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BRIDGE AND ROAD SYSTEM



KWANG WON INDUSTRIAL CO., LTD.

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PRODUCTIVE MANAGEMENT TECHNICAL DEVELOPMENT

CONTENTS

- 3** History
- 4** Intellectual Property Right
- 5** POT Bearing
- 11** POT Bearing with Anti-Bridge Device
- 15** DISK Bearing
- 19** Elastomeric Bearing
DSRB(Developed Shear reinforcing Rubber Bearing)
- 25** Eradi Quake System
- 27** Pendulum Bearing
- 28** Divided Spherical Bearing
- 30** Lead Rubber Bearing(LRB)
- 32** Finger Joint
- 34** Rail Joint
- 38** Introduction of Test Instruments

Kwangwon Ind. Co., Ltd. is a specialized bridge bearing manufacturer and builder, who has played a pivotal role in Korea since its establishment in 1986, with steady development of new product, acquiring an advanced technology. We have accumulated all the related technology and focused on core areas of business such as steel bearing, elastomeric bearing and expansion joint, especially on its production and quality improvement..

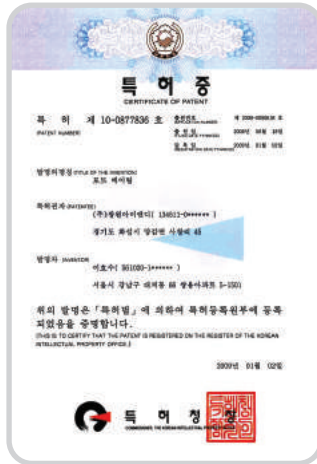
We will develop a new technology with a quality management from a customer's viewpoint and try our best to become a reliable company.

History

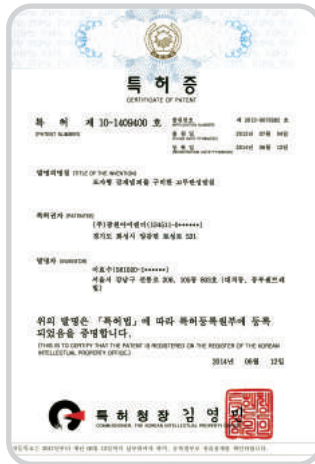
1986	10	KwangWon Ind Company established and factory Registered
1995	01	5 sets of actual design for bridge bearing device registered
	11	Trade business registered from korean Trade Committee
1996	04	Juridical person changed to KwangWon Industrial Co., Ltd.
	06	4 sets of utility patent for bridge bearing device registered
	07	Ground area increased to 16,500m ² , building area increased to 5,000m ²
	08	Member of Korea Federation of Machinery Industry Cooperatives(KFMIC)
	11	Obtained license for reinforced concrete work
1997	03	1 set of actual design for bridge bearing device registered Selected as favorable medium and small enterprise by Kyunggi Province
	08	Selected as favorable medium and small enterprise by Joheung Bank
	11	Selected as millitary exception enterprise Obtained license for steel structure work
2000	05	Established KwangWon R&D Institute
	06	Obtained ISO 9001 certificate - D.S.R KOREA
2001	06	Venture Company appointment
	12	Export birdge bearing(Taiwan - \$ 1,300,000)
2002	03	3 sets of utility patent for bridge bearing device registered
	09	Awarded prize for I Million dollar Exporting from KFMIC Obtained license for maintenance facilities
2003	09	Factory relocation(Sachang-ri, Yanggam-myeon, Hwaseong-si)
2004	02	Ground area increased to 10,000m ² , building area increased to 4,000m ²
2005	09	Bearing fatigue testing system(vertical 20000kn / Horizontal 1500kn increased)
2006	05	2 sets of utility patent for bridge bearing device registered
2007	07	2 sets of patent for bridge bearing device registered
	11	1 set of Now excellent Technology for bridge bearing device registered
2008	05	Korea Railroad Facilities Corporation new Technology 2008-0012 assignation
	09	Kwang-Won industrial(co.ltd) name changed(co.ltd) kwang-won IND head office 45, sachang-ri, yanggam-myeon, hwaseong-city, gyeonggi-do, korea
2009	01	Pot bearing Patent Registration
	12	2 sets of utility patent for bridge bearing
2010	10	CLEAN business recognized
2011	08	Technology Established R&D Center
	11	Small and medium enterprises Technology Innovation Selection
2012	03	Performance Certificate obtained-Divided Spherical Bearing
	09	1 additional Registered United States Patent
2014	03	2 patents on bridge bearing
2015	07	2 patents on bridge bearing
2016		KS(Korean industrial Standard) Certificate on elastomeric bearing

Intellectual Property Right

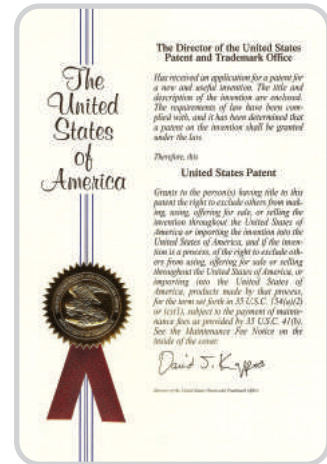
Patent on Pot Bearing



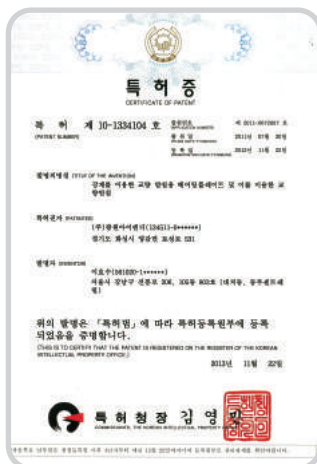
Patent on Rubber Elastomeric Bearing with hat-type steel damper



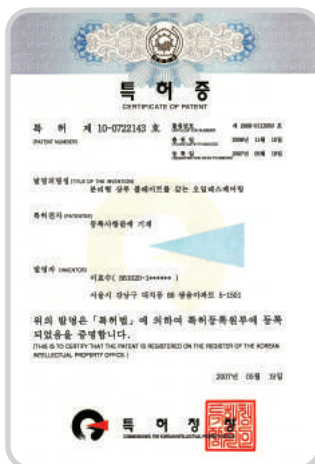
Patent on Reinforcement of Pillar Structure by Bimetal Reinforced Steel Plate (US Patent)



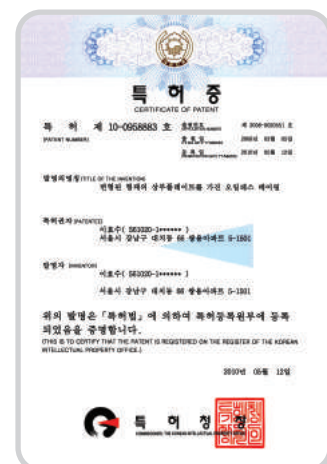
Patent on steel plate for bridge bearing



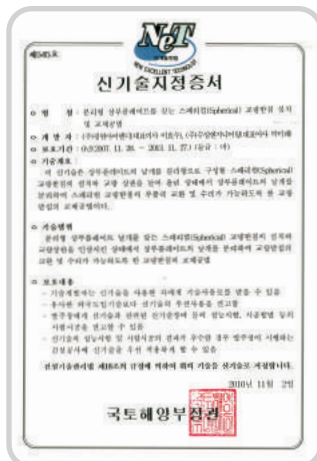
Patent on Oilless Bearing with separate upper plate



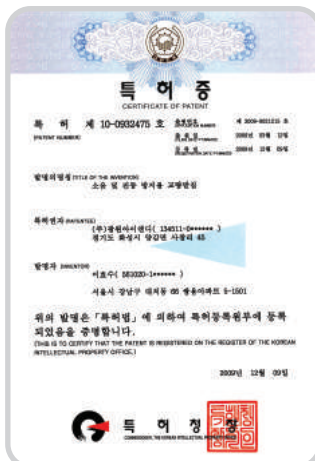
Patent on Oilless Bearing with modified upper plate



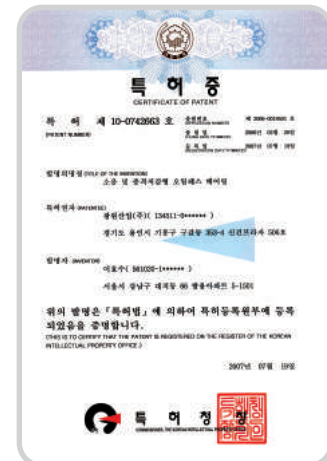
New Technology certificate on Oilless Bearing by Korea government



Patent on Bridge Bearing for prevention of noise and vibration



Patent on Oilless Bearing for reduction of noise and impact



POT Bearing

POT Bearing

Overview of POT Bearing

POT Bearing receives the vertical force and rotational distortion by its rubber plate, which is installed inside of the round airtight container. At the same time, it receives horizontal displacement by the low friction of the upper stainless steel plate and PTFE disc. POT Bearing is a one of the most world-wide popular design of bridge bearing. * Design Rotation : 0.03 rad

Part Details & Material



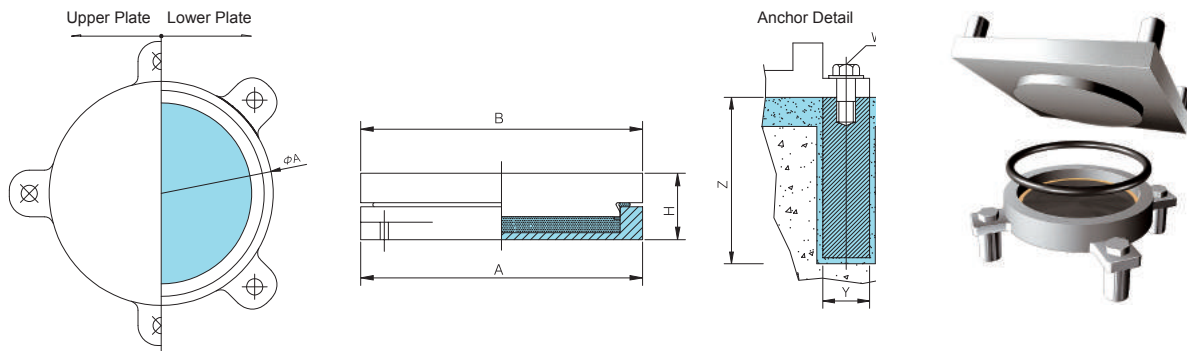
No.	Name	Material	Remark
1	Upper Plate	SM490 or SCMn2A	ASTM A572 Gr.50
2	Piston		
3	Pot		
4	Pad	CR or NR	Rubber
5	PTFE - Disk	P.T.FE	P.T.FE
6	Stainless Steel	STS 316	ASTM 167
7	Fixing Bolt	Grade 10.9	Grade 10.9
8	Anchor Socket	SS400	ASTM A570
9	Dust Seal	CR or NR	Rubber
10	Brass Ring	Brass	Brass

POT Bearing



POT Bearing - Fixed directional

S=NONE



Vertical Load Acceptance / Resistance to All Directional Horizontal Load / All Directional Rotation Acceptance



Dimensional Data - Fixed Directional

Design Load (kN)		Bearing Body Dimension (mm)				Anchorage Dimension (mm)			
Ver.	Hori.	H	A	B	P	w	y	z	n(EA)
500	50	55	220	220	189.5	16	40	100	4
	100	55	220	220	189.5	16	40	100	4
	150	56	220	220	189.5	16	40	100	4
	200	58	220	220	189.5	16	40	100	4
	250	59	220	220	189.5	16	40	100	4
1000	100	60	270	270	224.8	16	40	100	4
	200	61	270	270	224.8	16	40	100	4
	300	64	270	270	233.3	20	50	100	4
	400	66	270	270	233.3	20	50	120	4
	500	69	270	270	241.8	24	60	150	4
1500	150	64	320	320	260.2	16	40	100	4
	300	66	320	320	268.7	20	50	100	4
	450	69	320	320	268.7	20	50	120	4
	600	72	320	320	277.1	24	60	150	4
	750	76	328	328	295.5	30	75	150	4
2000	200	70	360	360	288.5	16	40	100	4
	400	72	360	360	296.9	20	50	120	4
	600	76	360	360	305.4	24	60	150	4
	800	81	372	372	326.6	30	75	150	4
	1000	86	382	382	333.7	30	75	180	4
2500	250	73	390	390	309.7	16	40	100	4
	500	75	390	390	326.6	24	60	150	4
	750	81	400	400	346.4	30	75	150	4
	1000	87	412	412	354.9	30	75	180	4
	1250	93	422	422	374.7	36	90	200	4
3000	300	78	422	422	340.8	20	50	100	4
	600	80	424	424	350.7	24	60	150	4
	900	87	440	440	374.7	30	75	180	4
	1200	93	452	452	395.9	36	90	180	4
	1500	100	464	464	404.4	36	90	220	4
3500	350	81	460	460	367.6	20	50	100	4
	700	84	460	460	388.8	30	75	180	4
	1050	92	478	478	414.3	36	90	200	4
	1400	99	492	492	424.2	36	90	220	4
	1750	106	506	506	446.8	42	105	220	4
4000	400	86	496	496	393.1	20	50	120	4
	800	88	496	496	414.3	30	75	150	4
	1200	97	514	514	439.7	36	90	180	4
	1600	104	530	530	463.8	42	105	250	4
	2000	111	544	544	473.7	42	105	250	4

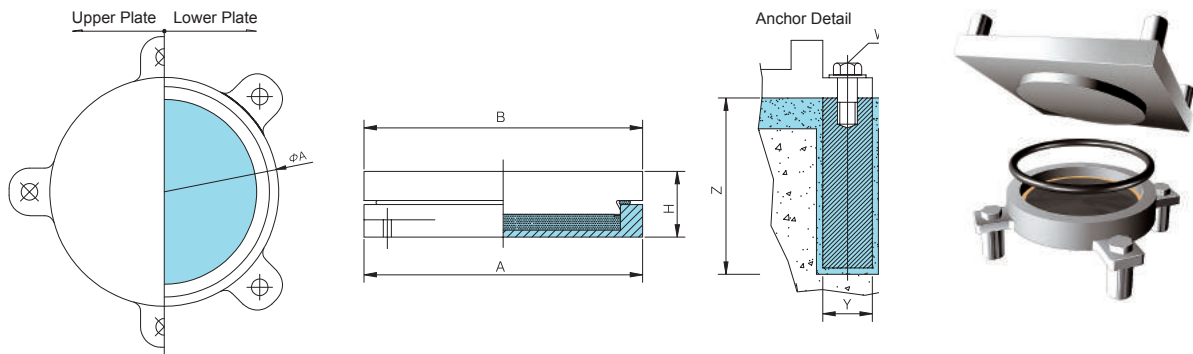
Design Load (kN)		Bearing Body Dimension (mm)				Anchorage Dimension (mm)			
Ver.	Hori.	H	A	B	P	w	y	z	n(EA)
4500	450	89	522	522	411.5	20	50	120	4
	900	92	522	522	432.7	30	75	180	4
	1350	100	542	542	459.5	36	90	200	4
	1800	108	560	560	485	42	105	250	4
	2250	117	576	576	509	48	120	280	4
5000	500	93	558	558	445.4	24	60	150	4
	1000	96	558	558	458.1	30	75	180	4
	1500	105	578	578	485	36	90	220	4
	2000	113	598	598	511.9	42	105	250	4
	2500	123	608	608	531.7	48	120	280	4
5500	550	96	582	582	462.4	24	60	120	4
	1100	99	584	584	489.2	36	90	200	4
	1650	110	606	606	517.5	42	105	250	4
	2200	118	622	622	541.6	48	120	280	4
	2750	128	638	638	569.8	56	140	300	4
6000	600	101	610	610	482.2	24	60	150	4
	1200	103	608	608	506.2	36	90	180	4
	1800	114	630	630	534.5	42	105	250	4
	2400	123	650	650	561.4	48	120	280	4
	3000	132	666	666	589.6	56	140	350	4
6500	650	104	630	630	496.3	24	60	150	4
	1300	108	632	632	523.2	36	90	200	4
	1950	119	654	654	551.5	42	105	250	4
	2600	129	676	676	579.7	48	120	300	4
	3250	138	692	692	608	56	140	320	4
7000	700	107	654	654	526	30	75	180	4
	1400	110	656	656	540.1	36	90	220	4
	2100	121	680	680	582.6	48	120	280	4
	2800	132	702	702	615.1	56	140	320	4
	3500	143	718	718	626.4	56	140	350	4
7500	750	111	680	680	544.4	30	75	150	4
	1500	115	678	678	555.7	36	90	220	4
	2250	127	704	704	599.5	48	120	280	4
	3000	137	726	726	632.1	56	140	350	4
	3750	147	744	744	644.9	56	140	350	4
8000	800	114	702	702	559.9	30	75	150	4
	1600	118	702	702	585.4	42	105	250	4
	2400	129	730	730	617.9	48	120	280	4
	3200	140	752	752	650.4	56	140	300	4
	4000	152	770	770	680.1	64	160	380	4

POT Bearing



POT Bearing - Fixed directional

S=NONE



Dimensional Data - Fixed Directional

Design Load (kN)		Bearing Body Dimension (mm)				Anchorage Dimension (mm)			
Ver.	Hori.	H	A	B	P	w	y	z	n(EA)
8500	850	116	726	726	576.9	30	75	150	4
	1700	120	726	726	602.4	42	105	220	4
	2550	134	752	752	633.5	48	120	280	4
	3400	145	776	776	667.4	56	140	320	4
	4250	155	798	798	699.9	64	160	350	4
9000	900	121	742	742	588.2	30	75	180	4
	1800	125	742	742	613.7	42	105	250	4
	2700	138	768	768	644.8	48	120	300	4
	3600	149	792	792	678.7	56	140	350	4
	4500	160	812	812	709.8	64	160	380	4
9500	950	124	762	762	602.4	30	75	180	4
	1900	128	762	762	627.8	42	105	250	4
	2850	140	794	794	680.1	56	140	320	4
	3800	153	816	816	712.6	64	160	380	4
	4750	164	838	838	728.2	64	160	400	4
10000	1000	126	788	788	620.7	30	75	180	4
	2000	130	788	788	646.2	42	105	250	4
	3000	143	816	816	695.7	56	140	320	4
	4000	156	842	842	731.1	64	160	380	4
	5000	168	862	862	751.0	64	160	380	6
11000	1100	131	824	824	659.0	36	90	200	4
	2200	136	824	824	691.6	48	120	280	4
	3300	150	824	824	722.7	56	140	320	4
	4400	163	882	882	759.4	64	160	380	4
	5500	176	904	904	786.0	64	160	380	6
12000	1200	136	860	860	684.5	36	90	180	4
	2400	140	860	860	724.1	48	120	280	4
	3600	156	894	894	750.9	56	140	350	4
	4800	169	920	920	786.3	64	160	400	4
	6000	182	944	944	811.3	64	160	400	6
13000	1300	141	898	898	711.3	36	90	200	4
	2600	146	898	898	736.8	48	120	300	4
	3900	161	930	930	793.4	64	160	380	4
	5200	177	958	958	820.2	64	160	380	6
	6500	189	982	982	847.0	64	160	380	6
14000	1400	145	932	932	735.4	36	90	220	4
	2800	150	932	932	777.8	56	140	280	4
	4200	167	968	968	820.2	64	160	400	4
	5600	181	1000	1000	868.0	64	160	380	6
	7000	194	1024	1024	894.0	64	160	400	6

