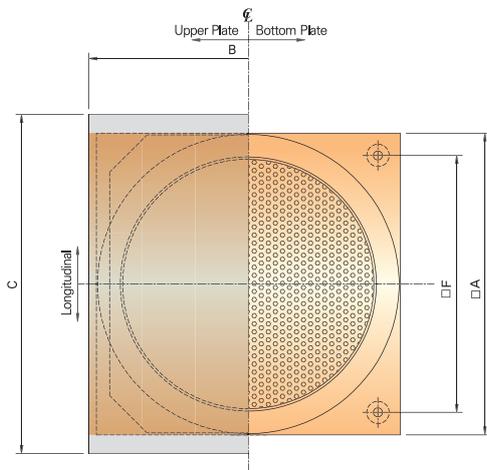
* Sleeve diameter is based on 100mm Anchor diameter.
* The above dimensions can be changed.



Pot Bearing



Multi-Directional



Vertical (kN)	Movement	Bottom Plate	Anchor Spacing	Top Plate		Bearing Height	Anchor Bolt	Anchor Socket	
	(mm)	□A(mm)	□F(mm)	Transverse (mm)	Longitudinal (mm)	H(mm)	Øc(mm)	Diameter Øb(mm)	Length a(mm)
1000	±50	270	220	310	370	85	16	40	150
1300	±50	290	240	330	390	85	16	40	150
1500	±50	320	270	360	420	89	16	40	150
1750	±50	330	280	370	430	90	16	40	150
2000	±50	360	310	400	460	99	16	40	150
2500	±50	400	340	440	500	103	20	50	180
3000	±50	440	380	480	540	107	20	50	180
4000	±50	510	430	550	610	117	24	60	180
5000	±50	570	490	610	670	126	24	60	180
6000	±50	600	510	640	700	136	27	70	200
7000	±50	670	580	710	770	146	27	70	200
8000	±50	720	630	760	820	155	30	80	220
9000	±50	760	660	800	860	159	33	90	220
10000	±50	800	700	840	900	160	33	90	220
11000	±50	810	700	850	910	153	36	90	220
12000	±50	840	730	880	940	161	36	90	220
13000	±50	890	770	930	990	164	39	100	250
14000	±50	920	800	960	1020	171	39	100	250
15000	±50	950	830	990	1050	179	39	100	250

* Sleeve diameter is based on 100mm Anchor diameter.
 * The above dimensions can be changed.



Overseas Projects



➔ Overseas Projects

- Samyoung M-Tek might be only company in the world which have expertise in both steel-casting and producing seismic resistant/isolation product.

- Based on the our unique technology, our work experiences cover many regions around the world, especially in special bridges and infrastructure (Monorail, Suspension Bridge etc.)

- Most well-known landmark projects are as follows :

 - 1915 Canakkale Bridge, Turkey
 - Suspension Bridge Material

 - Yavuz Sultan Selim Bridge, Turkey
 - Suspension Bridge Material

 - Panama Metro Line 3, Panama
 - Monorail Project (Hitachi - Type)

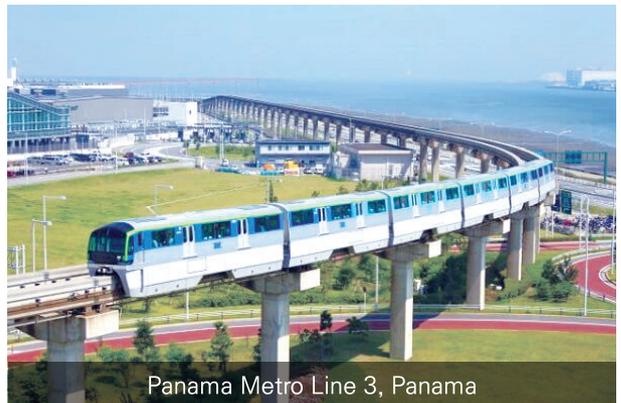
 - Philippine Arena Stadium, Philippines
 - Seismic Isolation System applied



1915 Canakkale Bridge, Turkey



Yavuz Sultan Selim Bridge, Turkey



Panama Metro Line 3, Panama



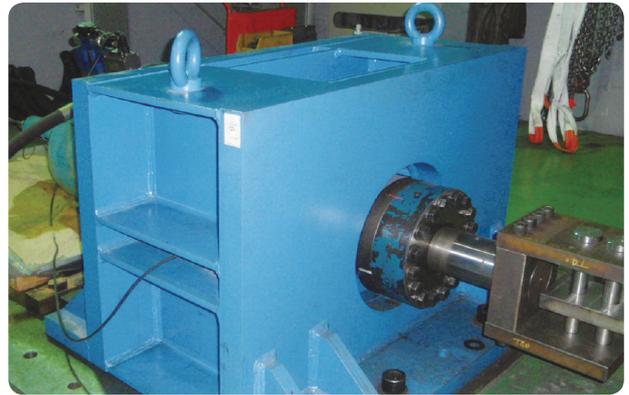
Philippine Arena Stadium, Philippines



Test Equipment Status

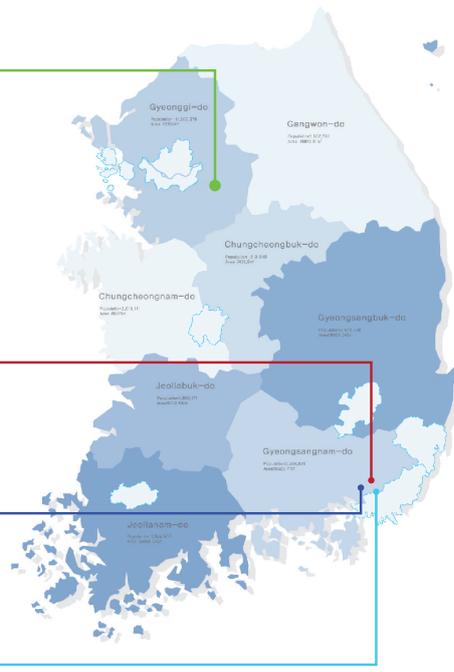


Performance Test Machine
Capacity : 30MN



Fatigue Tester
Capacity : 2MN

Location





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