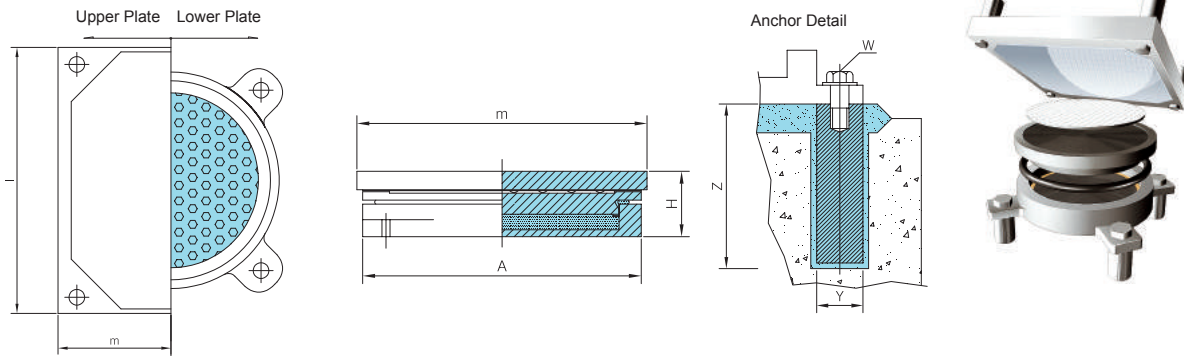
Design Load (kN)		Bearing Body Dimension (mm)				Anchorage Dimension (mm)			
Ver.	Hori.	H	A	B	P	w	y	z	n(EA)
15000	1500	151	958	958	753.8	36	90	220	4
	3000	157	958	958	796.2	56	140	350	4
	4500	172	996	996	840.0	64	160	380	4
	6000	188	1024	1024	868.0	64	160	380	6
	7500	202	1052	1052	894.0	64	160	380	8
18000	1800	164	1054	1054	834.4	42	105	250	4
	3600	169	1054	1054	864.1	56	140	350	4
	5400	188	1094	1094	901.0	56	140	350	6
	7200	204	1128	1128	928.0	64	160	400	6
	9000	220	1158	1158	954.0	64	160	380	8
20000	2000	171	1114	1114	876.8	42	105	250	4
	4000	177	1114	1114	923.5	64	160	380	4
	6000	197	1156	1156	974.0	64	160	380	6
	8000	214	1194	1194	1004.0	64	160	380	8
	2200	179	1154	1154	905.1	42	105	280	4
22000	4400	185	1154	1154	951.8	64	160	380	4
	6600	204	1202	1202	997.0	64	160	380	6
	8800	224	1238	1238	1028.0	64	160	380	8
	2400	187	1214	1214	960.3	48	120	280	4
	4800	194	1212	1212	992.8	64	160	400	4
24000	7200	214	1258	1258	1025.0	64	160	400	6
	9600	234	1300	1300	1057.5	64	160	400	8
	2600	193	1272	1272	1001.3	48	120	300	4
	5200	199	1272	1272	1020.0	56	140	350	6
	7800	221	1320	1320	1054.6	64	160	380	8
28000	2800	199	1330	1330	1059.2	56	140	350	4
	5600	206	1330	1330	1079.0	56	140	350	6
	8400	229	1380	1380	1115.8	64	160	400	8
	3000	206	1378	1378	1093.2	56	140	350	4
	6000	213	1378	1378	1115.0	64	160	380	6
30000	9000	237	1430	1430	1153.5	64	160	380	8
	3500	226	1574	1574	1231.8	56	140	350	4
	7000	233	1576	1576	1264.0	64	160	400	6
	4000	239	1682	1682	1325.1	64	160	380	4
	8000	248	1684	1684	1353.3	64	160	380	8
45000	4500	253	1770	1770	1387.3	64	160	380	4
	9000	262	1772	1772	1414.4	64	160	380	8
50000	5000	265	1874	1874	1521.0	56	140	320	6

POT Bearing



POT Bearing - Multi directional movable

S=NONE



Vertical Load Acceptance / All Directional Horizontal Load Acceptance / All Directional Rotation Acceptance



Dimensional Data - One Directional Movable

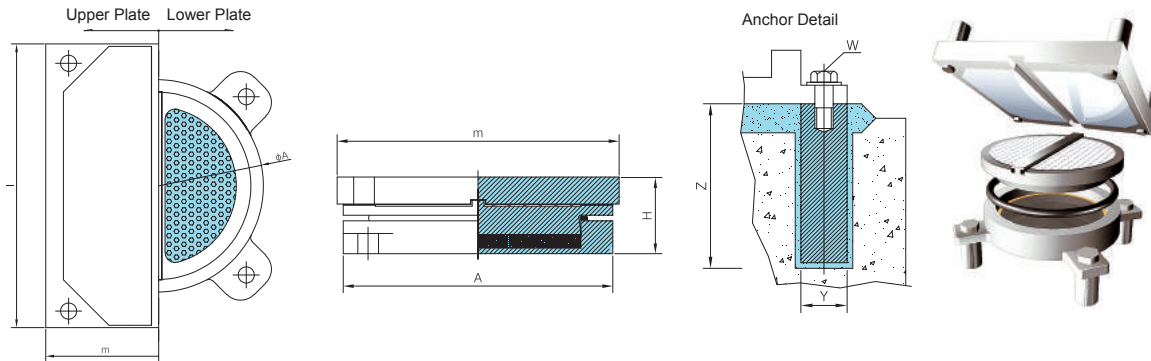
Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
500	-	±50	100	220	300	340	189.5	16	40	80	4
1000	-	±50	102	270	350	390	224.9	16	40	80	4
1500	-	±50	104	300	380	420	246.1	16	40	80	4
2000	-	±50	109	360	440	480	288.5	16	40	80	4
2500	-	±50	111	390	470	510	309.7	16	40	80	4
3000	-	±50	117	420	500	540	330.9	16	40	80	4
3500	-	±50	119	450	530	570	360.6	20	50	80	4
4000	-	±50	121	480	560	600	381.8	20	50	80	4
4500	-	±50	127	500	580	620	396.0	20	50	80	4
5000	-	±50	129	540	620	660	424.3	20	50	80	4
5500	-	±50	130	560	640	680	446.9	24	60	100	4
6000	-	±50	131	590	670	710	468.1	24	60	100	4
6500	-	±50	135	610	690	730	482.2	24	60	100	4
7000	-	±50	136	630	710	750	496.4	24	60	100	4
7500	-	±50	139	660	740	780	517.6	24	60	100	4
8000	-	±50	140	680	760	800	544.5	30	75	120	4
8500	-	±50	141	700	780	820	558.6	30	75	120	4
9000	-	±50	149	720	800	840	572.8	30	75	120	4
9500	-	±50	155	740	820	860	586.9	30	75	120	4
10000	-	±50	157	760	840	880	601.0	30	75	120	4
15000	-	±50	175	930	1010	1050	734.0	36	90	150	4
16000	-	±50	183	960	1040	1080	755.2	36	90	150	4
17000	-	±50	185	990	1070	1110	776.4	36	90	150	4
18000	-	±50	187	1020	1100	1140	810.3	42	105	150	4
19000	-	±50	188	1050	1130	1170	831.6	42	105	150	4
20000	-	±50	191	1080	1160	1200	852.8	42	105	150	4
25000	-	±50	213	1205	1285	1325	947.5	45	113	165	4
30000	-	±50	230	1330	1410	1450	1042.3	48	120	180	4
35000	-	±50	252	1530	1610	1650	1200.7	56	140	200	4
40000	-	±50	265	1630	1710	1750	1271.4	56	140	200	4
45000	-	±50	281	1720	1800	1840	1352.0	64	160	220	4
50000	-	±50	304	1820	1900	1940	1422.7	64	160	220	4

POT Bearing



POT Bearing - One directional movable

S=NONE



Vertical Load Acceptance / Acceptance & Resistance to One Directional Horizontal Load / All Directional Rotation Acceptance



Dimensional Data - One Directional Movable

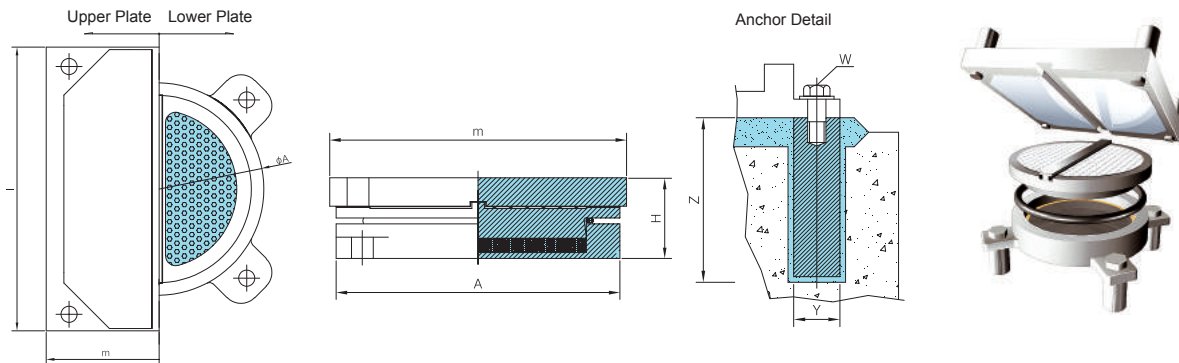
Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
500	50	±50	86	220	300	340	189.5	16	40	100	4
	100	±50	88	220	300	340	189.5	16	40	100	4
	150	±50	93	220	300	340	189.5	16	40	100	4
	200	±50	98	220	300	340	189.5	16	40	100	4
	250	±50	105	220	300	340	189.5	16	40	100	4
1000	100	±50	94	270	350	390	224.8	16	40	100	4
	200	±50	98	270	350	390	224.8	16	40	100	4
	300	±50	107	270	350	390	233.3	20	50	100	4
	400	±50	121	270	350	390	233.3	20	50	120	4
	500	±50	124	270	380	420	241.8	24	60	150	4
1500	150	±50	100	320	400	440	260.2	16	40	100	4
	300	±50	105	320	400	440	268.7	20	50	100	4
	450	±50	114	320	400	440	268.7	20	50	120	4
	600	±50	133	320	400	440	277.1	24	60	150	4
	750	±50	151	328	408	488	295.5	30	75	150	4
2000	200	±50	108	360	440	480	288.5	16	40	100	4
	400	±50	113	360	440	480	296.9	20	50	120	4
	600	±50	127	360	440	480	305.4	24	60	150	4
	800	±50	142	372	450	510	326.6	30	75	150	4
	1000	±50	161	382	460	510	333.7	30	75	180	4
2500	250	±50	113	390	470	510	309.7	16	40	100	4
	500	±50	120	390	470	510	326.6	24	60	150	4
	750	±50	135	400	480	520	346.4	30	75	150	4
	1000	±50	156	412	492	532	354.9	30	75	180	4
	1250	±50	183	422	502	592	374.7	36	90	200	4
3000	300	±50	118	422	504	544	340.8	20	50	100	4
	600	±50	125	424	504	544	350.7	24	60	150	4
	900	±50	143	440	520	560	374.7	30	75	180	4
	1200	±50	168	452	532	602	395.9	36	90	180	4
	1500	±50	179	464	544	614	404.4	36	90	220	4
3500	350	±50	122	460	542	582	367.6	20	50	100	4
	700	±50	131	460	540	580	388.8	30	75	180	4
	1050	±50	151	478	558	608	414.3	36	90	200	4
	1400	±50	170	492	574	624	424.2	36	90	220	4
	1750	±50	205	506	586	686	446.8	42	105	220	4
4000	400	±50	126	496	578	618	393.1	20	50	120	4
	800	±50	136	496	576	616	414.3	30	75	150	4
	1200	±50	155	514	596	636	439.7	36	90	180	4
	1600	±50	176	530	612	702	463.8	42	105	250	4
	2000	±50	208	544	626	706	473.7	42	105	250	4

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
4500	450	±50	128	522	604	644	411.5	20	50	120	4
	900	±50	140	522	604	644	432.7	30	75	180	4
	1350	±50	162	542	624	664	459.5	36	90	200	4
	1800	±50	183	560	668	728	485	42	105	250	4
	2250	±50	206	576	682	792	509	48	120	280	4
5000	500	±50	134	558	638	678	445.4	24	60	150	4
	1000	±50	146	558	638	678	458.1	30	75	180	4
	1500	±50	169	578	660	700	485	36	90	220	4
	2000	±50	191	598	676	726	511.9	42	105	250	4
	2500	±50	232	608	690	800	531.7	48	120	280	4
5500	550	±50	136	582	664	704	462.4	24	60	120	4
	1100	±50	151	584	664	704	489.2	36	90	200	4
	1650	±50	177	606	686	726	517.5	42	105	250	4
	2200	±50	200	622	702	802	541.6	48	120	280	4
	2750	±50	242	638	718	888	569.8	56	140	300	4
6000	600	±50	143	610	686	726	482.2	24	60	150	4
	1200	±50	156	608	686	726	506.2	36	90	180	4
	1800	±50	181	630	710	750	534.5	42	105	250	4
	2400	±50	206	650	728	818	561.4	48	120	280	4
	3000	±50	250	666	744	904	589.6	56	140	350	4
6500	650	±50	146	630	712	752	496.3	24	60	150	4
	1300	±50	160	632	712	752	523.2	36	90	200	4
	1950	±50	188	654	736	776	551.5	42	105	250	4
	2600	±50	214	676	754	824	579.7	48	120	300	4
	3250	±50	262	692	772	922	608	56	140	320	4
7000	700	±50	147	654	738	788	526	30	75	180	4
	1400	±50	165	656	736	776	540.1	36	90	220	4
	2100	±50	194	680	760	820	582.6	48	120	280	4
	2800	±50	222	702	782	922	615.1	56	140	320	4
	3500	±50	270	718	798	928	626.4	56	140	350	4
7500	750	±50	154	680	760	800	544.4	30	75	150	4
	1500	±50	170	678	760	800	555.7	36	90	220	4
	2250	±50	119	704	786	836	599.5	48	120	280	4
	3000	±50	231	726	806	926	632.1	56	140	350	4
	3750	±50	272	744	826	1006	644.9	56	140	350	4
8000	800	±50	157	702	784	824	559.9	30	75	150	4
	1600	±50	174	702	784	824	585.4	42	105	250	4
	2400	±50	203	730	810	850	617.9	48	120	280	4
	3200	±50	237	752	832	942	650.4	56	140	300	4
	4000	±50	281	770	850	1020	680.1	64	160	380	4

POT Bearing

POT Bearing - One directional movable

S=NONE



Dimensional Data - One Directional Movable

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	I	P	w	y	z	n(EA)
8500	850	±50	160	726	808	848	576.9	30	75	150	4
	1700	±50	179	726	806	846	602.4	42	105	220	4
	2550	±50	210	752	834	874	633.5	48	120	280	4
	3400	±50	244	776	856	896	667.4	56	140	320	4
	4250	±50	284	798	878	918	699.9	64	160	350	4
9000	900	±50	165	742	822	862	588.2	30	75	180	4
	1800	±50	182	742	822	862	613.7	42	105	250	4
	2700	±50	216	768	848	888	644.8	48	120	300	4
	3600	±50	252	792	872	912	678.7	56	140	350	4
	4500	±50	304	812	892	932	709.8	64	160	380	4
9500	950	±50	168	762	846	886	602.4	30	75	180	4
	1900	±50	188	762	844	884	627.8	42	105	250	4
	2850	±50	220	794	874	914	660.1	56	140	320	4
	3800	±50	258	816	896	936	695.7	64	160	380	4
	4750	±50	300	838	918	958	728.2	64	160	400	4
10000	1000	±50	171	788	870	910	620.7	30	75	180	4
	2000	±50	190	788	868	908	646.2	42	105	250	4
	3000	±50	224	816	896	936	665.7	56	140	320	4
	4000	±50	264	842	924	964	691.1	64	160	380	4
	5000	±50	307	862	944	984	715.0	64	160	400	6
11000	1100	±50	177	824	906	946	659.0	36	90	200	4
	2200	±50	197	824	906	946	691.6	48	120	280	4
	3300	±50	232	824	936	976	722.7	56	140	320	4
	4400	±50	274	882	962	1002	759.4	64	160	380	4
	5500	±50	319	904	984	1026	796.0	64	160	400	6
12000	1200	±50	184	860	942	982	684.5	36	90	180	4
	2400	±50	205	860	940	980	724.1	48	120	280	4
	3600	±50	242	894	974	1014	759.9	56	140	350	4
	4800	±50	287	920	1000	1040	796.3	64	160	400	4
	6000	±50	333	944	1044	1088	832.0	64	160	400	6
13000	1300	±50	189	898	978	1018	711.3	36	90	200	4
	2600	±50	211	898	978	1018	736.8	48	120	300	4
	3900	±50	251	930	1010	1050	773.4	64	160	380	4
	5200	±50	297	958	1038	1078	805.0	64	160	350	6
	6500	±50	343	982	1062	1102	836.0	64	160	380	6
14000	1400	±50	193	932	1016	1056	735.4	36	90	220	4
	2800	±50	213	932	1014	1054	777.8	56	140	280	4
	4200	±50	256	968	1048	1088	802.0	64	160	400	4
	5600	±50	306	1000	1080	1120	834.0	56	140	350	6
	7000	±50	353	1024	1104	1144	860.0	64	160	400	6

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	I	P	w	y	z	n(EA)
15000	1500	±50	200	958	1042	1082	753.8	36	90	220	4
	3000	±50	224	958	1040	1080	796.2	56	140	350	4
	4500	±50	268	996	1076	1126	840.0	64	160	380	4
	6000	±50	318	1024	1132	1146	868.0	64	160	380	6
	7500	±50	369	1052	1160	1196	896.0	56	140	350	8
18000	1800	±50	215	1054	1138	1178	834.4	42	105	250	4
	3600	±50	242	1054	1136	1176	864.1	56	140	350	4
	5400	±50	290	1094	1178	1216	896.0	56	140	350	6
	7200	±50	346	1128	1234	1248	928.0	64	160	400	6
	9000	±50	400	1158	1264	1296	960.0	64	160	380	8
20000	2000	±50	225	1114	1198	1238	876.8	42	105	250	4
	4000	±50	252	1114	1194	1234	923.5	64	160	380	4
	6000	±50	305	1156	1244	1278	954.0	64	160	380	6
	8000	±50	364	1194	1300	1320	980.0	64	160	380	8
	10000	±50	420	1234	1354	1378	1000.0	64	160	380	8
22000	2200	±50	232	1154	1240	1280	905.1	42	105	280	4
	4400	±50	261	1154	1238	1278	951.8	64	160	380	4
	6600	±50	319	1202	1280	1322	997.0	64	160	380	6
	8800	±50	381	1238	1314	1346	1028.0	64	160	380	8
	11000	±50	440	1278	1354	1382	1054.0	64	160	380	8
24000	2400	±50	242	1214	1296	1336	960.3	48	120	280	4
	4800	±50	272	1212	1294	1334	992.8	64	160	400	4
	7200	±50	333	1258	1346	1382	1028.0	64	160	400	6
	9600	±50	397	1300	1396	1432	1054.0	64	160	400	8
	12000	±50	460	1340	1440	1476	1080.0	64	160	400	8
26000	2600	±50	249	1272	1354	1394	1001.3	48	120	300	4
	5200	±50	280	1272	1352	1392	1032.0	56	140	350	6
	7800	±50	344	1320	1408	1448	1058.0	64	160	380	8
	10400	±50	408	1360	1456	1496	1084.0	64	160	380	8
	13000	±50	472	1400	1504	1544	1110.0	64	160	380	8
28000	2800	±50	259	1330	1412	1452	1059.2	56	140	350	4
	5600	±50	289	1330	1410	1450	1090.0	56	140	350	6
	8400	±50	354	1380	1460	1500	1116.0	64	160	400	8
	11200	±50	418	1420	1510	1550	1142.0	64	160	400	8
	14000	±50	482	1460	1560	1600	1168.0	64	160	400	8
30000	3000	±50	265	1378	1460	1500	1093.2	56	140	350	4
	6000	±50	297	1378	1458	1498	1124.0	56	140	350	6
	9000	±50	365	1430	1518	1558	1150.0	64	160	380	8
	12000	±50	430	1470	1558	1598	1176.0	64	160	380	8
	15000	±50	494	1510	1600	1640	1202.0	64	160	380	8
35000	3500	±50	286	1574	1658	1698	1231.8	56	140	350	4
	7000	±50	320	1576	1660	1700	1262.0	56	140	350	6
	10500	±50	354	1620	1704	1744	1288.0	64	160	380	8
	14000	±50	388	1660	1744	1784	1314.0	64	160	380	8
	17500	±50	422	1700	1784	1824	1340.0	64	160	380	8
45000	4500	±50	318	1770	1854	1894	1387.3	64	160	380	4
	9000	±50	357	1772	1856	1896	1418.0	64	160	380	6
	13500	±50	396	1812	1896	1936	1444.0	64	160	380	8
	18000	±50	435	1852	1936	1976	1470.0	64	160	380	8
	22500	±50	474	1892	1976	2016	1496.0	64	160	380	8
50000	5000	±50	332	1874	1928	1968	1412.0	56	140	320	6

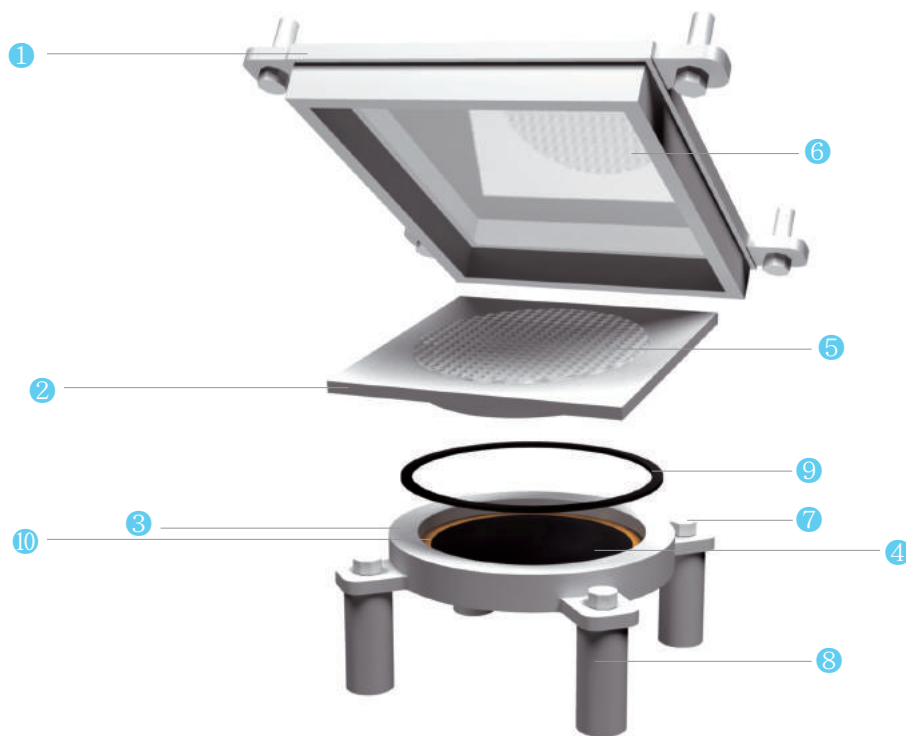
POT Bearing with Anti-Bridge Device

POT Bearing with Anti-Bridge Device

Special feature

- Much lowered height than normal POT bearing. (suitable for narrow-space job site)
- Guide bar in the edge of the upper plate prevents bridge - falling.
- Suitable for a big vertical load and available for all-direction rotation.

Part Details & Material

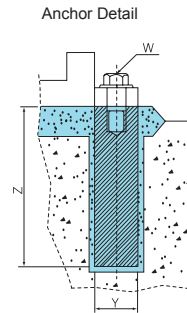
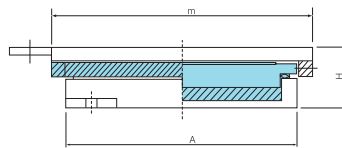
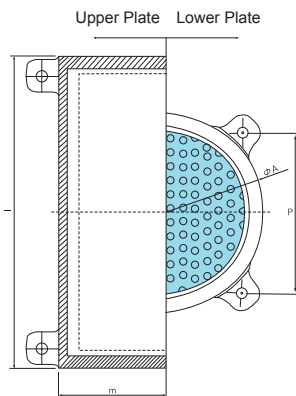


No.	Name	Material	Remark
1	Upper Plate	SM490 or SCMn2A	ASTM A572 Gr.50
2	Piston		
3	Pot		
4	Pad	CR or NR	Rubber
5	PTFE -Disk	P.T.FE	P.T.FE
6	Stainless Steel	STS 316	ASTM 167
7	Fixing Bolt	Grade 10.9	Grade 10.9
8	Anchor Socket	SS400	ASTM A570
9	Dust Seal	CR or NR	Rubber
10	Brass Ring	Brass	Brass

POT Bearing with Anti-Bridge Device

POT Bearing with Anti-Bridge Device

S=NONE



Vertical Load Acceptance / Acceptance & Resistance to One Directional Horizontal Load / All Directional Rotation Acceptance

Dimensional Data - One Directional Movable

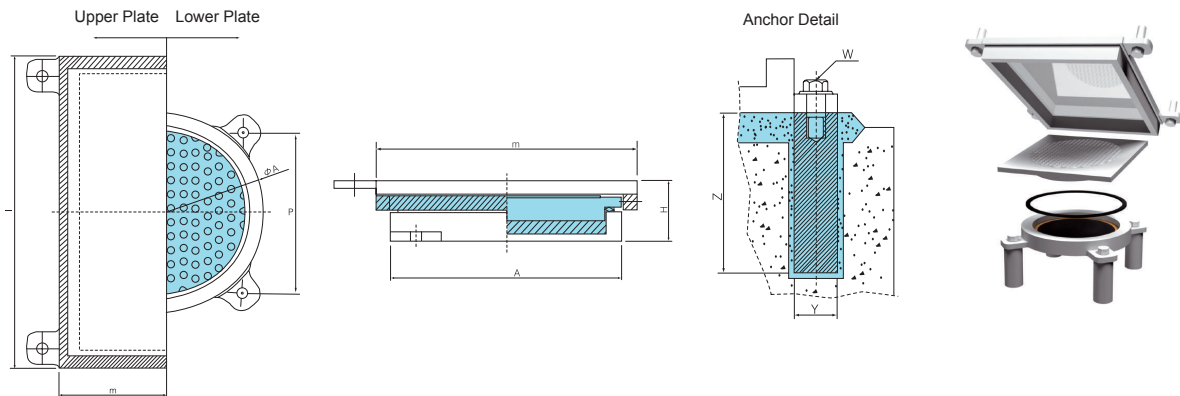
Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
500	50	±50	84	220	280	360	181.0	12	30	80	4
	100	±50	86	220	280	360	181.0	12	30	80	4
	150	±50	89	220	290	360	189.5	16	40	100	4
	200	±50	93	220	290	360	189.5	16	40	100	4
	250	±50	98	220	300	360	189.5	16	40	100	4
1000	100	±50	90	260	320	400	209.3	12	30	80	4
	200	±50	92	260	330	400	217.8	16	40	100	4
	300	±50	100	260	340	400	226.3	20	50	100	4
	400	±50	108	270	350	410	233.3	20	50	120	4
	500	±50	114	280	370	430	248.9	24	60	120	4
1500	150	±50	95	300	360	440	246.1	16	40	100	4
	300	±50	100	300	370	440	254.6	20	50	100	4
	450	±50	108	320	400	460	277.2	24	60	120	4
	600	±50	117	320	410	470	277.2	24	60	150	4
	750	±50	128	330	430	480	290.6	27	67.5	180	4
2000	200	±50	100	340	410	480	274.4	16	40	100	4
	400	±50	106	340	420	480	282.8	20	50	120	4
	600	±50	117	360	450	510	305.5	24	60	150	4
	800	±50	128	370	460	520	325.3	30	7.5	150	4
	1000	±50	137	380	480	530	338.7	33	82.5	180	4
2500	250	±50	103	380	450	530	302.6	16	40	100	4
	500	±50	110	380	460	530	319.6	24	60	100	4
	750	±50	125	390	480	540	339.4	30	75	150	4
	1000	±50	138	400	500	550	352.8	33	82.5	150	4
	1250	±50	147	420	530	570	373.4	36	90	200	4
3000	300	±50	105	410	480	560	332.3	20	50	100	4
	600	±50	115	420	500	570	347.9	24	60	150	4
	900	±50	130	440	530	590	374.8	30	75	180	4
	1200	±50	145	450	550	600	394.6	36	90	180	4
	1500	±50	160	460	580	610	408.0	39	97.5	200	4

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
3500	350	±50	110	440	510	590	353.6	20	50	100	4
	700	±50	115	450	530	600	375.5	27	67.5	150	4
	1050	±50	135	460	560	610	395.3	33	82.5	200	4
	1400	±50	150	480	590	630	415.8	36	90	220	4
	1750	±50	170	500	620	650	442.6	42	105	220	4
4000	400	±50	118	480	550	630	381.8	20	50	120	4
	800	±50	125	490	580	640	410.1	30	75	150	4
	1200	±50	140	510	610	660	437.0	36	90	180	4
	1600	±50	155	520	630	670	450.4	39	97.5	220	4
	2000	±50	175	540	670	690	477.3	45	112.5	250	4
4500	450	±50	120	500	580	650	404.5	24	60	120	4
	900	±50	135	510	600	660	424.3	30	75	180	4
	1350	±50	150	540	640	690	458.2	36	90	200	4
	1800	±50	165	560	680	710	485.1	42	105	230	4
	2250	±50	180	570	700	720	504.9	48	120	250	4
5000	500	±50	125	530	610	690	425.7	24	60	120	4
	1000	±50	135	550	640	710	458.9	33	83	180	4
	1500	±50	150	570	680	730	485.8	39	98	200	4
	2000	±50	170	590	710	750	512.7	45	113	250	4
	2500	±50	190	600	740	760	526.1	48	120	280	4
5500	550	±50	127	560	640	720	446.9	24	60	120	4
	1100	±50	140	580	670	740	480.1	33	83	180	4
	1650	±50	160	600	710	760	513.4	42	105	200	4
	2200	±50	185	620	740	780	540.2	48	120	200	4
	2750	±50	205	630	770	790	555.8	52	130	280	4
6000	600	±50	130	580	660	750	461.0	24	60	150	4
	1200	±50	145	600	700	770	500.6	36	90	180	4
	1800	±50	170	620	730	790	527.5	42	105	220	4
	2400	±50	190	630	760	800	547.3	48	120	270	4
	3000	±50	210	660	800	830	585.5	56	140	270	4

POT Bearing with Anti-Bridge Device

POT Bearing with Anti-Bridge Device

S=NONE



Dimensional Data - One Directional Movable

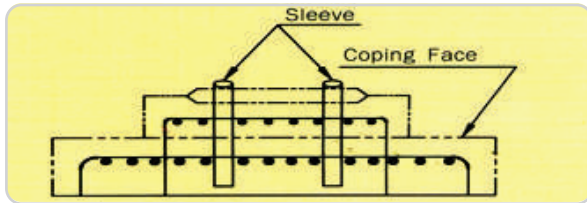
Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
6500	650	±50	135	610	690	780	488.6	27	68	150	4
	1300	±50	150	630	730	800	521.8	36	90	200	4
	1950	±50	175	650	760	820	555.1	45	113	220	4
	2600	±50	190	670	800	840	584.1	52	130	220	4
	3250	±50	215	690	840	860	606.7	56	140	300	4
7000	700	±50	137	620	700	810	495.7	27	68	150	4
	1400	±50	155	650	750	820	536.0	36	90	200	4
	2100	±50	180	680	800	850	576.3	45	113	250	4
	2800	±50	200	690	830	860	598.2	52	130	280	4
	3500	±50	225	720	870	890	638.4	60	150	300	4
7500	750	±50	139	650	730	820	516.9	27	68	150	4
	1500	±50	160	680	780	850	563.6	39	98	200	4
	2250	±50	180	700	820	870	590.4	45	113	250	4
	3000	±50	205	730	860	900	626.5	52	130	300	4
	3750	±50	225	760	900	930	664.7	60	150	320	4
8000	800	±50	140	670	750	840	537.4	30	75	150	4
	1600	±50	160	690	790	860	570.6	39	98	220	4
	2400	±50	185	720	840	890	610.9	48	120	250	4
	3200	±50	210	740	880	910	642.1	56	140	300	4
	4000	±50	235	760	920	930	664.7	60	150	350	4
8500	850	±50	142	690	770	860	551.5	30	75	150	4
	1700	±50	165	720	820	890	598.2	42	105	220	4
	2550	±50	185	740	860	910	633.6	52	130	250	4
	3400	±50	210	770	910	940	663.3	56	140	300	4
	4250	±50	235	790	950	960	694.4	64	160	330	4
9000	900	±50	144	700	780	870	558.6	30	75	150	4
	1800	±50	170	730	830	900	605.3	42	105	220	4
	2700	±50	190	760	890	930	647.7	52	130	280	4
	3600	±50	220	790	940	960	685.9	60	150	300	4
	4500	±50	245	810	980	980	708.5	64	160	350	4

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.		H	A	m	l	P	w	y	z	n(EA)
10000	1000	±50	148	740	820	910	593.3	33	82.5	170	4
	2000	±50	170	780	890	950	647.0	45	112.5	230	4
	3000	±50	200	800	930	970	676.0	52	130	300	4
	4000	±50	230	830	980	1000	722.7	64	160	320	4
	5000	±50	255	840	1010	1010	738.2	68	170	380	4
11000	1100	±50	153	780	860	950	621.5	33	82.5	170	4
	2200	±50	175	810	920	980	668.2	45	112.5	250	4
	3300	±50	210	840	970	1010	712.8	56	140	300	4
	4400	±50	235	860	1020	1030	743.9	64	160	350	4
	5500	±50	260	880	1060	1050	775.0	72	180	400	4
12000	1200	±50	161	810	900	980	642.8	33	82.5	200	4
	2400	±50	190	840	950	1010	695.8	48	120	270	4
	3600	±50	220	880	1010	1050	749.5	60	150	320	4
	4800	±50	250	900	1060	1070	780.6	68	170	380	4
	6000	±50	280	930	1110	1100	818.8	76	190	400	4
13000	1300	±50	165	840	930	1010	670.3	36	90	200	4
	2600	±50	190	880	990	1050	732.6	52	130	270	4
	3900	±50	225	910	1050	1080	770.7	60	150	330	4
	5200	±50	260	940	1110	1110	808.9	68	170	380	4
	6500	±50	290	970	1170	1140	855.6	80	200	400	4
14000	1400	±50	169	880	970	1050	698.6	36	90	200	4
	2800	±50	195	920	1040	1090	760.8	52	130	280	4
	4200	±50	235	950	1090	1120	807.5	64	160	330	4
	5600	±50	265	980	1150	1150	845.7	72	180	400	4
	7000	±50	300	1000	1200	1170	876.8	80	200	400	4
15000	1500	±50	176	910	1000	1080	726.2	39	97.5	200	4
	3000	±50	205	950	1070	1120	782.1	52	130	300	4
	4500	±50	240	990	1140	1160	835.8	64	160	350	4
	6000	±50	275	1020	1190	1190	882.5	76	190	400	4
	7500	±50	305	1050	1250	1240	927.0	88	210	450	6

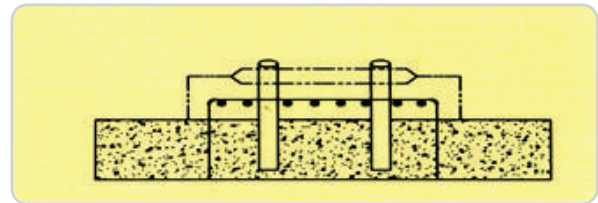
POT Bearing with Anti-Bridge Device



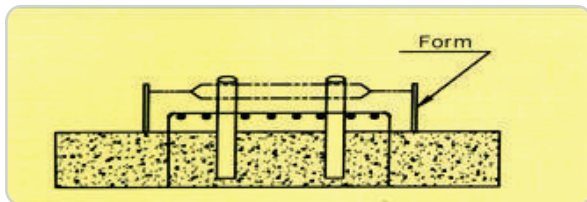
Installation Order of Pot Bearing



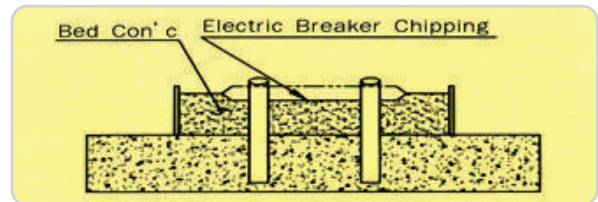
1. drive sleeves into coping face



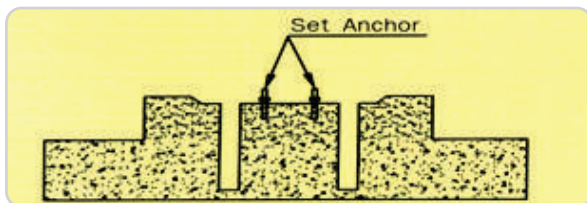
2. deposit concrete into coping face



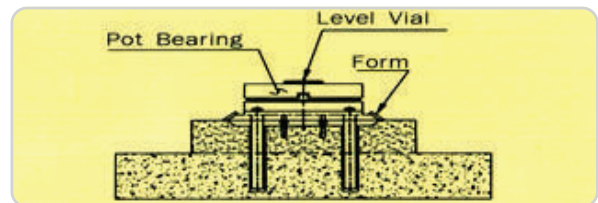
3. form work for bed concrete



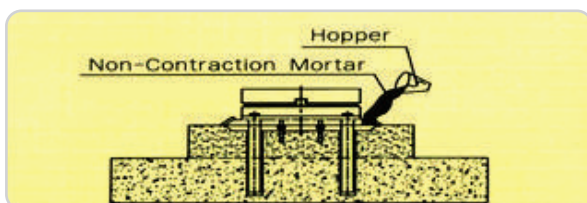
4. deposit bed concrete



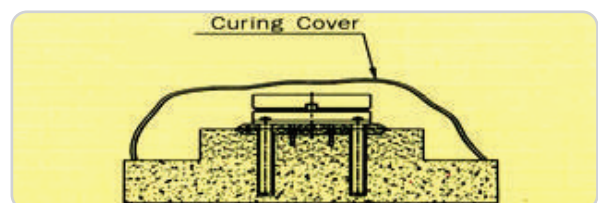
5. remove bed concrete form & sleeves and drive set anchors



6. horizontally install pot bearing with anchor sockets assembled



7. deposit non-contraction mortar by hopper



8. cure concrete with vinyl or curing cover



Advance Preparations

1. secure storage yard from main contractor for safe and easy organization, storage and installation of bridge bearings.
2. basically, installation schedule should be fixed 10 days before commitment of operators.
3. before installation of bridge bearing and anchor bolts, measured data like location and height should be fully informed and recognized.
4. based on measured coordinates like location and height of bridge bearing and anchor bolts, if any irregularities are checked in already-installed block-out or rebar, discuss with main contractor and supervisory corporation and compensate the irregularities.
5. before installation, site conditions and drawings should be fully recognized.

DISK Bearing



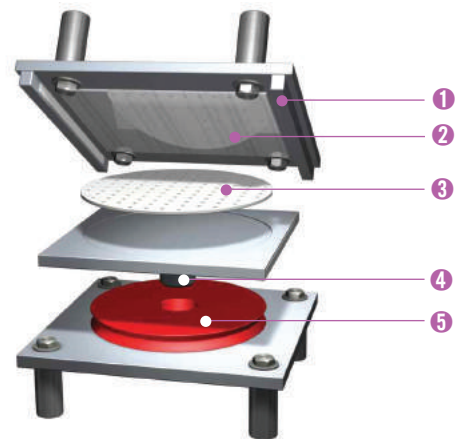
Disk Bearing

The disk bearing developed 30 years ago in the United States is the product by applying the main components of polyurethane have excellent durability and excellent seismic performance. The structural behavior of the form is similar to the POT bearings.

However pot disadvantages such as reduced durability due to leakage and damage to the rubber plate was improved.

● Product constitution and role

- ① Guide bar : The direction of movement restrictions.
- ② Stainless plate : Behavior accommodate expansion and contraction of the bridge.
- ③ PTFE : Behavior accommodate expansion and contraction of the bridge.
- ④ Shear pin : Horizontal force resistance.
- ⑤ Polyurethane disk : Load-bearing and rotating strain acceptance



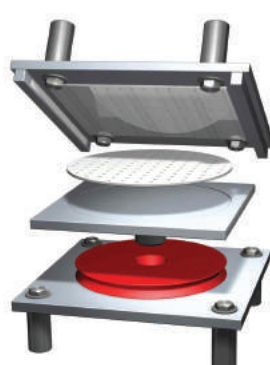
● Special feature

- It is easy to secure edge distance because the size of the Bearing is small.
It is advantageous when replacing bearings.
- Excellent durability
It is excellent in the resistance to various kinds of extreme conditions, such as ozone or chemicals, air pollution, water, corrosion, temperature changes.
- Easy Maintenance
The main parts of polyurethane disk is observed for damage because it is exposed to the outside from the outside easily.
- Economically superior products
The bearing the entire structure is simple, and is small size.

● Disktron Type



[Fixed directional]



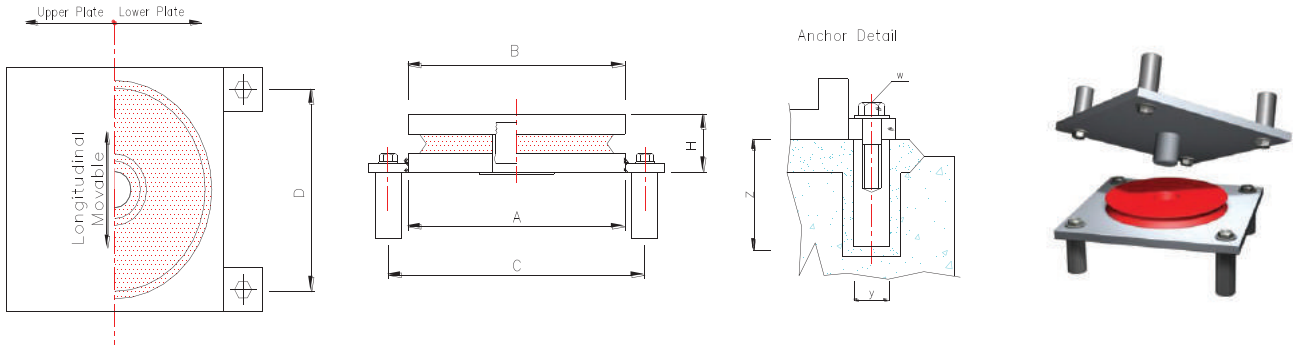
[One directional movable]



[Multi directional movable]

DISK Bearing

DISK Bearing - Fixed directional



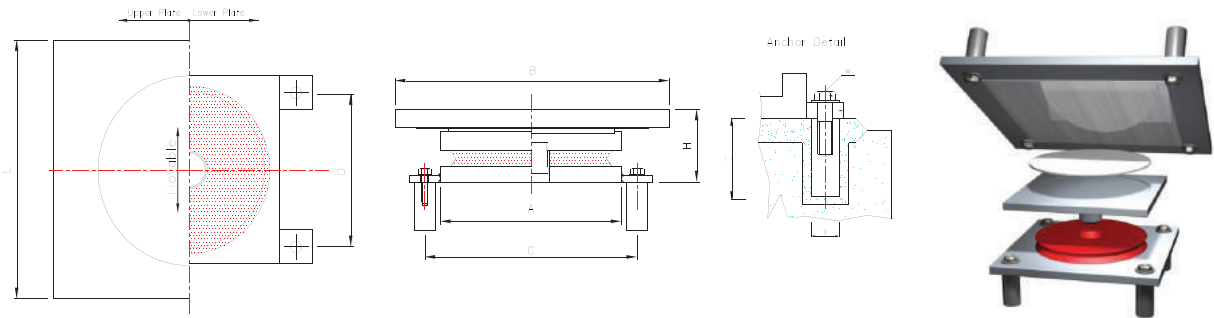
Dimensional Data - Fixed Directional

Design Load (kN)		Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.	A	B	C	D	H	M	a	l	n(EA)
500	100	220	220	270	170	59	16	40	110	4
	150	220	220	270	170	59	16	40	110	4
	200	230	230	280	180	62	16	40	110	4
750	75	240	240	290	190	60	16	40	110	4
	150	240	240	290	190	61	16	40	110	4
	225	240	240	290	190	64	16	40	110	4
1000	100	260	260	310	210	63	16	40	110	4
	200	260	260	310	210	65	16	40	110	4
	300	280	280	340	220	73	20	50	110	4
1350	135	290	290	340	240	68	16	40	110	4
	270	300	300	360	240	74	20	50	110	4
	405	320	320	390	250	86	24	60	150	4
1500	150	300	300	350	250	70	16	40	110	4
	300	310	310	370	250	75	20	50	110	4
	450	330	330	400	260	87	24	60	120	4
1750	175	330	330	380	280	74	16	40	110	4
	350	330	330	390	270	82	20	50	120	4
	525	330	330	400	260	94	24	60	150	4
2000	200	350	350	400	300	79	16	40	110	4
	400	350	350	410	290	88	20	50	150	4
	600	390	390	475	305	99	30	75	150	4
2500	250	380	380	430	330	85	16	40	110	4
	500	380	380	450	310	96	24	60	150	4
	750	410	410	495	325	108	30	75	180	4
3000	300	410	410	470	350	91	20	50	110	4
	600	410	410	495	325	105	30	75	180	4
	900	440	440	525	355	110	30	75	200	4
3500	350	440	440	500	380	100	20	50	120	4
	700	460	460	545	375	112	30	75	180	4
	1050	490	490	590	390	119	36	90	200	4
4000	400	470	470	530	410	105	20	50	150	4
	800	480	480	565	395	114	30	75	180	4
	1200	510	510	610	410	124	36	90	220	4
4500	450	500	500	570	430	112	24	60	120	4
	900	510	510	595	425	124	30	75	200	4
	1350	540	540	640	440	131	36	90	250	4
5000	500	530	530	600	460	117	24	60	150	4
	1000	550	550	650	450	122	36	90	200	4
	1500	580	580	705	455	133	42	105	250	4
5500	550	550	550	620	480	121	24	60	150	4
	1100	570	570	670	470	131	36	90	200	4
	1650	600	600	725	475	142	42	105	250	4

Design Load (kN)		Bearing Body Dimension (mm)					Anchorage Dimension (mm)			
Ver.	Hori.	A	B	C	D	H	M	a	l	n(EA)
6000	600	580	580	665	495	128	30	75	150	4
	1200	600	600	700	500	135	36	90	220	4
	1800	620	620	745	495	148	42	105	280	4
6500	650	610	610	695	525	134	30	75	150	4
	1300	630	630	730	530	141	36	90	250	4
	1950	670	670	810	530	162	48	120	280	4
7000	700	630	630	715	545	139	30	75	150	4
	1400	650	650	775	525	147	42	105	220	4
	2100	690	690	830	550	164	48	120	300	4
7500	750	660	660	745	575	142	30	75	180	4
	1500	670	670	795	545	152	42	105	250	4
	2250	700	700	840	560	169	48	120	300	4
8000	800	690	690	775	605	149	30	75	180	4
	1600	700	700	825	575	158	42	105	250	4
	2400	720	720	860	580	175	48	120	320	4
8500	850	700	700	785	615	151	30	75	180	4
	1700	720	720	845	595	159	42	105	280	4
	2550	770	770	930	610	180	56	140	300	4
9000	900	730	730	815	645	156	30	75	200	4
	1800	750	750	875	625	162	42	105	280	4
	2700	780	780	940	620	177	56	140	320	4
9500	950	750	750	850	650	158	36	90	180	4
	1900	770	770	910	630	165	48	120	250	4
	2850	800	800	960	640	175	56	140	350	4
10000	1000	770	770	870	670	161	36	90	180	4
	2000	790	790	930	650	170	48	120	280	4
	3000	810	810	970	650	181	56	140	350	4
11000	1100	810	810	910	710	171	36	90	220	4
	2200	830	830	970	690	179	48	120	300	4
	12000	850	850	950	750	177	36	90	220	4
12000	2400	870	870	1010	730	183	48	120	350	4
	13000	880	880	980	780	183	36	90	250	4
	2600	910	910	1070	750	190	56	140	300	4
14000	1400	910	910	1035	785	190	42	105	220	4
	2800	950	950	1110	790	195	56	140	350	4
	15000	950	950	1075	825	197	42	105	250	4
15000	3000	980	980	1140	820	202	56	140	350	4
	20000	1110	1110	1250	970	227	48	120	280	4
	4000	1140	1140	1320	960	231	64	160	400	4
25000	2500	1230	1230	1370	1090	252	48	120	350	6
	5000	1260	1260	1440	1080	256	64	160	350	6
	30000	1380	1380	1540	1220	281	56	140	350	4

DISK Bearing

DISK Bearing - Multi directional movable

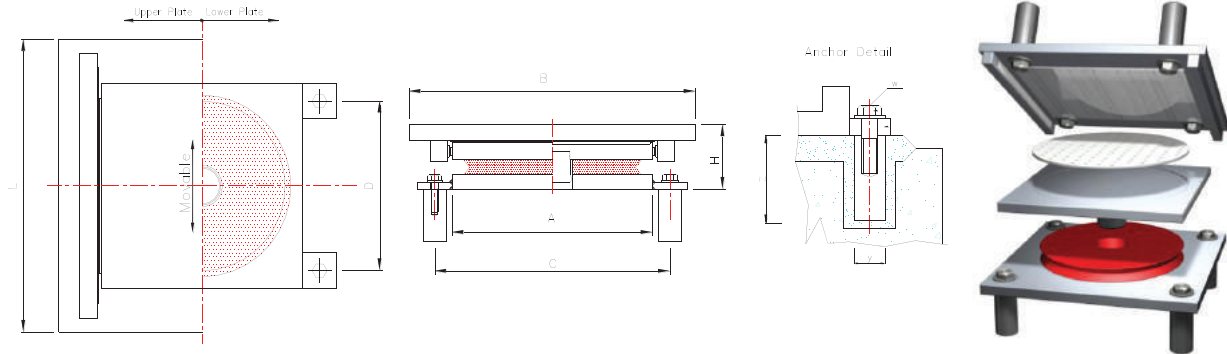


Dimensional Data - Multi Directional Movable

Design Load (kN)		displacement (mm)	Bearing Body Dimension (mm)						Anchorage Dimension (mm)			
Ver.	Hori.		A	B	L	C	D	H	M	a	l	n(EA)
500	25	±50	190	190	260	240	140	80	16	40	80	4
750	37.5	±50	230	230	300	280	180	83	16	40	110	4
1000	50	±50	250	250	320	300	200	85	16	40	110	4
1350	67.5	±50	290	290	350	340	240	90	16	40	110	4
1500	75	±50	300	300	370	350	250	93	16	40	110	4
1750	87.5	±50	320	320	380	370	270	94	16	40	110	4
2000	100	±50	340	340	400	390	290	96	16	40	110	4
2500	125	±50	370	370	430	420	320	99	16	40	110	4
3000	150	±50	400	400	460	450	350	106	16	40	110	4
3500	175	±50	430	430	490	490	370	114	20	50	110	4
4000	200	±50	460	460	510	520	400	119	20	50	110	4
4500	225	±50	490	490	540	550	430	125	20	50	110	4
5000	250	±50	510	510	560	570	450	129	20	50	110	4
5500	275	±50	550	550	600	620	480	140	24	60	110	4
6000	300	±50	570	570	620	640	500	145	24	60	110	4
6500	325	±50	600	600	650	670	530	153	24	60	110	4
7000	350	±50	620	620	670	690	550	156	24	60	110	4
7500	375	±50	640	640	690	710	570	163	24	60	110	4
8000	400	±50	660	660	700	745	575	166	30	75	110	4
8500	425	±50	680	680	720	765	595	171	30	75	110	4
9000	450	±50	700	700	740	785	615	178	30	75	110	4
9500	475	±50	720	720	760	805	635	182	30	75	110	4
10000	500	±50	740	740	780	825	655	188	30	75	120	4
11000	550	±50	780	780	810	865	695	197	30	75	120	4
12000	600	±50	810	810	840	895	725	201	30	75	150	4
13000	650	±50	850	850	870	950	750	208	36	90	120	4
14000	700	±50	880	880	900	980	780	215	36	90	150	4
15000	750	±50	920	920	930	1020	820	224	36	90	150	4
20000	1000	±50	1050	1050	1050	1175	925	256	42	105	150	4
25000	1250	±50	1150	1150	1140	1290	1010	274	48	120	180	4
30000	1500	±50	1310	1310	1270	1450	1170	313	48	120	200	4

DISK Bearing

DISK Bearing - One directional movable



Dimensional Data - One Directional Movable

Design Load (kn)		Displacement	Bearing Body Dimension (mm)						Anchorage Dimension (mm)			
Ver.	Hori.	(±mm)	A	B	L	C	D	H	w	y	z	n
500	50	±50	190	280	270	240	140	73	16	40	110	4
	100	±50	200	280	280	250	150	76	16	40	110	4
	150	±50	200	280	280	250	150	83	16	40	110	4
	200	±50	200	280	280	250	150	88	16	40	110	4
750	75	±50	230	310	310	280	180	78	16	40	110	4
	150	±50	230	320	310	280	180	80	16	40	110	4
	225	±50	230	320	310	280	180	87	16	40	110	4
	300	±50	240	330	320	300	180	91	20	50	110	4
1000	100	±50	250	330	330	300	200	81	16	40	110	4
	200	±50	260	340	330	310	210	88	16	40	110	4
	300	±50	260	340	340	320	200	96	20	50	110	4
	400	±50	260	360	340	330	290	104	24	60	150	4
1350	135	±50	290	370	360	340	240	87	16	40	110	4
	270	±50	290	380	370	350	230	95	20	50	110	4
	405	±50	290	390	370	360	220	203	24	60	150	4
	540	±50	300	410	370	370	230	117	24	60	150	4
1500	150	±50	300	390	380	350	250	88	16	40	110	4
	300	±50	310	400	380	370	250	97	20	50	110	4
	450	±50	310	410	380	380	240	105	24	60	120	4
	600	±50	310	420	390	395	225	135	30	75	150	4
1750	175	±50	320	410	400	370	270	63	16	40	110	4
	350	±50	330	420	400	390	270	104	20	50	120	4
	525	±50	330	440	400	400	260	117	24	60	150	4
	700	±50	330	460	400	415	245	137	30	75	150	4
2000	200	±50	340	420	420	390	290	97	16	40	110	4
	400	±50	350	440	420	420	280	102	24	60	120	4
	600	±50	350	470	420	435	265	112	30	75	150	4
	800	±50	360	480	430	445	275	127	30	75	180	4
2500	250	±50	380	470	450	430	330	101	16	40	110	4
	500	±50	380	470	450	450	310	111	24	60	150	4
	750	±50	390	520	460	475	305	122	30	75	180	4
	1000	±50	400	530	470	500	300	140	36	90	180	4
3000	300	±50	410	500	480	470	350	106	20	50	110	4
	600	±50	420	520	480	505	335	122	30	75	180	4
	900	±50	420	550	490	505	335	137	30	75	200	4
	1200	±50	430	570	500	530	330	154	36	90	220	4
3500	350	±50	440	530	500	500	380	115	20	50	120	4
	700	±50	450	550	510	535	365	127	30	75	150	4
	1050	±50	450	580	520	550	350	147	36	90	200	4
	1400	±50	640	610	520	765	515	169	42	105	220	4
4000	400	±50	470	560	530	540	400	120	24	60	150	4
	800	±50	470	570	540	555	385	146	30	75	180	4
	1200	±50	480	620	550	580	380	158	36	90	220	4
	1600	±50	490	640	560	615	365	182	42	105	250	4

Design Load (kn)		Displacement	Bearing Body Dimension (mm)						Anchorage Dimension (mm)			
Ver.	Hori.	(±mm)	A	B	L	C	D	H	w	y	z	n
4500	450	±50	490	680	550	560	420	127	24	60	150	4
	900	±50	500	610	560	585	415	140	30	75	200	4
	1350	±50	510	650	570	635	385	169	42	105	250	4
	1800	±50	520	680	590	645	395	194	42	105	280	4
5000	500	±50	520	610	590	590	450	136	24	60	150	4
	1000	±50	530	640	600	630	430	146	36	90	180	4
	1500	±50	530	670	590	655	405	179	42	105	250	4
	2000	±50	540	710	600	680	400	210	48	120	280	4
5500	550	±50	540	630	600	610	470	143	24	60	150	4
	1100	±50	540	660	600	640	440	171	36	90	200	4
	1650	±50	550	700	610	675	425	174	42	105	250	4
	600	±50	560	640	620	645	475	148	30	75	150	4
6000	1200	±50	560	680	620	660	460	153	36	90	220	4
	1800	±50	560	710	620	685	435	189	42	105	280	4
	650	±50	580	660	640	665	495	151	30	75	150	4
6500	1300	±50	590	710	650	690	490	159	36	90	250	4
	1950	±50	600	750	660	740	460	192	48	120	280	4
	700	±50	610	700	660	695	525	158	30	75	150	4
7000	1400	±50	620	750	670	745	495	165	42	105	220	4
	2100	±50	630	780	680	770	490	201	48	120	280	4
	750	±50	630	720	680	715	545	163	30	75	180	4
7500	1500	±50	630	760	680	755	505	176	42	105	250	4
	2250	±50	640	800	690	780	500	215	48	120	300	4
	800	±50	650	740	700	735	565	170	30	75	180	4
8000	1600	±50	660	790	710	785	535	180	42	105	250	4
	2400	±50	670	840	720	830	510	233	56	140	320	4
	850	±50	660	760	710	745	575	173	30	75	180	4
8500	1700	±50	670	800	720	795	545	186	42	105	280	4
	2550	±50	680	850	720	840	520	223	56	140	300	4
	900	±50	690	790	730	775	605	180	30	75	200	4
9000	1800	±50	690	830	730	815	565	199	42	105	280	4
	2700	±50	710	890	750	870	550	234	56	140	320	4
	950	±50	700	800	740	800	600	288	36	90	180	4
9500	1900	±50	710	850	750	850	570	202	48	120	280	4
	2850	±50	740	910	780	900	580	244	56	140	350	4
	1000	±50	720	820	760	820	620	294	36	90	180	4
10000	2000	±50	740	880	880	880	600	202	48	120	280	4
	3000	±50	750	930	880	910	690	236	56	140	350	4
	1100	±50	750	860	790	850	650	199	36	90	220	4
11000	2200	±50	770	910	810	910	630	215	48	120	300	4
	1200	±50	790	900	830	890	690	206	36	90	220	4
12000	2400	±50	790	940	830	950	630	225	56	140	350	4

Elastomeric Bearing

DSRB (Developed Shear reinforcing Rubber Bearing)

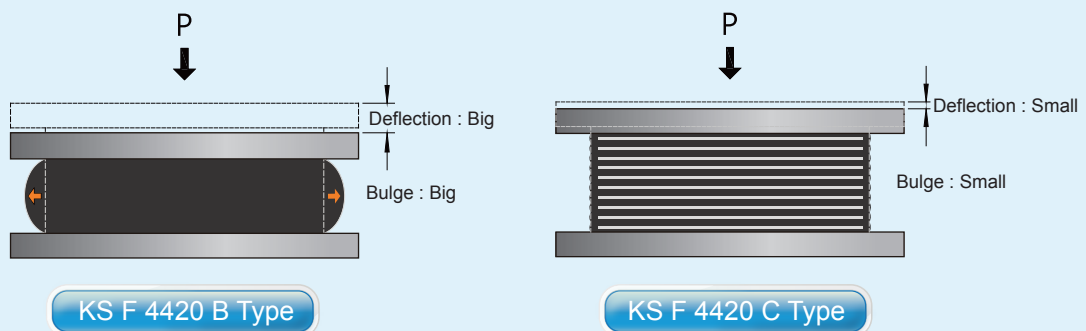


Resume

Elastomeric bearing (DSRB) is a bridge bearing for support, which is composed of reinforcing steel plates and rubbers in laminated layers. It reinforces a hardness of vertical load by steel plate and accepts a horizontal displacement and rotation of horizontal load by using elasticity of rubber.

At the first stage of developing elastomeric bearing (DSRB), "KS F 4420 B Type" was mainly used, of which upper / lower plates and elastomeric pad are separated. This type caused many troubles like roll-over, breakaway of elastomeric pad by sliding. Recently, "KS F 4420 C Type" is mainly used, of which upper / lower plates and elastomeric pads are combined in layers.

Structure of Elastomeric Bearing (DSRB)



Defects of "KS F 4420 B Type"



Roll-Over



Breakaway of Elastomeric Pad

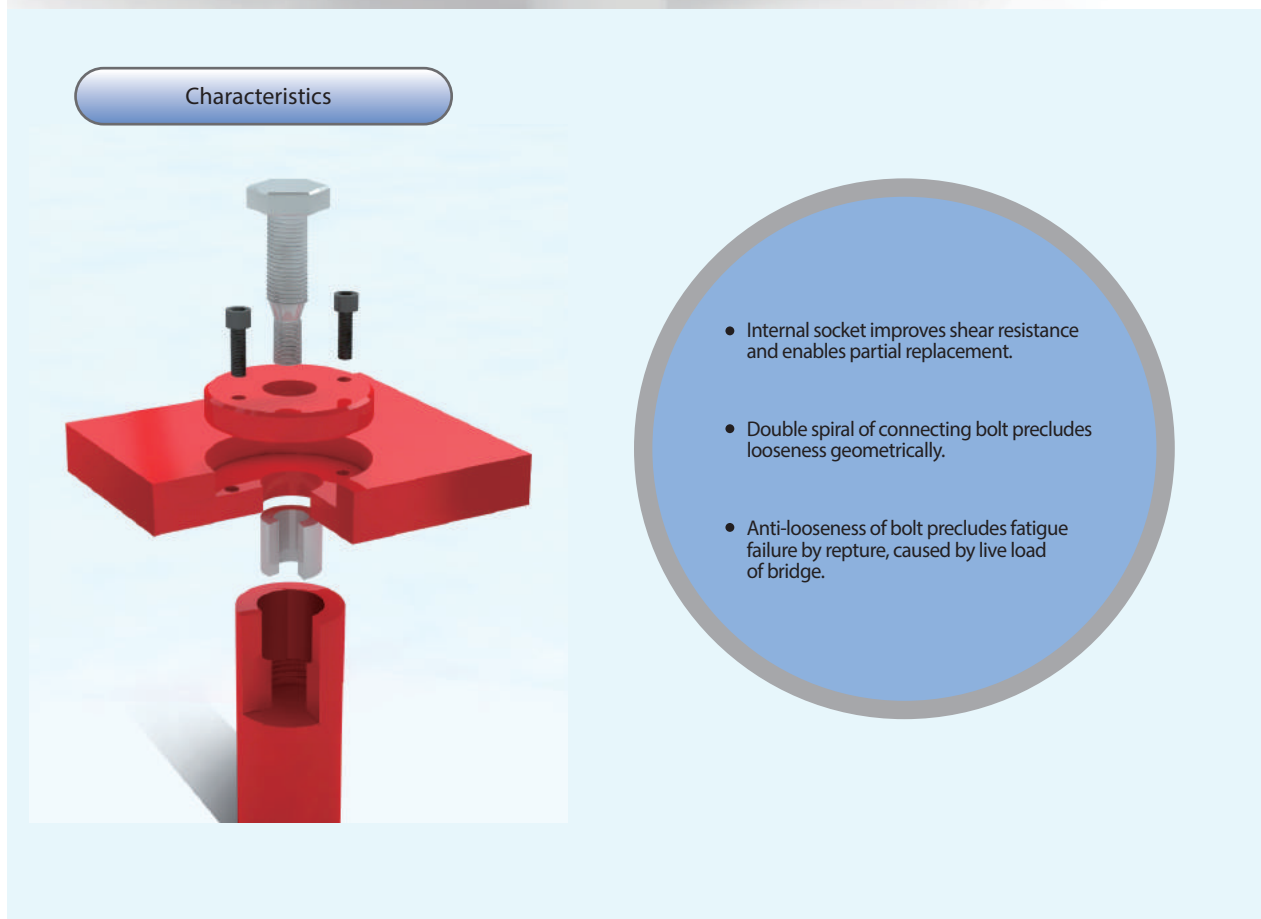
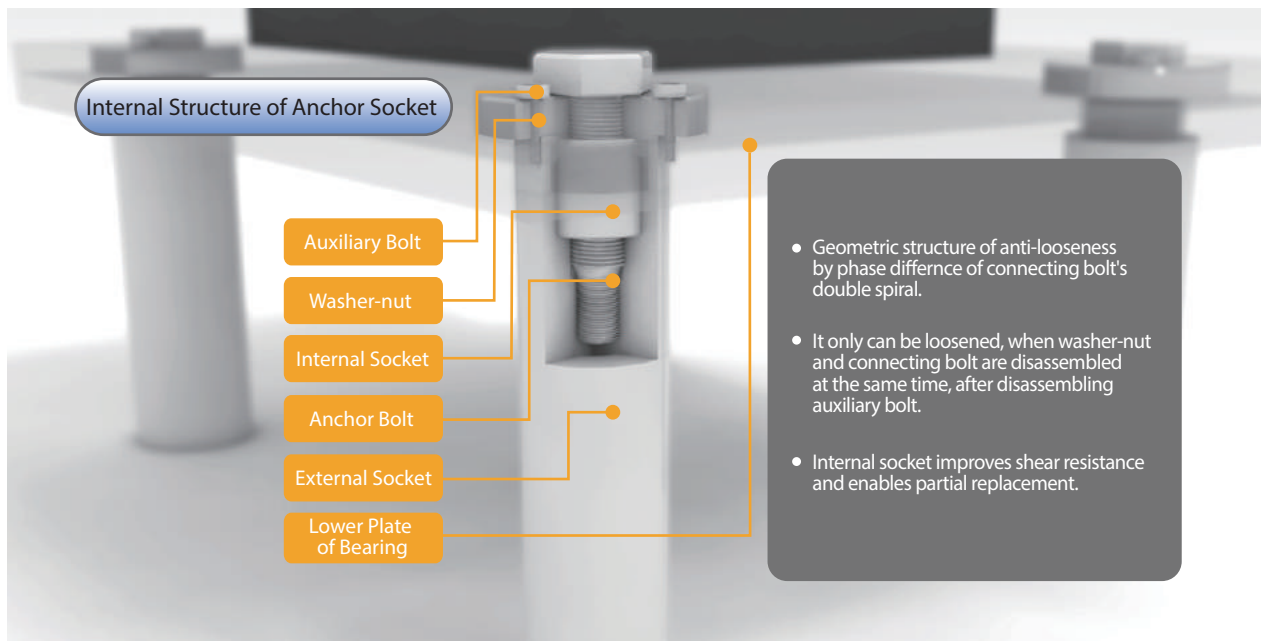


Separated

Elastomeric Bearing

DSRB (Developed Shear reinforcing Rubber Bearing)

» Elastomeric Bearing (KS F 4420)



Elastomeric Bearing

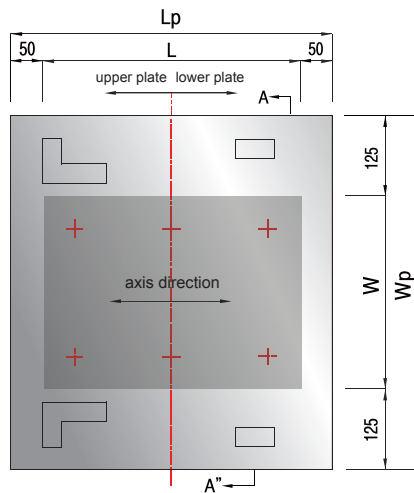
DSRB (Developed Shear reinforcing Rubber Bearing)



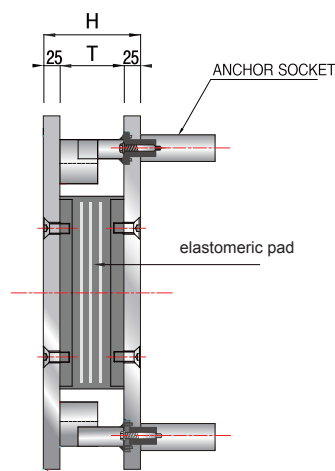
Dimensional Data of DSRB (KS F 4420)

Fixed Directional

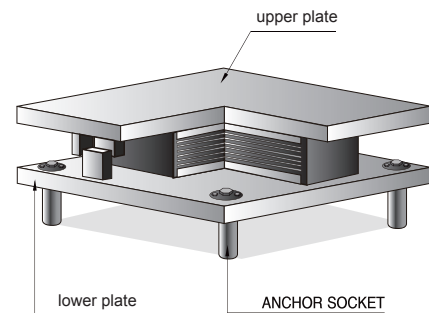
Ground Plan



A-A" Sectional Plan



Isometric Drawing



applied load (kN)	Elastomeric bearing dimension (mm)			Elastomeric rubber layer		Shear modulus of elasticity (MPa)										± displacements (mm)		Upper/lower plate dimension (Width, Length), mm								Socket and bolts dimension									
						0.9MPa					1.15MPa							Fixed		one directional movement			Multi- directional movement												
	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	all times 70%	earthquake 150%	Wp	Lp	Wp	Lp	Wp	Lp	Wp										Lp								
																												all times 70%	earthquake 150%	Wp	Lp	Wp	Lp	Wp	Lp
W × L	T	H	of rubber layers	effective thick ness (mm)	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%																	
80	100×150	49 60	99 110	2 3	16 24	9.5	20.3	27,400 18,300	844 563	12.1	25.9	34,900 23,200	1,078 719	11.2 16.8	24 36	350	250	350	250	250	350	200	250	φ30 × 100											
100	100×200	49 60	99 110	2 3	16 24	12.6	27.0	47,300 31,500	1,125 750	16.1	34.5	60,000 40,000	1,438 959	11.2 16.8	24 36	350	300	350	300	300	350	200	300	φ30 × 100											
200	150×200	49 60	99 110	2 3	16 24	18.9	40.5	139,500 93,000	1,688 1,125	24.2	51.8	176,000 117,300	2,157 1,438	11.2 16.8	24 36	400	300	400	300	300	400	250	300	φ30 × 100											
250	150×250	49 60	99 110	2 3	16 24	23.6	50.6	213,700 142,500	2,110 1,407	30.2	64.7	268,800 179,200	2,696 1,797	11.2 16.8	24 36	400	350	400	350	350	400	250	350	φ30 × 100											
350	150×300	49 60	99 110	2 3	16 24	28.4	60.8	294,900 196,600	2,532 1,688	36.2	77.6	370,100 246,700	3,235 2,157	11.2 16.8	24 36	400	400	400	400	400	400	250	400	φ30 × 100											
450	200×250	60 82	110 132	3 5	24 40	31.5	67.5	283,800 212,900	1,876 1,407	40.3	86.3	354,600 265,900	2,397 1,797	16.8 22.4	36 48	450	350	450	350	350	450	300	350	φ35 × 120											
550	200×300	60 82	110 132	3 5	24 40	37.8	81.0	401,000 300,700	2,251 1,688	48.3	103.5	499,100 374,300	2,876 2,157	16.8 22.4	36 48	450	400	450	400	400	450	300	400	φ35 × 120											
650	200×350	60 82	110 132	3 5	24 40	44.1	94.5	527,500 395,600	2,626 1,969	56.4	120.8	654,600 490,900	3,355 2,516	16.8 22.4	36 48	450	450	450	450	450	450	300	450	φ35 × 120											
700	250×300	60 82	110 132	3 5	24 40	47.3	101.3	659,800 329,900	2,813 1,407	60.4	129.4	815,300 489,200	3,595 2,157	16.8 28.0	36 60	500	400	500	400	400	500	350	400	φ40 × 120											
750	200×400	60 82	110 132	3 5	24 40	50.4	108.0	660,900 495,700	3,001 2,251	64.4	138.0	818,200 613,600	3,834 2,876	16.8 22.4	36 48	450	500	450	500	500	450	300	500	φ40 × 120											

Elastomeric Bearing

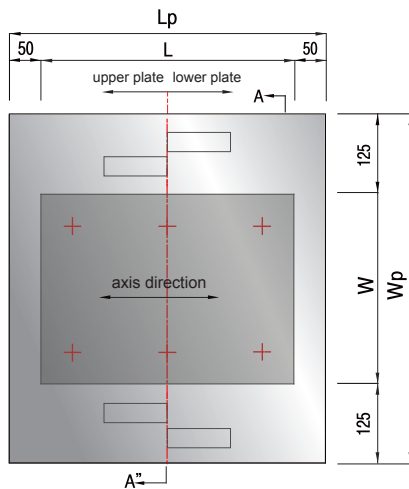
DSRB (Developed Shear reinforcing Rubber Bearing)



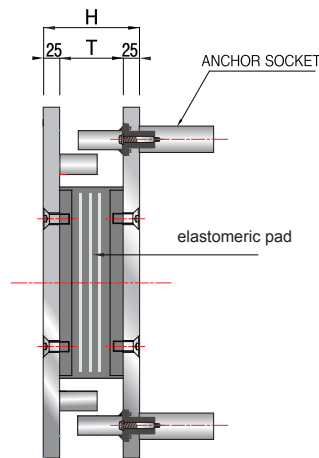
Dimensional Data of DSRB (KS F 4420)

Axis Directional

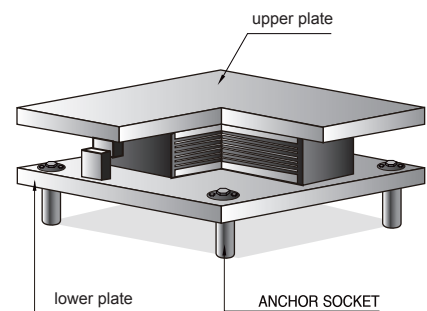
Ground Plan



A-A' Sectional Plan



Isometric Drawing



applied load (kN)	Elastomeric bearing dimension (mm)			Elastomeric rubber layer		Shear modulus of elasticity (MPa)										± displacements (mm)		Upper/lower plate dimension (Width, Length), mm								Socket and bolts dimension
						0.9MPa					1.15MPa							Fixed		one directional movement		Multi- directional movement				
	horizontal load(kN)		Compression spring coefficient Kv(kN/mm)	Shearing spring coefficient Kh(kN/m)	horizontal load(kN)		Compression spring coefficient Kv(kN/mm)	Shearing spring coefficient Kh(kN/m)	all times 70%	earthquake 150%	Wp	Lp	Wp	Lp	Wp	Lp	Wp									
	all times 70%	earthquake 150%	all times 70%	earthquake 150%	all times 70%	earthquake 150%																				
	Width x Length	Height		of rubber layers	effective rubber thick ness (mm)																					
W × L	T	H																								
1000	250×400	60	110	3	24	63.0	135.0	1,113,600	3,751	80.5	172.5	1,364,900	4,793	16.8	36	500	500	500	500	500	500	350	500	φ 40 × 120		
		71	121	4	32			835,200	2,813			1,023,700	3,595	22.4	48											
		82	132	5	40			668,100	2,251			819,000	2,876	28.0	60											
		93	143	6	48			556,800	1,876			682,500	2,397	33.6	72											
		104	154	7	56			477,200	1,608			585,000	2,054	39.2	84											
		115	165	8	64			417,600	1,407			511,900	1,797	44.8	96											
		126	176	9	72			371,200	1,250			455,000	1,598	50.4	108											
1350	300×400	84	134	3	36	75.6	162.0	544,900	3,001	96.6	207.1	678,900	3,834	25.2	54	550	500	550	500	500	550	400	500	φ 40 × 150		
		100	150	4	48			408,700	2,251			509,200	2,876	33.6	72											
		116	166	5	60			327,000	1,801			407,400	2,301	42.0	90											
		132	182	6	72			272,500	1,500			339,500	1,917	50.4	108											
		148	198	7	84			233,500	1,286			291,000	1,643	58.8	126											
		164	214	8	96			204,400	1,125			254,600	1,438	67.2	144											
		180	230	9	108			181,100	966			222,200	1,250	75.6	162											
1750	300×500	84	134	3	36	94.5	202.6	813,100	3,751	120.8	258.8	1,008,400	4,793	25.2	54	550	600	550	600	600	550	410	600	φ 50 × 150		
		100	150	4	48			609,800	2,813			756,300	3,595	33.6	72											
		116	166	5	60			487,800	2,251			605,100	2,876	42.0	90											
		132	182	6	72			406,500	1,876			504,200	2,397	50.4	108											
		148	198	7	84			348,500	1,608			432,200	2,054	58.8	126											
		164	214	8	96			304,900	1,407			378,200	1,797	67.2	144											
		180	230	9	108			271,000	1,250			336,100	1,598	75.6	162											
1900	350×450	84	134	3	36	99.3	212.7	945,100	3,939	126.8	271.8	1,168,700	5,033	25.2	54	600	550	600	550	550	600	460	550	φ 50 × 150		
		100	150	4	48			708,800	2,954			876,500	3,774	33.6	72											
		116	166	5	60			567,100	2,363			701,200	3,020	42.0	90											
		132	182	6	72			472,600	1,969			584,400	2,516	50.4	108											
		148	198	7	84			405,000	1,688			500,900	2,157	58.8	126											
		164	214	8	96			354,400	1,477			438,300	1,887	67.2	144											
		180	230	9	108			311,100	1,250			391,100	1,598	75.6	162											
2000	300×600	84	134	3	108	113.4	243.1	1,103,400	4,501	144.9	310.6	1,363,600	5,752	25.2	54	550	700	550	700	700	550	420	700	φ 55 × 150		
		100	150	4	36			827,600	3,376			1,022,700	4,314	33.6	72											
		116	166	5	48			662,000	2,701			818,200	3,451	42.0	90											
		132	182	6	60			551,700	2,251			681,800	2,876	50.4	108											
		148	198	7	72			472,900	1,929			584,400	2,465	58.8	126											
		164	214	8	84			413,800	1,688			511,300	2,157	67.2	144											
		180	230	9	108			361,100	1,250			441,100	1,598	75.6	162											

Elastomeric Bearing

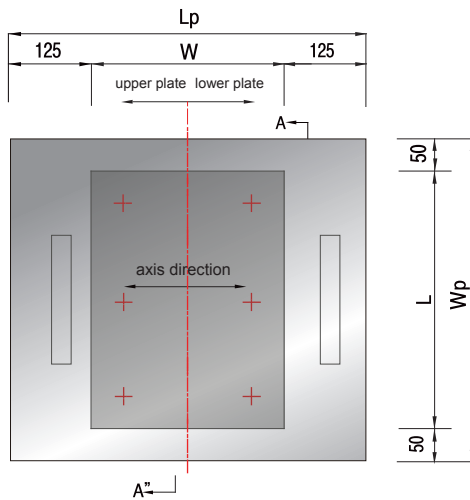
DSRB (Developed Shear reinforcing Rubber Bearing)



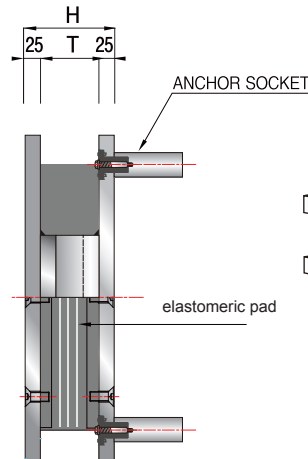
Dimensional Data of DSRB (KS F 4420)

Direction Perpendicular to Bridge

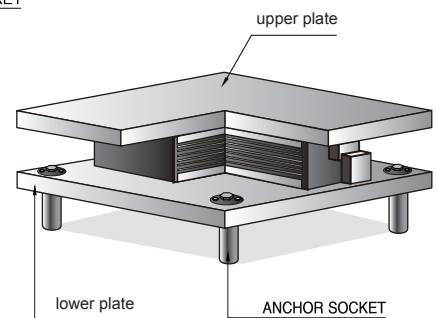
Ground Plan



A-A' Sectional Plan



Isometric Drawing



applied load (kN)	Elastomeric bearing dimension (mm)			Elastomeric rubber layer		Shear modulus of elasticity (MPa)										± displacements (mm)		Upper/lower plate dimension (Width, Length), mm								Socket and bolts dimension
						0.9MPa					1.15MPa							Fixed		one directional movement		Multi- directional movement				
	Width x Length		Height	of rubber layers	effective rubber thick ness (mm)	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	One directional (Longitudinal)	Perpendicular to the axis									Wp	Lp	
	all times 70%	earthquake 150%				all times 70%	earthquake 150%			all times 70%	earthquake 150%															
	W × L	T	H																							
2250	400×500	100	150	4	48			1,136,200	3,751			1,393,900	4,793	33.6	72									φ 55 × 150		
		116	166	5	60			908,900	3,001			1,115,100	3,834	42.0	90											
		132	182	6	72			757,400	2,501			929,300	3,195	50.4	108											
		148	198	7	84	126.0	270.1	649,200	2,143	161.0	345.1	796,500	2,739	58.8	126		650	600	600	650	520	600				
		164	214	8	96			568,100	1,876			697,000	2,397	67.2	144											
		180	230	9	108			505,000	1,667			619,500	2,130	75.6	162											
		196	246	10	120			454,500	1,500			557,600	1,917	84.0	180											
2800	400×600	100	150	4	48			1,568,400	4,501			1,913,300	5,752	33.6	72									φ 70 × 150		
		116	166	5	60			1,254,700	3,601			1,530,600	4,601	42.0	90											
		132	182	6	72			1,045,600	3,001			1,275,500	3,834	50.4	108											
		148	198	7	84	151.2	324.1	896,200	2,572	193.3	414.1	1,093,300	3,287	58.8	126		650	700	650	700	700	650	560		700	
		164	214	8	96			784,200	2,251			956,700	2,876	67.2	144											
		180	230	9	108			697,100	2,001			850,400	2,556	75.6	162											
		196	246	10	120			627,400	1,801			765,300	2,301	84.0	180											
3000	450×600	100	150	4	48			1,999,500	5,064			2,425,400	6,471	33.6	72									φ 70 × 150		
		116	166	5	60			1,599,600	4,051			1,940,300	5,176	42.0	90											
		132	182	6	72			1,333,000	3,376			1,616,900	4,314	50.4	108											
		148	198	7	84	170.1	364.6	1,142,600	2,894	217.4	465.9	1,385,900	3,697	58.8	126		700	700	700	700	700	700	610		700	
		164	214	8	96			999,800	2,532			1,212,700	3,235	67.2	144											
		180	230	9	108			888,700	2,251			1,077,900	2,876	75.6	162											
		196	246	10	120																					
3500	500×600	100	150	4	48			2,462,900	5,627			2,971,800	7,190	33.6	72									φ 70 × 150		
		116	166	5	60			1,970,300	4,501			2,377,500	5,752	42.0	90											
		132	182	6	72			1,641,900	3,751			1,981,200	4,793	50.4	108											
		148	198	7	84	189.1	405.1	1,407,400	3,215	241.6	517.6	1,698,200	4,108	58.8	126		750	700	750	700	700	750	660		700	
		164	214	8	96			1,231,500	2,813			1,485,900	3,595	67.2	144											
		180	230	9	108			1,094,600	2,501			1,320,800	3,195	75.6	162											
		196	246	10	120			985,200	2,251			1,188,700	2,876	84.0	180											
4300	600×600	119	169	4	64			1,640,100	5,064			2,008,600	6,471	44.8	96									φ 70 × 170		
		140	190	5	80			1,312,100	4,051			1,606,900	5,176	56.0	120											
		161	211	6	96			1,093,400	3,376			1,339,100	4,314	67.2	144											
		182	232	7	112	226.9	486.1	937,200	2,894	289.9	621.2	1,147,800	3,697	78.4	168		850	700	850	700	700	850	760		700	
		203	253	8	128			820,000	2,532			1,004,300	3,235	89.6	192											
		224	274	9	144			728,900	2,251			892,700	2,876	101	216											

Elastomeric Bearing

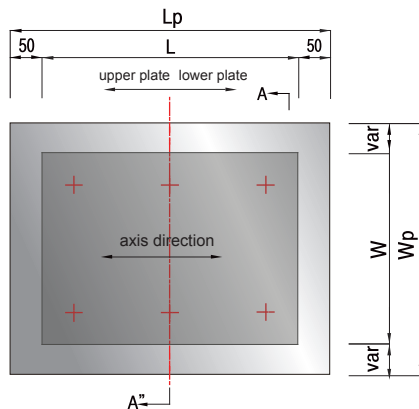
DSRB (Developed Shear reinforcing Rubber Bearing)



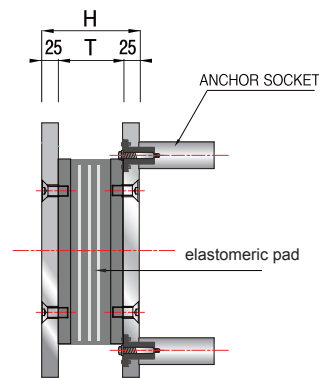
Dimensional Data of DSRB (KS F 4420)

Two-Way Directional

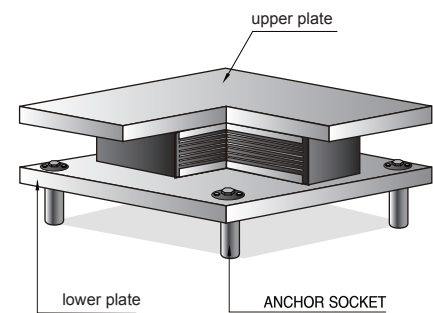
Ground Plan



A-A" Sectional Plan



Isometric Drawing



applied load (kN)	Elastomeric bearing dimension (mm)			Elastomeric rubber layer		Shear modulus of elasticity (MPa)									± displacements (mm)		Upper/lower plate dimension (Width, Length), mm								Socket and bolts dimension
						0.9MPa						1.15MPa													
	Width x Length W × L		Height T H		of rubber layers	effective rubber thick ness (mm)	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	horizontal load(kN)		Compression spring coefficient Kv(kN/m)	Shearing spring coefficient Kh(kN/m)	all times 70%	earthquake 150%	Fixed		one directional movement		Multi- directional movement				
							One directional (Longitudinal)	Perpendicular to the axis			Wp	Lp							Wp	Lp			Wp	Lp	
						all times 70%	earthquake 150%																		
5000	600×700	119	169	4	64	264.7	567.2	2,184,000	5,908	338.2	724.7	2,659,700	7,549	44.8	96	850	800	850	800	850	800	760	800	φ 70 × 170	
		140	190	5	80			1,747,200	4,726			2,127,800	6,039	56.0	120										
		161	211	6	96			1,456,000	3,939			1,773,200	5,033	67.2	144										
		182	232	7	112			1,248,000	3,376			1,519,800	4,314	78.4	168										
		203	253	8	128			1,092,000	2,954			1,329,900	3,774	89.6	192										
		224	274	9	144			970,600	2,626			1,182,100	3,355	101	216										
6000	700×700	119	169	4	64	308.8	661.7	2,927,700	6,893	394.6	845.5	3,541,700	8,807	44.8	96	950	800	950	800	800	950	860	800	φ 70 × 170	
		140	190	5	80			2,342,200	5,514			2,833,400	7,046	56.0	120										
		161	211	6	96			1,951,800	4,595			2,361,100	5,871	67.2	144										
		182	232	7	112			1,673,000	3,939			2,023,800	5,033	78.4	168										
		203	253	8	128			1,463,900	3,446			1,770,900	4,404	89.6	192										
		224	274	9	144			1,301,200	3,063			1,574,100	3,914	101	216										
7000	700×800	119	169	4	64	352.9	756.2	3,727,100	7,877	450.9	966.3	4,482,500	10,065	44.8	96	950	900	950	900	900	950	860	900	φ 70 × 170	
		140	190	5	80			2,981,700	6,302			3,586,000	8,052	56.0	120										
		161	211	6	96			2,484,700	5,251			2,988,300	6,710	67.2	144										
		182	232	7	112			2,129,800	4,501			2,561,400	5,752	78.4	168										
		203	253	8	128			1,863,600	3,939			2,241,300	5,033	89.6	192										
		224	274	9	144			1,656,500	3,501			1,992,200	4,473	101	216										
8000	800×800	119	169	4	64	403.3	864.2	4,144,000	9,115	515.3	1104.3	4,998,000	11,647	56.0	120	1050	900	1050	900	1000	1050	900	φ 70 × 230		
		140	190	5	100			2,680,800	7,202			3,265,600	9,203	56.0	120										
		160	210	5	100			2,144,600	5,762			2,612,500	7,362	70.0	150										
		185	235	6	120			1,787,200	4,801			2,177,100	6,135	84.0	180										
		210	260	7	140			1,531,900	4,115			1,866,100	5,259	98.0	210										
		235	285	8	160			1,340,400	3,601			1,632,800	4,601	112	240										
10000	900×900	119	169	4	64	510.4	1093.8	4,144,000	9,115	652.2	1397.6	4,998,000	11,647	56.0	120	1150	1000	1150	1000	1000	1150	1060	1000	φ 70 × 230	
		140	190	5	100			3,315,200	7,292			3,998,400	9,318	70.0	150										
		160	210	5	100			2,762,700	6,077			3,332,000	7,765	84.0	180										
		185	235	6	120			2,368,000	5,209			2,856,000	6,655	89.6	210										
		210	260	7	140			2,072,000	4,558			2,499,000	5,823	112	240										
		235	285	8	160			1,841,800	4,051			2,221,400	5,176	126	270										

Eradi Quake System

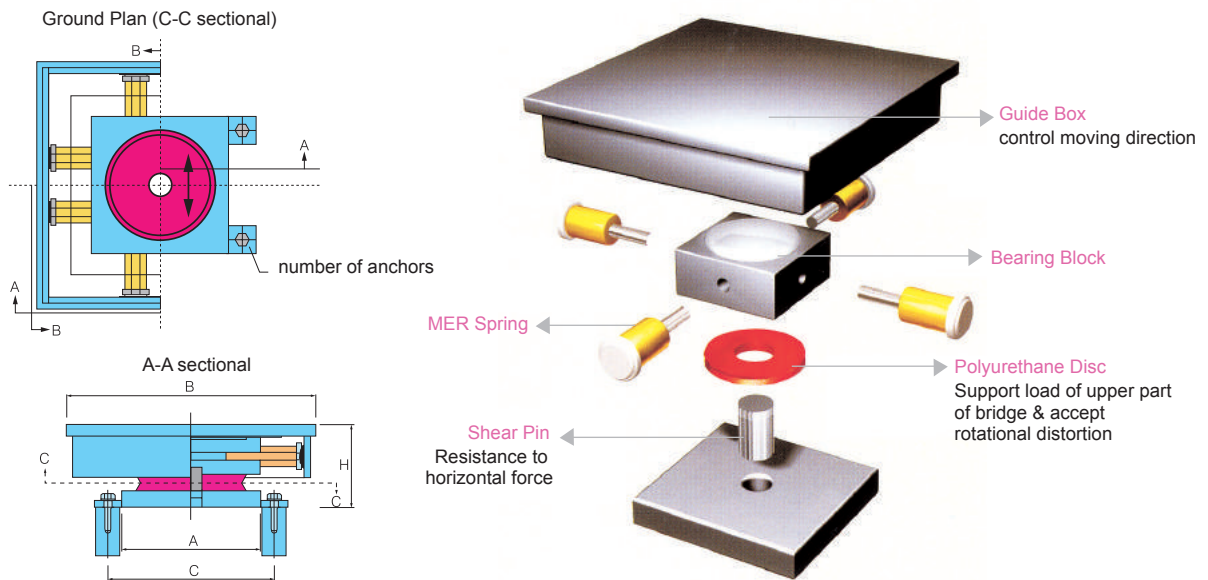


Resume of EQS

- EQS(Eradi Quake System), avoided seismic bearing, should be designed and installed according to AASHTO 14th edition Div. 1,2 Section 20, 30 and 15th edition Div. 2 Section 18.
- The basic function of EQS performs the same one such as "Load Bearing Device" which accepts rotation by providing force of restoration between the upper and the lower structure. When an earth quake comes, the sliding surfaces of PTFE and stainless steel dissipate much energy and MER Spring, mass energy regulator, provides the force of restoration.
- EQS should transfer horizontal and vertical load from the upper to the lower structure flexibly and properly.



Components and Structural Function



● Bearing Block

Bearing Block is a body which transfers vertical load and contains MER Spring and PTFE Disc. It transfers a vertical load to Polyurethane Disc through PTFE and horizontal force to Shear Pin, which is generated by compressive stiffness of MER Spring and frictional force of PTFE.

● Guide Box

When MER Spring is compressed, Guide Box and Bearing Block resist to hold it. In 4 sides of internal Guide Box, properly-polished stainless steel plates are stuck so that MER Spring can move with a minimum friction.

● Polyurethane Disc

It is a high-strength Polyurethane Disc, which is designed to accept average compressive stress 5.0Ksi and rotation. Test Pieces accepted 100Ksi. Each Disc has dimple on its surface for allowable proper compressive deformation and proper rotational clearance inside of it.

● Shear Pin

It is designed to accept rotation of bearing and made out of high-strength pin.

● Mass Energy Regulator (MER Spring)

MER Spring is composed of load resistance plate (where PTFE inserted), shaft and MER Spring which is made out of polyurethane-base material.

Eradi Quake System



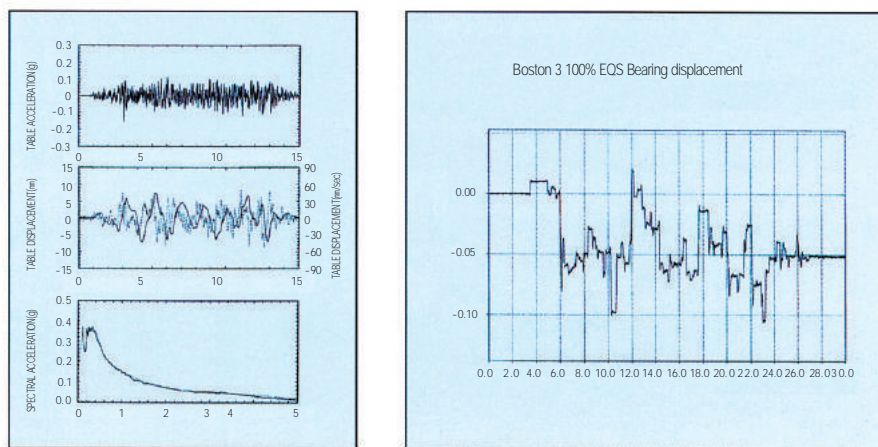
EQS Seismic Performance Test

Test Institutes

National Center for Earthquake Engineering Research, NCEER, HITEC(Highway Innovative Technology Evaluation Center)

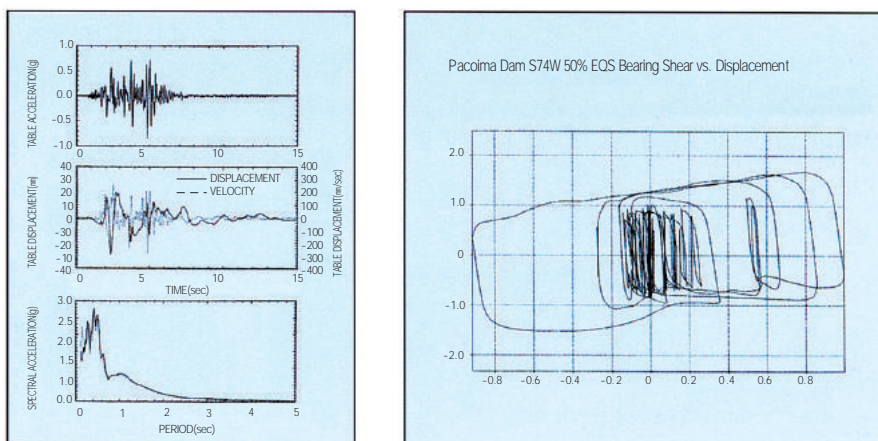
Time Histories of Displacement, Velocity and Acceleration and Acceleration Response Spectrum of Shaking Table Motion Excited with Boston 2 100% Motion.

Taken from Technical Report NCEER-94-0002

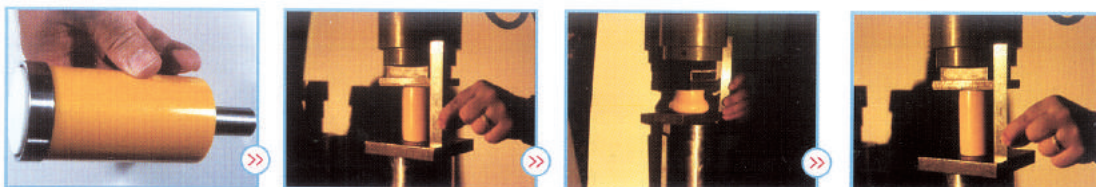


Time Histories of Displacement, Velocity and Acceleration and Acceleration Response Spectrum of Shaking Table Motion Excited with Pacoima Dam S74W 100% Motion.

Taken from Technical Report NCEER-94-0002



● Restoring Force of MER Spring



Pendulum Bearing

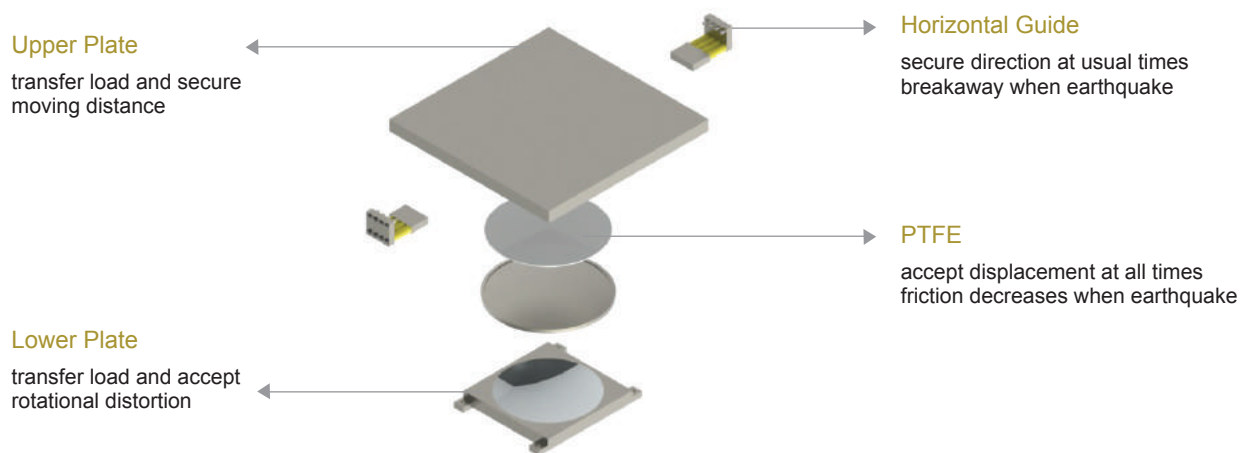


Synopsis

SPS(Sliding Pendulum System) is a seismic isolation bearing which supports the upper structure. It enables an optimum structural design to make a long structural period and dissipate seismic energy by its pendulum movement. When an earthquake comes, it can prevent damages of aftershocks, due to its characteristics of self-restoration by curvature surface and self-load. It is unnecessary to replace any parts, as there is no expendable material. The frictional pad of Pendulum Bearing has excellent durability and high compressive strength and it can minimize the size of bearing and increase a service life.



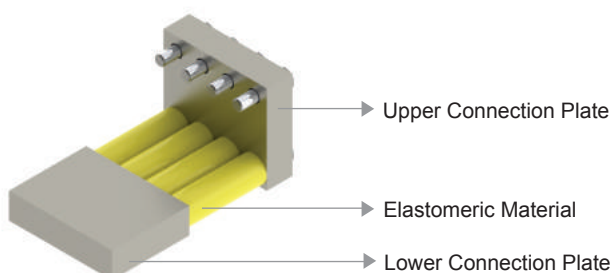
Components & Characteristics



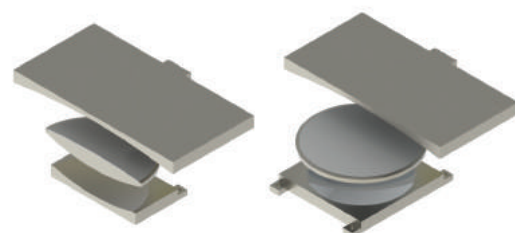
- Outstanding Self-Restoration
Without any other external force or structure, it performs self-restoration by curvature of pendulum.
- Easy to secure rotation and moving distance
By curvature of bearing, it is easy to secure rotation and moving distance.
- Flexible Behavior, when earthquake
It enables to behave flexibly to seismic acceleration
- Easy Maintenance
Due to its simple structure, it is unnecessary to replace any parts even after earthquake.



Detail & Sectional Plan



< Detail Plan of Guide >

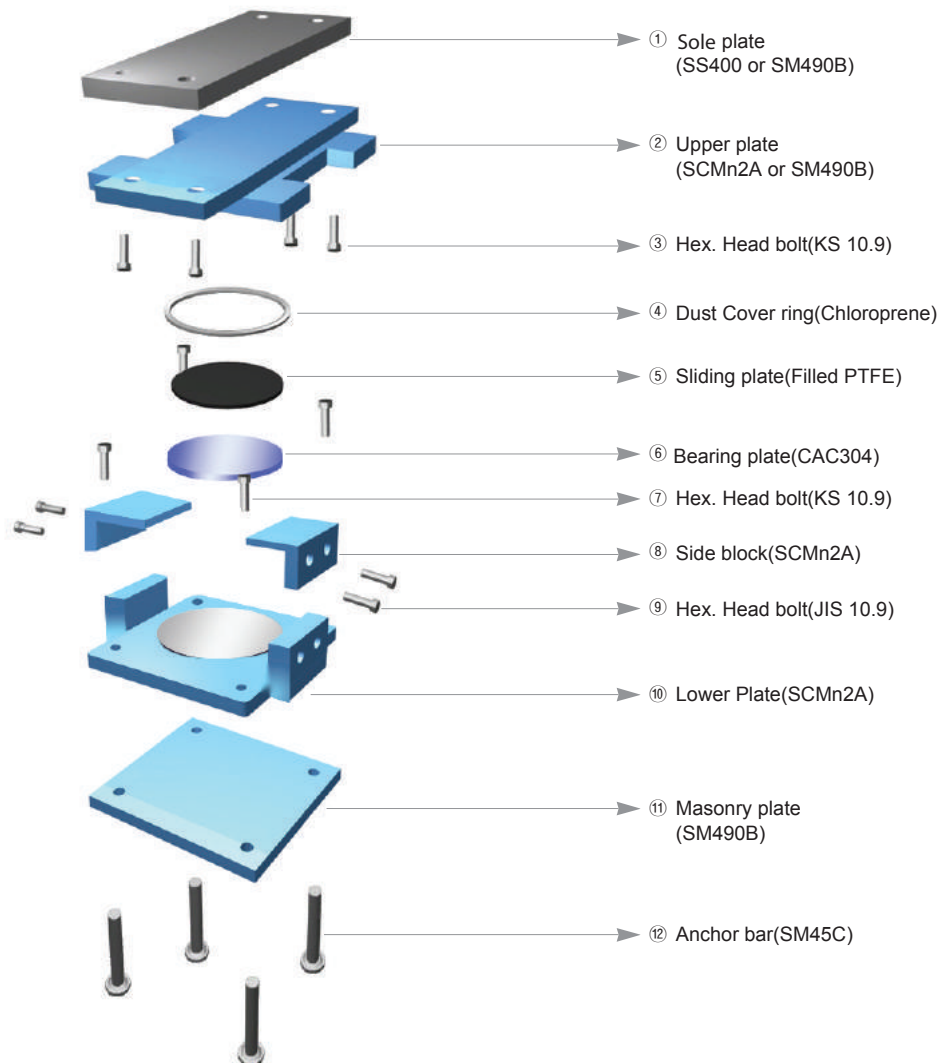


< Sectional Plan >

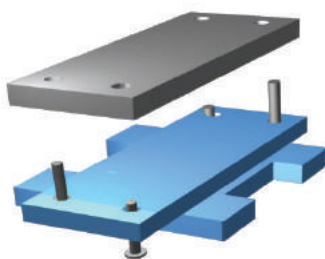
Divided Spherical Bearing

Components & Materials of Divided Spherical Bearing with Modified Upper Plate

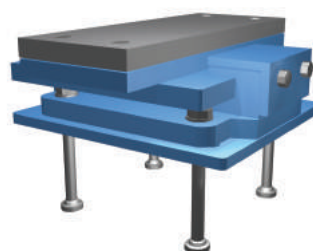
Deal Drawing of Divided Spherical Bearing



Upper Plate of Divided Spherical Bearing



Assembly Drawing of Divided Spherical Bearing



Divided Spherical Bearing

Replacement Test of Divided Spherical Bearing

Kyung-Buk Line Pyung-Cheon-Cheon Bridge (2007. 2. 27)



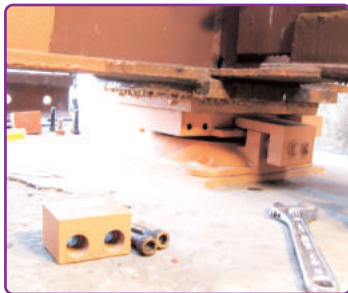
1 Bearing to be replaced



2 Install dial gauge



3 Disassemble bolt in lower plate



4 Disassemble built-up type wing part



5 Jack up (3mm)



6 Separate lower plate



7 Separate upper plate



8 After separation

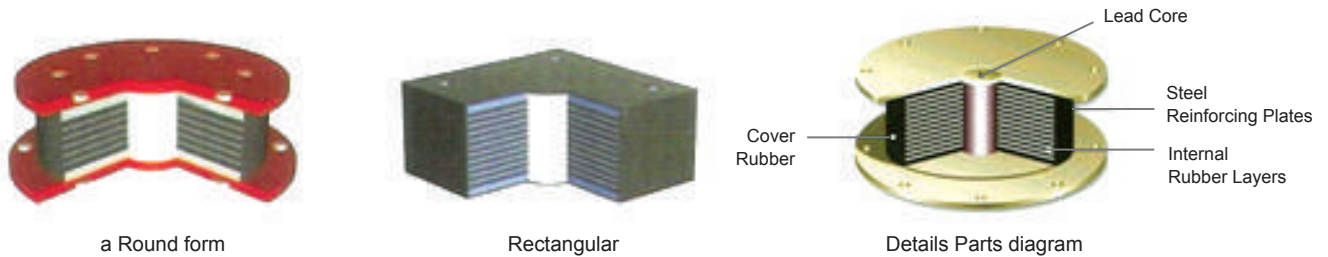


9 Replacement of Divided Spherical Bearing finished

* after separation, installation of replacement is in reverse order of separation.

Time	Time Required	Works
2007. 2. 27 13:05:46		installation of hydraulic jack / ready to disassemble anchor bolt
2007. 2. 27 13:06:36	00m 50s	disassemble anchor bolt / disassemble built-up type wing part
2007. 2. 27 13:08:10	02m 24s	measure raising height of jack-up
2007. 2. 27 13:09:14	03m 28s	disassemble bolt of lower plate / separate lower plate
2007. 2. 27 13:09:51	04m 05s	disassemble bolt of upper plate / separate upper plate
2007. 2. 27 13:15:13	09m 17s	installation of replacing spherical bearing / in reverse order of separation
2007. 2. 27 13:24:16	18m 30s	jack-down / remove hydraulic jack
2007. 2. 27 13:24:31	18m 45s	replacement finished

Lead Rubber Bearing(LRB)



Concepts of an LRB

- For an LRB, a lead plug is inserted into the center of the elastomeric bearing to absorb and scatter the horizontal energies generated during an earthquake.
- When an earthquake occurs, an LRB can extend the natural period of a bridge and reduce the horizontal power caused by the weight. It can be a guideline to economical lower structure designs.



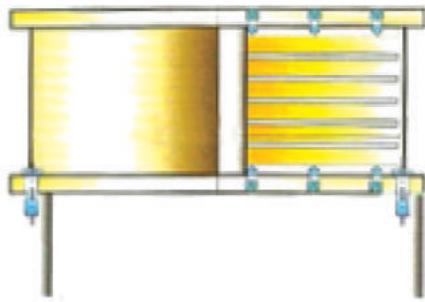
LRB Features

- An LRB can resist against short-term weights such as wind power or braking load by utilizing the elastomeric stiffness of lead. It has stability against all time weights. It easily adjusts to slow displacement such as temperature displacement and does not deliver large weights to the lower structure.
- By using the plastic deformation property of lead, it absorbs and scatters the earthquake energy.
- It can restore its original position after earthquakes are stopped. No additional repair or maintenance required.

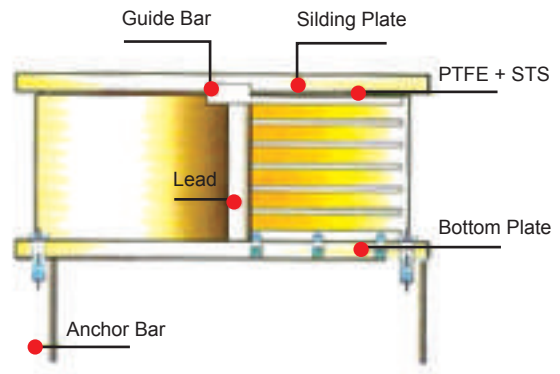


Lead Rubber Bearing(LRB)

LRB Shapes

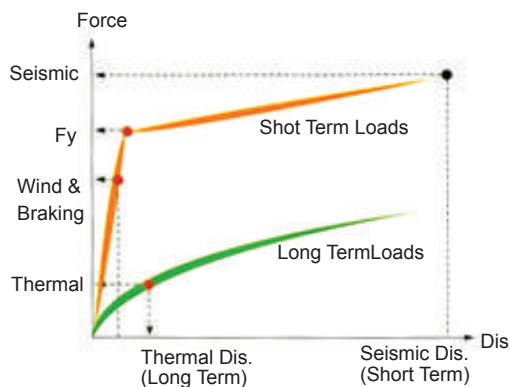


Multi directional LRB (LMD) shapes

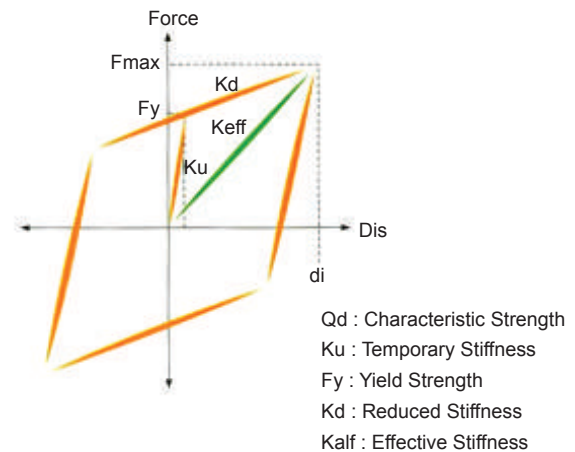


One-directional LRB (LOD) shapes

LRB Behavior Features



Behavior features



Force deformation curve

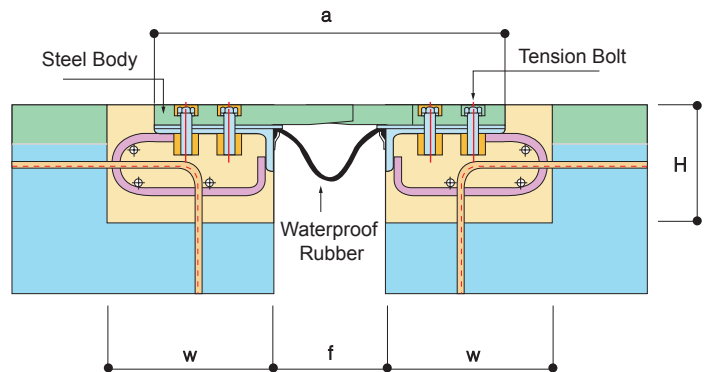
- An LRB is the most frequently used bearing for earthquakes.
- From the functional perspectives of a bridge, it supports excellent design of a continuous bridge.
- The lead molecules that experience earthquakes revert to the original molecular structure at room temperature.
- Due to the features of lead, it has high resistivity against winds or braking load (short-term weight) to improve the usability and less temperature ability (long-term weight) is applied.
- An LRB can improve flexibility in your design by arbitrarily adjusting the weight and reducing power for each bridge characteristic.
- The reverting power of rubber does not generate residual displacement after an earthquake. It can successfully return the bridge to its original condition.
- It is type of rubber bearing that can absorb the impact weight to improve the durability of a structure and suppress the noise.

Finger Joint

Finger Joint

It has a similar shape to normal Finger Rail Joint. Lower part has an integral structure like that of rail joint, which has an outstanding construct ability. It also allows an increased ground contact area to cars, which enables force dispersion, excellent driving and water proof by tightening rubber seal with bolt in upper part. Especially, it is suitable for environment-friendly highway and downtown, as it decreases much noise when large vehicles drive.

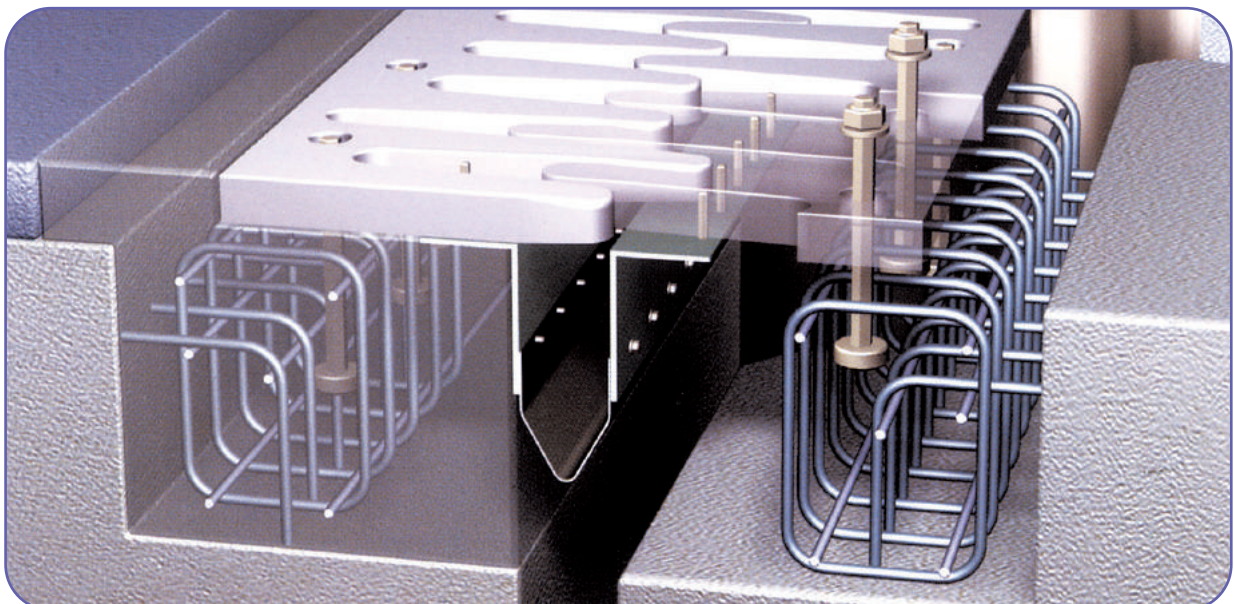
Standard Section



Dimensional Data

(mm)

Model	Expansion Length	Dimension				
		Joint Distance		Rail-Joint Clearance	Block-Out	
		Max.	Min.		W	H
IF50	50	300	350	50	250	200
IF80	80	330	410	80	300	250
IF100	100	350	450	100	300	250
IF160	160	450	610	160	350	250
IF200	200	500	700	200	350	250
IF250	250	560	810	250	350	250
IF300	300	630	930	300	350	300
IF350	350	680	1030	350	400	350
IF400	400	775	1175	400	430	350

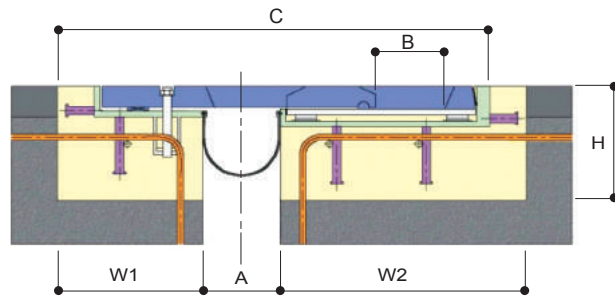


Finger Joint

Seismic Isolation Finger Joint (SF Joint)

SF Joint has a multi functions such as temperature displacement of axis direction, durability of finger part and excellent driving, which most expansion joints should necessarily fulfil. It also has the function for the displacement of the direction perpendicular to bridge, which any ordinary finger joint doesn't have. Thus, SF Joint can be applied as a standard model of future expansion joint.

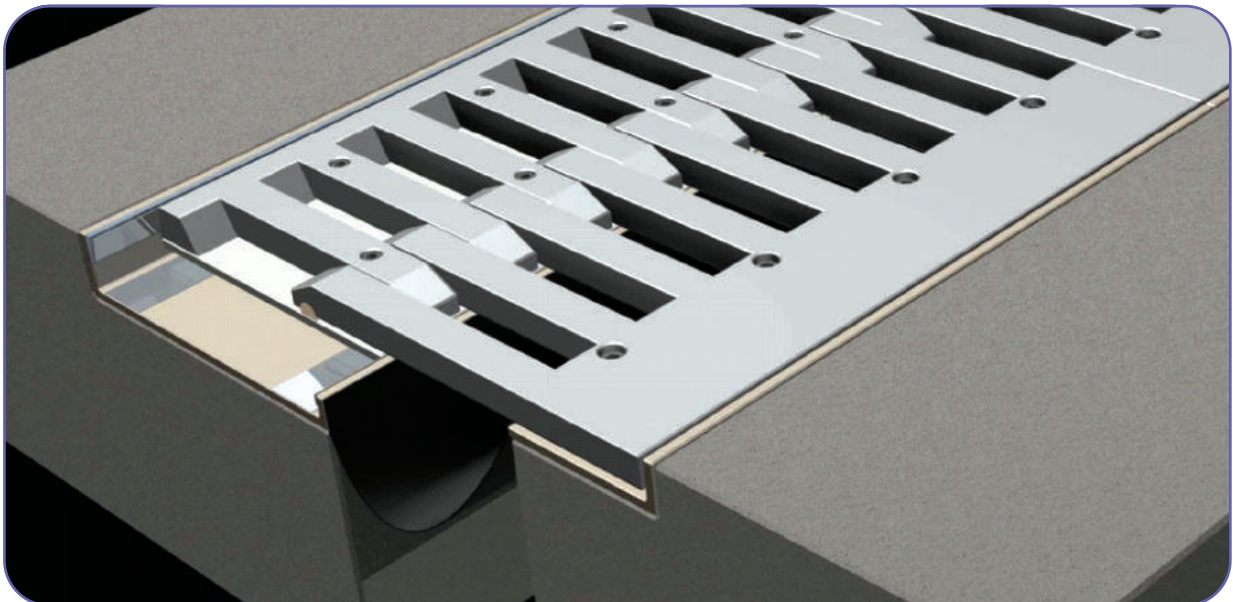
Standard Section



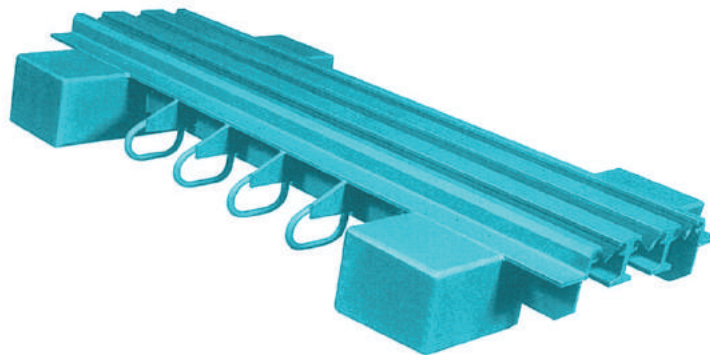
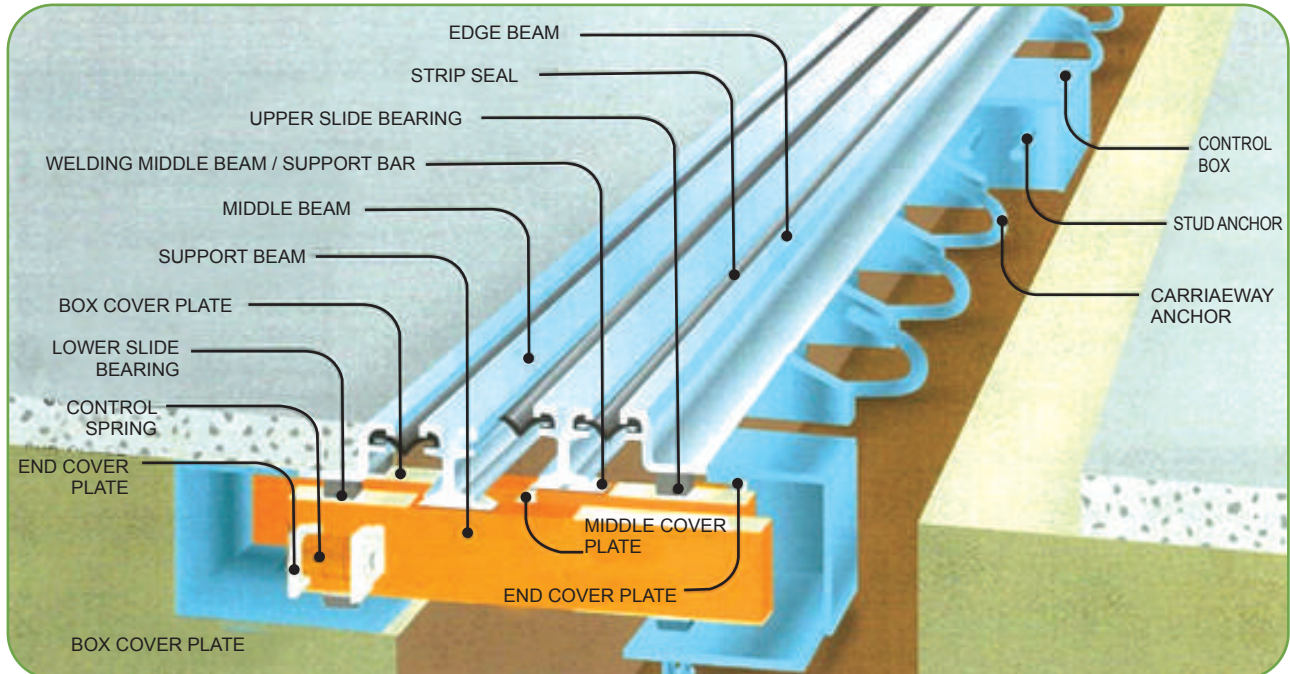
Dimensional Data

(mm)

Model	Dimension													
	Joint Distance(A)		Joint Distance(B)		Joint Distance(C)		L1	L2	T1	T2	T3	W1	W2	H
	Min.	Max.	Min.	Max.	Min.	Max.								
SF-080	50	130	30	110	700	780	368	550	50	105	80	400	450	300
SF-100	50	150	30	130	720	820	388	569.5	52	107	82	400	500	300
SF-130	50	180	30	160	750	880	418	599	53	108	83	400	500	300
SF-160	50	210	30	190	780	940	448	628.5	55	110	85	400	550	300
SF-200	50	250	30	230	825	1025	493	670	57	112	87	400	600	300
SF-300	50	350	30	330	925	1225	593	769	63	118	93	400	700	300
SF-400	50	450	30	430	1030	1430	698	870.5	68	123	98	400	800	300
SF-500	50	550	30	530	1130	1630	798	969.5	72	127	102	400	900	300
SF-600	50	650	30	630	1260	1860	903	1095.5	78	133	108	400	1000	350
SF-700	50	750	30	730	1360	1060	1003	1194.5	82	137	112	400	1100	350
SF-800	50	850	30	830	1515	2315	1108	1345.5	88	143	118	450	1200	350
SF-900	50	950	30	930	1615	2515	1208	1444.5	92	147	122	450	1300	350
SF-1000	50	1050	30	1030	2715	2715	1308	1543.5	95	152.5	125	450	1400	350



Rail Joint

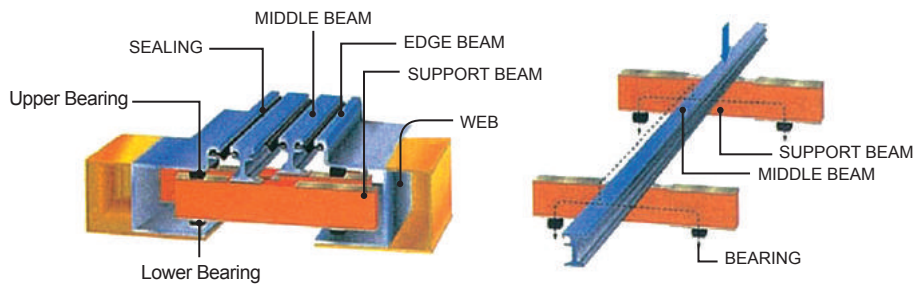


SPEC

TYPE	Expansion	Length(mm)
NO. 50		50 (± 25)
NO. 80		80 (± 40)
NO. 100		100 (± 50)
NO. 160		160 (± 80)
NO. 240		240 (± 120)
NO. 320		320 (± 160)
NO. 400		400 (± 200)
NO. 480		480 (± 240)

Rail Joint

Structure of Load Supporting Area



TRANSMITTING PROCESS OF LOAD

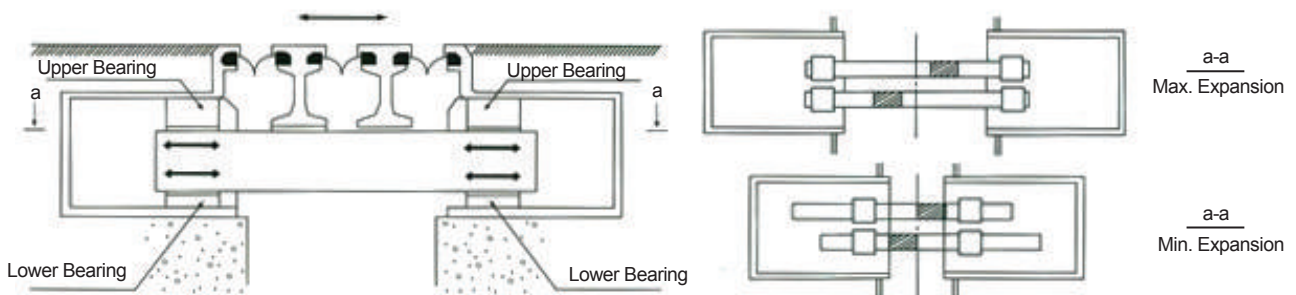
MIDDLE BEAM

SUPPORT BEAM

BEARING

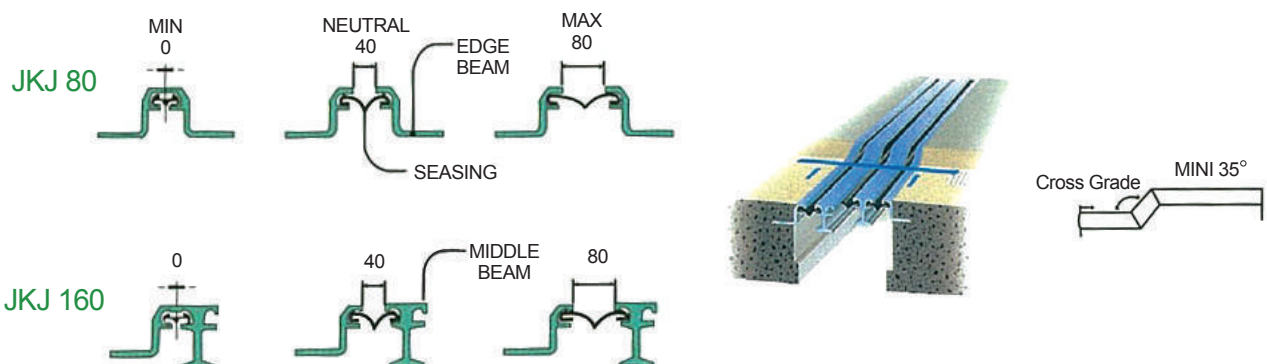
SLAB

Expansion



* Up-and-down action of expansion joint and bearing enables free expansion.

Watertightness

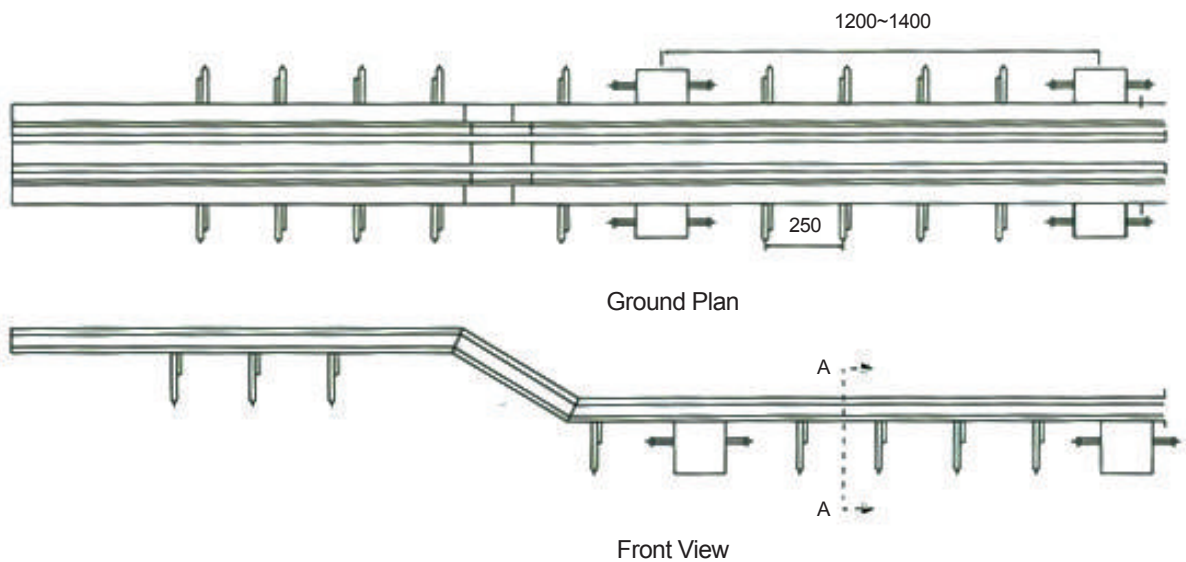


* Water-tight rubber, inserted into edge of beams, performs excellent watertightness.

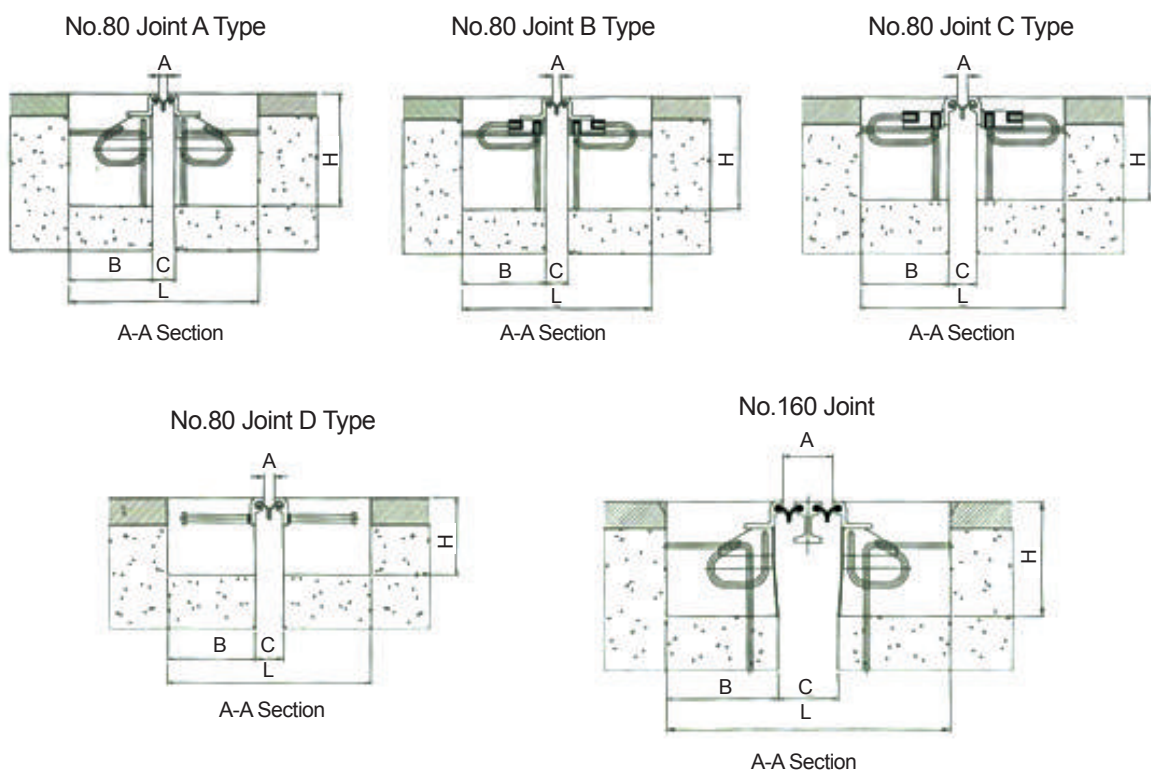
Rail Joint



Standard Drawing of Rail Joint



Standard Sectional Plan of Rail Joint



Rail Joint



Standard Dimensional Data of Rail Joint

NO	GAP(N)	Movement	A			B	C			H
			MIN	NEU	MAX		MIN	NEU	MAX	
80	1	80	0	40	80	300	0	40	80	300
100	1	100	0	50	100	300	0	50	100	300
160	2	160	80	160	240	350	110	190	270	380
240	3	240	160	280	400	440	190	310	430	400
320	4	320	240	400	560	520	270	430	590	420
400	5	400	320	520	720	650	350	550	750	470



Installation of Rail Joint



① Block-out Reinforcing Steel Bar

Check size of block-out and amount/location of reinforcing steel bars.



② Check temperature Decide Distance

Check temperature when joint installed and decide distance of Rail Joint.



③ Temporary Installation

Joints under No.100 can be transported by using anchor and joints over No.100 can be transported by temporary resources. And install joint temporarily.



④ Measuring Level Welding

Weld main body of joint and reinforcing steel bar, after measuring level precisely.



⑤ Deposit Concrete / Cure

Deposit concrete fully until no air gap left and put tapes on sealing area for no insertion of concrete.



⑥ Clean Road

Clean job site for good driving circumstance.



⑦ Installation Finished

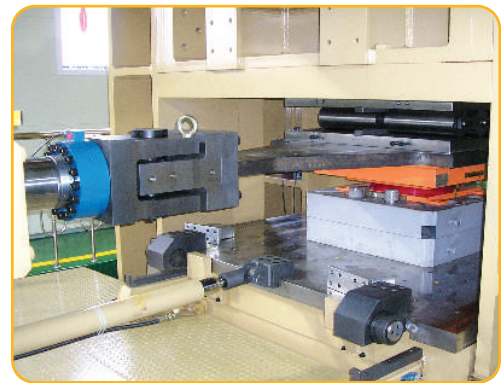
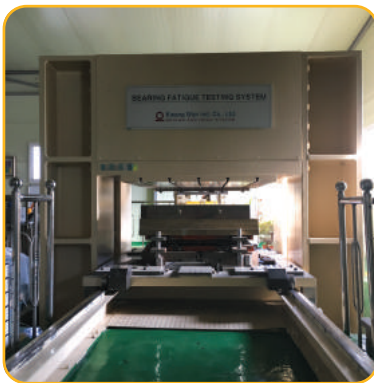
Introduction of Test Instruments

Resume

Test instrument is a compression shear apparatus for a performance test of pot bearing, elastomeric bearing and avoided seismic bearing and it is designed to test real situations which can happen on the bridge. With these instruments, we can test the performance of various types of bearings, by loading the actual vertical / horizontal load of behaviors at usual times according to vibration of bridge & temperature change and behaviors at earthquake.

Testers

Bearing Fatigue Testing System (Tester1)



Specification of Tester 1

TEST TYPES	COMPRESSION, SHEAR, DYNAMIC
Vertical Force	20,000 kN
Vertical Stroke	200 mm
Horizontal Force	1,500 kN
Horizontal Stroke	250 mm
Horizontal Speed	Max. ± 130 mm/sec
Test Space Range	2000 \times 2000 \times 800 mm
Test Item	Spherical, POT, PAD, DISK, LRB, EQS

Load Test Mechine (Tester 2)



Specification of Tester 2

TEST TYPES	COMPRESSION, SHEAR
Vertical Force	25,000 kN
Vertical Stroke	150 mm
Horizontal Force	9,000 kN
Horizontal Stroke	300 mm
Test Space Range	1100 \times 1100 \times 650 mm
Test Item	Spherical, POT, PAD, DISK

Introduction of Test Instruments

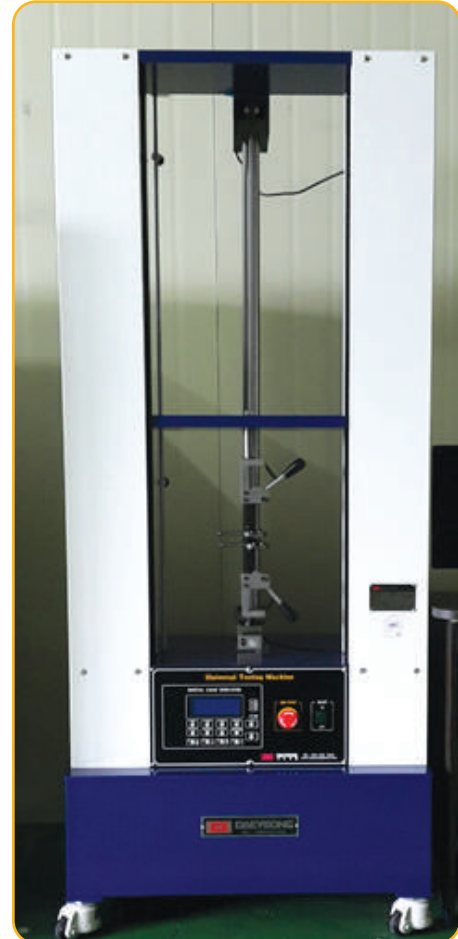
» Testers



Universal Test Machine



Reho Meter



Tensile / Bond Strength Tester



Ageing Test Chamber



Low Temperature Chamber



Ozone resist examination Chamber



PRODUCTS

DIVIDED SPHERICAL BEARING / ADVANCED SPHERICAL BEARING / DYNAMIC SPHERICAL BEARING
ANTI-SEISMIC SPHERICAL BEARING / POT BEARING / POT BEARING WITH ANTI - BRIDGE DEVICE
PIN & PIVOT BEARING / DISKTRON BEARING / ERADIQUAKE SYSTEM(EQS) / ISO POT BEARING
LEAD RUBBER BEARING(LRB) / SHOCK TRANSMISSION UNIT(STU) / EXPANSION JOINT
ALUMINIUM CIVIL PRODUCTS / BRIDGE SAFETY INSPECTION RAIL / GUARD RAIL / PENDULUM/DAMPER



Productive Management
Technical Development

